

Section 2. Removal Action Objectives

The following RAOs were identified for the site in the April 2010 Engineering Evaluation and Cost Analysis ([URS Corporation, 2010b](#)):

- Mitigate unacceptable human and ecological risks posed by exposures to waste rock constituents in soil, surface water, and groundwater.
- Minimize future erosion and transport of waste rock that contribute to unacceptable human or ecological risk in Joe Creek, Elliott Creek, and the Applegate Reservoir.
- Implement a removal action in a manner that satisfies applicable or relevant and appropriate requirements (ARARs) to the extent practicable and minimizes unacceptable human health and ecological exposures during the removal action.

2.1. PERFORMANCE OBJECTIVES

In addition to the RAOs, the NTCRA will meet the following performance objectives identified in the contract Statement of Work included in Delivery Order No. AG-0489-D-10-0126 ([Forest Service, 2010](#)):

- Comply with the provisions of the CERCLA, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and all other federal and state ARARs.
- Comply with the provisions of the American Recovery and Reinvestment Act (ARRA) of 2009 (stimulus bill) and optimize the intent of providing jobs in economically depressed counties.
- Minimize the ongoing release of hazardous substances to the environment from mining-related waste rock.
- Minimize site disturbance in the project area and associated cost, including those associated with temporary and permanent roads, staging, and stockpile sites.
- Minimize the excavation of clean soil and rock underlying, mixed in, or adjacent to the WRPs, and subsequent haul and placement of these materials into the repository.
- Isolate waste rock in a permanent repository to prevent future exposures to humans and the environment from hazardous substances associated with mining waste rock.
- Minimize erosion and off-site sedimentation or leaching of any residual contaminated waste rock, during and following NTCRA activities.
- Prevent the introduction of moisture to waste rock placed into the repository before the final cover has been constructed and approved.
- Reclaim all project-related disturbed sites, both contaminated and noncontaminated, with structural features and revegetation.
- Perform 3 years minimum of on-site operations, maintenance, and monitoring tasks to ensure the continued effectiveness of the NTCRA.

- Perform 3 years minimum of off-site environmental effectiveness monitoring of designated surface waters, stream sediments, macroinvertebrates, and fish.
- Monitor water quality of nearby residential (Joe Bar, California) drinking water supplies before, during, and for 3 years minimum following NTCRA activities.
- Conduct NTCRA activities while maintaining the safety of the general public, site workers, and government employees.
- Comply with all applicable Forest Service fire protection and suppression provisions.
- Adhere to applicable wildlife restrictions.
- Prevent the introduction and spreading of noxious weeds at the site and on Forest Service lands.

2.2. REMOVAL GOALS

The Forest Service established removal goals for metals (arsenic, cadmium, copper, lead, and zinc), acid base accounting, and net acid generation in the Removal Design. These goals were originally based on a relatively limited site background data set. In 2011, the Forest Service performed a statistical analysis of the laboratory and XRF sample data collected by ERRG during the 2010 work season to establish a more representative site background data set and update the removal goals. A revised set of removal goals for metals was prepared by the Forest Service and the contract was modified by Work Order 12 issued June 22, 2011. The performance standards also allow a Removal Goal and Confirmation Tolerance. Metals concentrations reported in XRF and laboratory confirmation samples collected during the NTCRA were compared with the updated removal goals to determine whether the NTCRA adequately achieved the RAOs. The Forest Service defined the achievement of the RAOs as follows:

- Metals concentrations are to be no more than 15 percent above the numeric standards, and no more than 15 percent of the sample results will be allowed to have concentrations above the 15 percent tolerance.

The following table lists the updated removal goals and the tolerance limits calculated for each metal.

Constituent of Concern	Removal Goal	Tolerance Limit ¹
Arsenic	87.00 mg/kg	100.05 mg/kg
Cadmium	23.00 mg/kg	26.45 mg/kg
Copper	1,041.00 mg/kg	1,197.15 mg/kg
Lead	179.00 mg/kg	205.85 mg/kg
Zinc	660.00 mg/kg	759.00 mg/kg
Acid Base Accounting	0.30 tons CaCO ₃ /1,000 tons soil	Not applicable
Net Acid Generation	3.51	Not applicable

Notes:

1 = Tolerance limit is the removal goal plus 15 percent

CaCO₃ = calcium carbonate

mg/kg = milligrams per kilogram

Section 4 describes the NTCRA activities that were performed to achieve the RAOs and performance objectives.