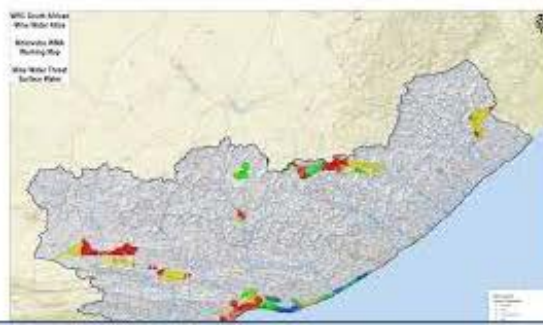
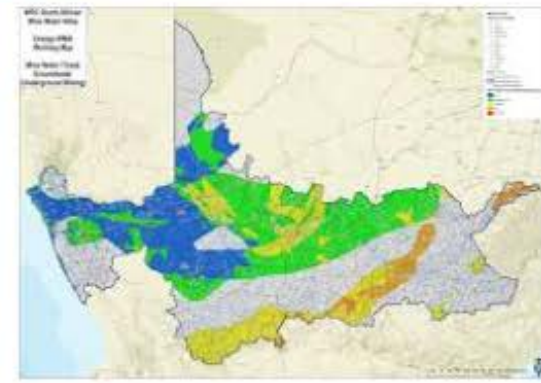




IMWA

International Mine Water Association

Samlar branschens aktörer med fokus på vattenfrågor



Tidig miljömedvetenhet

It was during the major reintroduction and expansion of mining and smelting in the 16th century that environmental controls were first introduced in England: Coal burning was prohibited in London in order to reduce the atmospheric smoke.

During the same period, Georgius Agricola, a physician and notably strong industry supporter, in *De Re Metallica* (1556), the first modern text on mining, mentioned some of the negative effects of the industry on the environment and further referred to early restrictive Italian legislation.

*Källa: Robertson, A.M. (1986) Mine waste disposal:
An update on geotechnical and geohydrological aspects*



Ur: De Re Metallica, av Georgius Agricola (1556)

"...the strongest argument of the detractors is that the fields are devastated by mining operators, for which reason formerly Italians were warned by law that no one should dig the earth for metals and so injure their very fertile fields, their vineyards, and their olive groves. Also they argue that the woods and groves are cut down, for there is need of an endless amount of wood for timbers, machines, and the smelting of metals. And when the woods and groves are felled, then are exterminated the beasts and birds, very many of which furnish a pleasant and agreeable food for man. Further, when the ores are washed, the water which has been used poisons the brooks and streams and either destroys the fish or drives them away. Therefore the inhabitants of these regions, on account of the devastation of their fields, woods, groves, brooks and rivers, find great difficulty in procuring the necessities of life, and by reason of the destruction of the timber they are forced to greater expense in erecting buildings. Thus it is said, it is clear to all that there is greater detriment from mining than the value of the metals which the mining produces."

Ur: De Re Metallica, av Georgius Agricola (1556)

"...the strongest argument of the detractors is that the fields are devastated by mining operators, for which reason formerly Italians were warned by law that no one should dig the earth for metals and so injure their very fertile fields, their vineyards, and their olive groves. Also they argue that the woods and groves are cut down, for there is need of an endless amount of wood for timbers, machines, and the smelting of metals. And when the woods and groves are felled, then are exterminated the beasts and birds, very many of which furnish a pleasant and agreeable food for man. Further, when the ores are washed, the water which has been used poisons the brooks and streams and either destroys the fish or drives them away. Therefore the inhabitants of these regions, on account of the devastation of their fields, woods, groves, brooks and rivers, find great difficulty in procuring the necessaries of life, and by reason of the destruction of the timber they are forced to greater expense in erecting buildings. Thus it is said, it is clear to all that there is greater detriment from mining than the value of the metals which the mining produces."

Ur: De Re Metallica, av Georgius Agricola (1556)

"...the strongest argument of the detractors is that the fields are devastated by mining operators, for which reason formerly Italians were warned by law that no one should dig the earth for metals and so injure their very fertile fields, their vineyards, and their olive groves. Also they argue that the woods and groves are cut down, for there is need of an endless amount of wood for timbers, machines, and the smelting of metals. And when the woods and groves are felled, then are exterminated the beasts and birds, very many of which furnish a pleasant and agreeable food for man. Further, when the ores are washed, the water which has been used poisons the brooks and streams and either destroys the fish or drives them away. Therefore the inhabitants of these regions, on account of the devastation of their fields, woods, groves, brooks and rivers, find great difficulty in procuring the necessaries of life, and by reason of the destruction of the timber they are forced to greater expense in erecting buildings. Thus it is said, it is clear to all that there is greater detriment from mining than the value of the metals which the mining produces."

