

HIPAL[®] - HIGH PRESSURE ACID LEACH PILOT PLANT FACILITY

SGS MINERALS SERVICES

SGS Lakefield Oretest Pty Ltd (SGS) was originally founded in 1993 as Oretest Pty Ltd. SGS has since developed into a major metallurgical services organisation located in a purpose-built laboratory in Perth, Western Australia.

The laboratory is dedicated to providing high quality metallurgical testing across the broad spectrum of the minerals industry including:

- Gold ores
- Nickel laterites
- Base metal
- Iron ore
- Mineral sands
- PGM ores
- Rare-earths and other exotics
- Diamond ores
- Environmental services

SGS provides a comprehensive range of test work capabilities including bacterial leaching, crushing, screening, grinding, ultra fine grinding, gravity, magnetic & electrostatic separation, solvent extraction, electrowinning, flotation, pressure leaching, pressure oxidation, pressure acid leach and cyanide speciation. Pre-feasibility studies, on-site diagnostic metallurgical services, environmental testing and analytical services are also included in our range of capabilities.

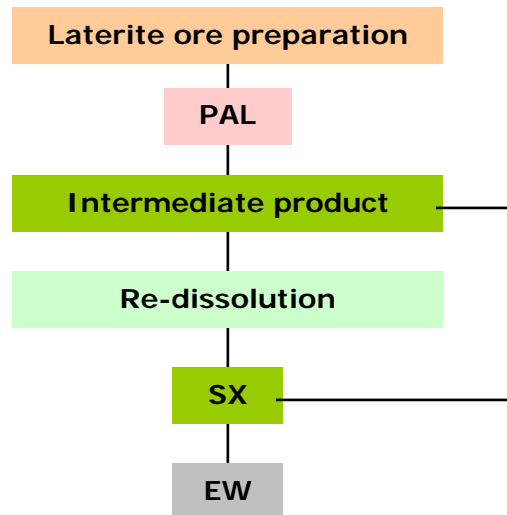
Introduction

The most advanced pressure leaching piloting facilities in the world – the HIPAL[®] submarine autoclave pilot plant, has been commissioned and operated at the SGS facility in Perth. The plant was designed by Hatch Engineering and constructed and detailed by Zeton Inc. of Canada. BHP-Billiton funded the design and construction of the equipment, to ensure that world-class testing facilities were available in Australia for the development of several of its nickel laterite projects. When not being used by BHP-Billiton, the pilot plant is available for independent use by SGS, working with third parties conducting evaluations of other properties. The pilot plant is operated by SGS to ensure access to the skills and experience of the metallurgists, engineers, chemists and technologists of the SGS group of companies. SGS in Australia and Canada have extensive experience developing, testing and piloting flowsheets used in the processing of lateritic nickel ores.



High Pressure Acid Leaching

Major reserves of nickel are contained in laterite ores, which have traditionally been treated by pyrometallurgical methods. Hydrometallurgical treatment, by direct acid leaching of the ore at temperatures above 240°C, is however the favoured treatment option for several new projects in the Australasian region. The basic steps in the process are as follows:



There are a number of possible variations to the above basic Flowsheet. Other metals such as copper and cobalt, may also be recovered by HIPAL[®] from certain ores.

The HIPAL Facility

The HIPAL[®] facility features six main sections:

1. Feed Preparation;
2. Autoclave;
3. Counter-Current Decantation (CCD) and Neutralisation;
4. Precipitation (Mixed Hydroxide) and Re-leach;
5. Assay and Offline Testing;
6. Control, Database and IT.

Features of HIPAL[®]

The HIPAL[®] pilot plant is capable of automatic, fully integrated, continuous operation of all unit processes, from feed preparation to production of final metal products.

- 5 compartment titanium – 7 autoclave.
- Continuous operation at 290°C and 9 Mpa.
- Working volume of 65 – 75 L.
- Feed rate is 10 – 20 kg/h.
- Flowsheets can include hydroxide and sulphide precipitation.
- Comprehensive distributed control system (DCS).
- Custom designed secure database (SQL/Access) for all operating and assay data links with other software (e.g. Excel) for accurate, rapid manipulation and reporting.

Auxiliary Equipment at SGS

A range of auxiliary equipment is available at SGS, including:

- A four-stage autoclave system in titanium-2 rated at 230°C and 3 Mpa (used for oxidative leaching);
- High pressure steam generator;
- Belt filters;
- Various other agitated tanks, reactors and thickeners;
- Solvent extraction and electrowinning batch and pilot testing facilities;
- Several batch autoclaves for offline testwork.

Facilities at SGS

The SGS facility offers clients the flexibility to consider virtually any processing option as equipment and expertise is available for a full range of processes. These include crushing, grinding, ultra-fine milling, magnetic and electrostatic separation, bacterial oxidation, gravity separation, leaching, flotation, pressure oxidation and acid leaching, solvent extraction, electrowinning and reduction and oxidative roasting.

- World class project reporting to full bankable feasibility standards.
- Batch Pressure Acid Leaching – many major projects.
- Continuous High Pressure Acid Leaching – 10 major pilot campaigns successfully completed with a total of some 12 weeks online run time.
- Batch Solvent Extraction – many major projects.
- Pilot Solvent Extraction – 10 major programmes on nickel, cobalt and zinc.
- Nickel Electrowinning – several programmes, including full-sized LME-grade cathode production.
- Batch and Continuous Oxidative Leaching – extensive testwork.

For more information, please contact us:

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