

## PARAGUAY

*By Gerald M. Ellis*

In recent times Paraguay has entered mining with a certain degree of prominence that it has not enjoyed in the past. The small, land-locked Republic of Paraguay has always been known for its important hydroelectric power potential, such as the joint Paraguayan-Brazilian hydroelectric project at Itaipu on the Parana River and the joint Paraguayan-Argentine hydroelectric project at Yacyreta.

In previous years uranium was found in the eastern region of the country by Anschutz Corp. and in the Chaco Boreal region, in the west, by Teton Exploration and Drilling, both US companies. The mineral industry was limited to the production of industrial minerals, including cement and construction materials, and petroleum products. The petroleum refinery employed imported crude from Algeria, Argentina and Brazil.

Recently exploration for hydrocarbons has gained considerably in scope. Data from *International Oil Letter*, states that ENEL, the Italian energy group, has formalised an agreement with Primo Cano Martinez to assume the latter's 100% interest in the 400 km<sup>2</sup> Gabo Mendoza Block in the Carandaity Basin of northwest Paraguay. The tract, originally awarded under Paraguayan Law 100288/83 and Decree 22116/98 as the country's first acreage assignment under production-sharing terms, offsets Pluspetrol's Parapeti block in the Chaco Basin of neighbouring Bolivia. The Gabo Mendoza block contains multiple gas discoveries, which proved productive from both lower and upper units of the Devonian San Alfredo Group. The first success was Pure Oil's 1959 wildcat Mendoza No1 well which tested an aggregate 5 million ft<sup>3</sup>/d gas from a lower unit in the San Alfredo at 2,600-2,700 m and from an upper unit at 590 m. Several succeeding wells over the years (1993 Fortin Gabino Mendoza No1, 1995 Primo Cano Mendoza

Independencia No 1 and Independencia No 2) confirmed the presence of gas deposits. Recoverable reserves were encountered which led, in 1998, to discussion on possible commercialisation of gas reserves in the Gabino Mendoza block where a reservoir contained 424.5 million m<sup>3</sup>.

In the domain of metallic resources we have learned the following from Yamana Resources' chief geologist, Mel Klohn. Yamana is in joint venture with Newmont Mining (operator) exploring for gold deposits. A 2,650 m core-drilling programme was to start in February 2001. Yamana is a recognised pioneer in exploration in Paraguay, helping the country promulgate a modern mining law in the mid-1990s. Yamana's efforts in a country having little prior exploration activity and no commercial metal mines are noted in the *Minerals Yearbook* for 1996, published by the US Geological Survey: "Through its Paraguayan negotiations, Yamana has had a positive impact upon the formulation of a national mineral law and the consequent encouragement of exploration and development. After two years, Yamana's mineral concession law was passed by the Paraguayan Congress on June 4 and promulgated into law on June 20, 1996. Yamana has achieved a prominent position in minerals exploration in Paraguay. This first grant of a mining contract is the underpinning for a new mining regime. Many companies are lining up to follow in Yamana's footsteps".

In 1997, Yamana drilled the first-ever bedrock gold in Paraguay history, hitting multiple intercepts of gold in a diamond drill hole in a fluorite-bearing breccia body in the Sapucaí area, about 100 km east of Asunción. Subsequently, Yamana entered into an agreement with Newmont in June 1999. As operator, Newmont must spend US\$5 million on exploration over six years to earn a 70%

interest in the project and another US\$4 million to earn 75%.

Newmont has completed extensive regional and detailed geophysical surveying, geochemical sampling and geological mapping in a large region. It includes the gold bearing Sapucaí area identified by Yamana. After completing a 14,000 line km of airborne magnetic/radiometric survey, Newmont expanded Yamana's residual land holdings obtained under the original 1996 law to the current total of 1,208 km<sup>2</sup> under a second national law promulgated on July 6, 2000.

The drilling programme in February 2001 will test six high-priority gold targets, four in the Sapucaí area and two in the Guazu Cua area, about 7 km away. All targets are related to alkaline igneous rock complexes generally similar to the still-producing Cripple Creek district of Colorado, which has historic production of 20 Moz gold at grades of at

least 0.5 oz/t. In Sapucaí, targets are sulphide-bearing alkaline intrusive bodies, which are defined at depth by detailed ground IP/resistivity surveys and expressed in surface soils by strong gold and fluorine geochemical 'leakage' anomalies.

It is important to note that when Yamana conducted a limited drilling programme in 1997 it intersected 16 m of 2.48 g/t Au, including 2 m of 6.72 g/t Au in the fluorite-bearing Picua Breccia. Newmont's later follow-up work indicated that the Picua breccia was merely a very small outcrop of a large intrusive complex, largely concealed by old lava flows and other cover rocks. Newmont's drilling programme will examine these targets. Both Newmont and Yamana are highly encouraged by the exploration results to date and it looks as though Paraguay will soon become a new country for mining companies seeking exploration investment.