

JORDAN

*By Neil Scott
Geological Consultant*

King Abdullah's Economic Consultative Council has taken the brave decision to privatise Jordan's two mining giants, the Jordan Phosphate Mining Co. (JPMC) and the Arab Potash Co. (APC). For many Jordanians, these companies have been seen as of strategic importance and consequently almost sacrosanct. Times change and JPMC's poor performance in 2000, when it recorded a loss of US\$113 million on top of debts of almost US\$500 million, convinced many that the unthinkable was possible, and may even be a good thing. After all, there has been substantial foreign investment in JPMC and JPC's many downstream activities for several years, so why not in the mining itself?

JPMC's Eshidiya deposit presently supplies 2.5 Mt/y of phosphate rock to its own phosphoric acid complex, as well as to two new joint ventures: the Indo-Jordan Chemicals Co.'s phosphoric acid plant located adjacent to the mine, and to a new Japanese-Arab Potash Co. NPA/DAP plant at Aqaba. By 2005 Eshidiya, which has a proved and possible reserve of 1,200 Mt, is expected to replace production from JPMC's other two phosphate mines at El Hassa and Al Abiad, which collectively mine about 3.5 Mt/y. JPMC had ambitious expansion plans for Eshidiya - with the intention of increasing production to as much as 10 Mt/y over the next decade, a significant proportion of this additional output being destined for the Hydro Agri Jordan phosphoric acid and NPK fertiliser joint venture. Then, at the beginning of this year, Norsk Hydro announced that it was pulling out of the project because other investment opportunities in its core business areas had been given greater priority. It would have been Jordan's largest industrial project. This reversal will have major repercussions on the timing of the proposed second expansion phase at Eshidiya, the

upgrading and construction of the rail link between the mine and Aqaba, and on the privatisation of JPMC itself.

The privatisation of APC should be easier, not least since it made record profits of US\$50 million in 2000. Its operations on the Dead Sea involve the solar evaporation of carnallite-rich brines to recover muriate of potash or potassium chloride. Production in 2000 was 1.9 Mt and it is working on an expansion programme that will raise production to 2.4 Mt/y over the next three years. This will cost US\$35 - US\$40 million and will be achieved by converting some of its salt solar evaporation pond into carnallite production and by modifying the cold crystallisation plant.

APC also controls the Jordan Saffi Salt Co. (JOSSCO), which was established in 1996. It harvests salt from the main APC salt evaporation pond, producing 1.2 Mt/y of industrial salt and 32,000 t/y of high-grade table salt. It has plans for product diversification - including salt tablets.

APC has entered into a number of other joint venture agreements for further downstream diversification that are presently in the construction or planning stages. These are summarised as follows:

- With Finland's Kemira Oy APC is constructing a 150,000 t/y NOP (potassium nitrate) plant and 75,000 t/y dicalcium phosphate animal feed supplement plant at a cost of US\$100 million. Production is expected to start in 2002. It has also studied the possibility of establishing an SOP (potassium sulphate) project.
- Through Jordan Magnesia Co., which was formed in 1997, APC is constructing a magnesia plant to produce 50,000 t/y of

dead-burned magnesia, based on magnesium chloride brine pumped from the APC potash operations. This plant will also produce 10,000 t/y of magnesium hydroxide and caustic calcined magnesia. Construction of the plant is expected to be completed this year, and Possehi SA of Greece has been appointed as sales agent and marketing consultant.

- APC, through Jordan Dead Sea Industries, is investigating the feasibility of producing between 100,000 - 300,000 t/y magnesium chloride product.
- Jordan Bromine Co. was established in 1998 in a 50-50 joint venture between APC and Albemarle Holdings of the US. It will produce elemental bromine and a variety of other bromide and chloride products. A plant is under construction at a cost of US\$150 million, and is scheduled for completion in 2002.
- Other possible downstream products being investigated by APC include magnesium metal, although high energy costs in Jordan make the feasibility of the project problematic, and potassium sulphate.

Another major minerals development could follow from the Ministry of Energy and Mineral Resources' request for proposals to build a 100 - 300 MW power station based on the direct use of oil-shale deposits in the Al-Sultani area.

Jordan is an important producer of ground calcium carbonate (GCC) from high purity limestone. Jordan Minerals has increased the

capacity of its Amman plant to 150,000 t/y of coated GCC and micronised products, while the Jordan Carbonate Co. produces 250,000 t/y of coated and uncoated grades for the Middle East market. Jordan also has a major cement industry in which the French company Lafarge has a majority interest. Production is 3.5 Mt/y, one third of which is exported, principally to the Middle and Far East. There are proposals for expansion to 4.5 Mt/y.

Other high priority investment opportunities are based on gypsum; the beautiful Ajlun limestone, which is very similar to building stones used in Jerusalem and Hebron; and zeolite, including faujacite, which has not hitherto been recognised as a naturally occurring mineral in potentially commercial quantities.

Metallic mineral potential will become clearer with further exploration and evaluation by the Natural Resources Agency (NRA), the principal minerals exploration and regulatory agency in Jordan. Three sedimentary oxidised copper deposits are known. The Wadi Araba deposit has an underground copper oxide and silicate resource of 17 Mt at 1.26% Cu, while the Abu Khusheiba deposit has a resource of 8 Mt at 0.65% Cu.

The Khirbet el Nahas deposit to the north of Wadi Araba shows promise at the early exploration stage. A gold occurrence in the Proterozoic, identified by France's BRGM in the case of a regional exploration programme, was the subject of NRA's exploration effort in 2000.