

Entries for August 16-31, 2026

Market/Commercialization Information

MARKET RESEARCH FOR FY 27 SOUTH GEORGIA OPTIMIZED REMEDIATION CONTRACT (SRCSGT)
U.S. Army Corps of Engineers (USACE), South Atlantic Engineer Division, Savannah District, Savannah, GA
Opportunities on SAM.gov W912HN26S1001, 2026

This is a sources sought notice for market research purposes only under NAICS code 562910. The USACE Savannah District requests that firms interested in its Optimized Remediation Contract (ORC) for environmental remediation activities at Robins Air Force Base (AFB) and Moody AFB, Georgia, review the Draft Performance Work Statement (PWS) and provide responses through an online survey. The draft PWS describes the environmental services required to conduct remediation under the ORC, including investigation, remedial design, construction of remedial systems, operation and maintenance of established remedies, optimization of applicable remedies, and achievement of site-specific objectives. The Contractor will perform environmental remediation activities to achieve defined Performance Objectives at 26 Installation Restoration Program sites and one Military Munitions Response Program site that does not involve unexploded ordnance. The survey link can be found in the Sam.gov citation link below. Survey responses are due by 5:00 PM EDT on October 9, 2026. <https://sam.gov/workspace/contract/opn/bch-78960nfr3143a3abed6a7d4c36a7880/view>

SOURCES SOUGHT - SLDA NCSO (SRCSGT)

U.S. Army Corps of Engineers (USACE), Great Lakes and Ohio Engineer Division, Buffalo District, Buffalo, NY
Opportunities on SAM.gov W912P426R1CMU, 2026

This is a sources sought notice for marketing research purposes only. The USACE Great Lakes and Ohio Engineer Division seeks survey responses from qualified firms interested in providing on-site Nuclear Criticality Safety (NCS) support for the Shallow Land Disposal Area (SLDA) environmental remediation project in Parks Township, Armstrong County, PA under NAICS code 541620. The contractor will provide a qualified primary NCS Officer and alternate NCS Officer to support active environmental remediation operations at the SLDA site and serve as an independent technical advisor to USACE by providing oversight and quality assurance of the remediation contractor's NCS program. The anticipated scope will include on-site support during active remediation operations; field walkdowns and direct observation of remediation activities; reviewing NCS Evaluations, calculations, technical-basis documents, work plans, procedures, and other submittals; assessing the implementation and effectiveness of criticality-safety controls; auditing, assessing, and surveilling the remediation contractor's NCS program; reviewing safety, radiological, operational, and nuclear quality-assurance documentation; supporting the safe handling, measurement, processing, storage, transport, and disposing of excavated radiological materials, including special nuclear material; preparing independent technical reports identifying findings, risks, and recommended corrective actions; and coordinating with USACE, the site owner, regulators, and other project stakeholders, as required. Work will require periodic travel to USACE offices and other off-site meeting locations as needed. The anticipated requirement is a firm-fixed-price service contract with cost-reimbursable travel, consisting of a one-year base period and four option years. Survey responses demonstrating capability are due by 1:00 PM EDT on October 9, 2026. <https://sam.gov/workspace/contract/opn/515106a0f03249352a6c7c75a95a068ad/view>

MARKET RESEARCH FOR FY 27 SOUTH GEORGIA OPTIMIZED REMEDIATION CONTRACT (SRCSGT)

U.S. Army Corps of Engineers, South Atlantic Engineer Division, Savannah District, Savannah, GA
Opportunities on SAM.gov W912HN26S1001, 2026

This is a sources sought notice for marketing research purposes only under NAICS code 562910. U.S. Army Corps of Engineers, Savannah District, is considering the solicitation and subsequent award of an Optimized Remediation Contract at Moody AFB and Robins AFB in Georgia. The range of activities includes investigation, design, construction of remedial systems, operation and maintenance of established remedies, optimization at applicable sites, and achievement of site-specific objectives. The Contractor shall undertake environmental remediation activities to achieve Performance Objectives at 26 Installation Restoration Program sites and one Military Munitions Response Program site (non-unexploded ordnance site). Work also will include the development of a Project Management Plan, Integrated Master Schedule (IMS)/Milestone Payment Schedule; and Base-wide Quality Program Plans and Community Involvement Plans for each installation. Responses to the 25-question survey related to this anticipated solicitation are due by 5:00 PM EDT on October 9, 2026. <https://sam.gov/workspace/contract/opn/bch-78960nfr3143a3abed6a7d4c36a7880/view>

