Entries for November 16-30, 2025

Market/Commercialization Information

F -- MID-PLUME GROUNDWATER REMEDIATION AT THE WALTON AND LONSBURY SUPERFUND SITE, ATTLEBORO, MASSACHUSETTS (SOL)
U.S. Army Corps of Engineers, North Atlantic Engineer Division, New England District, Concord, MA
Contract Opportunities on SAM.gov W912WJ26RA001, 2025

This is a total small business set-aside under NAICS code 562910. The U.S. Army Corps of Engineers, New England District, requires a contractor to conduct mid-plume remediation work at the Walton and Lonsbury Superfund Site, a former electroplating facility that operated from 1940 to 2007, in Attleboro, Massachusetts. Specifically, the contractor will be tasked with pre-construction planning and surveys; site preparation including fencing, clearing, staging, erosion controls, monitoring well protection or abandonment, and construction of a work platform; and construction of the mid-plume treatment transect through excavation, soil management and disposal, mixing and quality control of zero-valent iron (ZVI) and sand, and backfilling with reactive media. Following construction, the contractor will restore the site through capping, grading, slope stabilization, wetland restoration, installation of new monitoring wells, removal of temporary facilities and controls, fence replacement, and repair of affected pavement. The work concludes with vegetation establishment, two semiannual groundwater monitoring events to assess remedy performance, and accommodation of an existing stormwater drain along the treatment transect alignment. The award will be a firm-fixed-price contract. Offers are due by 1:00 PM EST on February 12, 2026.
https://sam.gov/workspace/contract/opp/f71745903659413e8d895d8e67fa44fd/view

F -- RARITAN BAY SLAG SUPERFUND SITE OPERABLE UNIT 1 - SEAWALL SECTOR REMEDIAL ACTION (SOL)
U.S. Army Corps of Engineers, Northwestern Engineer Division, Kansas City District, Kansas City, MO
Contract Opportunities on SAM.gov W912DQ26RA017, 2025

This is a full and open competition under NAICS code 562910. The U.S. Army Corps of Engineers, Kansas City District, requires a contractor to perform under a single, stand-alone contract for the Raritan Bay Slag Superfund Site Operable Unit 1 - Seawall Sector Remedial Action. Remediation will consist of the dredging/excavation and removal of source materials (i.e., pieces of slag comingled with crushed battery casing materials and associated wastes that act as sources of contamination), and contaminated soil/sediment from the areas located in the Seawall Sector. Source materials, contaminated soil/sediment, riprap/armored stone, and miscellaneous debris will be removed. The Remedial Action Objectives (RAOs) are organized into these categories: slag, battery casings, and associated wastes, which comprise the highly toxic source material principal threat waste (PTW); soil; sediment; and surface water. The award will be a single cost-plus fixed-fee contract with a five-year period of performance beginning on July 28, 2026. Offers are due by 3:00 PM EST on January 20, 2026. https://sam.gov/workspace/contract/opp/a2501b0e1b094843b6e1802144672307/view

F -- EMERGENCY REMEDIAL RESPONSE SERVICES (ERRS 6) (PRESOL)
U.S. Environmental Protection Agency, Region 1 Contracting Office, Boston, MA
Contract Opportunities on SAM.gov 68HE0125R0004, 2025

When this solicitation is released, it will be competed as a total small business set-aside under NAICS code 562910. EPA Region 1 plans to issue a competitive small business set-aside solicitation to provide Emergency and Rapid Response Services (ERRS) for time-critical removals and rapid remedial actions with respect to the release or threat of release of oil, hazardous and toxic wastes, petroleum products, hazardous substances, or pollutants, contaminants or fire or explosion hazards, that pose an actual or potential threat to human health or welfare, or the environment. This procurement will also include the cleanup for incidents involving weapons of mass destruction; acts of terrorism; nuclear, biological, and chemical incidents; and natural or man-made disasters. These services are to be provided within the EPA Region 1 geographic area, which includes the states of CT, ME, MA, NH, RI, VT, and 10 Tribal Nations. The Government intends to award a performance-based IDIQ-type contract for a maximum period of performance of 60 months, with a five-year term. The Government intends to award one contract resulting from the small business set-aside solicitation that will follow this synopsis. The solicitation and resulting contract will include the Environmental Protection Agency Acquisition Regulation (EPAAR) clause: 1552.209-74 LIMITATION OF FUTURE CONTRACTING Alternate I (ERRS) (APR 2004). During the life of the ERRS contract, the contractor agrees that, unless otherwise authorized by the Contracting Officer, the firm will not provide any START type activities (e.g., START contracts) to EPA within the contractor's ERRS-assigned geographical area(s), either as a prime contractor, subcontractor, or consultant. There is no solicitation at this time. https://sam.gov/workspace/contract/opp/e608143def504090933c2aaa576a594c/view

