**Technology Innovation News Survey**

**Entries for March 16-31, 2018**

**Market/Commercialization Information**

**GRANT PROJECTS: REDUCING MERCURY USE IN SMALL-SCALE GOLD MINING**

The Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, is advertising four international grant projects aimed at preventing or minimizing the release of mercury into the environment during artisanal or small-scale gold mining. The estimated award ceiling varies, but a single award is anticipated for each grant, and the responses due date is 2:00 PM ET on May 25, 2018.

**FOR更好地了解PFAS在全美范围内的使用情况，美国环保署寻求为以下主题提供新的信息：**

1. PFAS的暴露和健康后果，包括饮用、皮肤暴露和在环境中的持久性。
2. PFAS对人体健康的影响和风险的科学基础。
3. PFAS的暴露和健康后果对不同人群的影响，包括儿童、老年人和低收入、少数族裔和土著社区。
4. PFAS的暴露和健康后果的经济影响。
5. PFAS的暴露和健康后果的评估方法。
6. PFAS的暴露和健康后果的政策和监管行动的建议。

**CLEANUP NEWS**

**MIKE TAILING DRAINAGE: A BOTTOMS UP APPROACH USING HDD DRILLING AND INSTALLATION METHODS**

Bardley, D.

Ridal, Nevada Water Resources Association Annual Conference, 14-16 Feb 2017, Las Vegas, NV.

At some historic mine sites, impoundment dewatering is the first step in remediation. At a site in Nevada, two small tailings ponds were dewatered using HDD technology. The project was successful and met the client’s goals of reducing the volume of contaminated water in the ponds and preparing the site for future use.

**SUPERNATURAL ENVIRONMENTAL REMEDIATION SERVICES**

Federal Aviation Administration (FAA), W. Hughes Tech Center, Atlantic City, NJ.


The FAA requests proposals for services to perform Supernatural Environmental Remediation Services. The services include the removal of Supernatural Remediation Services (SRS) contaminated soils and organic residues from the site by excavation and dewatering of the site. The services are required to be performed at an SRS site located in the Atlantic City International Airport, Atlantic County, New Jersey.

**TRAINING SUPPORT WORKSHOP ACTIVITIES FOR THE STATE REVOLVING FUND (SRF) PROGRAMS**


U.S. EPA is soliciting applications from eligible applicants to promote participation in State Revolving Fund (SRF) program activities. The applications will be used to support the technical assistance and training needs of states and other SRF program participants.

**WASTE REMEDIATION: UNITED STATES CASE STUDIES**

HDI—Geotechnologies for Mine Site Rehabilitation, Elveron Inc.


Describes the strategies, successes and failures of various remediation systems worldwide. The book provides valuable information for engineers, site consultants, lawyers, etc., and is a valuable resource for anyone involved in mine site remediation.

**HENRY’S KNOLL SITE CASE STUDY: REVITALIZING MINE TAILINGS IN CLOVER, SOUTH CAROLINA**

U.S. EPA, Technology Innovation and Field Services Division, Washington, DC.

EPA OA-16-01, 10 pp, 2017.

Working with state and federal regulatory agencies, a proactive responsible party is using adaptive management approach to address environmental impacts from decades of cyanide mining at the Henry’s Knob Superfund Alternative. Sampling and testing of the site was conducted using a portable XRF that was developed by a team of researchers at the University of Kentucky.

**DEMONSTRATIONS / FEASIBILITY STUDIES**

**TREATMENT OF MINE DRAINAGE WITH SIGNIFICANT TOPOGRAPHICAL CHALLENGES: CASE STUDY OF THE BODENIKE SITE (FRANCE)**

Igual, J.C., M. Sainz, and T. Menard

Mine Water and the Environment [Publication online 3 Mar 2018 prior to print]

The Bodenike water treatment system was designed to treat mine drainage from a large open-cast mine in the French Pyrenees. The system consists of several treatment steps, including neutralization, precipitation, and filtration. The system is highly effective in removing metals and sulfur from the mine drainage, and the treated water is discharged into a nearby river.

**CLOSED LOOP FOR AMD TREATMENT WASTE**

Zamora, K. and G. Miller


The Leucite is an abandoned former copper and sulfur mine located in the Sierra Nevada of the Western United States. Acid mine water at the site is treated in a four-component, open-pit, alkaline-based biotreatment that has operated since 1999. The system includes a series of static mixing tanks, a pH adjustment step, a biological treatment zone, and a final clarification step. The treated water is discharged into a nearby river.

**PASSIVE TREATMENT OF HIGHLY CONTAMINATED IRON-RICH ACID MINE DRAINAGE**

Noyela, C.M., T.Y. Sakuramoto, B. Buryaeva, T. Denny, and J.C. Igual

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The economic pre-treatment of coal mine drainage water with caustic and ozone:


The author used coal mine wastewater and found that ozonation before coagulation decreases Fe concentration and chloride before ozonation decreases COD and TC. It was also found that ozone treatment reduces the COD and TC of coal mine wastewater. The results showed that ozonation can be used as a pretreatment step before coagulation to reduce COD and TC in coal mine wastewater.

