

Wide-Area Background Radiation Survey Technical Guidance for Response



Science and Technology

RADIATION IS EVERYWHERE

There is not a single place on Earth that is completely free of radiation. That is not a problem – just a fact. Every part of our planet is bathed in low levels of radiation, from its rocks, soils and waterways, to our hospitals, industrial parks and homes. This “background radiation,” however, is not evenly distributed. Every city, town and village have places that are more or less radioactive than others.

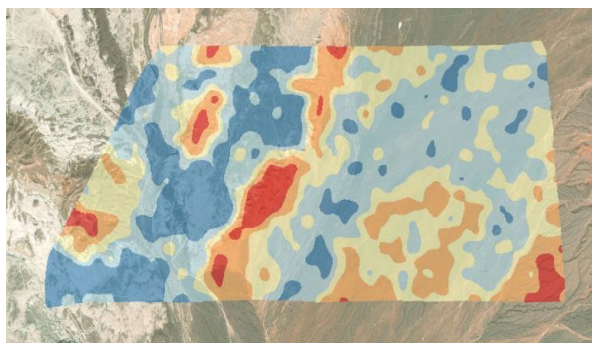


Figure 1: An example of a wide-area background radiation survey, showing variations in natural radioactivity.
Image credit: U.S. Department of Energy

Carefully and routinely measuring all of the radiation present is important – not so much for health and safety (because background radiation is not a danger) but rather – so that in the event of a release of radioactivity, we would know how much contamination had been added to the environment and, therefore, how much cleanup would be needed. The best way to have this information at the ready is to perform wide-area background radiation surveys.

CHALLENGES TO A GOOD RADIATION SURVEY

Performing a good radiation survey – especially for large areas – may involve significant time and effort. Once data is collected, the challenge is to make sure it is accurate and then assemble it all into a single coherent picture. Given limited budgets and competing priorities, this can be a daunting process for many government agencies especially if they must plan a survey from scratch.

The U.S. Department of Homeland Security (DHS) Science and Technology Directorate’s (S&T) National Urban Security Technology Laboratory (NUSTL) is working in conjunction with the Department of Energy’s (DOE) National Nuclear Security Administration (NNSA) and several DOE national laboratories to develop a set of processes and procedures that will make it easier to plan and perform wide-area background radiation surveys. This guidance will address how to determine the best utilization of often-limited personnel and equipment in order to perform a survey. Making it easier to plan, perform and show the end results of these background surveys, will enable jurisdictions with varying resources and skill sets to conduct these surveys and gain a better understanding of their background radiation environment.

DEVELOPING TECHNICAL GUIDANCE

Designing, performing and interpreting large-scale radiation surveys can be complex and many emergency responders, public health officials and others involved are not necessarily experts in radiation safety. To assist these groups in performing surveys using accepted best practices, this project will develop two primary products.

First, a technical guidance document will contain science-based recommendations on how to plan, conduct and document wide-area background radiation surveys. The guidance will explain how to develop a good radiation survey plan, including tips on how to collect the best data possible in a manner that will maximize the survey information’s usefulness. For example, guidance will be provided on selecting and using instruments properly as well as information on how the manner in which those instruments are used can affect data quality.

The second product, a template, will supply guidance on proper radiation survey techniques, such as the recommended driving speed when using a mobile radiation detection system and the recommended distance between survey locations when using hand-held radiation instruments.

These documents are expected to be completed in 2023.