

Exploration

Introduction

The future of a mining company depends on successful exploration to grow its portfolio of high quality Mineral Resources to sustain and grow its businesses.

Ma'aden, as the Kingdom's exploration and mining champion, continued to deliver in 2020 on its long term commitment as the largest investor in mineral exploration in Saudi Arabia. Since **Ma'aden** was formed in 1997, our exploration programmes have delivered major Mineral Resource growth in the Kingdom in gold, copper, phosphate, metallurgical bauxite, magnesite and kaolin. These resources are the foundation of **Ma'aden**'s business, and the Saudi mining sector.

Ma'aden's exploration success is highlighted by our ranking as the 18th largest mining company in the world by market capitalization in PwC's 'Mining 2020' report.

Strategy

The objective of **Ma'aden**'s mineral exploration programme in Saudi Arabia is to deliver growth options to the business from the exploration, discovery and evaluation of new Mineral Resources. These new Mineral Resources provide options for the development of new mines, or to increase production in our existing operations and to extend the life of mines.

Ma'aden undertakes exploration in both greenfield and brownfield sites. The objective of greenfield exploration on our exploration licences is to discover large, new Mineral Resources to develop into new standalone mines.

The purpose of brownfield exploration is to find new mineral deposits within economic transport distance of our existing mines to add shareholder value through expansion of existing mine capacity, from displacement of lower grade ore from the mine plan or from extending the life of the mine. Brownfield exploration usually delivers incremental growth in a mine's Mineral Resources but may result in major additions which allow expansion of mine production at a lower capital cost than for greenfield projects. Our exploration around the Al Jalamid phosphate mine and Mahd Adh Dhahab gold mine in 2020 are examples of brownfield exploration with the potential for major Mineral Resource additions.

Health And Safety

The health and safety of our exploration personnel who operate in remote areas of the Kingdom is our highest priority.

Since **Ma'aden's** formation in 1997, there have been no fatalities in Exploration. We closely monitor our health and safety reporting and performance to sustain our good record. We always apply the learnings from our incident reporting and investigations to identify and eliminate hazards and to continuously improve our controls to prevent injury and illness. For example, the Exploration Division reduced motor vehicle safety incidents to zero in 2020 after rolling out a real time monitored satellite location and speed tracking system for all vehicles complemented by advanced off road and defensive driver training to all personnel.

The challenge of COVID-19 to our exploration operations during the year was managed and mitigated by our team's rigorous adherence to PPE and health protocols in all field locations. Because of these measures, we successfully maintained the continuity of our exploration programmes and did not record any cases of COVID transmission in our field sites.

Mining law

Saudi Arabia enacted a new Mining Investment Law and Regulations with effect from 1 January 2021 replacing the previous law enacted in 2004. The new law introduces several significant changes for exploration and mining licences including new licence application requirements, new surface rentals for licences and ad valorem severance (production royalty) amongst other changes.

The new law is part of a wide ranging government strategy to encourage private investment to expand the exploration and mining sector in the Kingdom. The enactment of the new law provides opportunities to expedite the granting of **Ma'aden's** long standing exploration licence applications, which were deferred during the drafting of the legislation and the development of the government's mining sector strategy.

Licences

The Exploration Division explores **Ma'aden's** exploration licences while exploration on mining licences for mine development projects is conducted by the **Ma'aden** Business Unit and by the **Ma'aden** Affiliates on our operating mines.

Ma'aden held 45,000 km² of granted exploration licences for all commodities at 1 January 2020 but reduced the licence portfolio to 16,868 km² at 31 December 2020. Following the completion of a major investment in an accelerated two year major exploration program in 2020, 63% of the exploration licences held at 1 January 2020 were relinquished during 2020.

Ma'aden's exploration licence applications at 31 December 2020 for gold, copper, zinc, phosphate and bauxite totaled 32,600 km². We are hopeful that our long standing licence applications will be granted following the enactment of the new Mining Investment Law on 1 January 2021. In a positive sign, new gold exploration licences over an area totaling 1925 km² were granted in late 2020.

During 2020, new phosphate mining licences of 281.3 km² were granted for Umm Wu'al Blocks 4, 5, 6, 10 and 11 and a gold mining licence of 50 km² at Humaymah.

Area of Licences and Applications at 31 December 2020 (in km²)

Commodity	EL	ELA	ML	MLA
Gold	13,833	17,152	347.6	8.7
Base metals	558	7,091	16.5	0
Phosphate	1,660	6,126	368.1	0
Potash	228	987	0	0
Bauxite - kaolin	589	1,131	174.9	81.1
Magnesite	0	125	2.7	0
Total	16,868	32,612	909.8	89.8

EL - exploration licence; ELA - EL application; ML - mining licence; MLA - ML application

As Siham gold exploration licence with an area of 3,221 km² is an application for renewal of an expired exploration licence; it is reported in the above table as an EL.

Expenditure

Our focus in 2020 was exploration for the addition of new gold and phosphate Mineral Resources. In 2020, **Ma'aden** spent SAR 226 million in greenfield and brownfield exploration programmes for nine commodities. Of this expenditure, SAR 174 million was for greenfield programmes on exploration licences, SAR 12 million for brownfield programmes on exploration licences and SAR 39 million on brownfield programmes on mining licences.

