

## ***Mining Industry Services - Inactive Mines***

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Anderson Consulting Engineers, Inc has participated in the completion of over 30 AML projects encompassing over 100 individual mines and discrete disturbances throughout the western United State. Their AML experience includes the reclamation of abandoned bentonite, uranium, coal, limestone, gravel, copper, gold, lead and zinc mines. In particular ACE staff have performed hydrologic, hydraulic, hydrogeologic and geomorphic studies at each of these sites. ACE engineers and scientists have been responsible for the research and the determination of AML eligibility for funding, initial site and hazard inventory, surface and mineral ownership, consents and clearances, water rights investigations, environmental assessment (EA) preparation, water quality studies, spoils chemistry evaluations, predictions of post-reclamation surface and ground water quality, wetlands determinations and final design of reclamation improvements. ACE staff have provided design and construction management services including earthwork computations, long-term stabilization of disturbed areas, design of hydraulic structures and permanent channel diversions, preparation of final plans and specifications, cost estimates and full time construction observations.

### **Representative abandoned mine projects include:**

- **Carissa Mine Tailings Stabilization, South Pass City, WY;** ACE staff participated in the reclamation design for abandoned gold mill tailings. Services included hydrologic and sediment investigation, geochemical evaluation (arsenic and mercury contamination), and preparation of tailings stabilization and stream stabilization design drawings and construction documents. Construction management services and post construction monitoring were provided.
- **Day Loma Mine Reclamation, Fremont County, WY:** The staff of ACE participated in the preparation of reclamation designs for over 1,000 acres of abandoned uranium mine disturbances. Specific tasks included the preparation of a hydrologic restoration plan, wetlands evaluation and design, groundwater investigation/modeling, geomorphic evaluation, selective handling plan, highwall stabilization evaluation and preparation of construction drawings and contract documents.
- **Scofield Feasibility Study, UT:** Twelve abandoned coal mines were evaluated and reclamation plans prepared for pollution abatement, portal closures, backfilling and grading, highwall stabilization, revegetation, hazardous materials clean-up, and channel stabilization.
- **New Rambler Mine Reclamation, Albany, WY:** Anderson Consulting Engineers (ACE) staff participated in the reclamation of the highly contaminated abandoned copper mine. The mine site consisted of approximately 15 acres of severely disturbed land located within the heart of Medicine Bow National Forest approximately 30 miles west of Laramie, Wyoming. ACE staff participated in the spoils and materials classification (copper concentrations to 20,000 ppm), evaluation of surface and ground water quality, topsoil design investigation, and development of reclamation design plans.
- **Little Thumb Creek Restoration Design, Yellowstone National Park, WY:** The staff of ACE performed the hydrologic and hydraulic design for the restoration of Little Thumb Creek and an abandoned gravel mine. The main objectives of the stream restoration design were to (1) restore the channel to a geomorphically stable pre-mining condition in the critical fish spawning reach; (2) re-establish this reach of the channel as a fishery; and (3) to stabilize the upstream reach of the channel, adjacent to the reclaimed mine pit.

## ***Mining Industry Services - Inactive Mines (Continued)***

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- **John Gunnel Abandoned Uranium Mine, Gas Hills, WY:** The staff of ACE conducted the hydrologic and hydraulic investigations associated with the reclamation of this abandoned uranium mine. ACE staff assisted in the preparation of final designs of improvements including permanent closures of hazardous mine openings, final grading of the John Gunnel pit and waste piles, final hydrologic restoration, and selective handling of mine waste piles to protect the post-reclamation water quality.
- **Greybull Abandoned Bentonite Mine Project, Greybull, WY:** The staff of ACE participated in the reclamation of nine abandoned bentonite mines located near Greybull, Wyoming. ACE engineers and scientists assisted in the development of geomorphic design criteria, completed the hydrologic design of the reclaimed mine surface, and performed a water balance study to determine surface area requirements for reconstructed wetlands and stock ponds.
- **Little Medicine Bow Channel Reconstruction, Shirley Basin, WY:** ACE engineers and scientists participated in the design of remediation and improvements associated with an abandoned uranium mine. Approximately 1.5 miles of unstable channel diversion were evaluated and over 3.5 miles of reclaimed channel and floodplain for the Little Medicine Bow River and its associated tributaries in central Wyoming were designed and constructed. Portions of the reclamation design project included reclamation of the channel over the abandoned uranium mine pit, design of a backfill sequence, reconstruction of wetlands and stable channel design. The river and its associated wetlands were designed and permitted under the U.S. Army Corps of Engineers 404 program.
- **Rainbow Coal Mine Reclamation, Rock Springs, WY:** ACE engineers were responsible for the hydrologic and hydraulic investigations associated with reclamation of this abandoned coal mine. The project encompassed both surface and underground coal mine disturbances in the vicinity of Rock Springs, Wyoming. The largest disturbance in the project area was the abandoned Union Pacific Rainbow surface strip mine. The total disturbed area encompassed approximately 250 acres.
- **Bonanza Mine Planning and Reclamation Project, Halfway, OR.** ACE engineers developed a mining hydrologic control and reclamation plan for a placer gold mine in northeastern Oregon. The reclamation planning involved the development of a post-mining site grading plan, stable reclamation topography, and design of a permanent stream restoration plan for Lost Creek and Pine Creek adjacent to the *Eagle Cap Wilderness Area* near Halfway, Oregon. The design accommodated fishery habitat improvements in addition to meeting the geomorphic and river mechanics objectives.
- **Horsethief Creek Reclamation Project, Rock Springs, WY.** ACE engineers evaluated and developed channel reclamation measures associated with an abandoned coal mining operation in Wyoming. Geomorphic, channel hydraulic and sediment transport conditions were evaluated to identify the existing channel conditions. Proposed stabilization measures for the creek were developed and designed to ensure long-term channel stability and reduce the potential for flooding.