



Ballarat Goldfields

Installation of Modular Gold Plant



Model:	Stage 1 Gold Plant Designed and Installed (incorporating Six IPJ2400s and Two ISP30s)
Purpose:	Low cost, fast delivery, high pre-concentration recoveries.
Place:	Ballarat, Australia.
Mill Superintendent:	Steve Gannon.
Date:	April 2006.
Results:	On time start up, excellent equipment performance.

Gekko Systems have recently designed, engineered and built the Stage 1 process plant for Ballarat Goldfields (BGF). The plant currently has a capacity of 600,000 tonnes per annum (tpa) with the ability to increase production significantly beyond that on completion of Stage 2. The plant started commissioning in December 2005 and achieved the target of a first gold pour prior to Christmas.

The **unique design** of the plant incorporates a conventional two stage crushing circuit that is achieving a crush size of <25 mm at a rate of 1.5 million tpa. The crushed product is stored in an above ground bin capable of holding up to 500 tonnes of feed for the tertiary circuit. An allowance has been made for a second bin of the same or greater capacity to allow for daytime crushing and 24 hour running of the remainder of the circuit at the expanded capacity.



The complete Woolshed Gully gold processing plant - designed and installed by Gekko.

The final product size reduction is carried out by a **Vertical Shaft Impactor** (VSI) which is achieving better than design at a P80 crush of 650 µm. Re-circulating loads are below design at less than 250% with lower than design operating costs seen to date. The design allows for a second VSI to be added to the circuit when required. The plant has also been engineered for the inclusion of a Polysius High Pressure Grinding Rolls (HPGR) with trials to be undertaken in the middle of the year. The outcome of the trials may determine whether a second VSI or HPGR are fitted as part of any future expansion to the plant.

The **Gekko Gravity Recovery System** runs in closed circuit with the VSI and consists of rougher and scavenger InLine Pressure Jigs (IPJ) followed by a cleaner IPJ that produces a concentrate stream of approximately 4% of the mass (5% design). Mass pull is variable depending on the sulphides loading in the circuit. A Falcon concentrator scavenges the final tail.

Final tailings gold residues to date have been better than expected and well below design. Investigation of the tailings product shows insignificant gold in the coarser fractions above 500 µm, indicating exceptional liberation and recovery and the ability to increase grind size even further. Gravity recovery is very high due to the unique liberation circuit that ensures that over-grinding does not occur and heavies are recovered from the circuit as they are liberated.

The plant control incorporates fully automated startup and shut down with complete process control carried out through an Allen Bradley Device Net system. The fast commissioning was due to the simple design of the overall circuit and the complete integration of the control system.

Ongoing work is being carried out in all areas of the plant to gain a better understanding of the metallurgy of the ore and the recovery system.

Stage 2 of the process plant is planned to incorporate an intensive cyanidation plant to maximise the recovery of gold from the sulphide concentrate stream. Significant work has been carried out on the actual concentrates to ensure the downstream process will be at least as efficient as the primary recovery circuit. All cyanide leach residues will undergo detoxification prior to disposal.

To date the development of the BGF process plant is running to schedule and no foreseeable problems lie ahead in achieving the initial goals set at the beginning of the development.

“The plant was designed, constructed and commissioned in record time, an achievement we are proud of in the mining industry at this time. It is testament to not only Gekko Systems as lead designer, but all contractors involved such as the local earthmovers and engineering houses”.

“At the beginning of this project, Ballarat Goldfields said they wanted to pour gold by Christmas. We did preliminary studies in March and April 2005 and Ballarat Goldfields were ready for us to start preparations for building in July”

“Six months later, and before the Christmas deadline, we were pouring gold” says Gekko Senior Process Engineer Alvin Johns.

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