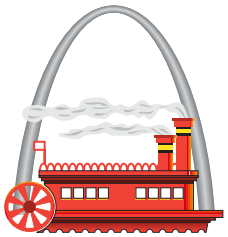
U.S. Army Corps of Engineers
St. Louis District

St. Louis Sites Fact Sheet

RISK ASSESSMENT



"Gateway to Excellence"

The U.S. Army Corps of Engineers (USACE), St. Louis District, is conducting a radiological cleanup called the Formerly Utilized Sites Remedial Action Program (FUSRAP) for four Missouri sites (SLDS, SLAPS, SLAPS VPs, HISS). These sites contain soils contaminated with radium, thorium, and uranium as a result of activities associated with the Manhattan Engineer District/Atomic Energy Commission during the nation's early atomic program in the 1940s and 50s.

A risk assessment is a method used to quantify threats to human health and the environment. By examining the potential adverse effects caused by a hazardous substance, the risk assessment can help decide what needs to be cleaned up, where, and to what level. Risk assessments help determine the most effective way to clean up a site while reducing the overall risk to human health and the environment. The investigation of Coldwater Creek is an example of how a risk assessment works.

USACE encourages private citizens to participate fully in the cleanup program.

To learn more about FUSRAP or to inquire about public involvement opportunities, contact the FUSRAP Project Office at (314) 260-3905 or write to the St. Louis District, Corps of Engineers, FUSRAP Project Office, 8945 Latty Avenue, Berkeley, Missouri 63134.

WHAT IS A RISK ASSESSMENT?

A risk assessment is a method used to quantify threats to human health and the environment. It is performed during the Remedial Investigation / Feasibility Study process required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). By examining the potential adverse effects caused by a radioactive or hazardous chemical substance, the risk assessment can help decide what needs to be cleaned up, where, and to what level.

HOW ARE RISK ASSESSMENTS PERFORMED?

Risk assessments are made up of two parts: a human health risk assessment and an ecological risk assessment. Together, they help determine the most effective way to clean up a site while reducing the overall risk to human health and the environment.

HUMAN HEALTH RISK ASSESSMENT

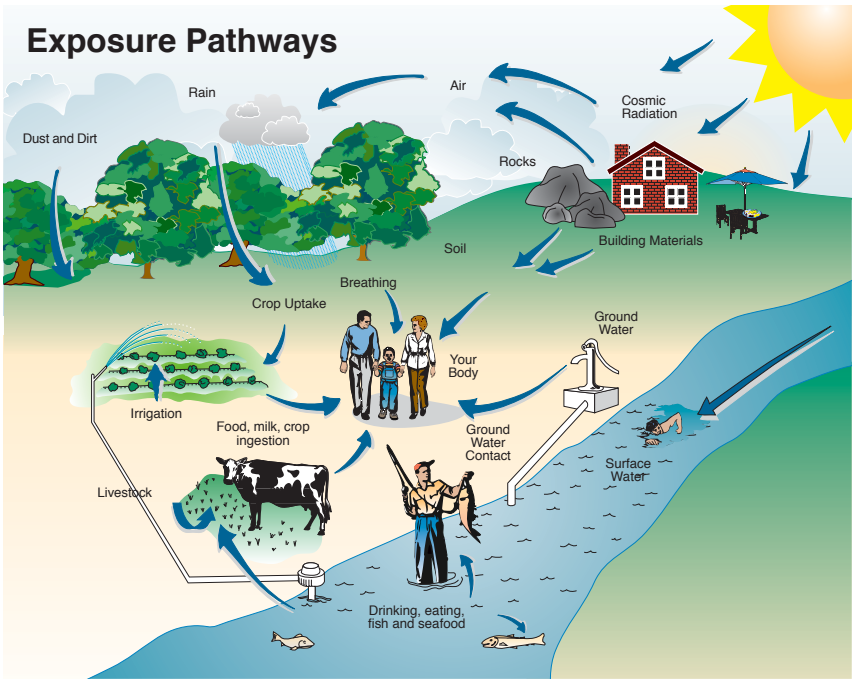
The human health risk assessment determines the risk posed by radioactive or chemical contaminants to people who live, work or play at or near the site. This assessment has four main steps:

- Data collection/evaluation - determines what contaminants are present at a site, where they are present, what levels they are present in, and whether or not the contaminants are moving off the site.
- Exposure assessment - calculates ways people might be exposed to the contaminants identified at the site. People may be exposed by breathing, touching, or consuming contaminated air, water, soil, or food in what we call "pathways." The estimates take into account how long, how often, and how many ways people could be exposed to site contaminants.
- Toxicity assessment - evaluates the health effects that exposure to site contaminants could cause. It includes an assessment of the increased risk of cancer and other effects (such as rashes, eye irritation, breathing difficulties, or organ damage).
- Risk characterization - combines the results of the three steps above to identify the critical risks posed by the site and determine whether they are great enough to cause health problems for people at or near a site.

