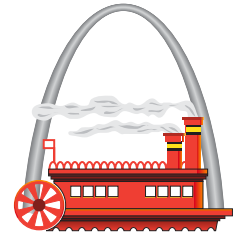




U.S. Army Corps of Engineers
St. Louis District

St. Louis Sites Fact Sheet

RISK ASSESSMENT



"Gateway to Excellence"

The United States Army Corps of Engineers (USACE), St. Louis District, is conducting a radiological cleanup program 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.

The 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 are comprised of two elements: the human health risk assessment and the 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.

The Corps of Engineers 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) 260-3924 or write to the St. Louis District, Corps of Engineers, FUSRAP Project Office, 8945 Latty Avenue, Berkeley, Missouri 63134

WHAT IS A RISK ASSESSMENT?

The 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 hazardous 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 comprised of two elements: the human health risk assessment and the 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. The following sections describe these two parts of the risk assessment in detail.

HUMAN HEALTH RISK ASSESSMENT

The human health risk assessment determines the risk posed by the contaminants to people who live, work or play at or near the site. Below is a basic explanation of the four main parts of a human health risk assessment.

- **Data collection/evaluation** - determines what chemicals are present at a site, where they are present, what levels they are present in, and whether or not the chemicals are moving off the site.
- **Exposure assessment** - calculates ways people might be exposed to the chemicals identified at the site. People may be exposed to chemicals by breathing, touching, or consuming contaminated air, water, soil, or food. For each "pathway", the quantity of a chemical that someone could take into their lungs, digestive system, or absorb through their skin is estimated for the time the individual is effected by the site given its current and likely future uses. The estimates take into account how long, how often, and how many ways people could be exposed to site chemicals.
- **Toxicity assessment** - evaluates the health effects that exposure to site chemicals could cause. It includes an assessment of the increased risk of *cancerous effects*, and an assessment of toxicological thresholds for *non-cancerous 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.

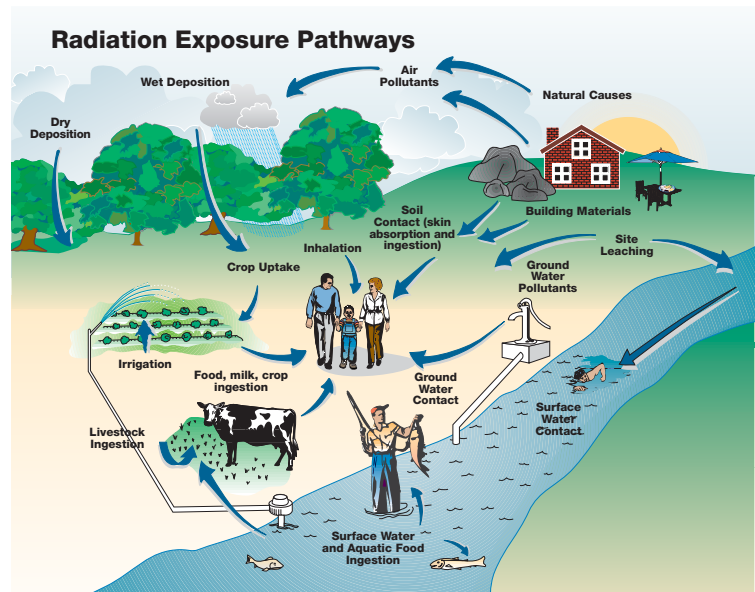
ECOLOGICAL RISK ASSESSMENT

The process for developing the ecological risk assessment is very similar to the human health risk assessment. The ecological risk assessment, however, focuses on the effects that site contamination has or could have on plants and wildlife. A basic explanation of the five major parts of this assessment follows.

- **Problem Formulation** - evaluates what chemicals, animal and plant species are present at a site, what levels the chemicals are present in, and whether or not the chemicals are moving off the site.
- **Analyses (Characterization of Exposure)** - calculates how animals and plants might be exposed to the chemicals, at what levels, and over how many years this exposure might reasonably be expected to occur. Animals may be exposed to chemicals the same ways that people could be exposed, by breathing, touching, or consuming contaminated air, water, soil, or food. Exposures are calculated for groups of animals like birds, mammals, and fish and plants like grasses, trees, and aquatic plants. Sometimes these groups are broken down into sub-groups such as birds of prey (eagles, hawks, etc.) and aquatic birds (ducks, geese, etc.).
- **Toxicity Assessment (Characterization of Ecological Effects)** - requires literature reviews, field studies, and toxicity tests to identify what the health effects of the various chemicals would be on each animal and plant group (or sub-group) identified.
- **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. The amount of uncertainty in the risk estimates is also considered. If this step identifies potential unacceptable risks to plants and/or animals, then remedial action is necessary and a Feasibility Study is 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.

HOW IS A RADIOLOGICAL RISK ASSESSMENT COMPLETED?

Overall, the process for assessing radionuclide exposures and radiation risks parallels the process for assessing increased risks from carcinogenic chemical exposures. Both radiological and chemical risk assessments follow the same processes, consider similar exposure scenarios and pathways, determine exposure point concentrations, and provide estimates of risks to humans and the environment. The primary difference is that the radiological risk assessment includes the external “direct exposure” pathway. The “direct exposure” pathway is unique to the radiological risk assessment.



We are exposed to ionizing radiation by many pathways. The main ones for most people are exposure to cosmic radiation, exposure to and breathing indoor and outdoor air, exposure to radiation from rocks and soils, and drinking and eating foods with naturally occurring radioactive elements.