Bonita Peak Mining District
Human Health Risk Assessment

June 2019

United States Environmental Protection Agency

COLORADO Department of Public Health & Environment

The U.S. Environmental Protection Agency (EPA) has prepared a human health risk assessment (HHRA) for the Bonita Peak Mining District Superfund Site (Site). The HHRA evaluated potential risks to humans, both now and in the future, from exposures to contaminants that may be present in the mining district. EPA has prepared this fact sheet to serve as a summary of the HHRA.

The mining district is primarily used for recreational, occupational, and tribal purposes. The populations of interest for the risk assessment included campers, hikers, hunters, recreational fishermen, ATV riders, and county road workers. An addendum to this risk assessment will be developed to evaluate tribal exposures once the necessary exposure data are available.

Mining-related activities have resulted in the generation of various types of solid wastes, such as tailings and waste rock piles that contain elevated levels of contaminants. In addition, mine-impacted water discharged from mine adits, as well as water that is contaminated by solid waste, enters nearby creeks. Metals are the primary chemicals of potential concern (COPCs) at the Site. The HHRA includes an evaluation of chronic exposures to COPCs, as well as a screening-level evaluation of acute exposures from lead and arsenic.

Bonita Peak Mining District

The Bonita Peak Mining District became a Superfund site on Sept. 9, 2016, when it was added to the National Priorities List. The Site consists of historic and ongoing releases from mining operations in three drainages: Mineral Creek, Cement Creek and Upper Animas, which converge into the Animas River near Silverton, Colorado.

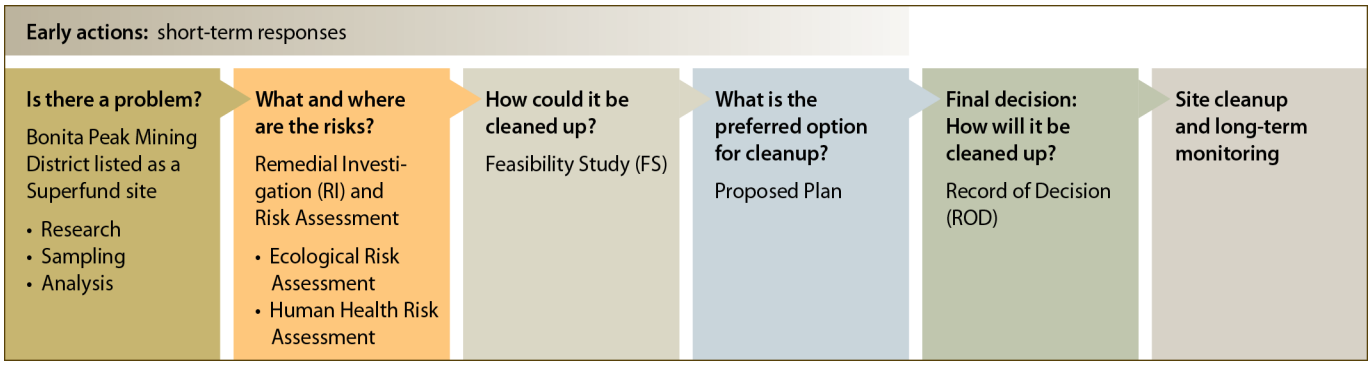
The 48 mining-related sources that define the Site include 35 mines, seven tunnels, four tailings impoundments and two study areas where additional information is needed to evaluate risks to human health and the environment.

The results of the HHRA:

- Found that no occupational exposures (road workers and ATV tour guides) exceeded levels of concern.
- Confirmed that exposures at the U.S. Forest Service campground near Mineral Creek do not exceed levels of concern.
- Verified the need for the interim remedial actions at the two dispersed campsites in the Animas River Drainage and three mine waste piles that may be used for camping in the Mineral Creek Drainage that are included in the recently release Record of Decision for Interim Actions (IROD).
- Identified additional source areas posing potential human health risks at the Site that may require further study and remedial action.

The Superfund Process:

As part of the Superfund process (see below), the HHRA takes place during the Site Remedial Investigation (RI). The RI involves gathering and analyzing numerous samples of soil, surface water, sediment, ground water, biological tissue, and waste materials from locations throughout the Site to determine the nature and extent of contamination. The RI also involves assessing risks to human health and the environment posed by the Site. While the RI is being completed, the Site team plans to conduct short-term response actions at a number of source areas in the BPMD under the recently issued IROD. These early response actions are intended to reduce human exposure, stabilize source areas and provide water quality improvements in the Animas River and can take place throughout development of the RI.