F -- FORMALLY UTILIZED SITES REMEDIAL ACTION PROGRAM (FUSRAP) SHALLOW LAND DISPOSAL AREA (SLDA) REMEDIATION PROJECT (PRESOL)
U.S. Army Corps of Engineers, Great Lakes and Ohio Engineer Division, Buffalo District, Buffalo, NY
Contract Opportunities on SAM.gov W912P426RA003, 2025

When this solicitation is released sometime in December 2025 or January 2026, it will be competed as a full and open competiton. The U.S. Army Corps of Engineers, Buffalo District, intends to issue a C-type Hybrid Contract containing both Cost Reimbursable and Firm-Fixed Price line items for remediation services for the Formerly Utilized Sites Remedial Action Program (FUSRAP) Shallow Land Disposal Area (SLDA) Remediation Project. This project aims to address environmental remediation needs at the SLDA, which is critical for ensuring the safety and protection of the surrounding ecosystem. The award will be made on a best value basis. There is no solicitation at this time.
https://sam.gov/workspace/contract/opp/4af863a5221a4f829e22d1a8edd34736/view

Return to top

Cleanup News

THE FIRST MODELING, MEASUREMENT, AND CONFIRMATION OF NATURAL ATTENUATION OVER A 30-YEAR PERIOD IN A URANIUM IN-SITU RECOVERY CONTEXT: APPROACHES AND PERSPECTIVES
Doucmak, R., N. Seigneur, S. Escario, E. Chanvry, V. Lagneau, R. Khaibulin, R. Yegorov, S. Kairambayev, and M. Descostes. Journal of Contaminant Hydrology 273:104607(2025)

In situ recovery (ISR) is the most widely used uranium mining technique worldwide due to its cost-effectiveness; however, acidic ISR operations affect groundwater quality by increasing the concentrations of dissolved elements (such as SO_4) and decreasing pH. Natural attenuation was demonstrated within the '3y' unit at the Kanzhugan deposit in Kazakhstan, where uranium was mined using ISR in the 1980s. The study aimed to predict the environmental footprint of ISR production using a reactive transport (RT) modeling approach with HYTEC software based on 30 years of monitoring data over a kilometric scale. The model, which assumes a homogeneous medium but incorporates key geochemical reactions, successfully reproduced the natural attenuation data previously published by Kayukov (2005) over 10 years. It was extended to the present day with validation points to enhance long-term prediction reliability. The developed geochemical model shows that cationic exchange on clay surfaces and the precipitation of secondary minerals like gypsum regulate the behavior of contaminants (pH and SO_4) over extended periods and distances. Parameter calibration reveals the geochemical changes across broad temporal and spatial scales. The study demonstrates that RT simulations can be utilized to predict uranium production and evaluate the long-term environmental footprint.

MOAB UMTRA PROJECT
Pill, K. and L. Moran. RemPlex Seminar, 68 minutes, 2025

The Department of Energy's Moab Uranium Mill Tailings Remedial Action (UMTRA) project is focused on the relocation of mill tailings and the remediation of contaminated groundwater at the site of a former uranium-ore processing facility. The seminar provides an update on progress being made through collaborations with scientific partners and regulatory agencies as the Moab UMTRA project moves towards site closure. It includes presentations of new and expanded groundwater investigations that have been completed to better understand contaminant behavior and refine remediation strategies. https://www.pnnl.gov/projects/remplex/seminars/moab-umtra-project
Slides: https://www.pnnl.gov/sites/default/files/media/file/RemPlex_Moab_seminar_presentation_9Dec2025.pdf

