

Tennessee Valley Authority
Regulatory Submittal for Kingston Fossil Plant

Documents submitted:
Swan Pond Embayment Sampling Plan

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Swan Pond Embayment Sampling Plan

Surface water flows from the surrounding topography into Swan Pond Embayment and eventually to the Emory River. The water from Swan Pond Embayment is discharged through culverts at two locations: Dike 2 and the East Embayment (see figure). The water from the culverts eventually enters the Emory River right where the largest portion of the released ash entered the river and blocked the main channel. Currently the water flows over and through the ash and through a culvert under Dike 2 or through a channel from the East Embayment directly to the Emory River. An interim drainage plan is being constructed that will separate the clean water from the dirty water west of Dike 2 and send the water in contact with ash through a series of surface water settling basins to allow the solids to settle out of the water prior to discharge into the clean water system and eventual discharge from Swan Pond Embayment. Clean water is defined as surface runoff water that does not come in contact with the ash. The primary means of separating clean from dirty water in the East Embayment is through removal of the ash.

Historical Sampling Results

A surface water sample was collected from the culvert through Dike 2 on April 27, 2009 and analyzed for total metals, dissolved metals, pH, total dissolved solids, and total suspended solids. The results from the April 27 sampling event will be included with the data generated during the execution of this plan. The total arsenic value was 0.05 mg/L (dissolved was 0.014 mg/L) while the total and dissolved selenium values were just at the 0.002 mg/L detection limit. Total suspended solids were 660 mg/L. Flow measurements at the sampling location were not collected during the April 27 sampling event.

Sampling Plan

Sample Locations and Frequency

The purpose of this sampling plan is to evaluate the quality and flow of the water entering the Emory River from Swan Pond Embayment during construction. The sampling will initially be performed at two locations where the flow is channeled through corrugated pipe that are functioning while construction on the interim drainage system is ongoing. The first location is where two galvanized steel, corrugated pipes flow beneath Dike 2. The sampling at Dike 2 will be performed on the upgradient side of the dike. Samples at this location are indicative of water quality during construction and not of the eventual water quality when the requirements of the interim drainage plan are in place. The second location is identified as the East Embayment, where one high-density polyethylene (HDPE) pipe flows beneath a constructed gravel road. The sampling at the East Embayment will be performed on the down-gradient side of the HDPE pipe. Likewise, the results from these samples only represent water quality conditions until the clean water is rerouted and the ash is removed.

Sampling shall be performed daily for a two week period (excluding weekends). Emphasis will be focused on sampling following storm events. If reverse flow is observed at the East Embayment sampling location, no sample will be collected at that location. The Dike 2 sampling location will be discontinued once the Dike 2 ditch is diverted into the settling basins currently under construction. At that time, the sampling location will be moved to the discharge from the settling basins. A new point will be added in the clean water ditch, after the discharge from the settling basins to represent the quality of the water discharging to the river. Sampling will continue at the East Embayment until the ash is removed from this area.

After 2 weeks of daily sample collection, the sampling effort will be reduced to two times a week and after every storm event with a greater than 0.5 in rain fall at the site in 24 hours.

Flow Determination

During sampling activities, the flow at each sampling location shall be determined to provide a basis for estimating mass flow out of the embayment area. The flow velocity will be measured

Shortcut to jacobs on knxpgfp16.lnk through the corrugated discharge pipes, which have a known diameter, by using a hand-held flow velocity meter. The cross sectional area of flow will be estimated in the field using tape measures or visual observations. The flow shall then be calculated by the following formula:

Area – cross-sectional area of flow (square feet)

Velocity is measured

Flow rate = area x velocity

Sampling Procedure

After the flow measurements are collected, surface water samples will be collected at each location. Previously established surface water sampling techniques will be employed when collecting the discharge samples. Samples will be collected from the bank adjacent to the sampling location; therefore it is recommended that a pole dipper be used for sample collection. The collected samples are from the surface. Sampling will be performed according to the general procedure described below.

