PHOSPHATE ROCK

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The recovery in the phosphate industry faltered somewhat in 2003, partly due to a further cutback in import demand for phosphate fertiliser by China. This, in turn, was partly due to high raw material costs, and partly due to the escalation in ocean freight rates later in the year. The start of 2004 has seen the recovery firmly back on track, however, even before freight rates began to fall. International phosphate fertiliser prices recovered to historically high levels at the start of the year. Producer margins continued to be squeezed early on in the year by high ammonia prices, but as ammonia prices and freight rates began to tumble early in the second quarter of 2004, producers began to see margins returning to more healthy levels.

The phosphate-rock industry was impacted by the downturn in fertiliser use early in the decade. Almost 90% of annual phosphate-rock production still finds its way into chemical fertiliser products. Phosphate fertiliser demand is therefore by far the most important factor in demand for phosphate rock. Industrial end-use sectors consume around 6% of phosphate rock produced, with animal feed additives making up the remainder. In the industrial sector, the recent recovery in global economic growth has also begun to impact positively on phosphate rock raw material demand.

Phosphate-rock production kept pace more or less with demand levels in 2003. There was some inventory draw-down, particularly in the US following a similar inventory accumulation in the previous year. Trade in phosphate rock continues to struggle against the basic industry trend towards processing rock into downstream chemicals at the site of rock production. Trade shrank by almost 3.5% in 2003 following a similar fall in the previous year. Rock trade levels were also impacted by the sharp increase in freight costs towards the end of the year and into 2004. At just under 28 Mt, phosphate rock-trade in 2003 was the second-lowest level in recent history. We expect some improvement in trade levels over the next few years as the industry generally recovers from recession. However, longer term there is expected to be a continued slide to lower levels.

In 2003, phosphate fertiliser demand worldwide increased by an estimated 3.4% following on from a similar increase in the previous year. These two increases were sufficient to raise phosphate fertiliser use to 35.3 Mt P_2O_5, higher than at any time in over a decade. For the phosphate rock market, the 3 Mt increase in P_2O_5 demand since 2000 has added 10 Mt to demand for phosphate rock. Growth in rock demand has not been even, however, due to stock changes. The 7% growth in 2002 was followed by virtual stagnation in 2003. We expect P_2O_5 demand to continue to grow in 2004 by around the same 3.5% but to slow significantly thereafter to a longer-term annual growth rate of 1.5-2.0%. Rock demand is likely to follow a similar pattern.

There will continue to be a number of major factors influencing these forecasts. **Asia** remains the largest phosphate fertiliser consuming region, and China continues to account for more than 50% of Asian consumption. China went through a period of reduced demand in the 1998-2001 period as a result of structural adjustments that were necessary in both the economy and agriculture in order to enter the WTO. Subsequent growth in 2001 and 2002 took phosphate fertiliser use back to 1998 levels. Growth of over 11% in apparent phosphate fertiliser demand in 2003 may have included some stock accumulation and growth levels are expected to be lower in 2004 and beyond as the government takes measures to cool the economy. Sharp growth in domestic production of phosphate fertilisers and phosphate rock in China continue to erode the level of phosphate fertiliser imports. Although only officially reported at 24.5 Mt, we believe that rock production in China today is actually over 42 Mt in total. This is based on a calculation of rock requirements of the downstream products produced. Many of the small mines in China (of which there are a very large number) do not report production levels to the government as they are required to do. 'The China Syndrome', published by Fertecon in 2004, analyses in detail the phosphate rock industry in China. Longer term growth in China will be limited by its decelerating population growth (already below 1% per annum) and by its already relatively high consumption of meat calories.

India probably remains a better bet for long-term growth in P_2O_5 usage, but here much will depend on policies followed by the government. The government has supported, through subsides, the development of a large domestic phosphate production industry based on imported phosphate rock and imported phosphoric acid. The government (pre-2004 elections) stated that it wished to eliminate subsides as a long-term policy. It is not clear yet whether the new government will endorse this policy, but the removal of subsidies would necessarily endanger the profitability of the domestic industry because of competition from imported phosphate fertiliser products. This could reduce phosphate rock import requirements, but is expected to have an even larger impact on the phosphoric acid import sector.