ECOLOGICAL RISK ASSESSMENT

The ecological risk assessment focuses on the effects that site contamination has or could have on plants and wildlife. This assessment has five main steps:

- Problem Formulation - identifies specific chemicals, animal, and plant species at a site, measures chemical levels present, and whether or not chemicals are moving off the site.
- Analyses - calculates how animals and plants might be exposed to site contaminants, at what levels, and over how many years this exposure might reasonably be expected to occur. Exposures are calculated for groups of animals like birds, mammals, and fish and plants like grasses, trees, and aquatic plants.



Risk is calculated based on how much of a contaminant affects a person's body (called "exposure") and how dangerous a contaminant is to humans. An exposure pathway is the way in which a person may come in contact with a material.

- Toxicity Assessment - requires literature reviews, field studies, and toxicity tests to identify what the health effects of the various contaminants would be on each animal and plant groups.
- Risk Characterization - determines the most critical ecological site risks and whether they are great enough to cause health problems for animals or plants at/near a site. If this step identifies potential unacceptable risks to plants and/or animals, then remedial action is necessary. A Feasibility Study is then performed to identify and evaluate remedial alternatives to reduce these risks.
- Data Acquisition - includes a number of activities performed throughout the ecological risk assessment process. Activities may include identification of threatened or endangered species/habitats, analyses of wildlife impacts, monitoring abundance of species within the area, and others.

CHEMICAL AND RADIOLOGICAL INVESTIGATIONS

In the process of organizing and analyzing information for both the human health and ecological assessments, USACE takes further measures to fully understand any radiological or chemical impact. Both radiological and chemical assessments consider similar exposure scenarios and pathways, determine exposure point concentrations, and provide estimates of risks to humans and the environment. Radiological assessments, however, evaluate the maximum risk over a 1,000 year period because some radionuclides have long half-lives.

In addition to the pathways evaluated in chemical risk assessments, radiological assessments evaluate the external direct exposure pathway. External exposure occurs when someone is close enough to a radioactive material to be affected by alpha, beta, or gamma emitting radionuclides. Depending on the pathway, radionuclides could release energy directly to different types of tissue, possibly causing DNA and other cell damage.

USACE uses risk assessments to provide consistent and credible ways to prioritize clean up actions. Risk assessments provide a basis for communicating risks to the public and for protecting all stakeholders.

HOW IS RADIOLOGICAL RISK MEASURED?

A cancer risk is the probability of an individual developing cancer over a lifetime as a result of exposure to a contaminant that can cause cancer. Under the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA), the U.S. Environmental Protection Agency established an acceptable risk range as risk falling somewhere below or between the minimum risk of 1 additional cancer occurring in a population of 1 million people and a maximum risk of 1 additional cancer occurring in a population of 10,000. Because risk is calculated as a probability, a finding of a cancer risk does not necessarily mean that someone will actually get cancer. USACE follows these guidelines for determining what and when cleanup actions are required.

WHY ARE RADIOLOGICAL RISKS ESTIMATED FOR CHILDREN?

In order to estimate radiological risks that show the greatest caution, scientists sometimes assume receptors are children. Children have behaviors, like putting fingers or toys in their mouths when playing, that put them at higher risk for exposure. Scientists calculate a child's risk with that normal behavior in mind.

The estimated dose from contact with Coldwater Creek assumes that a child will:

- Spend 52 hours of time in the creek in a year
- Drink 14 gallons of creek water in a year
- Swallow 1.3 grams (about 1/4 teaspoon) of creek sediment in a year

Even with that much contact in mind, the information from the samples allows scientists to estimate radiological risk for a child who plays in Coldwater Creek to be at the low-end of the U.S. EPA's acceptable risk range. This means that the probability of developing cancer is extremely low.

HOW LOW IS LOW?

A comparison of the levels of radiological risk is helpful to answer that question. Using monitoring data collected since 2000, scientists estimate that anyone who visits Coldwater Creek 26 times a year for 2 hours per visit has radiological risk that is much lower than the risk associated with other types of exposures (for example, smoking, cosmic radiation from the sun, and air pollution).

WHERE CAN I FIND MORE DETAIL?

Reports on dose assessments, including one for Coldwater Creek, dating back to the year 2000, are available on the USACE website, www.mvs.usace.army.mil/. Search for Environmental Monitoring Data and Analysis Reports.

Lifetime Risk of Cancer Incidence