

# SAUDI ARABIA

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In the mineral resource sector, Saudi Arabia produces gold, silver, copper and zinc; cement; other industrial and construction materials; and ornamental stone. The following government agencies operate in the sector: the Saudi Geological Survey (SGS), typical of geological surveys elsewhere in the world, is a government authority operating over a broad range of earth-science topics, including grassroots mineral exploration; the Deputy Ministry for Mineral Resources (DMMR) is primarily concerned with implementation of the Mining Code and the promotion of investment; Ma'aden, The Saudi Arabian Mining Co. is a government-owned mining and exploration company that runs two operating gold mines and has interests in magnesite, phosphate, bauxite, and other commodities.

## Mineral Exploration

The Saudi Geological Survey is responsible for maintaining and augmenting the primary earth-science and mineral-resource database in the country, and undertakes mapping, mineral exploration, geohazards and geoenvironmental studies, and hydrogeological studies. During the year, the SGS strengthened its geophysical, remote-sensing and geographic information system (GIS) capability, and reorganised its laboratory and publications arms, so that it is well placed to provide a full range of earth-science information about the Kingdom. Under the terms of its establishment, the SGS is able to provide, on a contract basis, a number of its services and consultation skills to the public and private sectors.

SGS concluded and reported on exploration for gold at two promising sites in the Precambrian Arabian Shield, for Zn-Pb in Cenozoic rocks

on the Red Sea coastal plain, for phosphate at two sites in the Sirhan Turayf phosphate province in the north of the country, and for silica sand at Tayma in the north-central region. The most significant reported gold resource is at Ad Duwayah, where drilling and sampling conducted over several years resulted in a total gold resource estimate of approximately 5 Mt averaging 2.2 g/t Au using a cut-off grade of 1 g/t Au. The prospects for finding additional resources are good. Jabal Umm Mattirah prospect, about 75 km south of Ad Duwayah, includes a high-grade resource of some 1 Mt averaging 6.2 g/t Au at a cut-off of 5 g/t or a low-grade resource of about 2.5 Mt averaging 4.3 g/t Au at a cut-off of 3 g/t. The base-metal prospect of Jabal Dhaylan on the Red Sea coast north of Yanbu has a resource in the weathered zone of 1.8 Mt at 5.6% Zn and 1.4% Pb. Recent SGS exploration at Jabal Dhaylan gave encouraging results, recommending further drilling and geophysical surveys. On the strength of this, a private company has applied for a concession. Continuing its phosphate-resource assessment work in the Sirhan-Turayf region, SGS reported the following results at five prospects.

Ma'aden is also conducting mineral exploration at a number of sites in various parts of the Kingdom aimed at quantifying the

Current SGS identified Prospects			
Prospect	Size	Grade	Detail
Markaz al Khabra	53 Mt	21.17% P <sub>2</sub> O <sub>5</sub>	Demonstrated resource
An Nuq	298 Mt	18.54% P <sub>2</sub> O <sub>5</sub>	Preliminary calculation
Al Khatimah	186 Mt	18.35% P <sub>2</sub> O <sub>5</sub>	Inferred resource
Widyaan ar Rushaydah	24 Mt	21.03% P <sub>2</sub> O <sub>5</sub>	Demonstrated resource
Sanam	23 Mt	16.91% P <sub>2</sub> O <sub>5</sub>	Demonstrated resource

amount of ore and undertaking feasibility studies including: the Ad Duwayah gold area; Al-Khnaiguiyah zinc area; Wadi Bidah gold belt; Samran-Shayban gold area; Zarghat, Jabal Rokham, and Jabal Abt magnesite areas; Jabal Sawda nepheline and syenite areas; Jabal sayid copper area; and Az-Zabirah bauxite and kaolin area.

### Gold and Base Metal Production

The Saudi Arabian Mining Co. (Ma'aden) is a government-owned joint stock corporation created in 1997 with a capital of SR4,000 million. Its articles of association state that the company will perform various mining activities in all phases of the mining industry including development, enhancement, and improvement of mineral and related industries. It was formed as a means of implementing the plans of Saudi Arabia to utilise mineral resources and related industries.

Ma'aden's objectives are to develop and operate commercially a mining industry according to international standards, to train and develop Saudi manpower, and to utilise modern technology so as to enhance national development.

