

MINING

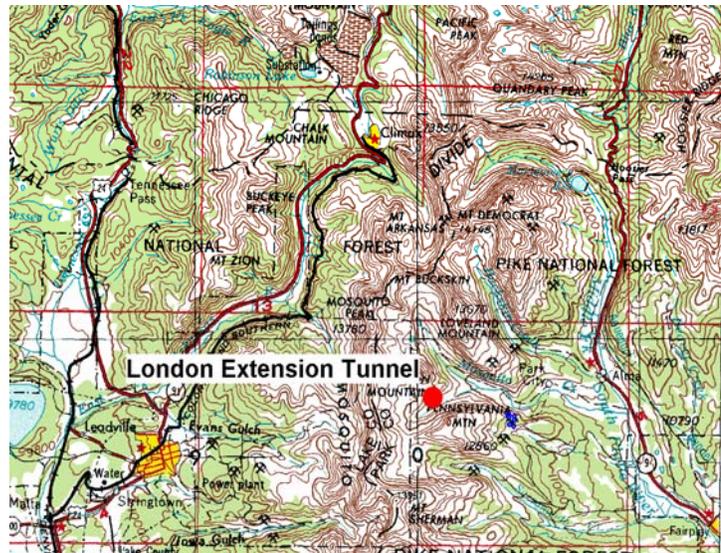
LONDON EXTENSION MINE DRAINAGE TREATMENT PROJECT

Conducted by: Colorado Division of Minerals & Geology
 On the Web: <http://mining.state.co.us/>
 Contact: Jim Herron or Al Amundson
 Project Partners: London L.L.C., Colorado School of Mines, Park County Road & Bridge Calco, Inc.
 Contract Period: 1997-2004
 NPS Funding: \$222,020
 Matching Funds: \$139,716

There are numerous mines in Colorado draining metal laden acidic water. Many of these are at high elevations where passive mine drainage treatment systems often function poorly. The Division of Minerals & Geology (DMG) in cooperation with London L.L.C., who owns the London Extension Tunnel, developed and constructed a low-cost, low-maintenance active mine drainage treatment system starting in 1997. The London Extension Tunnel is located at an elevation of 11,600 feet.

There is no access to the mine during the winter months of November to May. The treatment system had to be designed to operate with minimal maintenance during the winter months.

The London Extension Nonpoint Source Project is located in the Mosquito Creek watershed of Park County approximately 7 miles northwest of Fairplay and 15 miles south of Breckenridge. The London Extension Tunnel is the largest single source of metals contamination to the Mosquito Creek watershed.



London Extension Tunnel location map

The treatment system at the London Extension mine is simple, consisting of a collection system inside the mine, followed by the cement kiln dust (CKD) addition equipment and settling pond. The collection system consists of a partial bulkhead seal with a relief valve at the bottom and a collection pipe two feet above the floor of the mine. The relief valve is to flush sediments that accumulate behind the partial bulkhead into the settling pond

DMG constructed outside the adit in 1993. The collected water flows through a 6” diameter PVC pipe, out the mine, into a mixing tank located below the CKD bin. CKD is added to the water by a rotary valve at this location. The CKD/water mixture is mixed in the tank with an electrically powered mixer, then flows into a pitching, serpentine, corrugated plastic line, approximately 800 feet long, into the settling pond. CKD addition is manually set. The entire system is powered by 480-volt lines, which were installed for the treatment system.



Settling pond with treatment building in background

The London Extension Tunnel mine drainage treatment system has proven that acid mine drainage can be successfully treated with a low-cost, low-maintenance treatment system. The treatment system removes over 99.8% of the heavy metals when the effluent pH is maintained between 9.5 and 10.0. Zinc removal alone averages approximately 20 pounds per day.

Total construction cost for the treatment system was less than \$150,000. System maintenance and operation is estimated to be \$10,000 annually, plus labor costs. Numerous modifications were made to the system to operate efficiently and reliably at an elevation of 11,600 feet. Cement Kiln dust has been proven to be a cost-efficient neutralizing agent compared to other commercially available neutralizing agents.