



Abandoned Mine Land Services

Abandoned mines pose significant physical and environmental hazards on public lands throughout the Western United States. Cascade Earth Sciences (CES) has been engaged in dozens of abandoned mine projects over our 40-year history. The CES staff has a broad experience with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which brings value to our clients time after time. Our comprehensive service offerings include: Preliminary Assessments, Site Inspections, Engineering Evaluations/Cost Analyses, Remedial Investigation/Feasibility Studies, Removal/Remedial Design, Implementation, Closure, and Long-Term Monitoring.



Providing CERCLA investigation and response actions at abandoned, inactive, and legacy mines for decades

Assessment, Engineering and Cleanup

CES has completed dozens of investigations and Removal Actions (RAs) on abandoned mine sites in Oregon, Washington, and Nevada. With decades of experience providing design-build solutions for complex mine cleanup and reclamation projects, CES offers the following services:

- Sample collection from waste sources, waterways, and biota
- Data analysis and site characterization
- Engineering Evaluation/Cost Analyses
- Human health and ecological risk evaluation
- Community involvement/public meetings
- Removal/Remedial design and implementation
- Design-bid and other project delivery methods
- Closures, hazard mitigation, waste removal/remediation, and water treatment
- Management of large, interdisciplinary teams and subcontractors to implement RA objectives
- Technically complex solutions at remote mine sites
- Post-RA and long-term environmental monitoring

Selected Project Examples



Azurite Mine Site Inspection/Removal Action U.S. Forest Service – Okanagan National Forest

The Azurite Mine is an abandoned gold mine in a high-altitude valley in the North Cascades of Washington. The site contained five abandoned adits, 50,000 cubic yards of pyritic tailings and 25,000 cubic yards of waste rock with high acid rock discharge (ARD) potential. CES was retained to provide a broad range of CERCLA activities, including:

- Site Inspection/human health and ecological risk evaluation
- Tailings reprocessing bench study
- RA design, including physical hazard mitigation
- Turnkey RA under an aggressive 3-month schedule
- Repository construction on a 2.5:1 slope with a HDPE liner, geogrid and a talus rock cover
- Long-term monitoring of instream water quality and repository stability



Poorman/Balm Creek Mine Removal Action Bureau of Land Management – Vale District

The Poorman/Balm Creek Mine is an abandoned copper and gold mine located in Eastern Oregon. CES accomplishments include:

- Excavation and transport of approximately 36,000 cubic yards of tailings and waste rock.
- Construction of an earthen on-site repository
- Capping and closure of various open pits and shafts
- Construction of a passive water treatment system to treat shaft water
- Stream reconstruction of Balm Creek and Slide Creek
- Over 10 acres of reclamation and long-term water quality monitoring



Monte Cristo Mining Area Site Inspection, EE/CA. and Removal Action U.S. Forest Service – Mt. Baker-Snoqualmie National Forest

The Monte Cristo Mining Area is a 2,500+-acre recreation area that includes multiple abandoned mine sites and mineral processing-related facilities in a remote area of Snohomish County, Washington. CES was retained to manage the multi-year design and cleanup project, which included a wide range of services. These services included:

- Multi-phased site investigations with sampling and risk assessments
- Engineering Evaluation/Cost Analysis, including comprehensive costs modeling and alternatives analyses
- Construction of a 1.6-mile access route for equipment access
- Helicopter removal of 2,000 cy of waste rock from wilderness areas
- Development of a 1.15-acre lined repository
- Adit diversions and drainage
- Subcontractor management for \$5M in design and construction

