The Characterization of Geology and Resource Evaluation of the Las Bambas

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In October 2004 Xstrata Copper acquired the right from the Peruvian government to explore the Las Bambas district. Las Bambas is a greenfield copper-molybdenum project located in the Apurímac region, 72 km southwest of the city of Cusco.

A large mineral resource definition program involving over 300,000 m of diamond drilling followed by ore and waste characterization was put in place. In parallel the project was subject to subsequent technical and economic studies, from conceptual to feasibility, between 2006 and 2009.

The Peruvian authorities approved the environmental impact study for the project in March 2011. Full-scale construction started in the first half of 2012. Las Bambas will be a world-class copper mine with initial production of 400,000 tonnes per annum of copper in concentrate, including significant gold, silver, and molybdenum by-products, as well as first-quartile cash costs. The mine is expected to be commissioned in the second half of 2014 with ramp-up and full production reached in 2015.

As of December 31, 2011, the total mineral resource is 1.7 billion tonnes at a grade of 0.61% copper and 0.04 g/t gold. This mineral resource is located in three different copper-molybdenum porphyry-skarn deposits—Ferrobamba, Chalcobamba, and Sulfobamba, which have been the focus of the geologic and technical studies performed by Xstrata Copper over the last seven years. There are two additional deposits of similar nature already identified within the district that add future potential: Charcas and Azuljaja.

The Las Bambas district is located in the central part of the Andahuaylas-Yauri copper (Mo-Au) skarn-porphyry belt, which also hosts a number of Cu-Mo-Au–bearing skarn and porphyry deposits including Tintaya, Antapaccay, Coroccohuayco, Quechuas, and Constancia as well as other smaller orebodies.

Copper-molybdenum mineralization at Las Bambas is associated with the porphyry-skarn belt controlled by the Andahuaylas-Yauri batholith of Eocene-Oligocene age, which is emplaced in Mesozoic sedimentary units, among which is the Ferrobamba Formation (Lower to Upper Cretaceous in age); this formation was critical as it is a major host of the chalcopyrite-bornite-molybdenite mineralization.

The purpose of this paper is to describe the successful approach taken by Xstrata to unveil, characterize, and define a world-class economic mineral resource and promote it into one of largest copper mines to be developed in this decade. The project was taken from conceptual through pre- and feasibility study phases in five years.

This paper concentrates on the role of geology, ore characterization, and resource estimation throughout these stages, and on how geology adds value to the mining value chain.