

The U.S. Environmental Protection Agency (EPA) is planning to construct an Anaerobic Passive Treatment System (APTS) to treat acid mine drainage from the National Tunnel in North Clear Creek near the City of Blackhawk, Colorado. North Clear Creek is part of the Clear Creek/Central City Superfund Site, and the National Tunnel is a major contributor of contaminants to this tributary. The EPA would like to determine the feasibility of constructing an APTS at this location.

Two modes of sulfate reducing bioreactor (SRBR) configurations are under consideration. One mode is an ethanol fed SRBR and the other mode is a solid substrate fed SRBR (two different mixtures). Laboratory proof-of-concept studies to test the performance of locally available microbial inoculum and the effects of start-up conditions were conducted.

The rationale for the laboratory experiments was to establish the best start-up inoculum for two different types of bioreactors: solid phase substrate based - wood, corn stover/hay, limestone/quartz and ethanol based - ethanol as the food source, limestone /quartz, reducing additive. Bag tests were conducted with 3 different substrates (two solids phase mixtures and ethanol), and 7 different inoculum. Sulfate and copper removal from the proof-of-concept experiments suggest that domestic sewage sludge provided the best bacterial inoculum for the ethanol-fed SRBR with horse and goat manure tied for second best.