Ma'aden operates two gold mines - Mahd adh Dhahab, a polymetallic gold-silver-copper-zinc underground mine 380 km by road northeast of Jiddah, and Sukhaybarat (Saudi Company for Precious Metals – SCPM), an open-pit gold mine approximately 400 km

west northwest of Riyadh. Gold, silver, and base metal production is listed below.

Ma'aden has four additional projects at various stages of development: Al-Amar gold mine is in the final phase of a feasibility study; Al-Ghazalah Province magnesite mine is expected to commence production in 2002 as a joint development of Ma'aden and the private sector; production at Al-Hajar mine is expected to commence in mid-2001; and work is in hand at a phosphate project centred on Al-Jalamid deposit to identify the quantity of ore and determine the optimum means of ore transport to the Jubail Industrial City on the Arabian Gulf.

### Other Commodities

The growing industrial-mineral sector was strengthened last year by the results of silica-sand exploration in the north-central part of the Kingdom, which reported a proven potential resource of 8,400 million m<sup>3</sup> to a depth of 30 m averaging 97.63% SiO<sub>2</sub>, 1.25% Al<sub>2</sub>O<sub>3</sub> and 0.13% Fe<sub>2</sub>O<sub>3</sub>. Other industrial-mineral investigations concerned the location of deposits of feldspathic sand to meet future demand by the Saudi Arabian ceramics and glass industry, and of lightweight aggregate and pozzolan.

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Ma'aden Mine Production				
Mahd adh Dhahab				
Year	Gold (oz)	Silver (oz)	Copper	Zinc (t)
1998	118,989	445,076	782	3,550
1999	102,000	336,694	821	3,161
2000	69,514	279,666	804	2,520
Sukhaybarat				
1998	44,000			
1999	45,228			
2000	47,229			

## Mineral Resources

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The Deputy Ministry for Mineral Resources (DMMR) is the sole supervising agency for the application of the Kingdom's mining code, an important consideration for intending investors. Other roles include the provision to investors of advice and information, and surveillance of developments in the international mining industry and of document holders' activities. The overriding objective is to encourage investment by helping both local and foreign investors to participate in the Kingdom's mineral development. The objectives of the DMMR are to foster the development of the minerals sector so that it becomes a major contributor to national economic development, and to provide a fair and balanced fiscal framework to national and foreign investors. The DMMR will gladly assist all prospective investors interested in exploring the mineral sector of the Kingdom.

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DMMR has extensively revised the present mining code and regulations. They are in final form and currently awaiting ratification. The revision was undertaken to increase the level of investment in the sector; to create a transparent code reflecting world trends; and to increase efficiency and ease of administration. DMMR published a free handbook entitled 'A Brief for the Prospective Investor' containing an introduction to the Kingdom, its mineral resource sector, mining

legislation and taxation, investment procedures and incentives, and recent developments.

The success in recent years of the DMMR's efforts to promote investment in the mineral sector is illustrated by the growth in the number of concessions issued, particularly for industrial minerals. At the end of 2000, 22 mining leases were in existence: 11 for cement raw materials; five for gold and accompanying metallic minerals; and six for industrial minerals. Also extant, were 21 small-mine permits for salt, clay, silica sand, barite, feldspar, diatomite, basalt, limestone, marble, iron ore and dolomite, together with 875 building-material permits for sand, granite, marble etc. These concessions represent a total area in excess of 750 km<sup>2</sup>.

The total volume of all minerals extracted in 2000 exceeded 95 Mt. These minerals were used as intermediate products in the production of 18 Mt of cement, 407,000 t of gypsum, 3.6 million m<sup>3</sup> of ceramic products, 12,000 t of sanitary products, 102,000 t of salt, more than 3.5 t of gold and about 60 Mt of building products.

There were 13 exploration licences held by Saudi and foreign mining companies for gold, and metallic and industrial minerals, covering a total area of 36,404 km<sup>2</sup>. Also in issue were 22 reconnaissance permits to investigate all types of minerals.

Saudi Mineral Production		
Commodity	Volume of Minerals (t)	Volume of end products
Cement	33,052,320	18,295,342 t
Gypsum	518,087	407,047 t
Gold and Other minerals	1,580,799	3,630 kg
Ceramics	70,000	3.6 million m <sup>2</sup> tile and 12,000 t of sanitary products
Salt	103,460	102,021 t
Granite, Marble, Sand, Clay, Aggregates	60,000,000	60,000,000 t ornamental stones, bricks, building materials