Lonmin sets automation standards with Wonderware System Platform

by Wonderware Southern Africa

"Things that make sense to a control engineer don't necessarily make sense to process staff or, for that matter, accountants. That's why it's often important to look at the bigger picture."

Fritz Hiestermann,
Director, Hiprom

VALUE DRIVERS

Goals

- Improve mission-critical smelting process;
- Development and application of standards.

Challenges

- Extending the solution beyond the SCADA domain to benefit a broader audience;
- Improve the collaboration between the instrumentation and process departments.

KEY METRICS

Wonderware Solutions

- ActiveFactory software;
- InTouch HMI;
- Wonderware Industrial Computers;
- Wonderware System Platform.

Results

- Standards are saving engineering time, cost and effort for engineers at all of Lonmin's facilities;
- Standardization has reduced risk on new projects;
- Standardization has provided a uniform approach to support and maintenance;
- The use of international standards such as ISA – 88/95 is facilitated by ArchestrA technology;
- Wonderware System Platform greatly simplifies the definition of complex plant objects;
- Consolidation of all tags into a single database reduces errors and simplifies maintenance.

Company Overview

Lonmin Plc – Johannesburg, South Africa
Lonmin plc is a primary producer of Platinum Group Metals (PGMs). Value is created through the discovery, acquisition, development and marketing of minerals and metals. Apart from its four mines in South Africa, the company also has exploration projects in Canada, Tanzania and Gabon. The mined ore is concentrated and processed through a smelter and refinery before the refined PGMs are delivered to market. Platinum forms over half of Lonmin plc's total PGM production.

With platinum hovering at the $1300/ounce mark (April 2007), the production of the precious metal cannot tolerate inefficiencies or stoppages and a crucial part of the process is smelting. Lonmin's smelter in Marikana relies on the Wonderware System Platform to keep the wheels turning.

With industry specialists forecasting a rise to $1450/ounce and more by the end of 2007, any delays or stoppages in the production process can have a direct and drastic effect on the bottom line of producers. That's why Lonmin chose a no-nonsense approach to the automation and control of its Marikana smelting plant.

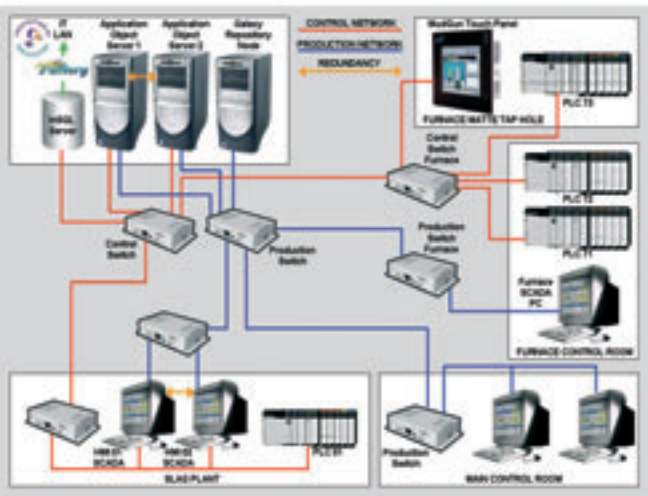

Figure 1: Lonmin smelter topology diagram

Solution selection

The selected solution is Wonderware System Platform based on the ArchestrA industrial automation architecture with its attendant Industrial Application Server, Wonderware Historian (formerly known as IndustrialSQL Server or InSQL), InTouch HMI (Human-Machine Interface - SCADA) and ActiveFactory software, analysis and visualisation tool. To engineer the project, Lonmin selected system integrator Hiprom, who specialises in providing automation solutions to the mining and metals industries and who had successfully completed other projects for Lonmin since the company's inception in 1997.

"Wonderware System Platform was chosen because it offers virtually unlimited growth and versatility while preserving the investment in existing assets," says Hiprom director Fritz Hiestermann. *"But the most important reason is the ability to define, deploy and maintain standards in order to reduce engineering and maintenance costs. Since our first project for Lonmin, the setting of standards that work well and that can be reused throughout all of the Lonmin operations have always been a top priority."*

Implementation

The system is as shown in figure 1. The dual-redundant Application Object Servers / HMI combinations for the slag plant ensure that the plant would remain autonomous and continue operation should anything happen to the very long link connecting it to the rest of the system.

The network is split physically into three layers in order to separate the IT LAN from the rest of the network:
- The **control network** connects the PLCs to the AOS servers;
- The **production network** (SCADA) connects the AOS servers to the HMI and Wonderware Historian;
- The **IT LAN** is connected to Wonderware Historian to enable ActiveFactory software users to view production data.

