Gold Process Development

MINTEK’S GOLD PROCESS DEVELOPMENT PROGRAMME provides a quick and cost-effective method of ensuring that gold recovery operations perform at their optimum level. Testwork may be carried out at both laboratory and pilot-plant scales, supported by well-proven computer-simulation design packages, so as to arrive at the most appropriate process route.

The programme offers a complete gold process testing package for:
- refereeing routine samples.
- preliminary feasibility studies.
- evaluation and design of recovery circuits using carbon and resin adsorption, elution, and electrowinning.
- troubleshooting and consulting services.

The expertise base includes the skills of experienced mineralogists, analysts and engineers with access to comprehensive analytical, laboratory, and pilot-scale facilities.

Laboratory-scale testwork
- Batch cyanidation tests to optimise leaching parameters;
- Heap leaching amenability testwork;
- Gravity concentration tests to establish free gold occurrence and composition;
- Adsorption loading tests to establish the relative merits of activated carbon or ion-exchange resin, and process simulation;
- Carbon elution testing and activated carbon quality assessment;
- Quantification diagnostic leaching and gold/mineral; associations to determine reasons for gold lock-up; and,
- Cyanide specification in process streams.

Continuous mini-plant
A fully instrumented advanced gold leach mini-plant allows the gold leaching kinetics and the environmental parameters to be monitored in relation to controllable process conditions such as pH, Eh, oxidant addition, pulp viscosity, and cyanide concentration. The dissolution kinetics can be evaluated in conjunction with other elements such as iron, sulphur, arsenic, copper, and nickel, during the leach. This testwork enables the holistic design and operation of gold recovery circuits to be improved from both the environmental and economic standpoints.

Pilot-plant facilities
- Skid-mounted multi-stage contacting systems (5 litre and 150 litre) for continuous leaching and adsorbent-in-pulp process evaluation;
- A range of percolation column sizes for heap leaching appraisals; and,
- Minix resin elution and gold electrowinning facility.

Cyanide services
Mintek has taken a leading role, together with industry, in developing local and international codes of best practice for cyanide usage in gold processing. A range of services is offered, from basic cyanide analysis and speciation to management of monitoring campaigns, cyanide destruction test work, cyanide audits, and interpretation of results.

Recent projects
- Mintek has assisted with gold processing appraisals and flowsheet development on ore sources world-wide, including Agbaou and Youga (Mali), New Liberty (Liberia), Gedabek (Azerbaijan), Ad’Duwahi (Saudi Arabia), Mupane (Botswana), and Burnstone and Modder East (South Africa).
- Cyanide speciation monitoring is carried out on a regular basis for gold operations in East and West Africa, as well as locally. Mintek co-ordinates and assists with Cyanide Code auditing at various operations locally, as well as in East and West Africa.

Specialists
Marthie Kotze – Consultant
Peter Lotz – Cyanide Services

For further information, contact:
The Manager
Hydrometallurgy Division
Tel: +27 (0)11 709-4930
Fax: +27 (0)11 709-4160
HMDmanager@mintek.co.za

Head: Gold Technology
Tel: +27 (0)11 709-4168
Fax: +27 10 709-4160

Mintek
200 Malibongwe Drive, Randburg, South Africa.
Private Bag X3015, Randburg 2125, South Africa.
Tel: +27 11 709 4111
www.mintek.co.za