

## PARAGUAY

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**M**ining was not an important activity in Paraguay during the year 2003, following the termination of what appeared to be a promising exploration venture between Newmont and Yamana Resources. Although deposits of petroleum, iron, manganese, salt and other minerals are reported, they are not exploited commercially. Limestone, extracted in significant amounts, was used in producing about 250,000 t/y of cement in the early 1990s.

Almost all of Paraguay's electricity is generated by hydropower, and output in 2003 was about 45 billion kw-hours. The great Itaipu Hydroelectric project on the Parana River became fully operational in 1991. The joint Paraguayan and Argentine Yacyreta Dam project was completed in 1994.

The 496,000 km<sup>2</sup> Upper Parana River Basin (UPRB) is an international river basin shared by Brazil, Bolivia and Paraguay. Together with the Uruguay and Parana Rivers, the Paraguay River is one of the three main components of the Plata Basin System, which drains almost 20% of the South American continent. The Upper Paraguay Basin comprises two areas with significantly different water and natural resource conditions, ie, the Plateau, or Planalto, and the Pantanal. The Planalto forms the eastern boundary of the drainage basin. The importance of the drainage system was recognised years ago and in 1968 La Plata Basin Pact was signed by the foreign ministers of Argentina, Bolivia, Brazil, Paraguay and Uruguay. This agreement, calling for joint development of the Plata River Basin, was expected to stimulate the economy of the entire region and would be of special importance to Paraguay, the least-developed nation in the area.

The Ministry of Public Works, in its Five Year Plan 2003-2008, has included Strengthening of the Mining Sector (Fortalecimiento del Sector Minas), to be accomplished by introducing and promoting projects aimed at hydrocarbon prospecting, minerals exploration, and a rational use of the subsoil.

### **Mining sector**

The Yamana Project: Yamana Resources Inc had been active in Paraguay in the 1990s, having helped the government prepare a national mineral law that encouraged exploration and development. Congress promulgated the law in 1996 and this initiated a new era for the mining sector. With a concession granted to Yamana Resources, the company began a drilling programme in 1997 in the Sapucaí area, and one drill hole yielded significant gold values. This led to a joint venture with Newmont Overseas Exploration, whereby Newmont would spend US\$5 million over a six-year period for a 70% interest, and a further US\$4 million for a 75% interest.

The large intrusive alkaline complex in the Sapucaí area, and the adjoining Guazu Cua area, was considered to be very similar to the Cripple Creek gold district of Colorado. Following a programme of detailed geologic mapping, geochemical sampling and 14,000 line km of magnetic and radiometric surveying, the JV partners extended the size of the concession and an 11-hole drilling programme was established. A total of 2,274 m of diamond drilling was conducted, comprising nine diamond drill holes in the Sapucaí area and two diamond drill holes in the Guazu Cua area. Results were not favourable enough to warrant a continuation of the project and hence the exploration ceased. The original drilling by Yamana Resources, prior to the JV, had intersected 16 m averaging 2.48 g/t Au, including 2 m at 6.72 g/t Au in the fluorite-bearing Picua breccia. It was this breccia, exposed in a small outcrop and considered to be part of a large intrusive complex largely concealed by volcanics, that became the prime target for Newmont.

### **Hydrocarbon exploration**

The hydrocarbon potential of Paraguay was assessed by the Inter-American Development Bank through Geoconsultores Group in 1998. This study has been considered to be the most comprehensive, definitive and current study available. The sedimentary basins of Paraguay are some of the last, largely-unexplored basins in the world, comprising some 302,067 km<sup>2</sup>. They correlate to producing oil and gas fields along the western and eastern borders within Bolivia, Argentina and Brazil. According to estimates, recoverable hydrocarbon reserves may amount to 27.95 billion barrels of oil equivalent in lower Palaeozoic and Mesozoic formations. The priority for hydrocarbon potential lies within the Carboniferous and the Devonian, as a structural/stratigraphic oil and gas play. Where geothermal gradients are reasonably preserved, a Devonian/Silurian and a Silurian/Ordovician oil and gas play is predicted.

The full hydrocarbon potential of Paraguay can only be determined by extensive exploration. Existing seismic data, as well as test drilling, are insufficient. The history of petroleum and natural gas exploration in Paraguay dates back to 1944. To date 18,413 km of 2D reflection seismic surveys have been shot and 48 hydrocarbon exploration wells have been drilled in the entire region, of which, 33 had oil and gas shows. Aeromagnetic and gravity surveys have also been completed. In recent years, motivated by the encouraging discoveries and production of hydrocarbons in the neighboring countries of Bolivia, Argentina and Brazil, the image of the hydrocarbon potential in Paraguay has improved substantially. The production in these countries is within 5 to 30 km of the Paraguayan border and in the same geological formations. Recent efforts to evaluate existing data, and integrate/correlate the geologic and production information with neighbouring countries, demonstrate the substantial hydrocarbon potential in Paraguay.

Local operator Guapex SA (Guarani Exploration Petroleum Co) was applying at the end of 2003 for Congressional approval for a concession law on the reconfigured 24,000 km<sup>2</sup> San Pedro Block. Guarani was also applying for a concession law on the Alto Parana Block. The two companies are

incorporated in Nevada and Paraguay. A concession law implies a more serious commitment than the usual Prospecting Permit.

Previously, another company, Perez Companc, had farmed in for a 90% interest and the operatorship of Guapex's San Pedro Block and Guarani's Alto Parana Block. Guapex and Guarani were to retain a 10% interest.

Paraguay Gas & Energy SA filed an application for the Americo Picco Block, which expired in October, 2003. Morrison Mining, which holds the rights to the Boqueron Block, was setting up arrangements with a number of companies that seem to be affiliates or subsidiaries, such as CDS Oil & Gas Ltd, CDS Energy SA, Tridanel SA, Kintyre Corp, and Republic Resources, in addition to Paraguay Gas & Energy.

In the past there were three wildcat wells drilled on the Americo Picco Reconnaissance Permit, located east of Morrison's Boqueron Block: Union Oil drilled La Paz 1 well in 1948, abandoning it after reaching 2,210 m. Pure Oil abandoned the Carlos Lopez 1 well in 1959 after drilling to 1,737 m, and Chaco Exploration drilled the Parapity 1 well in 1977, abandoning it at 3,000 m.