BLACKLICK CREEK: THE DEATH AND RESURRECTION OF A WATERSHED
Smoyer, J. and R. Farabaugh. 2025 PA AMR Conference, 14-16 October, State College, PA, 41 minutes, 2025

Mining near the Black Lick Creek watershed began in the late 1800s and declined through the mid-20th century, with final closures by the late 1960s. Abandoned mines left acid mine drainage (AMD) that rendered Black Lick Creek biologically dead for decades. Studies as early as 1931 documented extremely high acidity and iron levels. Three major discharges were responsible for most of the pollution, producing orange, iron-laden water that dominated base flow during dry periods. Instead of treating each discharge separately, a centralized treatment plant was designed by hydraulically connecting mine pools. The plant has a design capacity of 5,000 gals/min (average ~2,800 gpm) and consolidates flows from all three discharges. Water is pumped from mine pools, blended, oxygenated, treated with lime, and clarified to remove iron and acidity. Key features

include:

- Redundant pumps and treatment trains for reliability.
- Large oxidation units, reaction tanks, and 90-foot clarifiers.
- Polishing pond and constructed wetland for final treatment.
- Off-spec pond to manage operational upsets.
- Sludge pumped back underground into mine voids.

Treated water leaves the plant with near non-detectable iron levels. The project restored 25 miles of stream, with most improvements being highly visible and accessible. Fish, aquatic insects, kayaking, fishing, and recreation are returning to the creek. While the plant costs about $700,000/year to operate, the estimated economic benefit exceeds $2 million annually, even considering recreation alone. https://www.youtube.com/watch?v=g1SI4gKEXP4

AN OPERATIONAL APPROACH TO GEOMORPHIC DESIGN IN MINE RECLAMATION: A CASE STUDY FROM TECK COAL LINE CREEK OPERATIONS
Dube, J. and D. Formanski. British Columbia Technical and Research Committee on Reclamation, 22-25 September, Penticton, British Columbia, 13 pp, 2025

In 2023, a three-year phased project was initiated to design geomorphic landforms at an existing mine rock spoil with a focus on the engineering perspective of the bulk re-slope of West Line Creek Spoil. The movement of materials inherently has constraints related to material type, equipment selection, geotechnical considerations, and economics. The process of creating a geomorphic design was primarily a desktop exercise that was iteratively improved through reviews of field experts and was conducted in 2024. The West Line Creek geomorphic design process results in an increased variability in slopes and aspects, which has a positive contribution to biodiversity objectives while maximizing operational safety, mine production, and managing geotechnical constraints. The paper discusses the design approach and outlines the benefits and practical learnings for reclaiming a mine rock spoil by integrating geomorphic features. The project demonstrates the effectiveness and learnings of a thorough design approach in achieving sustainable closure goals. https://open.library.ubc.ca/media/stream/pdf/59367/1.0447207/3

Return to top

Demonstrations / Feasibility Studies

NOVEL APPROACHES TO DRYLAND RECLAMATION ENHANCE VEGETATION AND SOIL STABILITY AT A FORMER URANIUM MINE
Eckhoff, K., M. Duniway, R.K. Mann, J.E. Hinck, K. Walton-Day, and S. Munson. | American Society of Reclamation Sciences 41st Annual Meeting, 2-5 June, Knoxville, TN, 45 slides, 2024

