An Integrated Solution for the Twangiza Mine Project

The Twangiza-Namoya gold belt in the eastern Democratic Republic of Congo (DRC) is potentially one of the world's most exciting undeveloped gold deposits today. Canadian-based gold exploration company Banro Corporation acquired control of the Twangiza property in 1996; Banro has since invested more than US $80 million in exploration and is currently building a gold plant and mine at a cost of US $184 million. Scheduled to begin mining operations in late 2011, Banro aims to process 1.3 million tons of ore per year.

Banro Chief Surveyor Mike Trenor says Banro's mission for the Twangiza project is continued resource expansion. "Presently only about 10 percent of the total Twangiza license has been explored," Trenor said. "Banro hopes that continued regional exploration will add oxide and transitional resources."

Banro has also created community partnerships to support the regulated mining project while improving the area's living standards. Through the Banro Foundation, the company has built two new schools and a potable water system serving 18,000 people, and has rehabilitated more than 50 km (31 mi) of roads and bridges in the Twangiza area. Several new projects are planned for 2011.

Surveying Under Rigorous Conditions

Situated on the edge of the Rift Valley, the Twangiza Project lies at the northern end of the Itombwe Mountains. At 1,500–3,000 m (4,900–9,800 ft) above sea level with deep valleys and few or no roads, access was initially limited to helicopter, with communication by HF radio and satellite phones. National survey reference network points were destroyed by local inhabitants at the outset of Congo's independence in 1960. Banro had to establish a geodetic control network from scratch.

Under these rugged conditions, Banro provided real-time measurements with Trimble R8 GNSS Rovers and Trimble TSC2 Controllers using Trimble Survey Pro™ Software. "Trimble RTK GNSS equipment is used for almost all our day-to-day survey work," says Trenor. Today there is road access to the mine site and cell phone networks have penetrated to all project areas.

Surveying for Increased Productivity

Banro used AUSPOS (an online GPS processing service) to fix a primary control point. They then used static GNSS observations and Trimble Geomatics Office™ Software to establish a control network. To survey the difficult and dangerous faces in the artisanal pit, control is brought in by RTK and then completed by total station. Trimble GNSS receivers also provided essential ground control data. As Banro moves into mining, more rovers will be used for mine layout and repeated volumetric surveys. Accuracy requirements are dependent on the type of survey carried out, but typically for RTK are on the order of 25 mm (1 in).

One of the important tasks undertaken by Banro surveyors is the positioning of completed exploration drilling. All exploration diamond drill collars are surveyed and fixed using Trimble technology, providing repeat measurements to prove the accuracy of the results.

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