- Securely attach an unpreserved collection bottle or decontaminated dipper to the end of a pole dipper, if needed. Otherwise, if access is good, no dipper is needed.
- The sampler should position himself/herself on the edge of the embankment in a safe manner as to not slip or fall into the water. A second individual should act as a health and safety watch.
- Gently dip the unpreserved bottle into the surface water.
- Take care to avoid collecting cenospheres in the sample collection bottle and avoid disturbing sediment/ash from the bottom of the ditch or pipe.
- For the total metals analysis and for the TSS analysis, transfer the sample from the collection bottle to the laboratory-provided bottles by pouring the water into the certified-clean bottleware. Use of a peristaltic pump is also an acceptable means to transfer the sample.
- For the dissolved metals analysis, the sample should be transferred from the pole dipper bottle to the preserved bottle by means of a peristaltic pump with an in-line 0.45-micron filter. Either dedicated or new tubing should be used with the peristaltic pump.
- The collected samples should be labeled and placed immediately on ice (as required for these analysis) for shipment to the laboratory under proper chain-of-custody.

Analytical Parameters

The collected samples will be submitted to TestAmerica Laboratories in Nashville, Tennessee and analyzed for the parameters listed on Table 1. Expedited turn-around (24-hour) will be requested for TSS samples to provide immediate information to allow for correlation with site conditions such as rainfall to better understand how the system is responding and to answer external questions about water quality as quickly as possible.

Table 1 - Analytes and Methods for Surface Water Analysis

Test Parameter	Test Method
Basic Water Chemistry	
Total Suspended Solids (TSS)	160.2/SM 2540B
Metals – Total and Dissolved	
Aluminum	6010B/6020/200.7/200.8
Antimony	6010B/6020/200.7/200.8
Arsenic	6010B/6020/200.7/200.8
Barium	6010B/6020/200.7/200.8
Beryllium	6010B/6020/200.7/200.8
Boron	6010B/6020/200.7/200.8
Cadmium	6010B/6020/200.7/200.8
Calcium	6010B/6020/200.7/200.8
Chromium	6010B/6020/200.7/200.8
Cobalt	6010B/6020/200.7/200.8
Copper	6010B/6020/200.7/200.8
Iron	6010B/6020/200.7/200.8
Lead	6010B/6020/200.7/200.8
Magnesium	6010B/6020/200.7/200.8
Manganese	6010B/6020/200.7/200.8
Mercury	7470/245.1
Molybdenum	6010B/6020/200.7/200.8
Nickel	6010B/6020/200.7/200.8
Potassium	6010B/6020/200.7/200.8
Selenium	6010B/6020/200.7/200.8
Silver	6010B/6020/200.7/200.8
Sodium	6010B/6020/200.7/200.8
Thallium	6010B/6020/200.7/200.8
Vanadium	6010B/6020/200.7/200.8
Zinc	6010B/6020/200.7/200.8

The collected samples will be identified according to the following naming convention:

KIF-DIKE2-SW-mmddy (for Dike 2 discharge)

KIF-SETTB-SW-mmddy (for settling basin discharge)

KIF-EEMBAY-SW-mmddy (for East Embayment discharge)

KIF-CWDITCH-SW-mmddy (for Clean Water Ditch)

