US Army Corps of Engineers®
St. Louis District

St. Louis Sites Fact Sheet

# BACKGROUND LEVELS VARY FOR RADIONUCLIDES

"Gateway to Excellence"

Cleanup activities at the St. Louis Sites are part of a nationwide U.S. Army Corps of Engineers (USACE) environmental program known as the Formerly Utilized Sites Remedial Action Program (FUSRAP).

FUSRAP in St. Louis includes four Missouri sites (SLDS, SLAPS, Latty, and SLAPS VPs). These sites contain soils contaminated with uranium, thorium and radium because of activities associated with the Manhattan Engineer District/ Atomic Energy Commission (MED/AEC) during the nation's early atomic program in the 1940s and 1950s.

USACE uses scientific knowledge and skilled investigators to identify places that may need cleanup. The work requires deliberate sample site selection and then precise laboratory analysis in order to prioritize cleanup actions.

To learn more about FUSRAP, visit the FUSRAP webpage at https://go.usa.gov/xANRb or www.mvs.usace.army.mil/Missions/FUSRAP. Contact the FUSRAP Area Office at 314-260-3905 or by email at STLFUSRAP@usace.army.mil.

Radiation is all around us. It is in our environment and has been since the Earth was formed. As a result, life has evolved in the presence of ionizing radiation. It comes from outer space, the ground and even from within our own bodies. It is in the air we breathe, the food we eat, the water we drink, and the materials used to build our homes.

The St. Louis Sites, like the rest of the world, have natural background radiation. They also have low levels of radionuclide contaminants of concern (COCs) from MED/AEC-related activities in soil and sediment.

## WHAT ARE "BACKGROUND LEVELS"?

Natural radiation that is always present is known as "background" radiation. Scientists use "background levels" when analyzing FUSRAP sample data. Background levels are the concentrations of a substance in an environmental medium (air, water, or soil) that occur naturally and are not the result of human-introduced contaminants.

Knowledge of what average levels of background exist in the environment at the St. Louis Sites helps determine if detected concentrations of COCs are from MED/AEC-related radionuclides. The COCs in St. Louis Sites are radium, thorium and uranium.

## VARIATIONS OF BACKGROUND IN NATURE

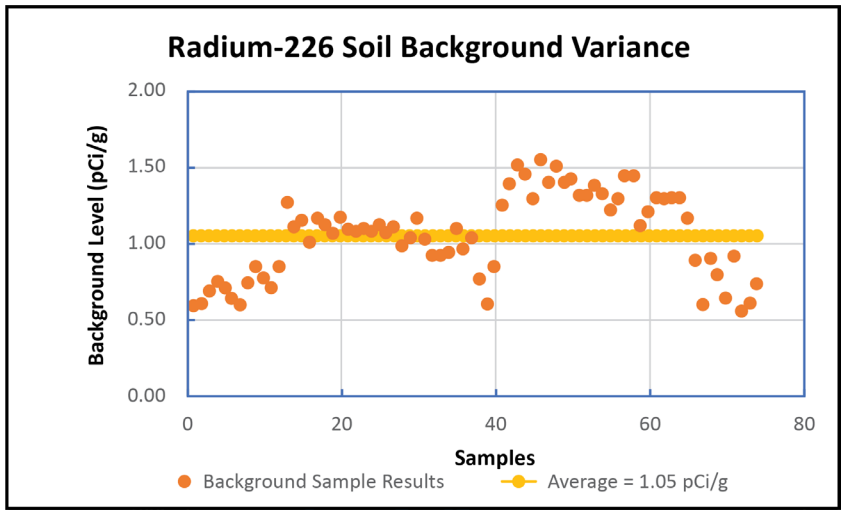
Radionuclides naturally vary in different concentrations depending on the type of soil and rock and the different depths within soil. This variation occurs in soils around the world. Because soil and rocks vary, background levels can vary greatly from one location to the next.

