

# Debswana Diamond Mines

## Reduced life-cycle costs and increased throughput for leading diamond mine



Aerial view of the Orapa uranium mine, the largest of Debswana's mines

The Debswana Diamond Company (Pty) Ltd is a joint venture between the government of the Republic of Botswana and South African diamond company, De Beers (Pty) Ltd. The high value per weight of diamonds mined by Debswana, has made the company the leading producer of diamonds by value in the world.

Consisting of three mines: Orapa, Letlhakane and Jwaneng, the company contributes to more than 30% of Botswana's GDP. The Orapa, Letlhakane and Jwaneng mines are all situated in remote parts of central Botswana, Africa and have been in operation for over 20 years.

### The Challenge

Debswana sought to upgrade the control systems for all three mines by replacing the VAX-based AZON SCADA system with new Windows-based dual redundant SCADA systems in order to achieve zero downtime during changeover.

The isolated and remote locations of the Orapa, Letlhakane and Jwaneng mines, mean reliability, redundancy and stability key requirements of the replacement system.

Project objectives included developing a more intuitive operator interface with simplified configuration, resulting in a system that is easier to operate and maintain. Other objectives included the reduction of operator training costs and the training of site personnel to be able to enhance the system after project completion.

Further, the data extraction from the existing AZON Control system was complex and not user-friendly. Consequently, it did not interface easily with other mine systems. The upgrade aimed to improve the quality of data made available for industrial information management, (IIM), as well as making it easier to expose this data to other applications.



### The Challenge

To upgrade the control system for Debswana's three mines whilst achieving zero downtime during changeover; increase performance stability; achieve a more intuitive operator interface, simplified configuration and easier maintenance; reduce training costs, improve connectivity and quality of data.

### The Solution

Dual redundant CitectSCADA systems were successfully implemented and zero downtime was achieved. Rigorous testing resulted in improved system stability and commonality between sites, ensuring easy maintenance and scalability. CitectHistorian also connected disparate systems and presented real-time data throughout the plants.

### The Benefits

The integrated solution of CitectSCADA, CitectHistorian and professional services expertise delivered a comprehensive, low-risk system that eliminates downtime, reduces life-cycle costs and presents real-time quality data for better decision-making to increase throughput.

# Common standards enabled rapid project development and reduced testing time

After an extensive selection process, CitectSCADA was chosen as the preferred SCADA system for all of Debswana's diamond mines because it offered a stable, reliable, dual redundant system that would greatly reduce the possibility of plant downtime. Debswana also chose to implement CitectHistorian to collect and store data and deliver relevant and timely reports throughout the mines, enhancing the managers' abilities to make decisions that would improve production performance, including operational equipment efficiencies, (OEE).

## The Solution

A common suite of GUI standards was developed and implemented across all three mines. The common standards allowed for rapid project development, reduced testing time and a smooth commissioning phase. Non-conformances reported and fixed for any one site, were fixed for the other sites without the need for additional engineering. With all three mines using the same standards, commonality between sites, easy maintenance and scalability were ensured.

CitectSCADA genies and super-genies were created as part of the project standards. Dynamic and information-rich mimic screens created using these genies allow operators to easily control the plant with control actions never more than two mouse-clicks away. Improved trend and alarm systems introduced with CitectSCADA are particularly beneficial in monitoring pressure in the plant cyclones during the dense media separation process where the diamond concentrate is separated from the waste material. Deviations from the cyclone pressure setpoints can result in diamonds being lost to the tailing dumps.

The manager nodes allow managers to view plant data from their offices in real-time, enabling them to better plan production and schedule maintenance. This functionality, together with the connectivity and aggregation capabilities of CitectHistorian, gives

managers and operators access to a vast amount of information, both current and historic, which improves decision-making on production issues. For example, by analyzing real-time information in any mine, they can improve OEE or by comparing information for all three mines, managers can ensure that the performance of each mine is optimized.

With CitectHistorian, production statistics are available during the shift and shift reports are available moments after the shift is completed. Current production figures compared to targets are also available, allowing staff to adjust production accordingly.

A team of professional services experts oversaw all aspects of the project life cycle and conducted rigorous quality testing throughout system development. Using CitectSCADA genies and super-genies, it was possible to thoroughly test one of each type of device and perform status checks for the remaining devices. This methodology coupled with CitectSCADA object libraries, both packaged and engineered, resulted in the projects being delivered ahead of schedule, with zero plant downtime.

## The Benefits

The greatest success in the CitectSCADA system upgrade was in achieving the objective of zero downtime. Operators found it easy to switch from the old to the new system, quickly becoming familiar with the new features available.

By upgrading to a comprehensive, integrated solution that included CitectSCADA and CitectHistorian, the Debswana mines were able to eliminate downtime, significantly lower life-cycle costs and access useful real-time data for better decision-making that would increase throughput. CitectSCADA's easy scalability and connectivity will also facilitate any future expansions with minimal development and testing time.



**"I have been exceptionally pleased with the stability and performance of our CitectSCADA system."**

Kevin Branch,  
System Technician,  
Jwaneng Mine, Debswana

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