YEMEN

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The Republic of Yemen, created in 1990 out of the peaceful unification of the Yemen Arab Republic (YAR) and the People's Democratic Republic of Yemen (PDRY), occupies some 527,970 km^2 of the southwestern corner of the Arabian Peninsula. Bounded on the west by the Red Sea and on the south by the Gulf of Aden, it is separated from Africa by the narrow strait of Bab el Mandeb. Neighbours are Saudi Arabia to the north and northeast and Oman to the east.

Geologically part of the Arabian Peninsula, a steep, jagged mountain range traces the western and southern limits of a high plateau that descends gradually north and east from the mountains into the desert interior, on the edge of the vast Rub' al Khali (Empty Quarter) of Saudi Arabia. To the west, the mountains drop abruptly to a low, flat coastal desert plain called the Tihamah. The mountains of northern Yemen are cut at right angles in several places by great wadis that feed large aquifers at their base on the Tihamah.

A tribal society with large areas outside the government's full control and, in the north, increasingly under the sway of a more puritanical Islam, Yemen remains one of the poorest Arab countries. Being the birthplace of Osama bin Laden's father, the bombing of the USS Cole in Aden, and the hunt for al Qaeda members has made this country newsworthy for all the wrong reasons. In October 2002, terrorists attacked the French oil tanker Limburg as it prepared to receive crude oil from Nexen's Ash-shihr export terminal off the Yemeni coast and this has boosted insurance premiums by 300% for vessels docking at a Yemeni port. Consequently, wherever possible, shippers are bypassing Yemen for the rival ports at Djibouti and Oman. This has resulted in a 50% decrease in port activity and a loss of revenue of approximately US$3.8 million per month. Meanwhile, the Bush Administration is keeping up pressure on Yemeni President Ali Abdullah Saleh for greater assistance with its anti-terrorism efforts.

With this backdrop, the Yemeni Government continues to implement an economic reform programme that it agreed with the IMF in 1995 as a condition for lending. The programme includes banking reform, privatisation of state-run industries, major infrastructure investment, and reduction or elimination of government subsidies. Yet, security concerns and high project risk have been a drag on investment – Yemen's real gross domestic product grew by 4.6% in 2001 and by an estimated 3.6% in 2002.

Yemen's economy is dependent on its oil and natural gas resources as well as the country's strategic location at the Bab el-Mandab strait linking the Red Sea and the Gulf of Aden, one of the world's most active shipping lanes. With proven oil reserves of 4 billion barrels, Yemen's oil output (452,521 bbl/d in 2001) provides the main source of hard currency revenue. The Masila block is the country's most productive, followed by the Marib-Jawf; operators include Hunt Oil, Hunt/Jannah, TotalFinaElf, Nimir Petroleum, and Nexen (formerly Canadian Occidental), with Nexen and Hunt Oil being the largest. Nimir Petroleum is inclined to divest its interest since it has not been able to expand production. In 1999, Algeria's Sonatrach signed an agreement with Italy's ENI on sharing exploration and production in the south and in that year the government also signed a memorandum of understanding with Australia's Oil Search Ltd and the UAE's Mohammed al-Otaibi Group to explore for oil in offshore Block 15, as well as with Adair International Oil and Gas of Houston on Block 20, and seismic survey work is being done. DNO, a Norwegian independent, recently began production at the Tasour field, which came on stream in November 2000, and Dove Energy of the UK reported a discovery in the next month in Block 53 in eastern Yemen. Yemen's border demarcation treaty with Saudi Arabia has opened up new exploration areas and Nexen signed a memorandum of understanding in January 2001 covering Block 59 next to the border.

Yemen has a crude refining capacity of 130,000 bbl/d based on two small, dated, and deteriorating refineries – Aden Refinery Co (ARC) in Aden, with a capacity of 120,000 bbl/d, and Yemen Hunt Oil Co at Marib, with a capacity of 10,000 bbl/d. The Yemeni Government has backed away from plans to privatise the Aden refinery, but may offer a partial stake to private investors at some point. However, in November 2001, Yemen signed a contract with United Co for Petroleum Investment (UCPI) for a new 100,000 bbl/d refinery in Hadramawt. UCPI represents a consortium of investors from Saudi Arabia and the United Arab Emirates. The US$895 million project is to be built in two phases, and would eliminate Yemen's need for imports of refined petroleum products, as well as providing refined products for export. There are also plans for a refinery project for Ras Issa on the Red Sea. Most of Yemen's gas reserves of 16.9 trillion ft^3 are in the Marib-Jawf fields operated by Yemen Exploration and Production Co. While there is no production of natural gas, the gas extracted by Hunt Oil from oil production is re-injected.