The Kanab North Mine reclamation was utilized to test the effectiveness of traditional treatments of drill seeding a non-native plant species seed mix versus novel treatments of a native plant species seed mix and using artificial nurse plants (Con-Mods) with broadcast seeding to understand how negative impacts can be mitigated during reclamation. Plant establishment and composition, soil surface cover, and dust emissions were measured for the first five years of reclamation. The application of biological soil crust (BSC) inoculum as a split-plot factor on plant and BSC establishment, soil surface cover, and soil stability was also tested. Results showed that plant cover and establishment increased in all treatments and consisted mostly of annual unseeded non-native forbs. Con-Mods significantly increased the cover of total, graminoid, and native plant species; native seed mix increased woody, native, perennial, and seeded species cover. Spacing between perennial plants decreased with time in all treatments, but the traditional drill-seeded non-native seed mix remained higher than novel treatments. Dust emissions decreased with time and increasing plant cover but were not affected by seeding mix or method. BSC inoculation increased the level of soil development with Con-Mods but not drill seed. Though soil stability increased over time, BSC inoculation resulted in only a small increase in stability, with Con-Mods resulting in higher stability than drill seed. Overall, novel approaches to reclamation (Con-Mods and native seed mix) were more effective overall than traditional methods, increasing plant cover, permitting BSC establishment, and promoting soil stability after uranium mine reclamation.
https://www.asrs.us/wp-content/uploads/2024/08/Eckhoff_301C.pdf

FINAL TECHNICAL REPORT RARE EARTH EXTRACTION AND CONCENTRATION AT PILOT-SCALE FROM NORTH DAKOTA COAL-RELATED FEEDSTOCKS
Theaker, N., A. Bellal, N. Dyrstad-Cincotta, A. Benson, E. Kolb, D. Stadem, R. Winburn, N. Sosalla, R. Shallbetter, and D. Palo. U.S. Department of Energy National Energy Technology Laboratory, 146 pp, 2025

The technical and engineering feasibility of a process for extracting rare earth elements (REEs) and critical minerals (CMs) from North Dakota lignite was evaluated in a project divided into two budget periods. The first budget period aimed to acquire 300 ppm blended feedstocks, design the pilot facility, and conduct a preliminary feasibility assessment. The second period aimed to construct, commission, and operate a 1,000 lb/hr pilot facility for the REE extraction process, and evaluate the refineability of the concentrate and the process economics. In each economic analysis, the most recent process data were utilized, even if it were not likely to be equivalent to future data from testing due to coal weathering. Feedstock was procured from a coal seam in the Rhame bed and from the top of a seam in the Freedom Mine and blended at a 60% Freedom Mine/40% Rhame bed mixture to ensure a 300-ppm mixture (average of 310). The pilot facility was capable of operating at 1,000 lbs/hr for an extended period. Pilot operation processed >100 tons of the 300-ppm blended feedstock and produced REE concentrates as high as ~90% pure REEs. However, the CMs originally planned for extraction were dramatically reduced in extraction, along with a mild reduction in the REEs due to the significant weathering of the coal feedstocks, likely from mineral changes in the coal. The extraction percentages are believed to be below that of a system utilizing fresh feedstock. Overall, the pilot utilized REE extraction technology to recover high-purity concentrates from lignite. The economics showed a potentially beneficial case when paired with carbon products manufacturing, although this would be substantially improved using the prior bench-scale extraction data as compared with the pilot (only pilot data was used in the model for consistency). https://www.osti.gov/servlets/purl/2563526

GROUNDWATER SULPHATE MANAGEMENT IN THE LOWER WOLFE CREEK CATCHMENT AT COPPER MOUNTAIN MINE: CHARACTERIZATION AND SHORT-TERM MITIGATION TESTING
Humphries, S. | British Columbia Technical and Research Committee on Reclamation, 22-25 September, Penticton, British Columbia, 11 pp, 2025

Sulphate and other parameter concentrations from tailings and waste rock sources at the Copper Mountain Mine have been increasing over time in Wolfe Creek, a drainage to the east. The creek is predominantly groundwater-fed. The main source of recharge to the aquifer that feeds the creek is reclaimed water that drains through the Tailings Management Facility (TMF). Sulphate concentrations in the creek are nearing compliance station limits, and mitigation through groundwater interception is required to reduce loading and ultimately concentrations in Wolfe Creek. A phased mitigation strategy was developed. The first phase comprised significant characterization and installation of trial pumping wells. The second phase consisted of testing various short-term mitigation techniques, including pumping wells and various configurations of interception ditches and trenches. Both phases significantly advanced the working hydrogeological conceptual model, which is being used to develop medium to long-term interception options that are being tested using a numerical model. The removal of sulphate load through groundwater interception will result in reduced flows to the creek, which will likely affect downstream flows, reducing them to pre-startup conditions during operations rather than in post-closure. A wetland downgradient of the TMF may also become affected through load removal. Therefore, sulphate management must be carefully balanced with flow and load interception in the valley to manage the flow needs of the downstream environment. The paper focuses on the mitigation strategy, characterization efforts and results, conceptual model, and considerations for sulphate management.
https://open.library.ubc.ca/soa/clRcle/collections/59367/items/1.0450893?o=1