Setting standards

Prior to the adoption of Wonderware System Platform, the first standardisation effort at Lonmin consisted of establishing a good tag-naming convention and well-structured PLC programming standards. I/O and equipment lists were used to set up tag names but sometimes I/O lists were not available and the PLC addresses were used as a source for tag names. *"This is not a good idea because there's no direct correlation between the SCADA tag-naming convention and that of the PLC,"* says Hiestermann. *"So a change in one is not reflected in the other and confusion quickly sets in."*

The standardisation initiative got a boost in 2000 at the Karee UG2 plant where the instrumentation staff was involved from the start with the result that by the time coding was started, complete I/O lists and good P&ID drawings were available. Early involvement of everyone concerned also meant that enough equipment was installed to get the data required for effective process management. *"This eliminated the scenario of trying to calculate something based on non-existent data,"* says Hiestermann. *"Another important contribution was made in adopting the Allen Bradley ControlLogix PLC which supported tag names rather than addresses which meant that properly structured templates could be developed in the PLC and they looked the same as those in the SCADA system."*

According to Hiestermann, standards excellence was achieved during the implementation and commissioning of the EPC and K4 concentrators at the end of 2001. *"This was the same team that worked on the Karee plant and they already had proof of the benefits of standards. Once again, involving them early in the project resulted in very good PLC code, an excellent SCADA implementation and a well-structured and populated Wonderware Historian database. These same standards are still in use today on all Lonmin projects."*

With standards already in place, when the time came to implement Wonderware System Platform, the changeover was clearly defined and proved easy, but could more be done? And could current procedures be

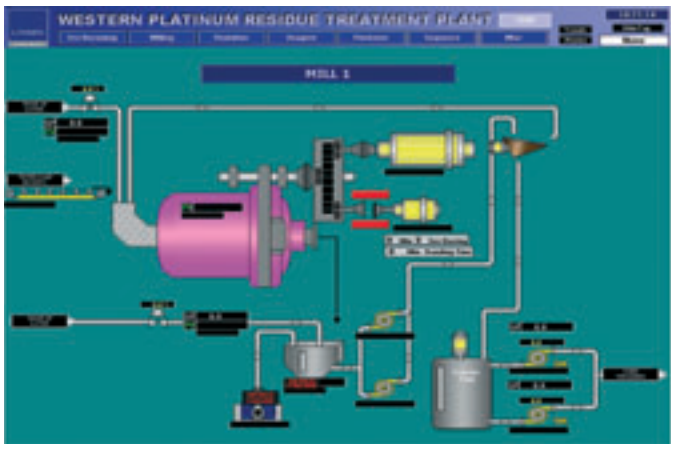

Figure 2: InTouch HMI screen with Smart Symbols showing one of the two mills at the slag plant, which together have a combined feed rate of over 63 tons/hour

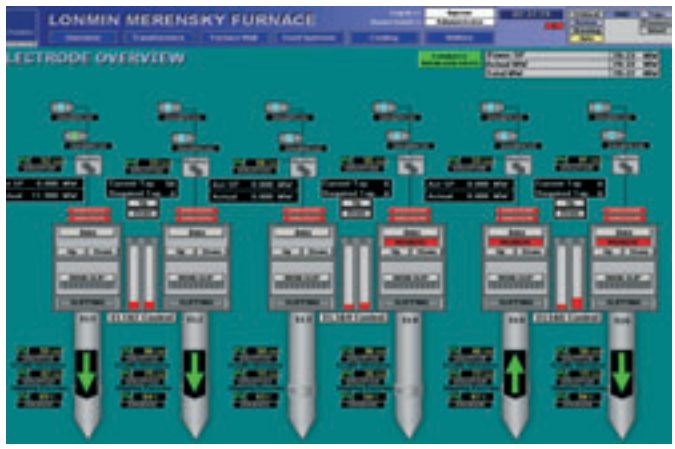

Figure 3: InTouch HMI screen showing the Merensky furnace, which consists of six in-line electrodes operating at a maximum of 9MW. The average operating temperature of the matte is 1280 °C and the slag 1450 °C.

improved? *"We enlisted the help of Wonderware SA and they showed us how Wonderware System Platform's functionality could improve and facilitate things that we previously thought were perfect. And we took things much further. It was no longer just a case of the instrumentation department versus the process department but more a case for collaboration,"* adds Hiestermann. *"We started to look at the significance of the ISA-88 and ISA-95 standards and this made us appreciate the problems the process people were experiencing. Using Wonderware System Platform's functionality we were able to build plant and process models which immediately got their attention and cooperation. Extending our vision beyond the SCADA domain allowed us to appeal to a broader audience to the benefit of the company. Things that make sense to a control engineer don't necessarily make sense to process staff or, for that matter, accountants. That's why it's often important to look at the bigger picture."*

Benefits

• The ability to define, deploy and maintain standards is saving engineering time, cost and effort while providing a predictable and uniform development environment for engineers at all of Lonmin's facilities;
• Standardisation reduces risk on new projects because the tools that are used for implementation are proven;
• Another benefit of standardisation is a uniform approach to support and maintenance throughout the group as well as helping with C&I governance and Change Management;
• The use of international standards (i.e. ISA-88/95) improves the exchange of information between operational and business disciplines. This helps to synchronise the production processes with the company's business objectives;
• The use and editing of existing templates simplifies the definition of complex plant objects to suit specific needs;
• Consolidation of all tags into a single database has all but eliminated errors and has made maintenance a lot easier;
• With Wonderware System Platform, the setup of the historian is free;
• Bit-picked I/O words save I/O points and provide more information at no additional cost and with no speed penalties.

Conclusion

By substituting engineering drudgery for ease and flexibility, Wonderware System Platform is helping Lonmin focus on its business and strategic objectives rather than on the engineering complexities necessary to achieve them. While there's no doubt that standards place companies in better control of their production processes and help inter-discipline communication, what is often lacking is a practical mechanism to define, manage and propagate them. Lonmin has found such a mechanism in Wonderware System Platform with the result that however many contractors and system integrators get involved with projects in the future, they will all have a common platform from which to operate and to develop collaborative solutions.

This document was realized thanks to the support of:
Fritz Hiestermann, Director, Hiprom,
ArchestrA-certified system integrator