The second-largest phosphate fertiliser consuming region is **North America** which uses around 4.8 Mt P_2O_5 of phosphate fertiliser annually. Of this total, the US accounts for around 85% of demand, the remainder being in Canada. Over the past decade, phosphate fertiliser use in the US has been relatively flat, despite increasing grain production. This has been possible through increased efficiency of phosphate fertiliser use, particularly the increased use of liquid fertilisers as part of a 'minimum till' programme. The increasing production of crops for bio-fuel production could hold out some hope of longer term growth in US fertiliser demand.

West Europe and **Latin America** both consume around 3.5-4.5 Mt/y of P_2O_5 in phosphate fertiliser products. However, whereas consumption is slowly declining in West Europe due to environmental and economic considerations, consumption in Latin America has been growing at a significant rate in the past few years.

At the start of the 1990s West Europe consumed over 5 Mt/y of P_2O_5 phosphate fertiliser products, more than double the consumption of Latin America at the time. By 2003, consumption in Latin America had grown to 4.7 Mt/y P_2O_5 compared with a drop to under 3.5 Mt/y in West Europe. The boom in the soya-bean industries in Brazil and Argentina has been particularly striking in the past two years. Brazil now accounts for almost 70% of regional phosphate use. Opportunities to increase the land under cultivation in Brazil provide it with an opportunity to continue to increase its agricultural output and phosphate fertiliser consumption.

Agriculture in sub-Saharan **Africa** remains depressed, but some growth has been apparent in the current decade by the three largest consumers, Morocco, Egypt and South Africa. However, for the region as a whole, this growth still leaves total P_2O_5 consumption below levels seen 20 years ago.

Supply developments

Phosphate-rock production worldwide increased by an estimated 1.5% in 2003 to 154.2 Mt There was a significant decline in output from the peak of 159 Mt in 1988 through a low of 120 Mt in 1993. This decline in rock use was largely a result of the wholesale scaling down in fertiliser use in the countries of the former Soviet Union (FSU). Here P_2O_5 consumption plummeted from over 8 Mt/y prior to 1990, to a low of just over 0.5 Mt in 1999. Since 1999, fertiliser applications in the FSU have grown slowly as measures have been put in place to try and revive the local farming sector. Growth in phosphate fertiliser demand in other regions has led the steady growth in phosphate rock demand. However, swings in phosphate rock inventories, particularly in the US, have meant that rock production has shown wider variation than the growth in demand for rock.

The impact of the reduced fertiliser use in the FSU on local rock production has been significant. FSU rock production fell from over 30 Mt in 1990 to under 10 Mt in 1994. Since then there has been some recovery in rock exports, which, together with higher fertiliser production in the FSU (mainly for export) has taken annual rock production back to around 12.7 Mt. Four sources of rock exist in the FSU. In Russia, Phosagro now controls the Apatit mines on the Kola Peninsula, where production reached around 9.5 Mt in 2003. The current litigation between the State and one of the major shareholders in Apatit is likely to result in some ownership changes by the end of 2004. The Kovdor and Kingisepp mines were both controlled by the MDM Group through EuroChem. The MDM group was split up in 2004 and the mines and fertiliser plants are now owned by EuroChem. The Kovdor mine recovers apatite from iron ore tailings. The Kingisepp mine works a more conventional sedimentary deposit. Together these two mines produce around 1.8 Mt of rock annually. Also in the FSU, there is rock production in Kazakhstan (1.3 Mt in 2003) and Uzbekistan (0.43 Mt).

Phosphate-rock was produced in 28 countries in 2003. Peru, Mexico and Iraq were all absent as producers, and there were no new producers.

The last new producers to emerge were in Canada and Australia where mines were commissioned in 1999. Output in the Kapuskasing mine in Canada (a igneous deposit) was problematic at first, but the operator, Agrium, has now stabilised production at around the 1 Mt/y level, which matches the requirements of its downstream plant at Redwater, Alberta.