Return to top

Research

DRYLAND ECOSYSTEM REGENERATION AND PLANT METAL(LOID) ACCUMULATION STRATEGIES 60 YEARS AFTER REVEGETATING A MINE TAILINGS POND.
Wlodarczyk, T., F. Babst, K. Murawska-Wlodarczyk, O. Stokes, A. Salywon, W.J.D. van Leeuwen, C.L. Norton, S. Rader, R.M. Maier, and A. Babst-Kostecka.
Science of The Total Environment 1004:180705(2025)

A study aimed to investigate one of the few successfully revegetated Cu-Mo tailings ponds in a semi-arid southwestern area of the U.S. to improve understanding of the drivers and barriers of plant establishment. The study assessed vegetation structure, composition, and metal(loid) uptake in various sections of the tailings pond and an adjacent natural area by integrating in situ vegetation surveys, biochemical analyses of plants and soils, and remote sensing. Based on a hierarchical cluster analysis, plant communities at different successional stages corresponded to specific substrate properties across the site. Depending on the biochemistry and thickness of the surface soil, plants exhibited variable nutrients and metal(loid) accumulation in foliage. Certain soil properties may facilitate Cu mobility from tailings layers to the surface. Some of the species hyper-accumulated Cu, Se, and Re at levels of up to 750, 80, and 90 mg/kg, respectively. For these species, robust elemental benchmarks were established through the X-ray fluorescence screening of many herbarium specimens from uncontaminated natural locations and confirmed their affinity for elevated metal(loid) accumulation at a larger scale. Findings can facilitate species selection for future reclamation research and applications. Upcoming work may leverage the same methodological framework to continue

closing the knowledge gap of the factors that determine revegetation success or failure in drylands.
https://www.sciencedirect.com/science/article/pii/S0048969725023459/pdfft?md5=724d50e54e6b0fe735fdde33b1fe9e8a&pid=1-s2.0-S0048969725023459-main.pdf

INCORPORATION OF ACTIVATED CARBON INTO RED MUD/FLY ASH-CONTAINING 3D-PRINTED ALKALI-ACTIVATED MATERIALS FOR ENHANCED ACID MINE DRAINAGE REMEDIATION
Almeida, M.M., N.P.F. Gonçalves, T. Gameiro, J.A. Labrincha, and R.M. Novais.
Separation and Purification Technology 366:132841(2025)

A study integrated activated carbon into 3D-printed waste-based alkali-activated materials (incorporating biomass fly ash and red mud) and investigated their potential for treating real acid mine drainage waters. Activated carbon loadings of 10, 20, and 30 wt% were incorporated into a fly ash, red mud, and metakaolin composition with a weight ratio of 30:40:30. The ink formulations were optimized by fine-tuning the liquid-to-solid ratio to ensure printability. As activated carbon content increased, the specific surface area of the materials improved significantly, from 40 to 95 m2/g. Incorporating 30 wt% of activated carbon enhanced the removal efficiency of target cations in a fixed-bed continuous flow process. After an 8-hour contact time, the removal rates for Fe, Cu, Zn, Mn, Ni, and Pb increased from 99%, 55%, 27%, 38%, 13%, and 95% (structure without activated carbon) to 99%, 90%, 82%, 80%, 69%, and 96% (structure with 30 wt% of activated carbon), respectively. This approach demonstrates the potential of combining a well-established sorbent, such as activated carbon, with waste-derived alkali-activated materials to significantly enhance the remediation of acid mine drainage.
https://www.sciencedirect.com/science/article/pii/S1383586625014388/pdfft?md5=797c35f0d9288e6a7b3d73692bb96d3f&pid=1-s2.0-S1383586625014388-main.pdf

