



Tennessee Valley Authority, 714 Swan Pond Road Trailer Park, Harriman, Tennessee 37748

February 20, 2009

Mr. Chuck Head, Director  
Division of Land Uses  
Tennessee Department of Environment and Conservation  
5<sup>th</sup> Floor, L&C Annex  
401 Church Street  
Nashville, Tennessee 37402

TENNESSEE VALLEY AUTHORITY (TVA), KINGSTON FOSSIL PLANT (KIF) – COMMISSIONER'S ORDER, CASE NUMBER OGC09-0001 – REQUEST FOR USE OF WICK DRAINS IN ASH PROCESSING AREA

Dear Mr. Head:

The Commissioner's Order, Section VIII.1, directs TVA to implement measures to prevent the movement of ash into waters of the State, as well as prevent its migration downstream in the river. To that end, TVA is submitting this request to install wick drains in the Ash Processing Area. Our consultants, Geosyntec Consultants, have identified the use of prefabricated vertical drains (i.e., PVDs or wick drains) to improve stability of temporary ash storage. Enclosed is an executive summary of wick drains and their implementation. Also enclosed are a sketch of a typical wick drain and a figure of the proposed instrumentation that will be installed in the Ash Processing Area. The enclosed summary has been reviewed by AECOM, TVA's Root Cause Analysis consultant. TVA would like to begin installing the wick drains on February 26, 2009. We will not increase the maximum temporary storage height of eight feet in the Ash Processing Area until further stability analysis verifying the safety of increasing the stack height is presented to TDEC for your review and approval.

TVA appreciates your expeditious review of this request.

If you have any questions, please contact me at (423) 871-1666 or by e-mail at [cmanderson@tva.gov](mailto:cmanderson@tva.gov). If I am not available, please contact John Dizer at (423) 751-7636 or by e-mail at [jedizer@tva.gov](mailto:jedizer@tva.gov).

Sincerely,

A handwritten signature in black ink that reads "Cynthia M. Anderson".

Cynthia M. Anderson  
Manager, Water and Waste Programs  
Environmental Permitting and Compliance

Mr. Chuck Head  
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CMA:DJC  
Enclosures

cc (Enclosures):

Bradley Bishop  
U. S. Army Corps of Engineers Regulatory Branch  
3701 Bell Road  
Nashville, TN 37214-2660

Paul Davis  
TDEC, Division of Water Pollution Control  
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A. A. Ray, WT 11A-K  
G. R. Signer, WT 6A-K  
R. T. Hope, KFP 1T-KST  
KIF Incident Document Control  
EDMS, WT CA-K

Paul Sloan, TDEC, Deputy Commissioner  
1<sup>st</sup> Floor, L&C Annex  
401 Church Street  
Nashville, TN 37402

Tom Welborn, Chief  
EPA Region 4  
61 Forsyth Street, SW  
Atlanta, GA 30303

## Executive Summary

Proposed Procedures for Construction, Operation, and Performance Monitoring  
Ball Field Temporary Ash Disposal Site  
Kingston Fossil Plant, Harriman, TN

### Objective

- Proposes to utilize a portion of KIF (i.e., Ball Field site (Site)) for the temporary storage of dewatered fly ash.
- Ash will be excavated and collected from the Emory River, the Swan Pond Creek Embayment, and other areas in and around the KIF.
- Site is triangular in plan view and comprises approximately 40 acres.
- Technical Summary Report will be prepared to provide the anticipated subsurface conditions at Site, development and construction activities (including environmental protection components), operating guidelines during temporary ash placement, and monitoring activities to assure integrity of the temporary disposal area and to control ash disposal activities.
- Executive Summary and Technical Summary will be presented to Mr. William Walton, P.E., of AECOM and to personnel from the Tennessee Department of Environment and Conservation (TDEC) for review, concurrence, and comment..

### Anticipated Site and Subsurface Conditions

- Anticipated subsurface conditions at the Site is summarized as follows (from top to bottom):
  - 8- to 10-ft thick crust layer of relatively dense fly ash and bottom ash;
  - 30- to 50-ft thick layer of soft fly ash with local thin zones of bottom ash;
  - 20- to 30-ft thick layer of relatively soft alluvium; and
  - bedrock.
- Groundwater surface is typically located within or near the base of the crust layer.
- Ground surface is generally flat and vegetated with grass, except in areas where isolated excavated ash stockpiles have previously been placed.

