

## SUCCESS STORY



# Smooth and Safe Migration to CENTUM VP Enhances Production Efficiency at Major Australian Gold Mine

**Location:** Kalgoorlie, Australia  
**Order Date:** February 2009  
**Completion:** November 2009  
**Industry:** Mining



## Executive Summary

Kalgoorlie Consolidated Gold Mines (KCGM) produces up to 800,000 ounces of gold every year from the ore taken from its Super Pit open pit mine, and is by far the largest gold mining operation in Australia. The Super Pit is Australia's largest open cut gold mine and a famous landmark that eventually will be 3.8 km long, 1.5 km wide, and over 600 m deep.

The gold in the Kalgoorlie ore occurs in several different forms, each requiring its own special treatment route to enable the precious metal to be recovered and refined. The ore from the Super Pit is processed through two KCGM treatment plants, the Fimiston Plant and the Gidji Roaster. The gold refining process is as follows:

1. Ore is processed through several grinding mills, where it is pulverized to 150 microns. Depending on its metallurgical characteristics, the ore may then be treated in one of three recovery circuits.
2. Pyrite and Telluride ores are concentrated by a flotation process, dried, and then transported to the Gidji Roaster. The concentrate is heated to over 1,000 degrees Fahrenheit, burning off the sulphide content.
3. The roasted product and non-sulphide ores are sent to leaching circuits at Gidji and Fimiston respectively. Cyanide dissolves the gold from the slurry, where it is then adsorbed by carbon granules.
4. The gold loaded carbon from both leaching processes is then further treated at Fimiston Plant. The carbon is washed with acid to remove inorganics, and then undergoes elution stripping to produce a gold solution.
5. Gold is then precipitated from solution electrolytically, leaving a sludge which must be filtered and dried. Once dry it is smelted to produce dore gold bars that are typically 70 – 80% gold.
6. The dore bars are then transferred to an external refinery in Perth to produce 99.9% pure gold.

The Fimiston Plant long relied on a CENTUM CS distributed control system (DCS), and experienced no major failures while it was in use. In 2009, KCGM decided to replace this legacy system with Yokogawa's latest DCS, CENTUM VP. Yokogawa Australia successfully installed this new system and it has operated with no major problems since the completion of this project in late 2009.



Fimiston Plant (crushing, grinding, floatation, gold recovery, carbon leaching)



Gidji Plant (roasting, carbon leaching)

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### The Challenges and the Solutions

#### 1. Smooth Replacement of Legacy System

This commenced with the migration of the human machine interface (HMI) from a CENTUM CS Unix based system to a CENTUM VP Windows based system. The legacy information control stations (ICS) were removed and replaced with new HMI stations and large screens. The control room has eight 50 inch wall-mounted screens and each HMI station has four monitors. The CENTUM VP displays have an entirely new look & feel and the new ergonomically designed HMI stations provide access to significantly more operation data and are easier to operate.

All graphics were imported from the old system to CENTUM VP without problems and then were modified as required. Although this normally is very time-consuming work, it was completed quickly and smoothly.

The control room upgrade was clearly the biggest hurdle in the project because the plant had to keep running while we demolished all of the existing equipment and then fitted out the room with new gear, which included new height adjustable desks, the CENTUM VP HMI stations, and communications equipment. As a temporary measure while this work was in progress, KCGM moved all of its control room equipment to a back office that, though one quarter the size, was adequate for this purpose.

#### 2. Safe Operations

KCGM has stringent occupational health and safety (OHS) policies that Yokogawa had to comply with. We are proud today that Yokogawa completed this project without causing any plant downtime and without any injuries to project personnel.

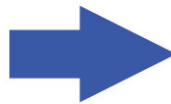
#### 3. High Production Efficiency

The HMI phase of this project was completed whilst the plant was producing at record levels. Planning was critical to the whole migration process. Yokogawa had an engineer on site for 10 months to ensure a smooth transition from CENTUM CS to CENTUM VP.

The HMI stations installed at the central control room, training system, primary crusher, workshop, and office are all connected via the same communications bus, allowing everyone access to the same data from throughout this huge mining operation. This integrated approach resulted in significantly improved production efficiency.



Before: CENTUM CS in the central control room



After: CENTUM VP

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#### 4. Environmentally friendly plant operations

**Air quality:** The emissions from the roasting process are strictly regulated, including compensating for various meteorological conditions. Complex logic implemented within CENTUM VP uses data from field analyzers and weather sensors to ensure that the roasting process operates cleanly.

**Waste water:** The chemical reagents in waste water have to be monitored and kept within the levels stipulated by regulations. As all relevant data from analyzers is integrated in CENTUM VP, it can be easily monitored so that adjustments can be made in good time.

### Customer Satisfaction

Ryan O'Halloran, a Senior Process Control Engineer at KCGM, says, "This project has provided KCGM with a highly reliable control room at the forefront of technology that will serve KCGM well into the future and I would like to offer a big thanks to all the people including Yokogawa Australia for their significant contribution to the project." He adds, "We are very happy that we could work together to complete this project on schedule and on budget."

#### System delivered

Distributed control system: CENTUM VP

Total I/O points: 35,000

Plant information system: OSIsoft PI

Field devices: Yokogawa