SMALL BUSINESS INNOVATION RESEARCH (SBIR) PHASE I SOLICITATION

U.S. Environmental Protection Agency, RTP Procurement Operations Division, E105-02. Federal Business Opportunities, FBO-4186, Solicitation SOL-NC-13-00012, 2026

During FY 2027, U.S. EPA contemplates awarding firm fixed-price contracts of up to \$100,000 that demonstrate proof of concept for specific topics under the broad focus areas of clean and safe water, air quality, circular economy/sustainable materials, and safer chemicals. Successful Phase I awardees are eligible to receive Phase II funding, up to \$400,000 for two years, through an additional application process. More information can be found on the EPA SBIR Funding Opportunities Page. Phase I contractors will conduct feasibility-related experimental research or R&D efforts in the following areas of interest:

- Topic A. Clean And Safe Water
- Topic B. Air Quality
- Topic C. Circular Economy/Sustainable Materials
- Topic D. Safer Chemicals

The period of performance for each Phase I contract will be six months. The EPA SBIR 2026 Phase I Solicitation is open from September 24, 2026, until November 8, 2026, at 11:59 p.m. ET. <https://www.epa.gov/sbir/how-apply-sbir-contract>

Return to top

Cleanup News

WATERSHED-SCALE REMEDIATION OF ACID MINE DRAINAGE IN THE ROBINSON RUN WATERSHED

DePriest, N. | West Virginia Mine Drainage Task Force 47th Symposium, 5-6 May, Morgantown, WV, 29 slides, 2026

Acid mine drainage (AMD) significantly impacts ~10 of the 13 stream miles of the Robinson Run Watershed in Monongalia County, West Virginia. The watershed encompasses extensive historic underground and abandoned mine workings and receives AMD from multiple sources. A watershed-scale remediation approach is being developed to address the sources collectively rather than through individual treatment systems. The project includes watershed characterization, project prioritization, preliminary design, and implementation. Thirty-four AMD sources have been identified in Robinson Run, including 31 with documented AMD discharges. Source monitoring indicates ~815 gpm of combined flow, with an average pH of 4.0, net acidity of 494 mg/L, total iron of 164 mg/L, and total aluminum of 55 mg/L, corresponding to estimated annual loads of 1,143 tons of acidity, 276 tons of iron, and 70 tons of aluminum. The proposed remediation strategy uses centralized treatment to collect and convey multiple AMD sources to a common treatment plant. The conceptual design includes gravity conveyance and pumping infrastructure, pretreatment of ferrous iron, a centralized hydrated-lime treatment plant designed for a max flow of 2,500 gpm, and sludge disposal within the Maiden Mine. Biological monitoring is also being conducted to establish pretreatment baseline conditions. Preliminary plans for Robinson Run are ~75% complete, with 30% of the design plans completed, which will then be provided to WVDEP's Abandoned Mine Lands Project for implementation. The project demonstrates a structured watershed-scale framework for prioritizing AMD sources, consolidating treatment infrastructure, and planning comprehensive stream restoration. <https://www.wmdtaskforce.com/wp-content/uploads/simple-file-list/2026-Symposium-Papers/DEPRIEST-WAMDTE-2026.pdf>

FAIRMONT AND MORGANTOWN MINE POOL MANAGEMENT

Roddy, R. | West Virginia Mine Drainage Task Force 47th Symposium, 5-6 May, Morgantown, WV, 16 slides, 2026