### Proposed Construction

- Proposed development and construction activities within the Site are directed towards providing a stable foundation area across the entire Site that will support: (i) construction and operation of an Ash Processing Area; and (ii) construction and operation of the Temporary Ash Disposal Area.
- Construction activities will be completed by (or subcontracted by) TVA.
- After construction, the Site will be operated and maintained by TVA contractor.
- Proposed Site development and construction activities are anticipated to include:
  - local re-grading of the Site to provide access across the Site and to facilitate construction of a “demarcation layer;”
  - construction of demarcation layer comprising (top to bottom) of non-woven geotextile, #4 or #57 stone, woven geotextile;
  - installation of prefabricated vertical drains (i.e., PVDs or wick drains) on likely 7 to 12 foot centers to expedite consolidation of the underlying ash and alluvium;

- PVDs can be fully penetrating through ash and into top of alluvium and not pose adverse impact to groundwater due to consolidation of the underlying alluvium and reduced infiltration through temporarily placed dewatered ash due to thickness and surface grading to control stormwater; or
- PVDs can be partially penetrating to terminate within 10 to 20 feet of the alluvium and eliminate potential for direct vertical conduit to the alluvium.
- Difference in these options is only the calculated time rate of consolidation and strength gain in the lowest reaches of the foundation materials at Site.
- placement of approximately 8-ft thick working platform for the Ash Processing Area within approximately 250 feet each side of the existing sluice channel.
  - working platform graded to promote drainage of dewatered effluent towards the sluice channel.

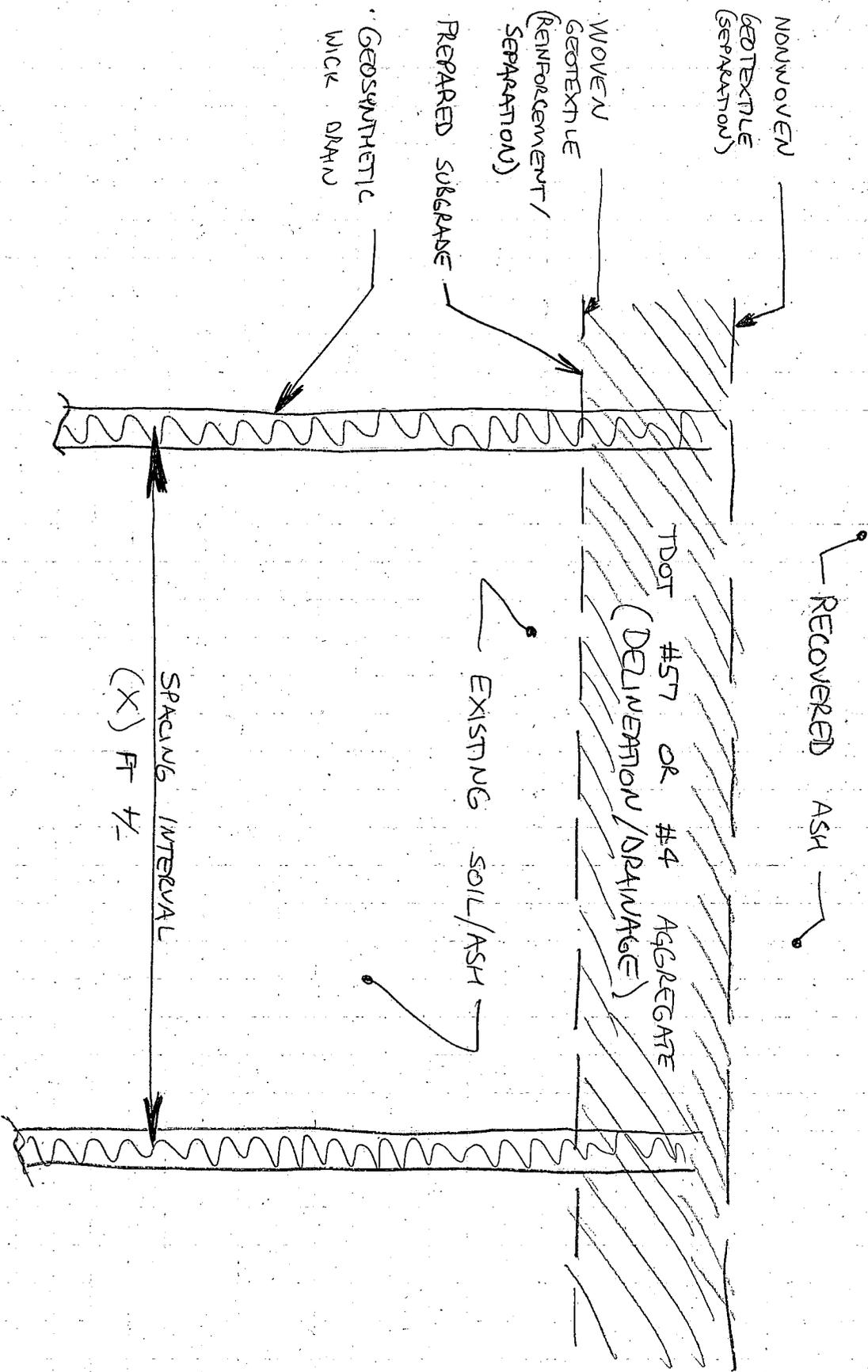
#### Proposed Operation of Temporary Ash Disposal Area