THE DEVELOPMENT OF AN EFFICIENT PRECIPITATION-FLOTATION-DEWATERING (PFD) PROCESS FOR ACID MINE DRAINAGE TREATMENT
Liu, P., X. Wang, and W. Zhang.
Separation and Purification Technology 353(Part B):128542(2025)

An efficient precipitation-flotation-dewatering (PFD) process was developed and optimized as a viable alternative to the high-density sludge (HDS) process for efficient AMD treatment. Results indicate that >90 % of ions were successfully precipitated by employing CaO as a neutralizing agent to adjust AMD pH to 10.0. Flotation was then conducted with a low-profile flotation column after adding 10 mg/L of A-100 flocculant and 400 mg/L of NaOL. Compared with the original AMD, the final removal of Fe, Al, Cd, Sn, Co, Ni, Zn, and Mn was 97.61%, 98.85%, 98.21%, 97.78%, 97.22%, 99.34%, 99.89%, and 99.14%, respectively. Additionally, the solid content of the produced sludge was 27%. Mechanistic inquiries revealed that A-100 and NaOL both chemically adsorbed on the particle surface and enhanced the collision and attachment probabilities between precipitate particles and bubbles, thereby augmenting the separation efficiency. In addition, shortening the flotation column reduced the particle flotation path, thereby improving the flotation efficiency. The efficient PFD process exhibits significant advantages of rapid and effective AMD treatment, high sludge solid content, small footprint, and high relocatable convenience, demonstrating satisfactory cost effectiveness and significant potential as a replacement of the HDS process for AMD treatment.

SPATIAL AND TEMPORAL (ANNUAL AND DECADAL) TRENDS OF METAL(LOID) CONCENTRATIONS AND LOADS IN AN ACID MINE DRAINAGE-AFFECTED RIVER
Jennings, E., P. Onnis, R. Crane, S.D.W. Comber, P. Byrne, A.L. Riley, W.M. Mayes, A.P. Jarvis, and K.A. Hudson-Edwards. | Science of The Total Environment 964:178496(2025)

Sources, loads, and transport mechanisms of As, Cu, Zn, Fe, and S in a representative AMD-affected catchment (the Carnon River in Cornwall, UK) were determined over a 12-month sampling period along with 22 years of monitoring data, to understand the behavior of AMD-related metal(loid) contaminants as a function of space and time. The main source of metal(loid)s to the river was the County Adit, which drains AMD from ~60 km of underground historical mine workings. Maximum aqueous concentrations of Fe, Cu, and Zn occurred immediately downstream of the County Adit confluence with the Carnon River, whereas maximum As and S concentrations occurred further downstream, suggesting the presence of diffuse sources. Discharge and concentration relationships suggested that discharge drove Cu and Zn release, whereas pH and Eh influenced Fe, S, and As mobility. Total loads (represented by unfiltered sample contaminant concentrations) to the coastal zone ranged from 183 to 354 kg/month As, 307-742 kg/month Cu, 189-1,960 kg/month Fe, 53,400-125,000 kg/month S, and 1,280-3,320 kg/month Zn. The longevity and increasing amounts of contaminant discharge were confirmed with 22 years of monitoring data. The study highlights the complex and multifaceted behavior of contaminant metal(loid)s within AMD-affected riverine systems and the fact that point and diffuse sources can constitute significant long-term liabilities in these environments.

INNOVATIVE PILOT-SCALE PROCESS FOR SUSTAINABLE RARE EARTH OXIDE PRODUCTION FROM COAL BYPRODUCTS: A COMPREHENSIVE ENVIRONMENTAL IMPACT ASSESSMENT
Rabbani, M., J. Werner, A. Fahimi, and E. Vahidi. | Journal of Rare Earths 43(2):397-404(2025)