Chemical mass transport between fluid tide fillings and the overlying water cover of an oil sands end pit lake:


The study was conducted in a large oil sands facility in Alberta, Canada, and found that chemical mass transport between fluid tide fillings and the overlying water cover is an important process in the water balance of oil sands operations. The results showed that chemical mass transport can lead to significant changes in water quality and that it is important to consider this process in the design and operation of oil sands facilities.

RESEARCH

STRATEGIES FOR REHABILITATING MERCURY-CONTAMINATED MINING LANDS IN COLOMBIA FOR RENEWABLE ENERGY AND OTHER SUSTAINABLE RE-USE:


The study was conducted in a mercury-contaminated mining area in Colombia and found that the strategies for rehabilitating mercury-contaminated mining lands are crucial for the development of renewable energy and other sustainable re-use. The study found that the use of sustainable re-use strategies can help to reduce the environmental impact of mining activities.

USING ORGANIC AMENDMENTS TO RESTORE SOIL PHYSICOCHEMICAL AND BIOLOGICAL PROPERTIES IN THE NORTHERN GREAT PLAINS, USA:


The study was conducted in the Northern Great Plains, USA, and found that using organic amendments can restore soil physicochemical and biological properties. The results showed that organic amendments can improve soil structure, increase soil organic matter content, and enhance soil microbial activity.

A study is underway to develop a low-cost and sustainable floating wetland treatment (FWT) system for acid mine drainage (AMD) at the abandoned Tab-Simco coal mining site in Illinois using vetiver grass. Tab-Simco AMD is highly acidic and contains significant amounts of heavy metals and other contaminants.

A PRELIMINARY STUDY TO DESIGN A FLOATING TREATMENT WETLAND FOR REMEDIATING ACID MINE DRAINAGE-IMPACTED WATER USING VETIVER GRASS (Vetiveria zizanioides) AT TAB-SIMCO市の酸性ミネラル汚染浸出液処理用浮動湿原システムの設計のための予備研究

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Potential of eucalyptus Callitris glaucoides for phytostabilization of trace metals in a contaminated soil:


The study was conducted in a contaminated soil and found that eucalyptus Callitris glaucoides has potential for phytostabilization of trace metals in a contaminated soil. The results showed that eucalyptus Callitris glaucoides can reduce the bioavailability of trace metals in a contaminated soil.

Grades of sand in a wave-like area were better in wave-like than in leveled plots. Grasses might have preferred the leveled plots because soil porosity was lower and clay content was higher in leveled than in wave-like plots.

A preliminary field trial was implemented in spring 2011 in Cunningham mining site in NW. The trials were amended with compost municipal solids and planted with a grass (Agrostis capillaris) and with willow (Salix spp.) and poplar (Populus nigra) trees. Compost amendments improved soil properties, such as pH and fertility, and decreased soil Cu availability, leading to the establishment of a healthy vegetation cover. Both compost amendment and root activity ameliorated acid enzyme activities and induced important shifts over time. The beneficial effects of the phytostabilization process were maintained at least three years after treatment.

GIANT MINE STATE OF KNOWLEDGE REVIEW: ARSENIC DUST MANAGEMENT STRATEGIES:


The study is a comprehensive review of arsenic dust management strategies and found that several strategies are needed to manage arsenic dust effectively. The study found that the use of dust suppressants, the use of dust control techniques, and the use of personal protective equipment are effective strategies for managing arsenic dust.

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MULTI-SCALE INVESTIGATION OF URANIUM ATTENUATION BY ARSENIC AT AN ABANDONED URANIUM MINE, SOUTH TERRAS

An international team led by the University of Sheffield has discovered that the toxic element arsenic prevents uranium at the abandoned South Terras uranium mine in Cornwall, England, from migrating into surface water and groundwater. Ore extraction processes and natural weathering of rock at the South Terras mine led to the proliferation of other elements during degradation, particularly arsenic and beryllium, which were found in significant concentrations. The arsenic and uranium have formed the highly insoluble secondary mineral metarsenite. This paper is in Open Access: https://www.nature.com/articles/s41598-017-11095-2

WATER QUALITY IN THE FREIXEDA ABANDONED GOLD MINE AFTER REHABILITATION

G. D. and P.A. Smith International Conference on Groundwater in Fractured Rocks, Chaves, Portugal, June 2017

At the Freixeda abandoned gold mine in Portugal NE, mine closure happened in 1965. Remediation processes of containment and control of tailings and phyto-remediation with macrophytes in a wetland were carried out in 2007. Water samples collected at various sites along the drainage system show that contamination is still present in the mine waters. The authors of this paper present a method to prevent the transport of suspended solids and heavy metals into the drainage system using macrophytes. The results of this investigation were validated with site data from the mine into the Freixeda basin and to the drainage from a covered aquifer. Restoration of AOD at the site is no longer effective due to lack of maintenance.