- TVA contractor to develop an Operating and Ash Management Plan that includes mechanically dredging ash from the sluice channel and processing on the Ash Processing Area platform.
- Dredged ash will be managed in stockpiles and windrows within the Ash Processing Area until material is sufficiently dry (e.g., >50% solids) to allow excavation, loading, hauling, and placement of the dewatered ash within the constructed Temporary Ash Disposal Area.
- At discretion of TVA, dewatered ash that is excavated from other areas of the KIF may be placed within the Temporary Ash Disposal Area.
- Perimeter berms and ditches will be utilized within the Ash Processing Area to control stormwater and to facilitate diversion back to the sluice channel.
- Dewatered ash will be placed in controlled lifts and compaction to assure stability.
  - lift thickness and placement rate will be controlled by results from monitoring plan (subsequently discussed);
- Lifts of the compacted dewatered ash will be graded to divert stormwater to perimeter ditches that will in turn be graded to divert stormwater to the sluice channel (or other controlled sump or outlet).

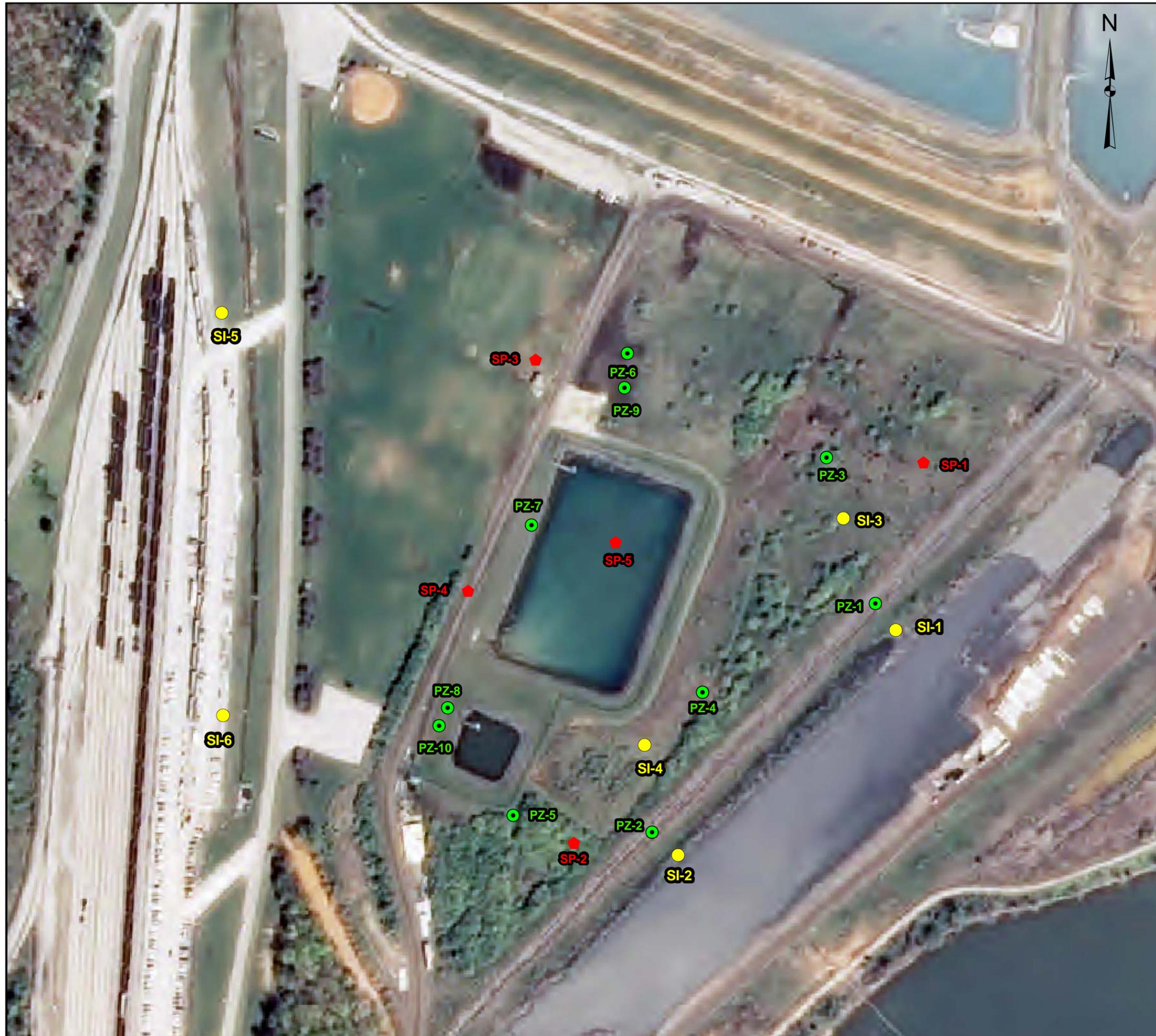
#### Proposed Performance Monitoring Plan