In Australia, WMC Resources continues to produce 2.2 Mt/y of phosphate rock from its new mine in northern Queensland. This rock is used in the nearby fertiliser complex which also uses sulphuric acid recovered from the nearby MIM smelter at Mount Isa. WMC has plans to increase capacity at the mine in a few years' time to cover planned debottlenecking at the downstream fertiliser plants.

The four largest phosphate-rock producers, the US, China, Morocco and the FSU, accounted for 73% of global production in 2003.

Although it remains difficult to define in many cases, phosphate-rock production capacity worldwide is thought to have increased by 3% or just over 5.2 Mt in 2003 following a similar increase in the previous year. World capacity is now thought to stand at 186 Mt/y, giving an average capacity use of 83% in 2003 – over one percentage point down on 2002 capacity use.

The **United States** produces phosphate rock and downstream products to feed a 7 Mt/y domestic fertiliser market and a 9 Mt/y export fertiliser market. Fertiliser exports fell by 24% in the three years to 2002 but began to recover slowly in 2003. Exports of rock dwindled to low levels in the mid 1990s, from 10 Mt/y in the late 1980s. In 2003, rock exports amounted just 10,000 t.

Production of phosphate rock in the US fell by 2.2 Mt in 2003, despite only a marginal reduction in demand. The reason was to redress an increasing inventory problem that had got significantly worse in the previous year. As a result, U.S. rock inventories fell by almost 1 Mt during 2003. Inventory addition was strong in January 2003 but the closure of IMC's Fort Green mine started inventories on a downward track. Despite the fact that Fort Green was restarted in May 2003, US inventories continued to slide, and at the end of December, at under 7 Mt, were at their lowest level since 1996.

One major announcement has been the merger of IMC Global and Cargill Crop Nutirition's potash and phosphate facilities into a new company called Mosaic. The merger, expected to be complete in September 2004, will impact on the plans and projects of both parent companies as discussed below. In 2003, Mississippi Phosphates, the phosphate fertiliser producer remained in Chapter 11 bankruptcy protection whilst Agrifos emerged from Chapter 11 after two years, with the adoption of a restructuring plan.

There has been little progress reported on IMC's various permit applications in Florida in the past year. As well as the development of the Ona reserve, IMC is currently fighting to gain permits to mine the Manson-Jenkins tract at Fort Green and the Altmann tract at Four Corners.

Of the two, the Manson-Jenkins tract is probably the more important for IMC since it represents just about the whole remaining reserve at Fort Green. Altmann is a relatively small area of the remaining reserves at Four Corners and the mining plan there could be adjusted if permits are not forthcoming in the near term.

The Kingsford reserve is now depleted, with most of the ore for the Kingsford plant now coming from the Nichols reserve further north. This will allow the Kingsford plant to continue operating through 2005, but a decision on the reconstruction of the Lonesome plant is now getting urgent, and some progress is expected this year.

Cargill signed a letter of intent with CA Indosuez in 2003 for the purchase of the Wingate Creek mine and reserve previously owned by Mulberry. The reserve covers a total of 7,500 acres of which 4,500 acres will require additional permits for mining. Mulberry transported the rock by road to its Mulberry plant when the mine was operational. There is currently no railroad spur connected to the mine. The deal was completed in March 2004. Following the planned merger with IMC, it is not clear whether Cargill expects to begin mining the reserve in 2004 as previously discussed. Clearly after the merger there will be many more options open to Mosaic than was the case for each individual producer. The current supply of rock from IMC to Cargill through its Farmland acquisition will become irrelevant. Mosaic could, if it wished, pump rock from Wingate to one of IMC's southern mines rather than trucking it. Both companies have sufficient reserves overall to sustain their individual operations, but both also face mine depletions in coming years that require new capacity to be added. This should be possible in a more efficient manner once the merger is complete.

The large (around 75 Mt) reserve at Cargill's South Fort Meade mine could provide a source for IMC when its own Kingsford and Fort Green mines deplete. This could delay the need for IMC to develop the Lonesome tract and/or the Ona reserve further south. However, South Fort Meade is close to the Peace River, which has been the main stumbling block for gaining permits for Manson-Jenkins at Fort Meade. There seems to be only a small logistical advantage to come from the supply of Florida plants from the combined mines. However, if the move allowed downstream capacity to be closed down, it could benefit the industry as a whole.