N-P FERTILIZATION STIMULATES ANAEROBIC SELENIUM REDUCTION IN AN END-PIT LAKE

Ludz, A., D. Preston, and S. Eavesman
Scientific Reports 7:10502(2017)

Fertilization of an end-pit lake with N and P increased primary production, creating a hypersaline, hypoxic layer, and enhanced the habitat for locally present anaerobic Se- and sulfur-reducing bacteria. Within two years, Se concentrations fell 10-fold, reaching water-quality guideline values.

General News

ARCH CENTRE FOR MINE SITE RESTORATION

The Australian Research-Council’s Centre for Mine Site-Restoration (CMSR) was officially launched on March 31, 2017. The CMSR, a joint research initiative of Curtin University and the University of Western Australia, is supported by the BHP Billiton, Rio Tinto, Fortescue Metals Group, Elyx Resources, and the Cooperative Research Centre for Coal Mine Water Management (CRC CMW). The Centre aims to deliver a suite of integrated and focused research projects to underpin successful mine site restoration outcomes.

PRACTITIONER RESTORATION MANUAL

Botanic Gardens and Parks Authority/Smitech Midwest Corporation, Australia, 44 pp, 2017

This restoration manual is largely a synthesis of research findings from a 5-year collaboration undertaken March 2012-March 2017 between Botanic Gardens and Parks Authority and Smitech Midwest Corporation (SMC). The project was carried out in the mid-west region of Western Australia on SCM holdings for post-mining restoration of a threatened ecological community in a banded iron formation landform that was mined for iron ore. While a large part of this restoration manual was developed for restoration within the mine, it is also useful for sites in other industries, such as oil and gas, linear infrastructure, and local government assets. The manual is based on current knowledge of restoration practices to improve the health of the restored site and to enable the future use of the site by future generations.

ANNUAL WORKSHOP PROCEEDINGS

British Columbia Mine Environment Neutral Drainage Acid Rock Drainage Annual Workshops.

The proceedings of the BC MEND ML/ARD workshops have been archived online since the first workshop in 1995. The online database allows access to every presentation delivered at the workshops. Browse by year or use the search functions to find a specific presentation.

SAN JUAN MINING AND RECLAMATION CONFERENCE

Mountain Studies Institute database.

The primary goal of this annual conference is to educate the public and other stakeholders on the science and policy of mining, mine lands remediation, and water quality as it relates to non-point source pollution, improving mining practices, and addressing water quality impairments through workshops, field tours, and presentations. Each year the conference is hosted in a different San Juan community to highlight the state’s mining heritage and success in productivity mine waste management and water quality. This year’s conference began posting presentation videos and audio recordings in 2015 along with the meeting agenda and abstracts. The eighth annual conference took place May 2-4, 2016, in Creede, Colorado.

IMWA 2017: MINE WATER & CIRCULAR ECONOMY, LAPPEENRANTA, FINLAND


The theme of the IMWA 2017 Congress—“Mine Water & Circular Economy”—was represented in 243 oral and poster presentations. A circular economy “closes the loop” of product lifecycles by improving recycling and re-use; hence, valuable nutrients such as nutrients found in abandoned metal mines are recovered from mining wastes and mine water. The proceedings are published online at https://www.imwa-2017.org

BIO-GEOTECHNOLOGIES FOR MINE SITE REHABILITATION

Pridgel, H.N. P. I. de-Carreras Fernández, and S.A. Rodriguez (eds)
Chester, New York: ISBN: 978111852669, 210 pp, 2018

This text identifies biological, physical, chemical, and engineering approaches useful to the reclamation of mine waste and acid mine drainage, providing coverage across different types of mining industries. Cost-effective strategies and remediation and rehabilitation methods are presented for contaminated sites, soils, and waste dumps. The paper in Section 1.5 provide potential strategies and approaches for mine site rehabilitation, and those in Section 2 offer site restoration case studies. See the table of contents and chapter abstracts at http://www.crcpress.com/Bio-geotechnologies-For-Mine-Site-Rehabilitation/Pridgel/9781138957360

APPROPRIATE ASPIRATIONS FOR EFFECTIVE POST-MINING RESTORATION AND REHABILITATION: A RESPONSE TO KAZMIERCZAK ET AL.


The lack of clarity surrounding the definition and application of terminology in post-mining ecological repair is problematic for setting objectives, establishing goals, and assessing recovery trajectories. The authors present an outline of internationally agreed definitions concerning the restoration and recovery processes, followed by an example to both the mining industry and policy-makers to re-examine terminology in the interests of attaining an internationally agreed definition. The goal is to promote sustainable clarity in the use and understanding of mine-site rehabilitation terminology to align post-mining targets with community expectation, enhance the capacity of the mining industry to understand and meet those targets, and foster better analyses and more industry-relevant discussion of recovery methodologies by the scientific community and practitioners.

The Technology Innovation News Survey welcomes your comments and suggestions, as well as an information about errors for correction. Please contact Michael Adam of the U.S. EPA Office of Superfund Remediation and Technology Innovation at Adam.michael@epamail.wa.gov or (703) 605-9915 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.