The Fairmont and Morgantown mine pools in northern West Virginia encompass extensive interconnected underground mine workings within the Pittsburgh coal seam and have historically required active pumping and water treatment to manage mine pool elevations and prevent uncontrolled discharges. Long-term monitoring and management of these mine pools have provided an opportunity to evaluate the effects of controlled flooding, changes in hydraulic connectivity, and reductions in active pumping to manage water treatment requirements. Monthly monitoring has been used to document mine pool elevations and pumped water volumes and to support long-term water management decisions. As pumping was discontinued in selected mine pools, water levels increased, and pools became hydraulically connected, including the observed transfer of water from the Humphrey and Pursglove mine pools into adjacent pools. The Morgantown mine pool water quality subsequently improved as the pools filled, transitioning from acidic to net alkaline conditions. The Flagg Meadows Water Treatment Facility, which uses recirculating lime slurry treatment, transitioned to hydrogen peroxide treatment in 2025 following the successful completion of the original design estimate. The data also identified significant differences in precipitation response among the mine pools, including a delay of up to ~1 week at Reitz 2, indicating substantial subsurface storage capacity. The resulting dataset enabled refinement of the proposed treatment plant design, including consideration of mine-pool storage to manage short-duration peak flows and incorporation of bypass capacity for extreme events. The presentation also describes the use of thermal drone surveys to identify previously unaccounted-for mine discharges and potential sources of sulfate loading to the Hawk Run watershed. <https://www.wmdtaskforce.com/wp-content/uploads/simple-file-list/2026-Symposium-Papers/RODDY-Fairmont-and-Morgantown-Mine-Pools.pdf>

HOW MANY DISCHARGE FLOWS ARE ENOUGH: A SHADE CREEK CASE STUDY

Clark, T. | West Virginia Mine Drainage Task Force 47th Symposium, 5-6 May, Morgantown, WV, 24 slides, 2026

The Shade Creek watershed in Somerset County, Pennsylvania, is one of the largest sources of mine drainage to the Stonycreek River and has been impacted by several large deep-mine discharges. Development of an active treatment plant was limited by the significant cost of treating the combined flows. Through grant funding, Phase 1 of the project was initiated to characterize discharge flows and support design of a future active treatment plant. Initial flow estimates based on a large dataset indicated that a treatment system sized for ~15 million gal/day (MGD) would be sufficient. However, installation of continuous water-level transducers at three major discharges (Reitz 4, Loyahanna 6, and Reitz 2) along with a local rain gauge provided a more complete understanding of watershed hydrology. Continuous monitoring captured flow conditions missed by conventional daytime and one-time measurements, and demonstrated that total flows could reach ~21 MGD, representing a 40% increase over the original design estimate. The data also identified significant differences in precipitation response among the mine pools, including a delay of up to ~1 week at Reitz 2, indicating substantial subsurface storage capacity. The resulting dataset enabled refinement of the proposed treatment plant design, including consideration of mine-pool storage to manage short-duration peak flows and incorporation of bypass capacity for extreme events. The presentation also describes the use of thermal drone surveys to identify previously unaccounted-for mine discharges and potential sources of sulfate loading to the Hawk Run watershed. <https://www.wmdtaskforce.com/wp-content/uploads/simple-file-list/2026-Symposium-Papers/CLARK-MV-TF.pdf>

Return to top

Demonstrations / Feasibility Studies

FIVE-YEAR PERFORMANCE REVIEW OF A MINE ROCK STOCKPILE COVER TRIAL IN THE CANADIAN SHIELD

Harrington, J., A. Cash, C. Mendoza, J. Straker, M. Iverson, V. Raizman, and M. Leclair.
Haagner, A. and F. van Wyk. Proceedings of the 18th International Conference on Mine Closure, 14 pp, 2025