The *Yemen Times* reported that the Yemeni Parliament struck down what they considered an illegal agreement for the Ministry of Oil to sell 60% of its share in an oil field to Saudi investors. More than 120 MPs threatened the government with a vote of no confidence if it does not abolish the agreement. The Minister of Oil, Dr. Rashad Baraba'a, was summoned before the Parliament where MPs claimed that this was the "biggest corruption issue in the field of oil ever discovered in the country" and that it would have caused Yemen to lose US$7million per year. However, the Ministry of Oil defended its decision and said that it is consistent with the law.

In the mid-1990s, Yemen formulated mining legislation guaranteeing the rights of private property in the mining of most mineral commodities. The royalty rate due to the government in any mining operation is 5% on precious metals and 3% on other minerals. The precious stone and hydrocarbon industries remained the exclusive domain of the government. In an effort to accelerate exploration and development, the government entered into multiple exploration and production-sharing agreements with private companies offering both expertise and capital. Subsequently, the *Yemen Times* reports that recent geological surveys conducted in Yemen have identified prospects for gold, copper, iron and zinc. Gold has also been discovered in the al-Faidh area, north of Sa'da and in the al-Hamour sector in the Taiz district. Zinc has been identified in the Mareb district. However, the report concludes that local tribal fighting has discouraged further work and investment in the mining sector.

Consequently, there have been no further developments since Cantex Mine Development Corp's geochemical results for nickel, cobalt and copper from the sulphide/gossan horizons at Wadi Qutabah layered igneous complex in 2001. The company was encouraged that the iron sulphides can contain potentially commercial nickel, cobalt and copper values, and started a programme of systematic gully and pit sampling for analysis. The Sadah region contains similar rocks to those that host the Saudi Arabian Al Masane and Dhahar copper-zinc mines some 100 km to the north. Cantex's Al Fayd gold project is located in the region and it has discovered several areas containing anomalous gold, copper, nickel and platinum group metlas in heavy mineral samples. At Suwar, Canadian Mountain Minerals, Yemen Ltd, a subsidiary of Cantex Mine Development Corp, stated that scout mapping along a north-trending anomaly obtained previously by Falconbridge, has identified gossans and malachite staining at various locations; the company suggests the nickel-copper-cobalt mineralisation identified and drilled at Suwar extends more than 1,000 m north of the drill sites, hence the interpreted mineralised zone there is now more than 2.7 km long. No further activity has been announced.

An important project is the exploration of the Jabali zinc-lead-silver deposit located 110 km northeast of the capital Sana'a. ZincOx Resources has the right to earn a 60% interest in a joint venture that holds the exploration licence over the deposit by financing and completing a feasibility study for the development of the deposit. ZincOx already holds a 20% interest in the joint venture and is its manager; the balance is split evenly between Anglo American and Ansan Wikfs, a Yemeni company. Jabali is a carbonate-hosted zinc oxide deposit, formed by replacement of porous horizons by metalliferous brines. Mineralisation, which is controlled by faults, is found along horizontal stratabound mantos, and vertical chimneys and keels. Extensive uplift and deep tropical weathering have oxidised almost all the primary sulphides to masses of the zinc carbonate, smithsonite, with some hydrozincite.

Silver was mined at Jabali as early as 1000 AD and the deposit was rediscovered by BRGM of France in 1984. Since then, considerable work, including over 9,000 m of drilling (69 holes), has been carried out by the Geological Survey of Yemen, BRGM, and Watts Griffis McOuat of Canada. Anglo American carried out exploration for sulphide ore between 1996 and 1998, but the drilling only encountered oxide mineralisation. Between 2000 and 2002, ZincOx drilled a further 4,358 m, with the result that 85% of the zinc resource falls within the measured and indicated categories (JORC code). Geological modelling has confirmed a resource of 12.6 Mt at grades of

8.86% Zn, 1.17% Pb and 68.2g/t Ag. There is excellent potential to increase the resource further as the deposit is open on two sides. In addition, smaller satellite orebodies are known to exist along strike.

ZincOx plans to develop an open-pit mine and produce an oxide concentrate by means of flotation. Flotation test work has been carried out in Belgium and Canada. Results indicate that, with beneficiation recoveries of 83.5%, a zinc concentrate grading 23.5% Zn and a lead-silver concentrate averaging 60.5% Pb and 3,010 g/t Ag can be produced. The zinc concentrate will either be shipped to Yanbu, in Saudi Arabia, where ZincOx is currently carrying out a feasibility study into the construction of a zinc production plant, or upgraded further by fuming, and sold as a high-grade concentrate to international zinc smelters. The lead-silver concentrate will be sold on the international market.

Yemen has a modest mineral output that includes dimension stone (limestone, marble, basalt and granite), gypsum at Salif and Khulalah, and salt at Salif. Yemen's cement industry consists of three main factories -- Bajil Cement Factory (250,000 t/y), Amran Cement Factory (500,000 t/y), and Al-Burg (500,000 t/y). The total annual capacity of 1.25 Mt/y satisfies about 70% of domestic demand.