Tidig miljömedvetenhet, Dylta Bruk

Ur: Från Svavelbruk till vattenbruk, berättelser ur Dylta bruks historia, Sture Nilsson (2005)

”Vattnet var det stora problemet för gruvhanteringen vid Dylta, nu och i framtiden. Det största problemet var den usla, många gånger obefintliga tillgången på ved och kol. Redan nu styrde möjligheten att få fram kolningsved produktionen i allt. Och kolvedskörslorna till Dylta krävde fler dagsverken än själva arbetet vid bruket.

Ytterligare ett bekymmer uppstod redan 1608. Det var miljöproblemet! Dyltas grannbönder klagade på både rök och industriutsläpp, som sades bekomma deras skördar illa. Miljöförstöring skulle vi kalla det nuförtiden. På 1641 års karta "Offwer Svavel Bruket I Neriket och Axebärghz Sochn" anmärkte lantmätaren "Een Sank Eng al forderfwat aff Victrils Luthen". Också en karta från 1710 över Dylta bruk ger oss en liknande upplysning: ”Ängsmark som är alldeles bortskämd af Vitriols Luten". Genom området flöt Lutabäcken, och det var dåtidens miljösyn som gav den dess nya namn. Tidigare hette vattendraget Olm eller Ölm”.

Tidig miljömedvetenhet, Dylta Bruk

Ur: Från Svavelbruk till vattenbruk, berättelser ur Dylta bruks historia, Sture Nilsson (2005)

”Vattnet var det stora problemet för gruvhanteringen vid Dylta, nu och i framtiden. Det största problemet var den usla, många gånger obefintliga tillgången på ved och kol. Redan nu styrde möjligheten att få fram kolningsved produktionen i allt. Och kolvedskörslorna till Dylta krävde fler dagsverken än själva arbetet vid bruket.

Ytterligare ett bekymmer uppstod redan 1608. Det var miljöproblemet! Dyltas grannbönder klagade på både rök och industriutsläpp, som sades bekomma deras skördar illa. Miljöförstöring skulle vi kalla det nuförtiden. På 1641 års karta "Offwer Svavel Bruket I Neriket och Axebärghz Sochn" anmärkte lantmätaren "Een Sank Eng al forderfwat aff Victrils Luthen". Också en karta från 1710 över Dylta bruk ger oss en liknande upplysning: ”Ängsmark som är alldeles bortskämd af Vitriols Luten". Genom området flöt Lutabäcken, och det var dåtidens miljösyn som gav den dess nya namn. Tidigare hette vattendraget Olm eller Ölm”.

Tusen års gruvdrift i Falun...

- Koncessionsnämnden för miljöskydd föreskrev 1976 att Stora Kopparbergs Bergslags Aktiebolag skulle utforma en metod för rening av gruvvattnet.
- 1987 började gruvvattnet vid Falun renas, då genom att sammanföra gruvvattnet med det kommunala avloppsvattnet. Problem med ex lättnedbrytbara organiska ämnen, slamavvattning och förändringar i gruvvattnets sammansättning gjorde att de båda vattnen sedermera fick separata behandlingssystem.

Källa: Falu gruvas miljöhistoria, Lennart Lindeström (2002)

Vatten...

- Surt gruvlakvatten (AMD/ARD) först beskrivet i Sverige av Gunnar Jacks, 1976 (Gustafsson, H.E. et al. (1999)).
- Största enskilda källan för metaller till vatten i Sverige och ex den största ekonomiska förpliktelsen för den kanadensiska gruvindustrin (MEND, 2001).
- Att stoppa bildandet av sura lakvatten, när processen väl startats, är en utmaning.
 - Den kommer att fortsätta (och eventuellt accelerera) till dess att en eller flera av reaktanterna (sulfidmineral, syre, vatten) tar slut eller utesluts.



INAP – The International Network for Acid Prevention

- Industridriven internationell organisation skapad 1998.
- Koordinera och möjliggöra global forskning och informationsöverföring avseende hantering av gruvavfall och utmaningar inom ARD.
- Medlemmar är gruvbolag som arbetar tillsammans för att sprida information och dela erfarenheter, bland annat genom konferensserien "ICARD" och tillhandahållande av "GARD Guide".
- INAP:s medlemmar är för närvarande:
 - Anglo American
 - Barrick Gold Corporation
 - BHP Billiton
 - Kinross Gold Corporation
 - Newcrest Mining Limited
 - Newmont Mining Corporation
 - Rio Tinto
 - Teck Resources Limited



Recognition of acid drainage as a major environmental challenge to the minerals industry worldwide led to the establishment of the first International Conference on Acid Rock Drainage...