The planned end land use for mine rock stockpiles at the Detour Lake Mine in Canada is dense mature coniferous forest to re-establish pre-mine ecosystems. A 10-hectare cover trial was constructed to assess the relative performance of different cover and revegetation prescriptions toward achieving planned end land use and determine site-specific reclamation design elements that would lead to better reclamation outcomes. The trial was divided into plots considering a range of slope angle, aspect, cover thickness, surface grading, and revegetation prescriptions. The trial was monitored after five years. Large-scale slope instabilities were not observed in the silv-ribe reclamation cover. Most erosional and depositional features stabilized three to four years following construction. The primary factors influencing erosion are variability in surface water run-on from the upstream bench and surface grading on slopes, with lesser influence from slope angle and cover thickness. Erosion performance was improved by limiting surface water run-on to slopes by using a microtopography surface grading of offset hummocks and hollows plus rapidly establishing vegetation. Conifer density is within the range required to achieve the planned end land use, although it is near the lower end with some ongoing mortality. Green runs are growing well and reveal water content. The presence of peat was the key driver of seedling survival and vigor. The trial demonstrated that the cover trial was successful in managing erosion and managed erosion. Insights into operational-scale construction methods and the relative performance of cover characteristics are being applied to ongoing progressive reclamation activities. <https://papers.acm.uwa.edu.au/72515-98-Cash/98-Cash.pdf>

ADAPTATION OF THE ENVIRONMENTAL CLAMSHELL DREDGE FOR BITUMEN MAT REMEDIATION IN BASE MINE LAKE DEMONSTRATION

Adedeji, O.E., N. Wang, R. Young, D. Major, A. Dunnola, A. Lanoue, and M. London.
Tailings and Mine Waste 2025 Conference, 2-5 November, Banff, AB, Canada, 12 pp, 2025

The Base Mine Lake Demonstration (BML) project presents the only full-scale commercial demonstration of water-capped tailings technology in an end pit lake. The method involves placing fine tailings (FT) below grade in a mined-out pit and covering them with the tailings from the plant to create a stable end plan. The mineral solids, which allow the tailings to densify. Over time, the water layer on top of the tailings form a lake that supports plants and animals. Since the BML's commissioning in 2012, research and monitoring show that FT settlement occurs as expected through self-weight consolidation, water quality improves over time, and ecological communities develop. Bitumen mats were found at the FT-water interface (mudline) in certain areas of the BML, which could impact lake performance. In 2024, a 55-day field pilot program was conducted to demonstrate that the environmental clamshell dredge could effectively remove the sediment and assess the bathymetry of the dredge bucket's position through surface surveys before and after dredging. The pilot was successful, with the post-dredging surface averaging ~39 cm, close to the intended 40 cm. A 3D sonar sensor was used during a live visualization test to verify the positional accuracy of the dredge bucket. <https://drive.google.com/file/d/1vWk4x14PIIX8lv05O-HmoeQ1pXG0Dn0L8/view>

ENHANCED ROCK WEATHERING IN ACID MINE DRAINAGE SYSTEMS: FIELD EVIDENCE AND PASSIVE TREATMENT IMPLICATIONS

Hkaung, H.S., N. Yamashita, N. Kimotsuki, F. Nakamura, F. Chikanda, R. Kikuchi, Y. Ohtomo, T. Otake, and T. Sato. | Cleaner Engineering and Technology 32:101203(2026)

Acid mine drainage (AMD) systems as potential enhanced rock weathering (ERW) sites were investigated in a field-scale study, emphasizing the use of mining waste rock as reactive material. Field-scale ERW trials were conducted in two AMD-impacted rivers in Japan using locally sourced basaltic waste rock (1-2 mm). One ton of crushed rock was deployed at each site: (1) Yoshioka basaltic andesite (YB) in the Amemasa River and (2) Tetsuzan basalt (Tz) in the Shojin River. After one year, ~0.79 tons of Yk and ~0.36 ton of Tz remained, reflecting substantial dissolution. Rapid weathering of volcanic glass in matrix phases caused particle fragmentation and increased reactive surface area, while the absence of alteration rinds confirmed congruent dissolution. Hydrochemical monitoring revealed sustained Ca ²⁺ and Mg²⁺ release, pH elevation, and schwertmannite precipitate. Schwertmannite co-precipitated arsenic without passivating rock surfaces, while proton release during its formation partly preserved acidic conditions that favor continued dissolution. The results highlight AMD systems as strategic ERW sites, offering a dual cleaner-production pathway: rapid and sustained weathering that ensures carbon dioxide removal (CDR) potential, and passive treatment of contaminated mine waters that provides remediation benefits. Leveraging mining by-products for ERW reduces the environmental burden of rock extraction and creates opportunities for integrated waste valorization, climate mitigation, and sustainable mine-site management. <https://www.sciencedirect.com/science/article/pii/S2766790876000675?pdf=share#d=6eaad737550a436176d46a66a657958oid=1-s2.0-S2766790876000675-main.pdf>