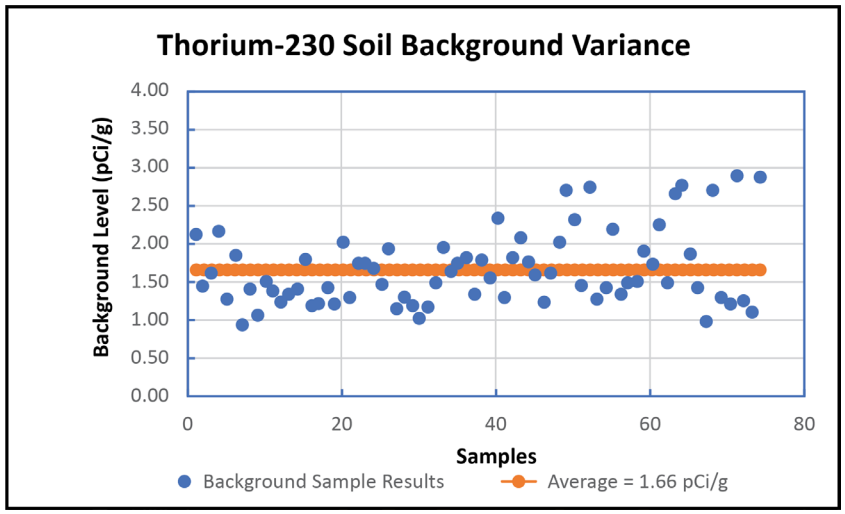
Nearly 20 years ago at the start of the FUSRAP investigations, scientists collected soil samples to statistically determine background levels for each of the detected radionuclides. Those background averages are still being used today to compare against the latest soil samples. Any FUSRAP site investigation, final status surveys, human health risk or dose assessments compares to those background levels.

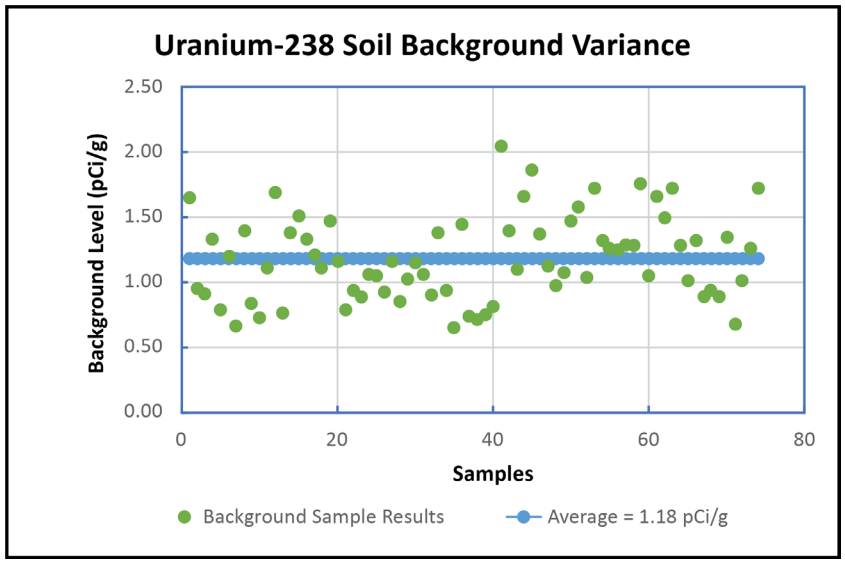
USACE consistently sees that sample levels are sometimes over background and sometimes under background. This variation is typical because all soil samples are unique. But when FUSRAP scientists detect sampling levels that are near or above the clean-up criteria for radionuclide levels, that sample location is tagged for further study and possible remedial action.

## WHAT DOES BACKGROUND VARIATION MEAN TO THE ST. LOUIS PUBLIC?

Remediation of COCs to levels within or below the associated ranges of background is technically and economically not likely, and maybe impossible. Simply put, this is because natural radiological elements are everywhere. Approximately half of background sample levels are above average levels and half are below, as shown in the graphs below.




These natural background soil sample results are from all soil layers.

### How USACE Measures Background

USACE measures natural background levels by collecting measurements at locations unaffected by MED/AEC materials. For example, soil samples were collected at Aubuchon Park, Howdershell Park, and St. Ann Park. The laboratory results for radionuclides of concern were used to calculate averages and variances for use as background data.

The curie is a standard measure for the amount of radioactivity in a sample of radioactive material. The basis for the curie is the radioactivity of one gram (g) of radium. Radium decays at a rate of about 2.2 trillion disintegrations per minute.

Because these levels are so low, USACE uses picocuries to measure background. A picocurie is one trillionth of a curie. Thus, a picocurie (pCi) represents 2.2 disintegrations per minute.

In all three of the charts shown, the variations of North County background above and below the average levels are within about a 2 pCi/g range, which represents 4.4 disintegrations per minute. Although a variation of 2 pCi/g seems like a small number, it is important in an investigation because variations determine when health risks are above background.