ICARD 1 – Röros, Norway: 1988

ICARD 2 – Ottawa, Canada: 1991

ICARD 3 – Pittsburgh, USA: 1994

ICARD 4 – Vancouver, Canada: 1998

ICARD 5 – Denver, USA: 2000

ICARD 6 – Cairns, Australia: 2003

ICARD 7 – St. Louis, USA: 2006 (IMWA/ICARD)

ICARD 8 – Skellefteå, Sweden: 2009 (värd: SveMin)

– **"GARD Guide" lanseras!**

ICARD 9 – Ottawa, Canada: 2012

ICARD 10 – Santiago, Chile: 2015 (IMWA/ICARD)

ICARD 11 – Pretoria, South Africa: 2018 (IMWA/ICARD)



Global Acid Rock Drainage (GARD) Guide

State-of-the-art summary of the best practices and technology to assist mine operators and regulators to address issues related to sulphide mineral oxidation.

The GARD Guide currently has 11 Chapters:

1. The GARD Guide
2. The ARD Process
3. Corporate, Regulatory and Community Framework
4. Defining the Problem – Characterization
5. Prediction
6. Prevention and Mitigation
7. Drainage Treatment
8. Monitoring
9. Management and Performance Assessment
10. ARD Communication and Consultation
11. ARD Management in the Future

The Executive Summary of the Guide has been translated into Spanish and French and Turkish is in the process.

INAP – Global Alliance Partners

- INAP stöttar arbete med sura lakvatten som görs över hela världen, såväl globala som mer regionala nätverk.
 - Genom att ingå partnerskap – *Global Alliance* – med nyckelorganisationer kan informationsflöden och aktiviteter koordineras.
- Partnerskapet inkluderar inte några avgifter, utan baseras på deklarerande av gemensamma avsikter och intressen.

ADTI – Acid Drainage Technology Initiative – USA

MEND – The Mine Environment Neutral Drainage – Canada

SMI – Sustainable Minerals Institute – Australia

WRC – Water Research Commission – South Africa

CNAMD – The Chinese Network for Acid Mine Drainage – China

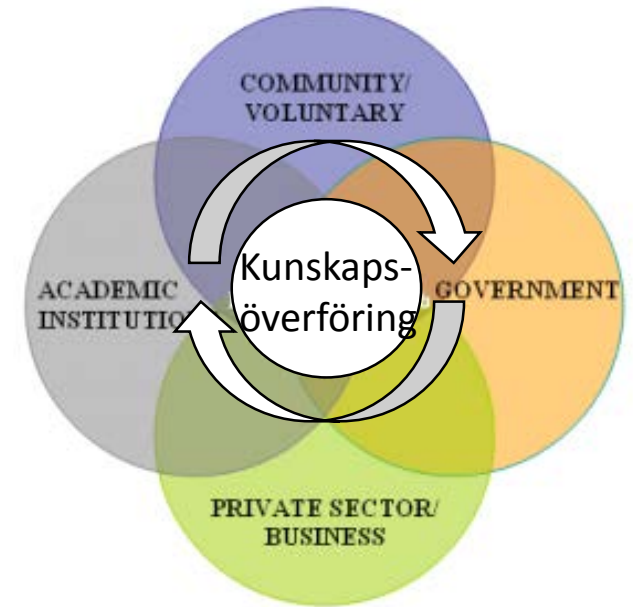
IMWA – The International Mine Water Association – Global

INAD – The Indonesian Network for Acid Drainage – Indonesia

SANAP – The South American Network for Acid Drainage – South America

IMWA – Vad och varför?

- Gruvvatten
 - Hydrologi, kemi, biologi, miljöaspekter
 - Surt, neutralt, alkaliskt
- Förebyggande, kontroll, behandling
- Medlemmar
 - Forskare & konsulter vid universitet/högskola, inom privat sektor, myndigheter
- Konferenser
- Tidskrift, Mine Water and the Environment



- IMWA 1979, Denver, Colorado (37 bidrag), fokus: "Mine dewatering"
- IMWA 1982, Budapest, Hungary (1st Congress)
- IMWA 1985, Granada, Spain (2nd Congress)
- IMWA 1986, Nottingham, UK, "Ground Water Problems in Mining"
- IMWA 1987, Kattowice, Poland, "Hydrogeology of Coal Basins"
- IMWA 1988, Melbourne, Australia (3rd Congress)
- IMWA 1990, Lisboa, Portugal
- IMWA 1991, Ljubljana-Pörtschach, Slovenia-Austria
- IMWA 1993, Chililabombwe, Zambia
- IMWA 1994, Nottingham, UK (5th Congress)
- IMWA 1995, Denver, USA, "Water Resources at Risk"
- IMWA 1996, Portorose, Slovenia
- IMWA 1997, Bled, Slovenia (6th Congress)
- IMWA 1998, Johannesburg, South Africa, "Mine Water and Environmental Impacts"
- IMWA 1999, Sevilla, Spain, "Mine Water & Environment for the 21st Century"
- IMWA 2000, Ustron, Poland (7th Congress)
- IMWA 2001, Belo Horizonte, Brazil