IN-SITU BIOAUGMENTATION OF URANIUM-CONTAMINATED GROUNDWATER USING DESULFOVIBRIO VULGARIS UR1: MECHANISTIC INSIGHTS, LABORATORY VALIDATION, AND FIELD PERFORMANCE

Jiang, L., H. Yang, J. Han, P. Wang, J. Liu, G. Zhu, L. Luan, J. Bai, Y. Guo, and J. Dou.
Journal of Hazardous Materials 506:141577(2026)

A study integrates lab mechanistic analysis with field-scale bioaugmentation, bridging microscopic insights with macroscopic application to remediate U(VI)-contaminated aquifers. Batch and simulated groundwater experiments demonstrated that quartz sand served as a matrix to promote biofilm growth and EPS secretion, which enhanced U(VI) reduction efficiency by ~40% and increased the UO₂ (U(VI)) product proportion by 14.05%. Bioaugmentation experiments established *Desulfovibrio*-dominated microbial consortia with stable effluent U(VI) concentrations around 10 µM and maintained a U(VI) reduction operation for over 30 days without external carbon input. Field pilot-scale experiments achieved U(VI) removal rate >80%, while UO₂ and sulfate levels remained stable under 10% SBB treatment, indicating more effective restriction of Cr uptake at this dose. However, 15% SBB showed improvement in soil physicochemical properties, antioxidant activity, relative water content, and reduction of oxidative stress markers, suggesting superior overall stress mitigation despite slightly higher Cr accumulation. Antioxidant defense mechanisms were strongly enhanced, reflected in increased APX, GR, MDHAR, AsA, GSH, and improved redox ratios.

Return to top

Research

MITIGATION OF CHROMIUM-INDUCED OXIDATIVE STRESS IN LEMONGRASS CULTIVATED ON SUKINDA CHROMITE MINE OVERBURDEN SOIL THROUGH BAGASSE BIOCHAR AMENDMENT

Nayak, M. and D.K. Patra. | Remediation 36(3):e70074(2026)

A study assessed the effectiveness of sugarcane bagasse biochar (SBB) in mitigating Cr-induced oxidative stress in *Cymbopogon flexuosus* grown on overburden soil (OBS) collected from a chromite mining site. The aim was to determine how SBB improves soil sustainability, reduces Cr toxicity, and enhances plant antioxidant responses for sustainable mine soil remediation. A greenhouse experiment was conducted with five treatments: T1 (garden soil), T2 (OBS), and T3-T5 (OBS with 5%, 10%, and 15% SBB). Soil physicochemical parameters (pH, organic carbon, cation exchange capacity [CEC], electrical conductivity), plant stress indicators (relative water content, electrolyte leakage), O₂ ²⁺, H₂O₂, and malondialdehyde were quantified. Ascorbate peroxidase (APX), glutathione reductase (GR), monodehydroascorbate reductase (MDHAR), non-enzymatic antioxidants (AsA, GSH), and soil enzyme activities were measured to assess biological responses. OBS showed increased pH and reduced CEC, organic carbon, and soil enzyme activity. SBB treatments improved soil properties, with 15% SBB showing the most significant improvements. The results highlight AMD systems as strategic ERW sites, offering a dual cleaner-production pathway: rapid and sustained weathering that ensures carbon dioxide removal (CDR) potential, and passive treatment of contaminated mine waters that provides remediation benefits. Leveraging mining by-products for ERW reduces the environmental burden of rock extraction and creates opportunities for integrated waste valorization, climate mitigation, and sustainable mine-site management. <https://www.sciencedirect.com/science/article/pii/S2766790876000675?pdf=share#d=6eaad737550a436176d46a66a657958oid=1-s2.0-S2766790876000675-main.pdf>