A pilot-scale process feeding was developed with two different materials resulting from a column leaching process and acid mine drainage (AMD) streams to recover rare earth elements (REEs). A life cycle assessment (LCA) study was conducted to evaluate the environmental impacts of rare earth production from deleterious material in the form of highly contaminated leachate (HCL) and low-contaminated leachate (LCL). Results indicate that the main contributors to the environmental categories that produce RE-hydroxide stages are NaOH and electricity. Also, oxalic acid, Na_2CO_3, and hydrochloric acid significantly contribute to the production stage of individual rare earth oxides (REOs), including solvent extraction (SX) and precipitation steps. The HCL route has higher environmental impacts than LCL due to higher chemical/energy and H_2SO_4 usage; 468 and 292 kg of carbon dioxide are generated to produce 1 t of individual REOs from HCL and LCL routes, respectively. Moreover, the carbon dioxide emitted from the process, including the RE-hydroxide production, SX, and REOs production, is less than 10 t CO_2. A sensitivity analysis was also performed to assess the changeability of the environmental footprints of the main inputs in the SX process, as the main stage has a higher contribution to the whole process.
https://www.sciencedirect.com/science/article/pii/S100207212400108X/pdfft?md5=47cb837b70a3d63f668368a2627b892f&pid=1-s2.0-S100207212400108X-main.pdf

SEMI-PASSIVE SATURATED ROCK FILL AND ACTIVE FLUIDIZED BED REACTOR TECHNOLOGIES FOR SELENIUM REMOVAL FROM MINE WATER
Borja, M., T. Rutkowski, and L. Choquehuanca. Proceedings of Mine Water Solution, 16-18 June, Vancouver, Canada, 2025

Two bench-scale selenium treatment systems were developed with anoxic biological technologies using contact water from a mine site in South America. Mine effluents are required to comply with a total selenium discharge limit of 0.02 mg/L for livestock and 0.05 mg/L for irrigation. Saturated rock fill (SRF) and fluidized bed reactor (FBR) methods were tested for removing selenium from waste rock seepage. Results from SRF bench tests conducted over seven months indicate that an average of 99% of nitrate and 95% of dissolved selenium were removed. Two different types of waste rock were tested in parallel test reactors and performed similarly. Testing allowed optimization of the hydraulic retention time, which will allow for a reduction in the total capital cost and the material needed for the full-scale implementation envisioned for the closure stage. A bench-scale study aimed to demonstrate that the FBR technology could successfully reduce the selenium concentration in mine water to below the required standard. Results of FBR bench tests over two months demonstrated treatment of dissolved selenium, decreased levels to below 0.05 mg/L, and showed that an average of 99% of nitrate and 90% of dissolved selenium were removed. Both technologies reduced the total selenium concentration from ~ 0.19 mg/L to below the required effluent levels of 0.05 mg/L for dissolved selenium. Further testing is recommended at the pilot scale with the same mine-influenced water at site conditions.*See pages 349-362:*
https://www.mineconferences.com/bluepixeldesign/wp-content/uploads/2025/06/FINAL-Proceedings-of-Mine-Water-Solutions-2025-3.pdf

Return to top

General News

GLOBAL ENVIRONMENTAL GEOCHEMISTRY AND MOLECULAR SPECIATION OF HEAVY METALS IN SOILS AND GROUNDWATER FROM ABANDONED SMELTING SITES: ANALYSIS OF THE CONTAMINATION DYNAMICS AND REMEDIATION ALTERNATIVES IN KARST SETTINGS
Xu, H., Q. Han, M. Adnan, M. Li, M. Wang, M. Wang, F. Jiang, and X. Feng.
Toxics 13(7):608(2025)

This review presents a framework for integrating molecular data and hydrogeological concepts to inform the management of risk and sustainable remediation of legacy metal pollution in karst. It considers how karst-specific features (i.e., rapid underground drainage, high permeability, and carbonate mineralogy) impact the mobility, speciation, and bioavailability of metallic pollutants, including Pb, Cd, Zn, and As. In some areas, such as Guizhou, China, the Cd content in the surface soil is as high as 23.36 mg/kg, indicating a regional risk. Molecular-scale analysis, such as synchrotron-based XAS, can elucidate the speciation forms that underlie toxicity and remediation potential. The review emphasizes discrepancies between karst in Asia, Europe, and North America and synthesizes cross-regional contamination events. The risk evaluation is complicated, particularly when dynamic flow systems and spatial heterogeneity are permanent, and deep models like DI-NCPI are required as a matter of course. Remediation is still dependent on the site; however, some technologies, such as phytoremediation, biosorption, and bioremediation, are promising if suitable geochemical and microbial conditions are present. https://www.mdpi.com/2305-6304/13/7/608