- IMWA 2002, Freiberg, Germany
- IMWA 2003, Johannesburg, South Africa (8th Congress)
- IMWA 2004, Newcastle Upon Tyne, UK
- IMWA 2005, Oviedo, Spain (9th Congress)
- ICARD/IMWA 2006, St. Louis, Missouri, USA
- IMWA 2007, Cagliari, Sardinia, Italy, "Water in Mining Environments"
- IMWA 2008, Karlsbad, Czech Republic (10th Congress)
- IMWA 2009, Pretoria, South Africa
- IMWA 2010, Sydney, Nova Scotia, Canada, "Mine Water and Innovative Thinking"
- IMWA 2011, Aachen, Germany, "Mine Water – Managing the Challenges" (11th Congress)
- IMWA 2012, Bunbury, Australia
- IMWA 2013, Golden, Colorado, USA, "Reliable Mine Water Technology"
- IMWA 2014, Xuzhou, Chia, "An Interdisciplinary Response to Mine Water Challenges"
- ICARD/IMWA 2015, Santiago, Chile
- IMWA 2016, Leipzig, Germany
- IMWA 2017, Lappeenranta, Finland, "Mine Water & Circular Economy"
- ICARD/IMWA 2018, Pretoria, South Africa (292 bidrag), "Risk to opportunity"

Processtekniska
aspekter

Miljöpåverkan

Policies,
myndigheter

Minska uppkomst
(avfallet, vittring)

Behandlingstekniker
för gruvvatten

Passiva metoder,
kostnadseffektivitet

Resurseffektivitet,
energi, materialval

Svemins miljökonferens 2017
Örebro

IMWA 2017-2020

President

Prof. Dr. Christian Wolkersdorfer, Pretoria, South Africa; Mikkeli, Finland

General Secretary

Dr. Lotta Sartz, Kumla, Sweden

Treasurer

Dr. Alison Turner, Plymouth, United Kingdom

Vice Presidents

Dr. Michael Paul Chemnitz, Germany

Prof. Dr Qiang Wu, Beijing, China

Councillors

Gareth Digges La Touche Stanton-on-the-Wolds, United Kingdom

Prof. Linda Ann Figueroa, Golden, USA

Dr. Andrew Johnstone, Johannesburg, South Africa

Prof. Jorge Loredó, Oviedo, Spain

Dr. James Pope, Christchurch, New Zealand

Prof. Nad'a Rapantova, Ostrava, Czech Republic

Prof. Changshen Wang, Xuzhou, China

John Waterhouse, West Perth, Australia (2014–2017)

Co-opted Councillors

Dr. Michael Drobniewski, Herne, Germany

Prof. Mark Lund, Joondalup, Australia

Uppdraget som G



- Hållbar mineralnäring
- Intressera/engagera unga för branschen

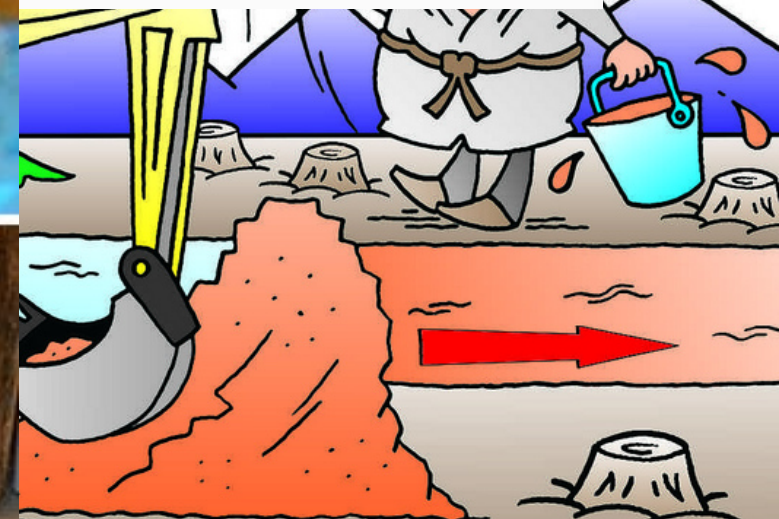
-
-



Social Media?

...minate knowledge and
...rch in an iterative and
...ctive way
...communities for partnerships,
...oration and sharing
...cademic research into the
...of people who can use it
...cademics connected to
...rch partners

...cs-of-social-media-marketing/



...nd Environment in Central Asia: A Cartoon
...anion , Zoï Environment Network, 2012



generalsecretary@imwa.info
lotta.sartz@bergskraft.se
lotta.sartz@oru.se