

# Tailings and Mine Waste Management

## Tailings Facilities

Tetra Tech's tailings management expertise includes thickened, paste, dewatered, and cycloned tailings operations as well as co-disposal technologies. We have completed projects throughout the world in high-altitude, alpine, arctic, tropical, and desert climates on terrain ranging from flat to extremely rugged.

Our professionals have earned a well-deserved reputation for offering expert advice; focused designs; and cost-effective, practical solutions. Success in the field of tailings disposal requires a focused, multidisciplinary approach drawing from a variety of interrelated technical fields and led by strong geotechnical and water resource engineers.

Tetra Tech's interdisciplinary staff optimizes solutions to address a range of issues—permitting, capital expenditures, environmental protection, constructability, ease of operation, closure, and reclamation.

### Engineered Cap and Liner Systems

Tetra Tech has designed hundreds of acres of engineered cap and liner system repositories, including soil caps and native soil liners and multi-component geocomposite systems designed to comply with regulatory requirements. Tetra Tech's innovative designs include incorporating the use of slag, using designs that maximize water retention and minimize airflow, and making use of on-site materials to minimize further disturbance and reduce cost.

Over the past decade, Tetra Tech's construction subsidiary, American Environmental Group, has successfully installed more than 600 acres of geosynthetic liner systems for heap leach pads, tailings dams, pond containment structures, and trench conveyance systems.



## Tailings Management and Disposal Expertise

- Facility siting and sizing
- Permitting and baseline studies
- Geotechnical evaluations
- Water balance studies
- Hydrological evaluation and hydraulic engineering for diversions, solution collection ditches, conveyance channels, etc.
- Solution application and collection systems
- Liner system design and installation
- Large load testing of solution collection pipes and finite-element modeling to simulate high-heap stacking
- Detailed stacking plans
- Tailings deposition and consolidation modeling
- Wick drain evaluation for tailings densification
- Foundation improvement studies
- Slurry and water return pipeline design
- Storage facility audits
- Dam review and inspection
- Construction drawings, technical specifications, and bid packages
- Construction management and construction quality assurance
- Operation analysis and optimization
- Simulation of drain-down flow rate, quantity, and duration
- Closure planning, including covers and capping

**Tetra Tech** is a leading provider of consulting, engineering, program management, construction management, and technical services. The Company supports government and commercial clients by providing innovative solutions to complex problems focused on water, environment, energy, infrastructure, and resource management. With 13,000 employees worldwide, Tetra Tech's capabilities span the entire project life cycle.



*Tetra Tech's multidisciplinary approach creates innovative and cost-effective methods to prevent, mitigate, and treat mine-related waste.*

## #1 in Water and Environmental Management

as ranked by *Engineering News-Record*

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Canada	Vancouver, British Columbia Toronto, Ontario
Chile	Santiago, Santiago Province
UK	Swindon, Wiltshire
US	Golden, Colorado

## Mine Waste Management

Tetra Tech provides environmental and engineering services to manage and remediate the effects of wastes associated with mining operations and metal-refining sites. Our staff has performed removal actions, remedial design, construction management, and inspection of numerous mine tailings and waste rock closures for projects worldwide. The projects have included closure-in-place, consolidation, and capping of tailings and waste deposits with innovative earthen or geosynthetic systems; design of run-on and run-off control systems; associated stream rehabilitation and repair; and stabilization of tailings, dams, and waste rock deposits.

Tetra Tech works with clients to develop the best strategy for managing the environmental risks associated with mine-related waste by considering not only the technical issues but also the business, economic, regulatory, political, and legal dynamics of a project.

### Our technical capabilities in management and remediation of mine-related wastes include:

- Mine waste characterization
- Acid rock drainage (ARD) evaluation, prediction, and mitigation
- Analysis and design of remedial alternatives
- Stormwater management
- Bench-scale treatability testing, and design and installation of full-scale treatment systems
- Design of mine adit plugging systems
- Geotechnical engineering and slope stability analysis
- Cyanide code compliance
- Floodplain restoration and reclamation
- Design of water and sediment control structures
- Mine tailings disposal and closure of tailings impoundments
- Assessment and design of natural and synthetic liner and cover systems for waste disposal and mining applications
- Construction management and quality assurance field testing
- Development of revegetation programs for mine waste, soil cover systems, and other disturbed areas
- In situ biogeochemical remediation evaluation and implementation