FEASIBILITY ASSESSMENT OF ELECTROCOAGULATION FOR HEAVY METAL REMOVAL FROM BARAPUKURIA COAL MINE DRAINAGE

Rifat, M.I., K.M. Jafar, S. Shamsuddin, and M. Hossain. Proceedings of the 3rd International Conference on Mechanical, Manufacturing and Process Engineering, 30-31 January, Gazipur, Bangladesh, 2026

Heavy metal contamination, including Fe, Mn, Ni, Cd, Cr, Pb, and As, in the vicinity of the Barapukuria coal mine poses serious environmental concern, especially in groundwater. This study assessed the applicability of electrocoagulation for Barapukuria's mine drainage. The process involved optimizing key operational parameters and evaluating the removal efficiency of major metals. Different electrode materials were compared to identify the most effective option. The study

examines both economic and environmental implications of the treatment process. A review of existing literature and data analysis showed that electrocoagulation can remove >90% of Fe, Mn, and Ni. The best performance is achieved at specific current densities, pH, and treatment durations. The cost analysis indicated that energy and electrode use are reasonable. The sludge volumes can be manageable under site conditions. The process outperforms conventional treatment in chemical savings and sludge reduction. Pilot studies are recommended to validate these findings for full-scale application.

Cu ISOTOPES RESOLVE ACID MINE DRAINAGE SOURCES AND TREATMENT PATHWAYS AT THE ARGO TUNNEL WATER TREATMENT PLANT

Morgan, M.C., R. Mathur, E.A. Holley, and C. Lasinsky.
Chemical Geology 703:123250(2026)

A study leveraged Cu isotopes as environmental tracers to identify AMD sources and decode treatment mechanisms at the Argo Tunnel Water Treatment Plant (ATWTP) in Idaho Springs, Colorado. The $\delta^{65}\text{Cu}$ isotopic signatures from the Argo Tunnel, Virginia Canyon, and Big Five Tunnel effectively differentiated the Cu contributions from each source. Mass balance modeling revealed that Mn-oxides accounted for 54% of Cu retention, and Mn-oxide adsorption is the dominant mechanism for Cu removal at the ATWTP, although Fe-oxides are more abundant. Findings suggest that adjusting Mn concentrations in influent waters could enhance Cu removal, forming the basis of the proposed Chemical Lime Enhancements for Advanced Remediation and Purification At Treatment Hubs (CLEAR PATH) strategy to optimize AMD treatment. The study also demonstrates the utility of Cu isotopes for tracing AMD sources and refining treatment processes, offering actionable insights for improving environmental remediation in mining-impacted regions. This work provides the first plant-wide copper-isotope mass balance ever reported for a full-scale AMD treatment plant and the first operational quantification of Cu partitioning between co-precipitating Fe- and Mn-oxides. <https://www.sciencedirect.com/science/article/pii/S0009254126001197?pdf=1&via=ihub>

EVALUATION OF A NOVEL ZERO-VALENT IRON BASED REACTIVE AMENDMENT FOR WETLAND SEDIMENT CONTAMINATED WITH HISTORICAL GOLD MINE TAILINGS USING CHIRONOMUS DILUTUS

Sequeira, S.A., E.E.V. Chapman, H. Gavel, and L.M. Campbell.
Science of The Total Environment 1011:181184(2026)

A study evaluated the efficacy of a Thin Reactive amendment and Protective capping (TRaP) treatment composed of silica sand, zeolite, zero-valent iron (ZVI), and bentonite as a potential remediation strategy for numerous wetlands in Nova Scotia contaminated by Hg and geogenic As from gold mine tailings. It also assessed whether TRaP could limit Hg and As toxicity and bioavailability to *Chironomus dilutus* larvae. Overlying water from TRaP-treated sediments had dissolved methylmercury (MeHg) and As concentrations, which were 78% and 99% lower, respectively, compared to untreated contaminated sediments. Chironomid survival improved from 45% in the contaminated sediment to 90% when treated, while growth increased by 36.5%. TRaP also reduced MeHg levels and improved chironomid growth and survival beyond that observed in sediments treated only with ZVI. However, total Hg bioaccumulation in the chironomids remained similar across contaminated and treated sediments at the end of the test. TRaP holds considerable promise as a practical remediation strategy for legacy-contaminated wetland ecosystems. Further research is needed to assess its effectiveness under real-world field conditions.