CF Industries will be the only other phosphate-rock production company in the central Florida field, once the creation of Mosaic is complete. CF will continue to mine its 80 Mt reserve at the Hardee Phosphate Complex north of Ona, the most southerly mine currently operating in the Florida field.

Production at the most northerly mine in Florida, PCS's Suwannee River mine, increased in 2003 as full-scale operations at the Swift Creek di-ammonia phosphate (DAP) unit were resumed. In North Carolina, PCS has now fully moved its mine into the NCP area, a low-cost portion of the reserve.

The move, which cost PCS around US$9 million, will save PCS up to US$5 per short ton in operating costs. The full advantage will come in 2004 as the one-off charges will be taken in 2003. Other one-off costs in 2003 included US$13 million for the restart to the White Springs DAP plant and US$18 million for the start-up of a new DFP plant at White Springs. This new plant will consume up to 80,000 t/y of additional rock.

In the Western states, the 50% share of SF Industries that was owned by Farmland has been taken over by the other partner, JR Simplot. Simplot paid US$64.5 million in cash and an 'additional consideration' for Farmland's share of the joint venture. JR Simplot's application for an exploration permit to drill in the south Manning Creek area has been returned to the Caribiou-Targhee National Forest for reappraisal. The exploration of the 200 acre area would add reserves to the existing Manning Creek lease which Simplot purchased in 1999. The importance of the decision by the federal authorities lies in the fact that, previously, permission for the exploration stage did not have to take into account the impact of actually mining the site. It seems that this decision is now saying that the eventual impact of mining should be considered before exploration permits are granted.

Phosphate rock production continues at four mines in Idaho and one in Utah. Total production amounts to a total of around 5.5 Mt/y.

Morocco contains the largest phosphate rock reserve in the world. Total resources are now put at 85.5 billion m^3, roughly the same number in terms of finished product. In 2003, the state-owned operating company, Office Cherifien des Phosphates (OCP) produced 23.3 Mt of rock of which almost all was exported either as rock or as downstream chemicals. Production levels for phosphate rock were 1.3% higher than in the previous year, driven by higher levels of rock requirements from domestic plants. Shipments of phosphate rock to overseas markets fell slightly during 2003. Over 90% of phosphate-rock production in Morocco is from open-pit mines.

The largest of these are in the Khouribga area, where almost 70% of mined production originates. The rock from Khouribga is used in the Maroc Phosphore III and IV units and the Imacid unit at Jorf Lasfar. The latter unit is a JV with India's Zuari/Chambal group. Rock from Khouribga is also exported through Casablanca or Jorf Lasfar ports. Around 2 Mt/y of rock is mined in the open-pit Benguerir mines in the Youssoufia district to the south of Khouribga. This low-grade rock is transported to the Maroc Phosphore II plant at Safi for further treatment prior to being used in the phosphoric acid unit there. Youssoufia has the only underground mines in Morocco, producing around 1.2 Mt/y. In the same area, around 1 Mt/y of rock is produced in open-pit mines. Most of the Youssoufia rock is used in captive acid units at Safi to the west.

Exports of phosphate rock by OCP decreased marginally in 2003 but its global market share increased to 39.5%, an all-time high.

Further increases could come in rock export levels in 2004, although there remain some problems, not least the high level of freights during the first quarter of the year. In the US, now Morocco's largest rock export destination, Mississippi Chemical Co. (MCC) remains in Chapter 11. Although the plant has continued to operate, the economics of supplying rock will continue to be marginal for OCP whilst freight costs remain high. The plant uses around 1 Mt/y of Moroccan rock. In Mexico, the main rock importer, Fertinal, remained out of production during 2003, following damage caused by a storm in 2001. In India, OCP was the first supplier to take a share in downstream plant in 2002. The OCP/Chambal/Zuari JV took a 74% stake in the ailing PPL when the government came to sell part of its stake. The JV has proved successful so far and has provided a new outlet for Moroccan phosphate rock.