The Superfund Process

What is a Human Health Risk Assessment?

EPA conducts risk assessments that provide information about site contaminants and the range of potential health effects posed by those contaminants. The EPA's risk managers will use the risk assessment and other factors to select the best strategies to manage risks at the Site.

Superfund human health risk assessment is the process to estimate the nature and probability of adverse health effects in humans who may be exposed to chemicals from the Site. The risk assessment establishes an acceptable level for each potentially harmful contaminant present. Contaminants below the acceptable concentration are unlikely to pose significant risks to human health.

The Bonita Peak Mining District HHRA will help support cleanup decisions for the Site and provides answers to three basic questions.

1) What contaminants are individuals recreating or working in the mining district exposed to?
2) How toxic are the contaminants?
3) Is there a risk to human health from exposure to the contaminants?

The results of the HHRA are intended to help inform the public and risk managers about potential health risks to humans that may occur as a result of exposure to contaminants from the Site. The HHRA helps determine if there is a need for action to reduce human health risk at the Site.

How was the HHRA conducted?

A number of studies have been performed since 2015 to investigate and characterize the nature and extent of contamination at the Site. The sources for potential exposure have included: soil and mine waste at various locations; sediment; surface water; groundwater; fish tissue; game tissue; and roadway air (stationary and transportation-related). Samples of these sources have been collected and analyzed to estimate exposure to people recreating and working in the mining district.

The estimates of exposure combined with our knowledge of the toxicity associated with exposure to metals in the environment were combined to develop an estimate of health risk. The estimates of risk were then further evaluated to determine if remedial action was needed.

How EPA Determines Risk

1. **Develop a Site Conceptual Model**
   How are people exposed?
   EPA has developed a model describing where contamination is found and how people can be exposed.
2. **Determine Exposure Parameters**
   What is the duration and frequency of exposure?
   With the help of the community, EPA has studied how often people engage in activities throughout their lifetime.
3. **Determine Exposure Point Concentrations**
   What are the concentrations that people are exposed to in soil, air, etc.?
   EPA has collected almost 15,000 samples at the Site to estimate the concentrations of chemicals of potential concern in the environment.
4. **Assess the Toxicity**
   What are the adverse effects from exposure?
   EPA has developed toxicity values for both cancer and non-cancer effects for the chemicals of potential concern.
5. **Calculate Risk**
   What are the cancer and non-cancer risks?
   Using the information above, EPA calculates cancer and non-cancer risk estimates.

What are the results of the HHRA?

Estimated recreational and occupational risks throughout the Site from chronic exposure to non-lead COPCs in a variety of media are below a level of concern.

However, at three waste rock piles that may be used for camping (Koehler, Junction, and Longfellow source areas), acute exposure to arsenic exceeded risk-based criteria. These three source areas will be addressed under the IROD as recreational staging areas.

Lead is evaluated using different methods than those used for non-lead COPCs. Using methods that estimate levels of lead in blood, risks to adult workers from exposures to lead are below a level of concern.

However, the same methods showed that exposures to lead for children and adults involved in recreation at four select dispersed campsite locations were above a level of health concern. Two of these dispersed campsites (Campsite 4 and Campsite 7) will be addressed under the IROD as recreational staging areas.

The HHRA verified the need for the interim remedial actions included in the IROD and identifies two additional source areas posing potentially unacceptable human health risks at the Site that may require further study and remedial action (Campsite 2, Campsite 3). The HHRA also identified source areas that may need more investigation.

How can I get more information?

EPA is available to answer questions about the human health risk assessment. Please contact:

- **Steven Merritt,** EPA toxicologist, 1-800-227-8917 (ext. 312-6146) merritt.steven@epa.gov
- **Christina Progess**, EPA project manager, 1-800-227-8917 (ext. 312-6009) progess.christina@epa.gov

The ***Human Health Risk Assessment*** is available at: https://semspub.epa.gov/src/document/08/100006501

Or visit the Bonita Peak Mining District website: www.epa.gov/superfund/bonita-peak

Dispersed Campsite and Recreation Staging Areas
Identified as Posing Unacceptable Risks to Human Health