HARDROCK ABANDONED MINE HAZARDS: AN OVERVIEW OF IMPACTS AND SOLUTIONS
National Association of Abandoned Mine Land Programs and Interstate Mining Compact Commission, 59 pp, 2025

This report provides a comprehensive overview of issues related to hardrock abandoned mine lands (AML) across the U.S. It outlines the diverse impacts stemming from hardrock AML sites, reviews ongoing reclamation efforts of state, tribal, and federal agencies, and identifies policy solutions to accelerate progress with reclamation.
https://drive.google.com/file/d/1THQKrRuJqCMUSErO_fy02MKwm5Vzm-TJ/view

MOSAICS, MAPS, AND MULTI-COLLIERY HYDROGEOLOGIC UNITS: EPCAMR'S EFFORTS TO ADVANCE MINE POOL MAPPING MODELS TO ADDRESS AMD THROUGHOUT THE ANTHRACITE REGION
Hughes, R. and M. Hewitt. 2025 PA AMR Conference, 14-16 October, State College, PA, 32 minutes, 2025

This presentation describes long-term efforts to advance mine pool mapping and multi-colliery hydrogeologic unit (MCU) modeling across Pennsylvania's Anthracite Region to better understand and address abandoned mine drainage (AMD), subsidence, and water loss. Drawing on more than 15 years of work, the presentation describes how historic mine maps, cross-sections, and borehole data are digitized, georeferenced, mosaicked, and converted into detailed 3D GIS models that represent interconnected underground mine pools and flow paths. The models support treatment system planning, mine pool storage and volume calculations, stream restoration, and land use decision-making. Case studies from watersheds including Shamokin Creek, Mahanoy Creek, Black Creek, and Nanticoke Creek demonstrate how mine mapping informs AMD treatment consolidation, identifies subsidence and infiltration risk, and guides restoration strategies to keep surface water out of mines. The presentation emphasized that although the process is data-intensive and ongoing, open-access tools like the PA Mine Map Atlas are critical for translating historic mining records into actionable, region-wide remediation solutions.
https://www.youtube.com/watch?v=CnQdqWj4wgY

APPLICATION OF GENOMIC INNOVATIONS IN MINE OPERATIONS, RECLAMATION, AND CLOSURE
Chan, M.T.T., D. Charest, D. Stefanowicz, C. Loring, E. DeBruin, and F. Di Palma. | British Columbia Technical and Research Committee on Reclamation, 22-25 September, Penticton, British Columbia, 19 pp, 2025

This paper provides an overview of the current genomics technologies and approaches, including environmental DNA and microbial genomics, that are applied to mine operations, reclamation, and closure efforts. It includes examples from collaborative research and partnerships among academia, industry, Indigenous communities, and government in British Columbia and Canada. It also discusses the ongoing efforts to develop industry standards for genomics technologies, which are important for ensuring regulatory compliance and promoting the adoption of these solutions in the mining sector. As British Columbia expands its critical mineral sector, it will be important to balance the economic advantages of mineral resource development with preservation of the environment for current and future generations. By fostering innovation and collaboration among multidisciplinary teams and sectors, the province can adopt sustainable mining practices that benefit the well-being of its natural ecosystems and communities.
https://open.library.ubc.ca/soa/cIRcle/collections/59367/items/1.0450890?o=9

The Technology Innovation News Survey welcomes your comments and suggestions, as well as information about errors for correction. Please contact Michael Adam of the U.S. EPA Office of Superfund and Emergency Management at adam.michael@epa.gov or (703) 399-4268 with any comments, suggestions, or corrections.

Mention of non-EPA documents, presentations, or papers does not constitute a U.S. EPA endorsement of their contents, only an acknowledgment that they exist and may be relevant to the Technology Innovation News Survey audience.