

21 November 2010
08:45 AM



Metal nitrates extracted from AMD used in explosives test

By: Christy van der Merwe

Published: 19th November 2010



JOHANNESBURG (miningweekly.com) - Environmental solutions developer Earth Metallurgical Solutions (EMS), through its proprietary acid mine drainage (AMD) treatment process, has used the metal nitrates extracted from mine effluent to produce a stabiliser used in emulsion explosives.

EMS CEO **Richard Doyle** said that the company has carried out field trials with mining services company AEL, which manufactures explosives, initiating systems, electronic initiators and blasting accessories.

The testing crew detonated 45 kg of emulsion explosives, in nine separate explosive charges.

"The testing went off with a bang, showing that we can blow the AMD problem out of the water," said

Doyle.

AEL Mining Services says that it intends to incorporate EMS's product into its bulk surface formulation, and the percentage replacement of ammonium nitrate in the final product will be dependent on the price and availability of the mixed metal nitrates (MMN) solution.

AEL Mining Services chief technologist **André Pienaar** explains that the MMN solution received from EMS was analysed to ensure that the correct concentration of metal nitrate salts were provided.

The product was then used to make up two batches of AEL's S200 Eco formulations, and 10% and 13% of the traditional ammonium nitrate was replaced by the MMN. The base emulsion was sensitised at AEL Mining Services' test range and successfully initiated with the standard initiating system.

"This is a significant step forward for AEL as it strives to provide the mining environment with an eco-friendly bulk explosive product. The combination of recycled waste oils and mixed metal nitrates in our surface bulk emulsion products ensures this. The MMN solution enhances the environmental stability of our products without negatively affecting the performance of our offering," adds Pienaar.

Doyle reiterates that the AMD problem, which has more recently come under the spotlight as an environmental issue that needs to be remedied with urgency, is a problem of funding, and not a problem of technology.

"There are various technology solutions to deal with AMD, but they are all expensive, and the mines and the government are trying to resolve who should pay for this," Doyle states.

By separating the AMD into its constituents, which all have uses and can be sold as products, generating revenues, they are commercially viable, negating the funding concerns.

EMS notes that what sets the company's technology solution apart, is the fact that it does not produce any byproducts through its AMD treatment process. Most solutions partially treat the AMD water, and often generate brine, or sludge, which poses an ongoing liability that needs to be stored and dealt with.

Doyle emphasises that the key to the solution is in the "salt" or the contaminating metals and other ions. He adds that the water purification is the 'easy part', and what is required, is finding a useful and profitable 'home' for the uranium, iron, calcium, sodium, sulphates and chlorides contained in the acidic water.

"This is what EMS does - we produce potable water, fertilisers, explosives - and nothing else."

EMS has also found that it can convert the metal nitrates it produces to thermal salts, which can be used for thermal storage in concentrated solar power plants.

South Africa has expressed interest in pursuing a large solar park, and this use for the AMD byproduct could

potentially present a R1-billion import replacement opportunity for Eskom and others considering building these plants.

EMS's initial AMD pilot programme was conducted at a Randfontein gold mine during 2009. This was followed in 2010 by an extensive Coaltech-funded trial programme on coal AMD and brines at four of South Africa's largest coal-mining companies.

The EMS process uses ion-exchange - likened to running a soup factory in reverse - to disassemble the AMD into its constituent elements. Once isolated, these are recombined into useful and valuable products, which could be sold to offset treatment costs and even generate profits in some cases.

The clean water produced at the end of the process, could be discharged into the environment or re-used either as drinking or industrial water.

Importantly, there is no solid or liquid waste generated.

The South African Cabinet recently appointed an Inter-Ministerial Committee to assess the extent of the AMD problem in South Africa. The IMC then appointed a team of experts to compile a report on the AMD situation in the Witwatersrand.

This was completed and presented to the IMC on October 22. The Ministers were said to have discussed the findings with the experts, and asked the team to identify more options to resolve the AMD problem, as well as the cost implications of each.

The IMC and the team of experts would then meet again to decide on the way forward, based on recommendations from the new report.

The report was not made public.

Copyright Creamer Media (Pty) Ltd. All rights reserved.

Tel: +27(0)11 622 3744 | Fax +27(0)11 622 9350 | newsdesk@miningweekly.com
<http://www.miningweekly.com>