At the end of May 2004, OCP announced two new JVs, with Bunge in Brazil and with Fauji Fertiliser in Pakistan. OCP is going to build a new phosphoric acid unit at Jorf Lasfar in conjunction with Fauji in order to supply the phosphoric acid requirements of Fauji's DAP unit in Pakistan. OCP will also be supplying 70% of Bunge's phosphate import requirements in future and possibly constructing another joint venture plant. The OCP/Fauji unit, comprising 375,000 t/y of P_2O_5, will be on stream in 2007.

In **Jordan**, production of phosphate rock at JPMC's mines was 3.7 Mt in 2003, some 8% lower than in the previous year. The decrease came largely in the output of JPMC's higher-grade 73/77% BPL rock and, more recently, the 69/72% BPL product. In 1998, high-grade rock output accounted for more than two-thirds of JPMC's overall production. By 2003, output of high-grade rock accounted for less than one-third.

In shipment terms, JPMC today despatches 2 Mt/y less high-grade rock than it did in 1998. It has been the export market that has seen the greatest decline. In 1998, 3.1 Mt of high-grade rock were shipped, of which domestic plants used 454,000 t. By 2003, domestic plants were still consuming 356,000 t of high-grade rock. In the same time period, exports of high-grade rock declined from 2.6 Mt to just 735,000 t.

Phosphate-rock deliveries by JPMC remain substantially below production levels. Overall, 1.07 Mt of rock was added to inventories in 2003. The largest proportion of this inventory addition came in the high-grade product which is odd given the rapidly shrinking output of that grade. Production of 73/75% BPL rock exceeded shipments by 800,000 t in 2003. Some of this might be accounted for by use of high-grade rock in mixture with lower grade products.

Shipments of phosphate rock by JPMC improved significantly in the second half of 2003, but still ended 10% lower than in the previous year. At the half-year stage, shipments had been over 20% down.

Exports of phosphate rock by JPMC improved significantly in the third quarter of 2003, but declined again in the final quarter of the year.

Overall, exports ended 2003 at 3.7 Mt, which was 8% lower than in 2002. Mostly this decrease was a result of lower shipment levels to India.

Production of phosphate rock by Rotem-Amfert-Negev in **Israel** ended 2003 some 8% lower than in 2002. Output was fairly consistently lower throughout the year. Production and sales were reported at the same level as in 2003. Exports of phosphate rock by Rotem-Amfert-Negev were 12% down on 2002 levels through the first nine months of 2003, but fell back further in the final quarter. Just 178,000 t were shipped in the final three months of 2003, 26% less than in the same period of 2002. Shipments to Rotem's plant in Holland were almost halved, but still accounted for 42% of rock shipped in the final quarter. Brazil also took less but again accounted for 49% of Israel's rock exports.

In West Africa, production of phosphate rock in **Togo** ended 15% higher in 2003. Investments made by the IFG group in the Togolese mining and shipping systems began to impact on production during the year, but the fourth quarter saw a lower level of output again. In the final part of the year, a new head of IFG was appointed by the Togolese Government. Exports of phosphate rock by IFG increased by 7% in 2003, but production exceeded exports by over 100,000 t, and this amount of rock was added to inventory. The higher level of exports was largely a result of better offtake by India and Turkey.

In **Senegal,** production of phosphate rock by CSPT fell by 5% in 2003 and was some 308,000 t less than the total shipments for the years. There is no sign yet of then improvement in output that is expected when the move to the new mining area at Tobene is implemented. The 300,000 t shortfall in production had to be met from accumulated stocks to bring total inventory withdrawals in the past two years to over 1 Mt. This is about the same as the level accumulated in the previous few years, hence we expect production and shipments to come more into balance in 2004. Just one cargo was exported in 2003, amounting to 33,000 t to India. The remainder was consumed in local production of phosphoric acid for export to India under a joint venture agreement.

Production of phosphate rock by CPG in **Tunisia** fluctuated through 2003, ending 4% higher than in the previous year. Shipments had been well below production levels through the first nine months of the year, but increased to surpass production during the fourth quarter. Overall for the year, however, shipments were still 360,000 t lower than production, and this was the net amount added to CPG's rock inventories during the year.