- Instrumentation will be utilized to control placement of the dewatered ash to assure stability and to monitor consolidation of the foundation ash and alluvium.
- Instrumentation is anticipated to include piezometers, settlement plates, and slope inclinometers, as follows:
  - Piezometers (low-displacement piezoelectric, strain gage, or vibrating wire) will be used to monitor pore pressures in ash and alluvium
    - two piezometers in ash adjacent to the sluice channel;

- two piezometers in ash and one piezometer in alluvium behind Ash Processing Area platform; and
    - three piezometers in ash and two piezometers in alluvium within the Temporary Ash Storage Area.
  - Slope Inclinerometers (conventional tiltmeters manually deployed using grooved casing or MEMS-based units) will be anchored below alluvium stratum and used to monitor lateral spreading and provide early warning of potential slope instability
    - two slope inclinometers adjacent to sluice channel;
    - two slope inclinometers behind Ash Processing Area platform; and
    - two slope inclinometers adjacent to the railroad.
  - Settlement plates (simple vertical standpipes or electronic/hydraulic settlement gages) will be used to monitor vertical time rate and magnitude of settlement
    - two settlement plates within the Ash Processing Area
    - three settlement plates within the Temporary Ash Storage Area
- Instrumentation network will be installed after installation of the PVDs and prior to any ash placement/construction activities.
- Monitoring program will be developed to establish baseline information and then to read, report, and plot all instruments on a daily basis for at least two weeks after significant construction is initiated in a given area to establish response of the foundation materials, particularly in the initial phases of development..
- Monitoring program may be subsequently reduced depending on instrumentation response and actual dewatered ash placement rate, but not anticipated to be less frequent than: (i) piezometers on a daily basis, (ii) slope inclinometers at a frequency of two times per week, and (iii) settlement plates at a frequency of two times per week.
- Monitoring program will include daily reports of dewatered ash production and placement activities, including location of fill placement, fill height, etc.
- Web-based instrumentation reporting system will be developed and reviewed/updated daily for review by TVA, TDEC, AECOM, and other project personnel.
- Final details of the monitoring plan will be developed prior to construction initiation using slope stability and settlement calculation results when these analyses are completed utilizing actual laboratory and field testing results (when these data are available).



TYPICAL SECTION - WICK DRAIN  
 (MIS)

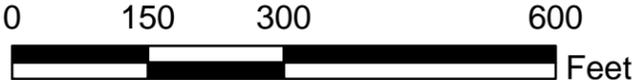


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Piezometer No.	Material to be Monitored
PZ-1	Foundation Ash
PZ-2	Foundation Ash
PZ-3	Foundation Ash
PZ-4	Alluvium
PZ-5	Foundation Ash
PZ-6	Ash to be Stored
PZ-7	Ash to be Stored
PZ-8	Ash to be Stored
PZ-9	Alluvium
PZ-10	Alluvium

**Legend**

- Proposed Piezometer
- Proposed Slope Inclinometer
- ◆ Proposed Settlement Plate



<b>PROPOSED INSTRUMENTATION PLAN</b>		
<b>TVA Kingston Fossil Plant</b>		
		Figure 1
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