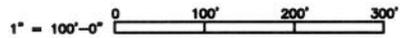
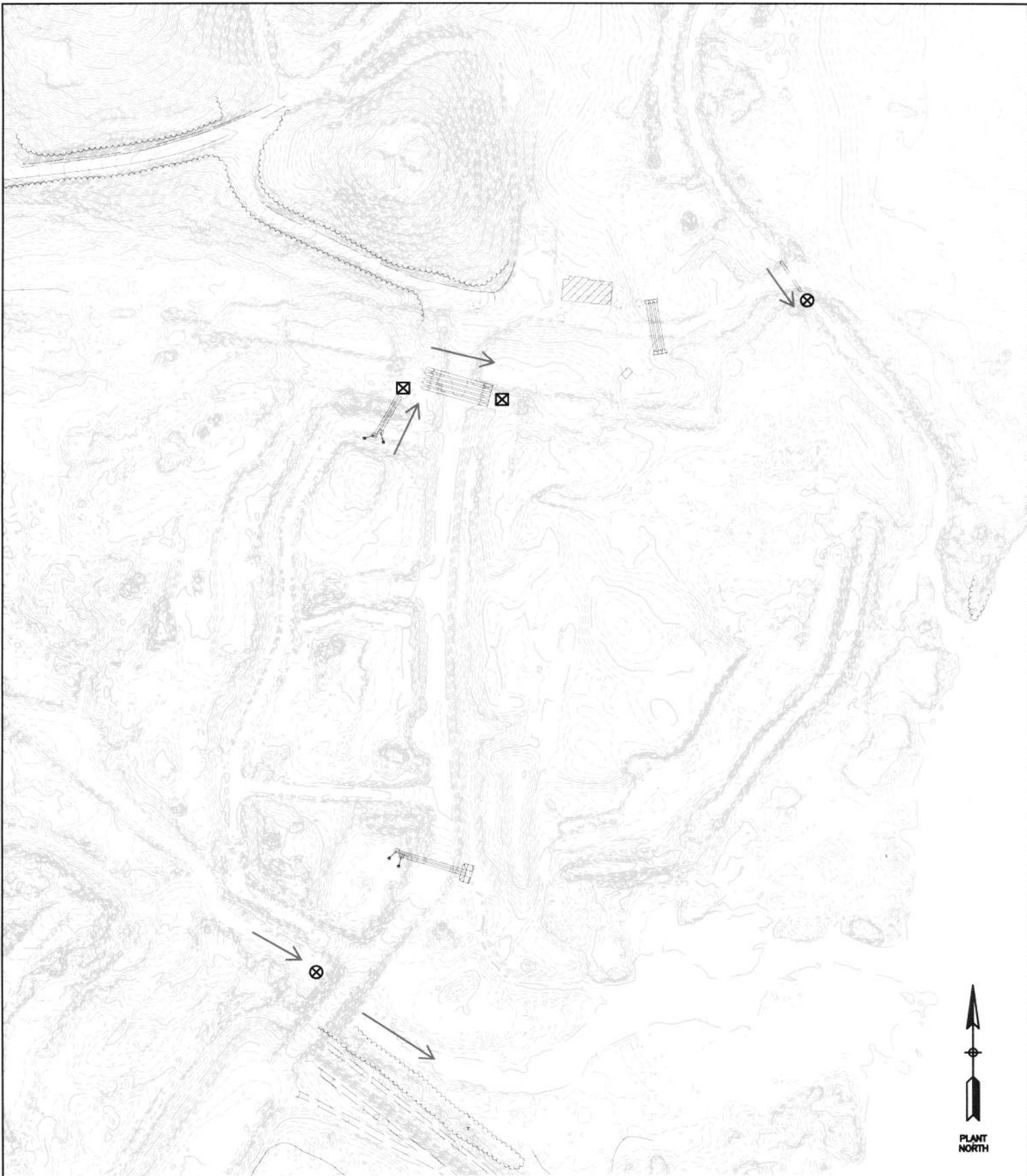
QA/QC Samples

The QAPP for the Phase 1 Dredge Plan details the following QA/QC sampling requirements.

- Duplicates: Collect a duplicate sample for every 10 investigative samples collected. A duplicate will be required for every week of initial sampling but will be reduced appropriately thereafter.
- Field Blanks: Collect one field blank for every day of sampling.
- MS/MSD: Collect one MS/MSD for every 10 samples collected. An MS/MSD sample will be required for every week of initial sampling but will be reduced appropriately thereafter.

Data Compilation and Reporting

The analytical results will be generated as both hard copy and electronic data deliverable (EDD) by TestAmerica. The EDD will be downloaded into EQUIS[®]. EQUIS[®] will be used to generate tabulated data for review and analysis. This data will not be used for risk assessment so data validation is not required.



LEGEND

- ⊗ MONITORING POINT
- ⊠ FUTURE MONITORING POINT

JACOBS
KINGSTON FOSSIL PLANT TENNESSE VALLEY AUTHORITY
SAMPLING LOCATIONS