STANDARD OPERATING PROCEDURE FOR:

AQUATIC SNAIL SAMPLING

TVA-KIF-SOP-30

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1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to describe the methods for collecting aquatic snails relative to the Kingston Fossil Plant (KIF) Ash Recovery Project and reference locations for analysis of contaminant exposure; that appropriate documentation is maintained; and that samples are properly handled to ensure their integrity.

2.0 GENERAL CONSIDERATIONS

Potential hazards associated with the planned tasks are thoroughly evaluated prior to conducting field activities. The *Site-Wide Safety and Health Plan* (SWSHP) provides a description of potential hazards and associated safety and control measures.

Sampling personnel must wear powder-free nitrile gloves while performing the procedures described in this SOP. Specifically, powder-free nitrile gloves are worn while preparing sample bottleware, preparing and decontaminating sampling equipment, collecting samples, and packing samples. At a minimum, nitrile gloves are changed prior to the collection of each sample, or as necessary to prevent the possibility of cross-contamination with the sample, the sample bottleware, or the sampling equipment.

Field sampling equipment that may come in contact with snails that have been collected is decontaminated in accordance with *Decontamination of Equipment* SOP (TVA-KIF-SOP-08) procedures prior to use.

Because snails inhabit solid substrates that are normally found along shallow shorelines, it may be possible and even desirable to collect snails while wading. If personnel wade while collecting snails, they wear appropriate wading and personal protective gear (such as waders with boots having non-slip soles and life jacket, if necessary) and are aware that water depth can change suddenly. In most instances in large bodies of water, sites are accessed with a motorized boat, and snails are collected without having to exit the boat. Because use of a motorized boat may be required during collection of snails, personnel working from or operating a boat are properly trained on boat safety and operation. Additionally, a Float Plan is completed prior to traveling anywhere on a water vessel. A Float Plan includes a description of the water vessel, specifies who is on board, provides a description of the safety equipment being carried, and indicates destination and expected time of return.

3.0 PROCEDURES

The following sections describe the procedures for collecting aquatic snails from a boat. Any variation in these procedures must be approved by the Project Manager and Quality Assurance/Quality Control (QA/QC) Lead and must be fully documented. Field work cannot progress until deviations are approved or resolved.

3.1 Pre-Job Preparation

The Project Manager is responsible for overall implementation of this procedure and ensuring that it complies with current regulations and standards as these are subject to change. The Project Manager is also responsible for the following activities.

a. Coordination with appropriate regulatory agencies to ensure that appropriate documentation and/or permits are obtained.

b. Review project work control documents including the SWSHP, *Quality Assurance Project Plan* (TVA-KIF-QAPP), and appropriate SOPs to determine appropriate field protocols.

c. Develop a Sampling and Analysis Plan (SAP) that ensures project objectives are met including sample type (individual animal, composite), sample size (necessary biomass/volume of material needed and number of specimens needed to meet those requirements), number of replicates, and sample locations (transects, random, stratified).

d. Identify approximate sample-station locations. If necessary, make a reconnaissance visit of perspective sampling locations to evaluate their suitability.

e. Obtain legal right-of-entry from appropriate landowners and jurisdictions as needed.

f. Discuss project objectives and potential hazards with project personnel.

g. Coordinate with Field Team Leader to ensure that appropriate field equipment and safety gear are available.

h. Identify appropriate laboratories to perform analysis and confirm that they have been contacted and are prepared to receive the samples.

i. Make sure that all training requirements and needs have been identified and that project personnel complete the necessary training.

3.2 Field Preparation

The Field Team Leader is responsible for implementation of the field collection process. The Field Team Leader ensures that samples are safely collected, that decontamination protocols are used to maintain sample integrity, and that the associated data are accurate and well-documented. The Field Team Leader is also responsible for the following activities:

a. Gather equipment necessary for completing the collection and sampling activities (refer to example checklist provided in Table 1.).

b. Provide a summary of potential hazards and appropriate safety equipment to the field sampling team.

c. Ensure that QA/QC protocols are followed.

d. Maintain documentation of field activities and Chain-of-Custody (COC) records in accordance with the *Field Documentation* SOP (TVA-KIF-SOP-06).

