TITLE AND LOCATION *(CITY AND STATE)*		YEAR COMPLETED
GUALCAMAYO CRUSHING CHAMBER AND TUNNEL SYSTEM SAN JUAN PROVINCE, JÁCHAL DISTRICT, ARGENTINA		PROFESSIONAL SERVICES 2008 - 2011
PROJECT OWNER'S INFORMATION		
PROJECT OWNER Yamana Gold – Minas Argentinas S.A.	POINT OF CONTACT NAME Mr. Eduardo Arce	POINT OF CONTACT TELEPHONE NUMBER (416) 815-0220

RIZZO Associates carried out geotechnical engineering, design, and construction management services for the Gualcamayo Crushing Chamber and Tunnel System in one of the most important Argentine mining projects to date. The Gualcamayo Project is being executed by Yamana Gold in the north of the San Juan Province, in the Jáchal District. The Project area encompasses the Andes foothills in the Province of San Juan, featuring San Juan formation outcrops composed of limestone and dolomites.

The initial Project included a primary crushing stage underneath the Open Pit to be operated in Cerro Diablo massif. The next stage consisted of a secondary crushing, for which purpose a conveyor belt was used along a tunnel within the above-mentioned massif. In addition to the tunnels, the final Project included a crushing chamber with a stepped descent and two Ore Passes. The project was designed by Hatch Mott MacDonald. Yamana Gold engaged RIZZO for two major assignments in Gualcamayo: the first one is the direction of geotechnical aspects for the construction of the Chamber, Tunnels and underground facilities. The second contract is for the geotechnical engineering design based on Hatch's initial project.

This new component required the design of a support structure capable of withstanding the crushing and transport process operations during the entire lifetime of the Project and providing appropriate support for the works to be carried out over the excavated area, taking into consideration the vibrations and absorption by the rock. The connection between the Open Pit and the Primary Crushing Chamber was initially proposed by RIZZO in the form of an Ore Pass (a vertical hole used simultaneously for the gravity transfer of ore to lower levels and as a storage silo). The system as a whole works as a plug-flow system, the operating conditions of which are governed by the primary crushing process demand.

Upon completion of the first stage of construction of the Ore Pass, and due to the Project's operational requirements, Yamana Gold decided to contract RIZZO to conduct the feasibility study and design of a second Ore Pass in the vicinity of the first.

Design software developed by RIZZO was used specifically for the Gualcamayo Project. In addition, we used a variety of mathematical models intended to provide solutions to a wide range of problems inherent to mining projects. Modeling of the stresses that were sustained by the Ore Pass supports required a dynamic geotechnical design that considered occasional settlements at the mouths resulting from the Pit floor lowering during the progress of the works.