WHEN DENSITY MATTERS: HYDRAULIC AND SALINITY EVOLUTION IN GROUNDWATER-FED PIT LAKES IN SEMIARID AND ARID CLIMATES

Moser, B., P.G. Cook, J. Greskowiak, and I. Wallis. | Groundwater 64(4):441-456(2026)

Using numerical modeling, this study advances understanding of how density effects alter flow and salinity patterns in post-mining pit lakes. The study shows the impact of ambient groundwater salinity, regional hydraulic gradients, evaporation rates, and hydraulic conductivities on the interaction between a pit lake and the surrounding aquifer. The modeling shows how density effects can substantially increase lake water outflow and decrease pit lake water salinities. Pit lakes can turn from terminal sinks into throughflow systems purely due to variable-density flow. Understanding the hydraulic and salinity evolution of pit lakes is crucial for planning post-mining rehabilitation. <https://onlinelibrary.wiley.com/doi/pdf/10.1111/gwat.70704>

REMEDIATION OF Pb^{2+} -CONTAMINATED GROUNDWATER IN MINING AREAS USING ZEOLITE DERIVED FROM LITHIUM PORCELAIN CLAY TAILINGS

Li, T., G. He, M. Liu, Z. Cao, and J. Min.
Journal of Environmental Management 403:129087(2026)

A sustainable approach that converts lithium porcelain clay tailings (LPCT) into highly crystalline Na-faujasite zeolite to remove Pb^{2+} is presented. The synthesis conditions were optimized, and the framework evolution mechanism was elucidated: four-membered rings → 6-rings → faujasite supercages → crystalline faujasite. The synthesized zeolite exhibited a high Pb^{2+} adsorption capacity of 584.12 mg/g and a removal efficiency of 99.7%. In actual mining area groundwater, it achieved >99% Pb^{2+} removal with a high distribution coefficient (K_d of 3.3×10^5 mL/g, demonstrating excellent selectivity. Mechanistic studies revealed that ion exchange serves as the primary adsorption mechanism (contributing ~78%), supplemented by electrostatic interactions and surface complexation. The zeolite structure remained stable and could be effectively regenerated using 1 M NaCl, maintaining a high adsorption capacity (>85%) after five consecutive cycles. Preliminary environmental benefit analysis indicates that this "waste-to-resource" approach not only reduces tailings disposal but also exhibits a significantly lower carbon footprint compared to conventional zeolites and activated carbon during synthesis, highlighting its circular economy and environmental synergies. The study further discusses the potential and challenges for the industrial-scale application of this technology.

[Return to top](#)

General News

AMD TREAT SOFTWARE (VERSION 6.1): WHAT CAN IT DO FOR YOUR AMD TREATMENT EVALUATION?

Shultz, B. | 47th Annual National Association of Abandoned Mine Land Programs Conference, 20-23 September, Park City, UT, abstract only, 2026

Version 6.1 of the AMDTreat software was recently released with many enhancements. A basic understanding of the software capabilities, including sizing, evaluating predicted outfall water quality, and cost estimating the construction and operations and maintenance of passive and active treatment systems, is critical for its use. Currently, no formal training exists for the software from OSMRE, but resources are available to assist state personnel with the use of the AMDTreat software and how it can serve as a useful tool for evaluating AMD treatment options. New tools available in the latest version make the software extremely powerful and useful for understanding and applying AMD treatment technologies. *The software is available at* <https://www.osmre.gov/programs/reclaiming-abandoned-mine-lands/amdtreat>

INTEGRATED REMEDIATION AND ECOLOGICAL REHABILITATION OF MINE TAILINGS, MINING-IMPACTED SOILS AND ACID MINE DRAINAGE: TECHNOLOGY AND DECISION FRAMEWORKS