Exploration Expenditure by Commodity in 2020 (in SAR million)

Commodity	EL	PFS + FS	ML
Gold	141.48	12.31	27.2
Base metals	16.12	0	4.01
Phosphate	10.03	0	0
Bauxite - kaolin	6.75	0	0
Total	174.38	12.31	31.21

EL - exploration licence; PFS – prefeasibility ; FS – feasibility; ML - mining licence

Operations

Ma'aden's greenfield and brownfield exploration drilling on exploration and mining licences for all commodities totaled 338,729 metres in 2020.

Exploration Drilling by Commodity in 2020 (in metres)

Commodity	EL	PFS + FS	ML
Gold	171,450	47,603	47,384
Base metals	17,298	0	7,032
Phosphate	34,625	0	0
Bauxite - kaolin	13,247	0	0
Total	236,620	47,603	54,416

EL – exploration licence; PFS – prefeasibility ; FS – feasibility; ML - mining licence

Ma'aden Exploration completed a two year accelerated exploration programme on our granted exploration licences, which expire in 2022 and 2023.

In 2020, **Ma'aden** Exploration Division tested 117 gold and base metal targets in the exploration licences. Exploration advanced 33 of these targets into subsequent evaluation stages. The Exploration Division conducted resource delineation drilling on three gold targets at Umm Mattirah, Umm Salam and Shaktaliyah in the central area of the Arabian Shield. Work commenced on new exploration licences granted in late 2020 at Zalim and Tawan, with promising early results. Resource delineation drilling was conducted on the Al Jalamid and Umm Wu'al exploration licences, adjacent to the Al Jalamid and Al Khabra phosphate mines.

Ma'aden Gold and Base Metals Company (MGBM) conducted resource delineation drilling and evaluation on mining licences at Mahd Adh Dhahab gold mine and the Humaymah gold project.

Exploration Targets

The brownfield resource delineation programmes in 2020 delineated significant Exploration Targets.

An Exploration Target, as defined by the JORC Code, is a conceptual estimate of the mineral potential of a mineral deposit for which there has been insufficient exploration to estimate a Mineral Resource. This must be stated as a range of tonnes and grade. It is not certain that further exploration will result in a Mineral Resource being identified. The public reporting a Mineral Resource by **Ma'aden** is subject to resource estimation by a Competent Person and a scoping study on the exploration licences and mining licences to establish the reasonable prospects of eventual economic extraction required by the JORC Code.

MGBM conducted brownfield exploration drilling for an open pit mining target. at Mahd Adh Dhahab and Humaymah mining licences. **Ma'aden** Exploration Division conducted brownfield exploration drilling on exploration licences for Umm Mattirah gold and Al Jalamid phosphate. Smaller exploration targets were drilled on brownfield exploration licences at Umm Salam near to the Mansourah project.

Mahd Ad Dhahab Gold Target

This Mahd Adh Dhahab target is near surface oxide and sulphide mineralisation, which is potentially amenable to open pit mining above the Mahd underground mine on an existing granted mining licence. MGBM drilled a total of 47,384 metres of diamond drilling on the target in 2020.

The results of this brownfield exploration are encouraging with the delineation of an Exploration Target of 20 to 40 million tonnes of at a grade of 2 to 3 g/t gold with minor silver, copper and zinc. A Prefeasibility Study is in progress to establish the reasonable prospects of eventual economic extraction and economic mineability before public reporting of a Mineral Resource and an Ore Reserve. A mining licence application over an area of 8.7 km² was lodged over the Exploration Target area.

Humaymah Gold Target

Humaymah is located on a mining licence about 35 kilometres southeast of Bulghah gold mine and 90 kilometres south of Sukhaybarat gold mine. **Ma'aden** Exploration Division drilled a total of 110,000 metres of diamond drilling at Humaymah. The purpose was to evaluate potentially open pit mineralisation as a brownfield ore feed to the Bulghah-Sukhaybarat processing complex. A mining licence was granted in 2020 for area of 50 km² covering the Humaymah Exploration Target.

The results of the 2019-2020 programme are encouraging with the delineation of an Exploration Target of 20 to 40 million tonnes of oxide and sulphide mineralisation at a grade of 0.8 to 0.9 g/t gold.

Umm Mattirah Gold Target

Umm Mattirah is located on an exploration licence about 85 kilometres south of Ad Duwayhi mine. The target was explored as a potential brownfield ore source to the Ad Duwayhi process plant. **Ma'aden** Exploration Division drilled 8,460 metres of diamond and reverse circulation drilling in 2020 for a total of 39,667 metres to date. The results of the 2020 programme delineated an Exploration Target of 10 to 20 million tonnes of oxide and sulphide mineralisation at a grade of 1.6 to 2.3 g/t gold.

Al Jalamid Phosphate Target

The Al Jalamid target is located on an exploration licence adjacent to the Al Jalamid mine. The target was explored as a potential brownfield ore source to the Al Jalamid process plant or as a new standalone project.

The results of the 2020 programme delineated an Exploration Target of 700 to 1800 million tonnes of phosphate mineralisation at a grade of 16 to 19% P₂O₅.