



# ALBION PROCESS NEWS

## The Albion Process

The Albion Process was developed to treat refractory base and precious metals ores. Initially developed in 1993, the technology has since been patented worldwide.

The Albion Process consists of a hot oxidative leach of finely ground concentrates at atmospheric pressure. The process does not employ autoclaves, and does not rely on bacterial cultures. The technology is jointly owned by Xstrata and Highlands Pacific/OMRD (a Japanese consortium). Core Resources is the exclusive global marketing agent. Core's subsidiaries **hrl**testing Pty Ltd and Albion Process Pty Ltd provide testwork and engineering support for the technology, and Xstrata Technology ("XT") provides engineering services and technology support.

The Albion Process is an effective and simple solution for the treatment of refractory sulphide ores, to maximise metal recovery and minimise costs. With rapid development and commercial uptake of the Albion Process, this newsletter provides news on recent developments of this exciting technology.

**Duncan Turner,**  
General Manager – Albion Process.



The M3000 IsaMill Installed at Lonmin, South Africa

## Project Updates

### Las Lagunas, Dominican Republic

Australian company EnviroGold ("EVG") holds an Albion Process licence for the Las Lagunas Tailings Gold Project in The Dominican Republic. The project will treat over 5 million tonnes of tailings, producing around 85koz/y gold and 620koz/y silver. All environmental and construction licenses are in place.

Construction is expected to proceed in late 2009, and site earthworks (final floor, pads and spillage dam) are complete. The project has secured strong support from Macquarie Bank, which has structured a project finance facility and other financial support.

### Certej, Romania

Albion Process licensee European Goldfield Limited ("EGU") is progressing permitting for its Certej gold project in Romania. This involves the mining and processing of approximately 3.0 million tonnes per year of ore to produce approximately 160koz/y of gold and 820koz/y silver bullion in doré.

Three phases of metallurgical and pilot testwork were undertaken in Brisbane at **hrl**testing in collaboration with XT and EGU to support process design and engineering for the project.

EGU has announced an initial capital cost of €133.4 million, and a cash cost of US\$370/oz including silver credits.



Top: Las Lagunas, Dominican Republic  
Below: Certej, Romania

The project is currently being progressed to basic and detailed engineering phases to be carried out by a partnership of Romanian engineering company Cepromin together with Aker Solutions and Xstrata Technology.

## Other Albion Process Projects

Strong interest in Albion Process continues with **hrl**testing undertaking bench scale and pilot testwork on a wide variety of feed materials over the past 12 months. A number of refractory gold projects worldwide are currently progressing through testwork programs into process engineering studies. Advanced pilot plant and engineering programs for copper and nickel projects are also progressing, with successive stages of testing (bench scale, pilot and demonstration) planned.

## Preliminary Process Engineering Studies

Albion Process Pty Ltd offers cost effective process engineering services for the Albion Process, for projects at scoping or prefeasibility level. At modest cost, process studies can be rapidly developed including mass/heat balance, process flow diagrams, general arrangement, capital costs and operating costs. These preliminary studies can be done as part of option analyses for projects, drawing on over 15 years of research, trial work and engineering experience.

Detailed Metsim modelling has been used to assist with the design and optimisation of the Albion Process for several projects. Metsim serves as a valuable predictive tool allowing the optimisation of key process variables including Albion Process tankage heat dissipation & operating temperature, reaction modelling across the leach train and integration of the Albion Process into the site wide water balance. These engineering activities have contributed towards a robust process package supporting the full scale design and construction of Albion Process plants.

## Xstrata Technology (XT) engineering services

XT has recently developed several key technology components to complement its revolutionary Albion Process oxidative leach.

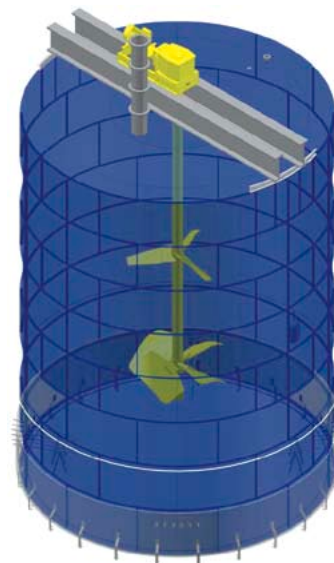
The Albion Process couples XT's successful IsaMill® fine grinding technology with low cost leaching at atmospheric pressure. Coupled with ongoing advances in the design of the IsaMill®, XT has invested considerable effort in ensuring that the oxidative leaching component of the technology is robust and efficient. XT has developed advanced designs for oxidative leaching tanks that incorporate conventional hydrofoil agitators with high pressure gas spargers to provide the best balance between leach intensity and capital and operating cost.

XT has developed gas spargers that result in very high shear forces at the point of injection of the gas into the slurry. The gas spargers also generate a very fine mist of bubbles, resulting in rapid oxygen mass transfer into the slurry. The combination of these two effects allows the size of the leach tank agitator to be reduced significantly relative to other

atmospheric leach systems, such as bacterial leaching, and results in very high oxygen utilisation.

A second key component of the XT design is modularity, with all tanks capable of fabrication off site with no requirement for expensive scaffolding or crane hire during assembly. The construction time is significantly reduced, resulting in a lower installed cost for the oxidative leach circuit. The leach circuit is also relocatable, which makes the technology ideal for short life projects.

XT offers its clients a full suite of design service for all of its technologies, inclusive of the Albion Process. XT can offer studies ranging from concept to Feasibility level, as well as provide preliminary and detailed design services, inclusive of commissioning. XT backs its design services with process guarantees to cover all of its technologies.



**The Albion Process uses simple open tanks utilizing modern, state of the art, hydrofoil impellers and high pressure gas sparging**

## Albion Process Introductions



**Duncan Turner**

**Duncan Turner,**  
*General Manager – Albion Process.*

Duncan has a PhD in electrometallurgy and over 17 years of experience across a broad range of metallurgical applications in the mining/processing industry. He was involved with the original invention of the Albion Process.

Before joining Core Resources, Duncan worked for MIM Holdings (Queensland, Australia), Lakefield Research (Ontario, Canada) and Ennex International (Dublin, Ireland). Before his return to Australia in late 2007, Duncan worked for 8 years with ZincOx Resources plc as Manager of Technology and Technical Services based out of Belgium and was responsible for process engineering and metallurgical activities within group. More recently, Duncan worked with XT developing the Albion Process Technology package (equipment and engineering design) now offered by XT.

Duncan is the key point of contact for Albion Process inquiries and manages and coordinates testwork and engineering services for clients.



**David Nakon**

**David Nakon,**  
*Principal Process Engineer – Albion Process.*

With over 15 years of experience in metallurgical engineering David has worked with major engineering houses, universities and specialist engineering groups across a broad range of projects. Specialising in the design of hydrometallurgical based processes David has designed refineries for metals including nickel, cobalt, copper, zinc, manganese, titanium, magnesium and more recently has designed mass/heat process models for the Albion Process. He possesses advanced process modelling skills using Metsim, Excel and HSC Chemistry and has extensive knowledge of hydrometallurgical nickel processing plants where he is recognised as an expert in nickel solvent extraction.

**Mikhail Lyssy**

Mikhail Lyssy has recently been appointed as Sales Representative – Albion Process for Russian speaking countries. Mikhail is Located in Almaty, Kazakhstan.

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For further information on the Albion Process please visit [www.albionprocess.com](http://www.albionprocess.com)



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