USACE selects sampling points along Coldwater Creek (CWC) with the goal of obtaining the most representative locations possible. In order to gather accurate and representative information, FUSRAP investigators collect samples from carefully chosen systematic and biased sampling locations.

**SYSTEMATIC SAMPLING LOCATIONS**

The systematic sample locations follow a grid based on the 10-year floodplain adjacent to CWC. USACE will collect more samples if contamination is found at the border of the floodplain, and USACE will expand sampling beyond the 10-year floodplain until the extent of contamination is clearly determined. At systematic sample locations, USACE generally collects samples from the surface to a depth of 2 to 6 feet, depending on the nature of the sample. If the location has known fill materials, workers will collect deeper samples.

**BIASED SAMPLING LOCATIONS**

The conceptual site model for CWC identifies the biased sampling locations. This model defines areas where contamination likely accumulates or is trapped or covered. These locations are based on current and historical knowledge of:

- Physical movement (like hauling and historic grading)
- Topographically low-lying areas
- Depositional areas (like where CWC bends or goes around structures)
- Distinct locations (like the mouth of a tributary or a realigned channel)

At biased locations, USACE takes samples at a depth that is appropriate for the location. For example, samples within historic tributaries will extend to the depth of the former channel.

**LABORATORY ANALYSIS OF SOIL SAMPLES**

After collecting soil samples, workers deliver them to a dedicated FUSRAP Laboratory, central to the St. Louis Sites. The lab is run by an independent contractor who meets the strict requirements of USACE and DOD. Because USACE requires quick analysis of site samples, this lab runs two shifts, employing 11 specially trained technicians and scientists. All laboratory instruments meet National Institute of Standards and Technology calibration standards.
SOIL ANALYSIS STEP-BY-STEP

The FUSRAP lab tests soil (and other media) in a precise process that begins at the front door. Workers log and track field samples’ movements through the lab from entry to analysis to disposal with careful documentation.

Soil is first dried overnight in an oven and then ground into a powder. After thoroughly mixing the sample, laboratory workers begin the steps to isolate any radium, thorium, or uranium isotopes.

From each site sample, separate but identical processes are run to isolate these three isotopes. Lab workers measure levels of ionizing radiation in each isolated radium, thorium, or uranium isotope. The laboratory equipment is specialized to detect ionizing radiation, which includes alpha and beta particles and gamma rays emitted from radioactive materials.

Reports from lab analysis guide USACE in meeting the remediation goals set by each site’s Record of Decision.

After soil and sediments are dried and ground into a powder, specially trained laboratory technicians begin the steps to isolate any radium, thorium, or uranium from a sample.

Here a specially trained laboratory technician separates thorium from other isotopes in a sample so thorium alone can be measured by alpha spectroscopy.

Technicians mount isolated thorium on a filter and insert it into the alpha spectrometer. This step tests for uranium, radium, and thorium alpha particles in samples.

Here a technician loads a soil sample into a gamma spectrometer. The instrument detects gamma rays emitted from the sample, identifies the isotopes within the sample, and measures them.