



# In style with Installed Base Services

By C Lennox, Schneider Electric

*Rhovan is one of the world's leading producers of primary vanadium. The Rhovan operation in South Africa is situated above a rich mineral deposit producing about 10 000 tons of vanadium pentoxide and 1 700 tons of ferro vanadium per annum.*

**R**hovan has been in operation since 1989 and is one of the region's most important suppliers of minerals for industrial and other purposes. The operation combines open cast mining, as well as processing and concentrator plants on the same site.

The mine has a long history with Schneider Electric's (referred to as 'the company' from this point) automation solutions, having adopted its PL7 Pro solution a decade ago as part of a challenging expansion project aimed at significantly increasing production. Over the years the system met all expectations and helped the mine reach its full production capacity. When the decision was made to refresh the entire IT network the company also chose to upgrade its PLC network with the latest hardware and software from the company.

## Challenge

One of the greatest challenges was to stay abreast of technology while retaining the legacy programming at the site. Over the past years thousands of I/Os had been programmed and a myriad of devices

added to control every aspect of the mine. After a decade of service and expansion to the operation's nine plants, the PLCs were reaching the limits of their memory.

At the same time advancing technology meant the rest of the mine had already migrated to the new Windows 7 IT platform and there was a risk of falling behind the technology curve. Communication across the new and old platforms would also be more complicated and as a result it was recommended to upgrade to the latest technology by installing the Unity Pro system.

After considering the benefits, the mine management agreed and go ahead was granted to purchase and install the system. However, owing to the continuous-production nature of the business there were strict considerations that needed to be met, not least of which was a mere 48 hour period allocated to the project (during the next planned maintenance shutdown) during which time the system would have to be installed and commissioned. Any loss of production would be punitive and mistakes could cost the mine a fortune in lost production for every hour lost.

## Solution

Working closely with the company's specialists, the Rhovan team took the decision to install an all-new system, running Unity Pro software and making use of the company's powerful Modicon PLCs. The software's built-in intelligence would allow easy plug-and-play recognition of new components and, most importantly, the built-in importing tools would enable the recognition of legacy programming codes. This meant that thousands of hours that had previously been spent programming 15 000 I/Os over the past decade could be retained and therefore shave days off the system installation timeline.

Thorough preparation allowed the new system to be preconfigured off-site and simply be plugged-in to the existing infrastructure on the day of installation. Careful planning and judgment was still required, however, to ensure full communication would be possible across the entire system once live.

On the day of the installation in November 2012, nine engineering stations were arranged to control the entire mine, with one PLC controlling each plant. A tenth controller was installed as the main station and the server was able to oversee the entire mining operation. During the roll-out, communication was established with each of the 15 000 I/Os that are used across each operation, including mining, concentration, kiln, salt recovery, desilication, precipitation plants, reactors and furnace.

## Benefits

### Minimal downtime

The Xtrata project team allocated 48 hours of scheduled downtime to upgrade the system. Thanks to careful planning, the company commissioned and installed the new controllers in only eight hours. The upgraded system is more reliable, therefore reducing the risk of unscheduled downtime.

### Capitalising on existing investment

The company's PlantStructure system provided Rhovan with a migration path that allowed them to keep the legacy programming code, which saved them reprogramming 15 000 I/Os.

## Conclusion

The conversion to Unity Pro and more powerful Modicon PLCs means the mine has the ability to stay abreast of technology and migrate with the rest of the company to Windows 7 based software. Expanded memory on the PLCs allows for further production optimisation with the capacity to incorporate whatever peripheral equipment is required.

With Unity Pro's ability to recognise most programming languages, it is now possible to use third party or proprietary coding when installing new peripheral equipment. Upgradeability of the system also allows for any future expansions or additional processes that may be required in years to come.

Careful planning turned 48 hours downtime for commissioning and installation of the new controllers - into just eight hours.

Vanadium is a rare, soft, ductile grey-white element found combined in certain minerals and used mainly to produce certain alloys. Vanadium resists corrosion due to a protective film of oxide on the surface. Common oxidation states of vanadium include +2, +3, +4 and +5. Most of the vanadium (about 80 %) produced is used as ferrovanadium or as a steel additive. Mixed with aluminium in titanium alloys is used in jet engines and high speed air-frames, and steel alloys are used in axles, crankshafts, gears and other critical components. Vanadium alloys are used in nuclear reactors because vanadium has low neutron-adsorption abilities and it does not deform in creeping under high temperatures.

Vanadium oxide ( $V_2O_5$ ) is used as a catalyst in manufacturing sulphuric acid and maleic anhydride and in making ceramics. It is added to glass to produce green or blue tint. Glass coated with vanadium dioxide ( $VO_2$ ) can block infrared radiation at some specific temperature.

Vanadium occurs in about 65 different minerals among which are patronite, vanadinite, carnotite and bauxite. Vanadium occurs in carbon containing deposits such as crude oil, coal, oil shale and tar sands. Various vanadium ores are known but none is mined as such for the metal, which is generally obtained as by-products of other ores. The largest resources of vanadium are to be found in South Africa and Russia.

Info obtained from [www.lenntech.com](http://www.lenntech.com)

I/O – Input/ Output  
IT – Information Technology  
PLC – Programmable Logic Controller

## Abbreviations



Schneider Electric's Claude Lennox has been with the company for nine years. Automation Support Engineer for six years, Business Development Manager for three years, Claude is currently the Business Development Manager for Industry Installed Base Services (IDIBS). Specialising in Industrial Automation, he is passionate about assisting customers to eliminate the risk of ageing industrial control systems. Enquiries: Tel. 011 046 1900 ext 2088 or email [claudel.lennox@schneider-electric.com](mailto:claudel.lennox@schneider-electric.com)