Chang, X., Y. Wang, Z. Zhang, Z. Gao, H. Geng. Minerals Engineering 244:110275(2026)

Recent progress in remediation and ecological rehabilitation technologies relevant to mining-impacted sites was synthesized, with an emphasis on approaches that couple contaminant control with ecosystem function recovery. A clear transition from single-technology solutions toward system-oriented integration driven by coupled source-pathway-receptor (SPR) processes and whole-of-life performance requirements was identified based on a screened core dataset of 904 primary research articles and complementary evidence from engineering practice. Physical, chemical, and biological approaches are compared using unified dimensions of mechanism, applicability window, operational constraints, failure modes, and by-product burdens. A consistent finding across the literature is that apparent short-term compliance frequently fails to translate into durable outcomes unless long-term contaminant loads (not only concentrations) are addressed, secondary wastes are managed in closed loops, and monitoring-triggered adaptive management is embedded from the outset. The review proposes a practitioner-oriented decision framework that links site conditions (pollutant speciation, hydrology, climate, receptors and post-closure land use) to recommended integrated treatment trains and default multi-criteria decision analysis criteria, highlighting research priorities for carbon-aware, circular and risk-based optimization. <https://www.sciencedirect.com/science/article/pii/S0892687526002190?pdf=1&via=ihub>

NEXT-GENERATION REMEDIATION OF POLLUTED MINE WATER: INNOVATIONS IN MICROBIAL ENGINEERING AND INTEGRATED TREATMENT SYSTEMS

Anekwe, I.M.S., and Y.M. Isa. | Mine Water and the Environment 45(1):3-21(2026)

A restructured perspective on acid mine drainage (AMD) bioremediation focused on innovations in microbial biotechnology and integrated bio-treatment systems. The objective was to identify emerging scalable and eco-efficient approaches for mitigating AMD through advanced biostimulation and bioaugmentation techniques. Emphasis was placed on the synergistic role of microbial consortia, typically featuring sulphate-reducing bacteria and carbon source optimization to enhance metal removal and sulphate reduction. Integrated and hybrid AMD treatment methods show high removal efficiencies for metals, sulphates, nitrate, and selenium, including integrated anaerobic bioreactors and constructed wetlands (30-99%), combined bioaugmentation and biostimulation (47-96%), and multi-sequential systems (60-99%). These approaches offer site-specific adaptability, environmental resilience, and cost-effective solutions for sustainable AMD remediation. The review also analyzes critical parameters affecting performance, including pH, temperature, metal toxicity, and hydraulic retention time. It provides an outlook on biotechnological strategies that integrate microbial engineering, waste beneficiation, and process optimization to redefine the landscape of AMD remediation. *This article is Open Access at* <https://link.springer.com/article/10.1007/s10230-026-11105-z>

MICROBially INDUCED MINERALIZATION FOR MINE TAILINGS TREATMENT: PROGRESS, CHALLENGES, AND FUTURE PROSPECTS

Li, Z., X. Yuan, H. Fu, S. Lin, and X. Xu.
Journal of Environmental Management 413:130350(2026).

This review synthesizes recent advances in microbial-induced carbonate precipitation (MICP) for mine tailings management. It organizes current knowledge around four engineering functions, including tailings dam reinforcement, heavy metal immobilization, surface dust control, and value-added utilization of tailings materials, and links treatment performance to the underlying biogeochemical and microstructural mechanisms. Particular attention is given to additive-assisted MICP strategies. It classifies organic and inorganic additives and evaluates their effects on bacterial activity, nucleation behavior, crystal morphology, reaction environment, and engineering performance. The review identifies the key factors governing treatment effectiveness across different tailings types and service conditions and discusses major barriers to field implementation, including low and heterogeneous treatment efficiency, high reagent and delivery costs, uncertain field adaptability, and insufficient evidence on long-term durability. A future research framework is proposed that integrates mechanism clarification, additive optimization, multi-scale performance evaluation, and field-oriented process design. The review aims to provide a clearer scientific basis and a more practical roadmap for advancing MICP from laboratory studies to engineering application in mine tailings management.

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.micba@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.