

SECTION 8.6

AIR SAMPLING

1.0 Purpose

To describe the procedures for sampling airborne radioactive materials.

2.0 Responsibility

- The site coordinator is responsible for assuring that this procedure is implemented.
- Survey team personnel are responsible for following this procedure.

3.0 Procedure

3.1 Equipment

- ✓ Commercial air sampler (HIVOL, Atomics, Andersen, etc.).
- ✓ Velometer or inclined manometer and Pitot tube.
- ✓ Sampling apparatus: pumps, pump housings, rotameter nozzles, tygon tubing, filters, filter housings, metal plates, probes, bubblers etc., as required.
- ✓ Petri dishes or other small containers.
- ✓ Tweezers.
- ✓ Masking tape, teflon tape.
- ✓ Record forms and/or log book.
- ✓ Thermometer.
- ✓ Cleaning equipment.
- ✓ Drill and appropriate size hole saw.

3.2 Sample Collection

The following describes the techniques, methods and considerations generally applicable to air monitoring surveys. Because specific procedures will depend upon many site conditions and parameters, this section should be viewed primarily as

providing guidance to program personnel for planning purposes. Site specific procedures will be described in detail in survey plans.

3.2.1 Stack Sampling

- 3.2.1.1 Select a location in the stack for insertion of sampling probe. The optimum location to obtain isokinetic flow is a minimum of 8 stack diameters downstream and 2 diameters upstream from any transitions or bends in the stack. However, stack design may not allow the choice of sampling location by this criteria.

NOTE: For certain facilities it may be necessary to use already existing probes or access points.

- 3.2.1.2 Drill (or hole saw) two 4 cm diameter access holes in the stack wall. These holes should be at approximately 90° angles to each other. Additional access holes may be required for stacks exceeding 0.75 m in diameter.

- 3.2.1.3 Using a Pitot tube and Alnor velometer or inclined manometer, perform duct traverses to determine the velocity distribution. Locations of measurements are in accordance with EPA Standard Method #1 as determined using the Stack Velocity Worksheet (Figure B-18 or equivalent). A minimum of 12 points are required for diameters > 0.61 m; 8 are required for diameters between 0.30-0.61m. Record all measurements.

- 3.2.1.4 Measure temperature and, if appropriate, moisture content of stack gases.

- 3.2.1.5 Calculate appropriate nozzle diameter sizes and flow rates for isokinetic sampling, using the Stack Sampling Rate Worksheet (Figure B-19 or equivalent). Nominal sampling rates will be determined by the sample collection system design; these rates typically range from 5 to 30 L/min.

NOTE: The collection system selected will be specific for the stack conditions and contaminants of interest. Because of the wide variety of possibilities which may be encountered, there is no attempt in this procedure to address specific or individual systems. Such matters are addressed in detail in site specific survey plans.

- 3.2.1.6 Attach nozzles and secure plates to probe tubes.

- 3.2.1.7 Adjust nozzle location (sample tip to plate assembly distance) to the desired sampling position.
- 3.2.1.8 Insert nozzle the appropriate measured distance into stack with nozzle opening in direct alignment with stack air flow.
- 3.2.1.9 Secure metal plates against stacks with rope or bungee cords.
- 3.2.1.10 Place one probe at a fixed location, usually in the same approximate location as the site's sample probe; reposition a second probe periodically to various predetermined sampling locations within the stack.
- 3.2.1.11 Start pump and adjust needle valves to obtain the desired flow rate.
- 3.2.1.12 Test system for leakage by blocking intake or pinching hose near intake. If flow rate does not drop to <10% of the initial (unblocked) rate, re-check and tighten connections and components until the system is leak tight.
- 3.2.1.13 Note and record starting time and flow.
- 3.2.1.14 During initial sampling, periodically (every 2-4 hours) check the system to assure that the desired sampling rate is being maintained. Make flow rate adjustments or changes in collection system as necessary. Record on the Stack Sampling Record Form (Figure B-20 or equivalent).
- 3.2.1.15 Turn pump off at the previously determined time. Record final time and flow rate.
- 3.2.1.16 Transfer sample collection media to appropriate containers and label in accordance with Section 8.15 and the chain-of-custody procedures in Section 8.16. Record pertinent information on the Chain-of-Custody Form (Figure B-16 or equivalent).
- 3.2.1.17 Clean equipment before initiating further sampling.
- 3.2.1.18 When sampling is complete, remove probe assemblies, and insert expansion plug into stack access hole, if appropriate.

3.3 Sampling Ambient Air

- 3.3.1 Select sampling location, based on objective of sampling.
- 3.3.2 Select collection media or system, based on contaminants of interest and ambient atmospheric conditions (see NOTE in 3.2.1.5).
- 3.3.3 Assemble collection system, flow measuring device, and vacuum system. Record pertinent information on the Field Air Sampling Data Sheet (Figure 23 or equivalent).
- 3.3.4 Proceed as in items 3.2.1.12 to 3.2.1.16.