3.3 Snail Collection

Snails normally inhabit shallow rocky or stable wooden structures along the shore line where they feed on periphyton (complex mixture of algae and other microorganisms) growing on the structures. Snails are located visually and collected by hand. Use of polarized sunglasses may aid in locating snails.

a. Upon arrival at a collection site, conduct a visual search for snails.

b. As snails are observed, collect them by carefully leaning over the side of the boat and removing them by hand.

c. After verifying that a snail is alive, place the snail in a pre-labeled sample jar or clean tray filled with water from the site.

d. Verify that each jar label includes site (location) name, date and time, sample replicate number, name of collector(s), and unique sample identification number.

e. After collecting the pre-determined number of snails (refer to Section 3.1.c), transfer snails from the clean tray to the labeled sample jar. Replace the water in the sample jar with fresh water from the collection site, place the lid on the jar, and then place the jar in a cooler of ice.

f. Obtain geographic coordinates with a portable GPS unit at each sampling location.

g. Record the site name, date and time, GPS coordinates, names of sample team members, visual observations of general site conditions/characteristics in a field logbook.

h. Repeat steps (a) through (g) for each sample replicate at each sample site.

i. If time is available before leaving a sample site, remove silt and algae that are present on the outer surface of the snail shell by scrubbing them with a clean stiff nylon brush and rinsing them with water from the site.

Note: Because this step requires more extensive handling of the snails, a new pair of nitrile gloves will be worn.

j. After scrubbing and rinsing the snails, replace the water in the sample jar with fresh water from the collection site and place the lid on the labeled sample jar. Place the labeled sample jar in the ice cooler and return the live snails to the laboratory to complete processing per Oak Ridge National Laboratory's (ORNL's) *Laboratory Procedures—Preparation of Invertebrates for Contaminant Analysis* SOP (BAA-SOP-06).

3.4 Field Logbook Documentation

Field logbooks to record daily activities, including sample collection and tracking information, are maintained by the Field Team Leader. Information is entered into the field logbook by the appropriate field team member using waterproof ink. In addition to the minimum requirements discussed in the *Field Documentation* SOP (TVA-KIF-SOP-06), the field logbooks document those collection and sampling characteristics specific to this SOP and as defined in the applicable project work control documents.

The Field Team Leader and/or designee reviews the field logbook entries on a weekly basis at a minimum (daily review is preferred) for completeness and accuracy and indicates this review by initialing the entries. The Field Team Leader is also responsible for the completion of all required data collection forms.

3.5 Sample Labeling and Sealing

Samples will be labeled and custody sealed in accordance with the *Sample Labeling, Packing, and Shipping* SOP (TVA-KIF-SOP-07).

4.0 REFERENCES

- Oak Ridge National Laboratory (ORNL). *Laboratory Procedures—Preparation of Invertebrates for Contaminant Analysis* SOP (BAA-SOP-06), 2009.
- Tennessee Valley Authority (TVA). *Decontamination of Equipment* SOP (TVA-KIF-SOP-08), 2010.
- TVA. *Field Documentation* SOP (TVA-KIF-SOP-06), 2009.

- TVA. *Site-Wide Safety and Health Plan for the TVA Kingston Fossil Plant Ash Release Response* (SWSHP), 2010.
- TVA. *Quality Assurance Project Plan for the Tennessee Valley Authority Kingston Ash Recovery Project* (TVA-KIF-QAPP), December 18, 2009.
- TVA. *Sample Labeling, Packing, and Shipping* SOP (TVA-KIF-SOP-07), 2009.
- U. S. Environmental Protection Agency (EPA). *Test Methods for Evaluating Solid Waste*, SW-846, Washington, DC, http://www.epa.gov/waste/hazard/testmethods/sw846/online/index.htm, 2007.

Table 1. Suggested Aquatic Snail Sampling Equipment and Material Checklist	
Item Description	**Check (or NA)**
Health & Safety	
Motorized boat of sufficient capacity to carry field gear and up to 3 passengers	
U.S. Coast Guard-approved life jackets (1 per passenger)	
U.S. Coast Guard-approved boat cushion (at least 1)	
Paddles (at least 2)	
Waders	
Hard hat (if working in construction zone)	
Field first-aid kit	
Reflective safety vest (if working in construction zone)	
Paperwork	
Field logbook and pen with indelible ink	
Chain-of-Custody forms (if samples will be changing custody from original collector)	
Custody seals (if samples will change custody using a secondary carrier)	
Sampling Equipment	
Forceps, ~5 inches long (plastic, plastic or Teflon coated, or stainless steel)[1]	
Glass sample containers (16-oz or larger)[1]	
Clean plastic or stainless steel pans (1 or more)[1]	
Sample labels	
Permanent markers	
5-gal plastic carboy filled with distilled water[1]	
Clean plastic squirt bottle for dispensing distilled water[1]	
Sufficient cooler capacity to hold ice and all sample containers	
Disposable nitrile gloves	
Polarized sunglasses	
Liqui-Nox® or other phosphate-free detergent	
Stiff nylon-bristled brushes (e.g., tooth brush; a minimum of 1 per site) [1]	
Global positioning system (GPS) unit and spare batteries	
Digital camera	

[1]If these items cannot be certified as contaminant-free, they must be cleaned per *Decontamination of Equipment* SOP (TVA-KIF-SOP-08).

End of Procedure