



PROJECT EXAMPLES

MINING & MINE RECLAMATION

TAILINGS DAM RAISE AND RECLAMATION PLAN

Umetco Minerals Corporation, Hot Springs, Arkansas

Engineering Analytics, Inc. (EA) designed and supervised construction of an embankment raise of the 125-foot high tailings dam and developed a reclamation plan. The reclamation plan provided for continued operation of the tailings impoundment while closing the other portions of the impoundment. The raise and reclamation work improved the existing drainage system and overall stability of the impoundment. The project included subsurface investigation and piezometer installation, flood routing and spillway design, seepage analyses and blanket design, cover design, stability analyses, liquefaction analyses, and construction oversight.

DESIGN OF TAILINGS STORAGE FACILITY

Uranium One, Ticaboo, Utah

Engineering Analytics provided geotechnical engineering design for the tailings storage facility and impoundment reclamation for the Shootaring Canyon mill. The scope of work included design of a liner and collection system for the tailings impoundment area and design of a cover for final reclamation. Design documents were prepared for submittal to the Utah Department of Environmental Quality in support of the permit application.

FOUR CORNERS PIT LAKE AND MINE ASSESSMENT

IMC Agrico, Mulberry, Florida

Engineering Analytics staff completed a comprehensive environmental and geochemical assessment of pit lakes and settling ponds for the Four Corners phosphate mine near Mulberry, Florida. The mining process had resulted in a number of groundwater and surface water impacts from arsenic, boron, lead, gross-alpha radiation and low pH. EA staff completed detailed hydrologic and geochemical modeling intended to reduce the concentrations of these chemicals to acceptable levels in groundwater and surface water. The modeling provided the geochemical basis for engineering solutions that involved both water treatment and re-routing and mixing of different water masses.

OPEN PIT DESIGN ANALYSES

Western Mesquite Mines/New Gold, Brawley, California

Engineering Analytics provided consulting services to Western Mesquite Mines to perform stability analyses of the high walls during active mining and for mine closure. The analyses entailed reviewing the subsurface faulting and structural geology at the site, material strength testing, and slope stability analyses using anisotropic strength parameters to model the faulting and bedding at the site.

Highlighted Services

- Environmental Permitting and Regulatory Assistance
- Engineering Design
 - Heap Leach Pads
 - Tailings Impoundments
 - Waste Rock Disposal
 - Impoundment Design
 - Open Pit Design
- Site Investigation and Remediation Design
- Water Supply, Management, and Treatment
- Closure and Reclamation
 - Cover Design
- Construction Management





PROJECT EXAMPLES

MINING & MINE RECLAMATION

ROSEMONT COPPER MINE

Tucson, Arizona

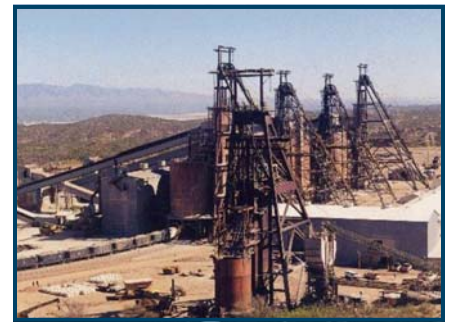
Engineering Analytics (EA) staff completed a regional groundwater flow model that simulated the potential impacts to stream flows, riparian vegetation, and springs due to a proposed 2,000-foot deep open-pit mine. Groundwater flow models were constructed to simulate pre-mining, mine development, and post-closure conditions. Flow modeling required development of a conceptual model supported by multiple data types, a 3-dimensional geologic framework model, hydraulic aquifer property analyses, water-level analysis, and recharge distribution analysis. Pit-lake formation and post-closure conditions were simulated for 1,000 years to support the Environmental Impact Statement (EIS) documents. A comprehensive flow model sensitivity analysis provided a range of potential impacts for use in the EIS.



HEAP LEACH PAD DRAIN DOWN AND RINSE

Minera Yanacocha/Newmont, Cajamarca, Peru

Engineering Analytics completed unsaturated flow modeling and geochemical analyses for the drain down and rinse of a heap leach pad for final closure at the Yanacocha mine. The project consisted of modeling the projected discharge rate from the pad during and after closure. The geochemical properties of the discharge solution from the heap leach pad during and after the proposed progressive closure were also modeled to determine the projected duration of sampling and potential water treatment requirements.



COMPREHENSIVE RECLAMATION AND CLOSURE PLAN

Umetco Minerals Corporation, East Gas Hills, Wyoming

Engineering Analytics provided reclamation plans for their uranium mine and mill operations. The project consisted of designing a reclamation plan for an inactive uranium tailings impoundment, two evaporation ponds, four mined pits, and a below grade tailings impoundment. EA staff performed a site-wide hydrology study, characterization study of the groundwater and geochemistry, a risk assessment analysis for clean-up of radiological contaminants, seepage analyses, stability analyses, and radon attenuation analyses. The reclamation plans were presented to the U.S. Nuclear Regulatory Commission for review.



COVER AND REPOSITORY DESIGN

Umetco Minerals Corporation, Uravan, Colorado

Engineering Analytics assisted in preparation of modifications to the remedial action plan for this CERCLA site. EA staff designed cover alternatives for the raffinate spray area and designed runoff control features. The repository was designed to contain Title 1 waters from the nearby Naturita site. EA staff designed the cover for the repository considering radon flux, frost protection, settlement, cover cracking, erosion protection, and stormwater diversions.