Production of phosphate rock by Gecopham in **Syria** ended 2003 marginally lower than in 2002. Output dropped back in the second and third quarters of 2003 after a first half in which 158,000 t of rock was added to inventory. In the final quarter, output was increased once more, adding a further 40,000 t to inventory levels.

In the past two years, phosphate-rock production in **Egypt** has risen significantly as part of El Nasr Phosphates' expansion plan. Output is thought to have reached around 2.1 Mt in 2003, about 0.5 Mt higher than shipment levels and this excess production is thought to have been added to inventory. Most of the stock accumulation was in the first half and, as a result, production levels were pulled down in the second half to bring output more into line with shipments.

Production of phosphate rock in **Algeria** increased by 21% in 2003 to just under 0.9 Mt. This is the highest level of output by EPE Ferphos since 1999. Sales amounted to 774,000 t, indicating a stock addition of around 175,000 t. Most of this addition came in the fourth quarter when exports dropped by 100,000 t. Overall, rock shipments in 2003 fell by 9% to 774,000 t. Ferphos has announced a feasibility study into an ambitious three-phase expansion of the domestic rock-processing industry that could see phosphoric acid production capacity rising in increments to 1 Mt/y of P_2O_5 requiring 5 Mt/y of rock.

Production at Foskor's Phalaborwa mine in **South Africa** improved marginally on 2002, reaching 2.9 Mt. Shipment levels indicate a major problem in the third quarter, when shipments to the domestic market fell significantly. Mine operations continued at normal levels, however, and shipments were at above normal levels in the fourth quarter in order to compensate. Even so, overall shipments in 2003 were 11% down on 2002 levels, with domestic shipments dropping by 8% and exports by almost 30%. Foskor is wholly-owned by South Africa's Industrial Development Corp (IDC) and is to be partially privatised. For the year to June 30, 2003, it reported a net loss of R3 million, after interest and tax. The main factors in this loss appear to have been a combination of a strong rand, higher operating costs and poor market conditions for phosphate products. Revenue fell by 12% to R1.98 billion, and operating profits slumped by 70% to R147 million. Production volumes at the Richard's Bay division were hit by a 4.5-month delay to the 80% expansion of phosphoric acid capacity. The IDC says in its annual report that Foskor continues to look for various ways to consolidate its position in the phosphate market, including taking an equity stake in an Indian phosphate producer. Phosphate rock production rates have been made more secure following the successful implementation of Foskor's 'Extension 8' project initiated three years ago.

In **Saudi Arabia**, the development of the phosphate resources in the north of the country continues. Saudi Arabian Mining Co (Ma'aden) has initiated the final feasibility study on the phosphate resources, and the rail project has gone straight into the design and engineering phase. The rail project is expected to be complete in 2007 and the phosphate mine at Al Jubail, together with phosphate fertiliser production facilities on the east coast near Jubail, are expected to commence production in 2008. Rock production is expected to reach 5 Mt/y.

Table following page.

Phosphate rock production ('000 t)		
	2002 (r)	**2003 (e)**
Finland	800	799
West Europe	**800**	**799**
FSU	**12,386**	**12,744**
Algeria	741	898
Egypt	1,550	2,183
Morocco	23,028	23,338
Senegal	1,554	1,763
South Africa	2,913	2,919
Togo	1,281	1,471
Tunisia	7,566	7,890
Others	129	100
Africa	**38,761**	**40,562**
Canada	1,004	981
US	36,200	34,065
North America	**37,204**	**35,046**
Brazil	5,027	5,252
Colombia	42	44
Mexico	0	0
Peru	43	43
Venezuela	400	400
Latin America	**5,512**	**5,696**
Iraq	450	0
Israel	3,476	3,208
Jordan	7,179	6,763
Syria	2,483	2,414
Middle East	**13,588**	**12,385**
India	1,185	1,070
Christmas Is/Other	547	586
China	38,858	42,121
North Korea	100	100
Vietnam	788	823
Asia	**39,745**	**43,044**
Australia	2,075	2,218
Nauru	147	147
Oceania	**2,222**	**2,302**
WORLD	**151,950**	**154,234**

r – revised, e - estimated