

COBALT

By Michael Hawkins

World refined cobalt demand in 2001 was about 6% down on that in 2000, totalling about 36,500 t. Demand in the first half of the year was essentially the same as that in the second half of 2000 but declined thereafter as a result of the slowdown in the economies of the industrialised nations. The rate of decline increased after the terrorist attack in New York on September 11, 2001.

Refined cobalt production by Cobalt Development Institute (CDI) members totalled 28,538 t, an increase of 754 t as compared with 2000. Refined availability was 33 t less than in 2000, totalling 39,271 t.

In the first quarter of the year, prices rose slightly as demand remained steady at a time when there were fears of supply shortages. These fears subsided in the second quarter of the year and prices stabilised at levels just below those seen at the beginning of the year. Thereafter, the slowdown in the world's economies, coupled with increased availability, resulted in prices declining steadily to end the year at US\$7.00/lb and US\$6.50/lb for high- and low-grade metal respectively.

Production

Table 1 shows refined cobalt production from CDI members for the calendar years 1995-2001 using the methodology adopted in 1999, which the Institute believes eliminates double counting.

The table shows that production from most members increased slightly in 2001 resulting in an additional 754 t of cobalt over that of 2000. Increases from Murrin Murrin in Australia and Kasese in Uganda were noted as both producers continued to ramp up their operations following commissioning in 1999. In addition, in Zambia, Chambishi Metals' production increased despite reported

technical difficulties with its new slag treatment furnace. It is interesting to note that even with these teething difficulties, Chambishi Metals' production was higher than the nominal capacity of the original Chambishi refinery.

CDI Members Refined Cobalt Production Statistics (t)

	1997	1998	1999	2000	2001
CTT	220	241	470	1,200	1,200
Falconbridge	3,417	3,851	4,009	3,433	3,314
Gécamines	2,808	4,490	5,180	4,320	3,199
ICCI	2,250	2,640	2,770	2,855	2,943
Inco	1,500	1,740	1,420	1,470	1,450
OMG	5,000	5,250	6,200	7,700	8,100
QNI	617	1,395	1,539	1,520	1,818
Sumitomo	263	329	221	311	350
Zambia	3,949	5,011	3,946	2,316*	2,789*
Eramet	159	172	180	204	199
Umicore	1,200	1,200	950	1,110	1,090
Kasese			77	420	634
Murrin Murrin			83	925	1,452
TOTAL	21,383	26,319	27,045	27,784	28,538

* *Chambishi Metals only*

The table shows that Falconbridge production remained below capacity and at a similar level to 2000. This undoubtedly resulted from the strike at its Sudbury operations in the final quarter of 2000 to the end of the first quarter of 2001.

The total production for Gécamines in the Democratic Republic of Congo includes 116 t toll refined for Kalabankola Mining Co. It is interesting to note that Gécamines second-half calendar year refined production was only slightly down on its first half, but the total for the year was 1,121 t (25.95%) lower than in 2000.

Refined cobalt production and availability from other sources are shown in Table 2. This table shows an increase in production in Zambia by

Mopani Copper Mines of 850 t or 82.8% over that of 2000. This is in line with Mopani's plans to return to about 2,500 t/y, the capacity of the Nkana refinery.

Other Refined Cobalt Availability (t)

	1997	1998	1999	2000	2001
Brazil	266	364	630	792	889
Bulong			79	192	203
China	1,200	1,200	1,200	1,200	1,470*
India	110	120	120	206	250
Mopani Copper				1,026	1,876
South Africa	294	320	320	320	252
DLA Deliveries	1,621	2,310	1,679	3,083	1,893
Other Stockpiles	-	-	-	-	-
TOTAL	3,491	4,314	4,028	6,819	6,833
CIS Exports	3,200	2,800	2,678	4,700	3,900*
TOTAL	6,691	7,114	6,706	11,519	10,733
DLA Sales	1,684	1,948	2,234	3,078	1,770
DLA Sales	7,634	9,582	11,816	14,894	16,664
Cumulative					
DLA Deliveries	7,018	9,328	11,007	14,090	15,983
Cumulative					

* Estimate

Minor increases were also reported from Brazil (Tocantins) and Bulong in Australia, and estimates suggest that Chinese production increased marginally during the year. In spite of the increased refined production from CTT in Morocco over the past two years (Table 1), import/export reports show that China continues to receive Moroccan cobalt containing concentrates.

Deliveries from the US Defense Logistics Agency (DLA) stockpile during the year, totalled 1893 t, 1,190 t less than in 2000, hence total availability of refined cobalt from these sources was 6833 t, an increase of about 14 t compared to 2000. Sales from the DLA during 2001 totalled 1,770 t which meant that stocks of cobalt sold but still in DLA warehouses at year-end declined by 123 t to 681 t. At the end of 2001, stocks of unsold cobalt in DLA warehouses totalled 7,518 t, sufficient for sales at the maximum approved

annual rate of 2,700 t per fiscal year for the next two and three-quarter years.

Exports from the CIS are based on import/export data for the first three quarters of the year, and indicate a significant drop (ie, 800 t), compared with 2000. Hence, total availability from non-CDI members during 2001 totalled 10,733 t, a decrease of 786 t (or 6.82%) compared with 2000.

The total availability of refined cobalt for 1995-2001 is shown in Table 3. These data show that despite the continued perception of an increased availability of refined cobalt as a result of new production coming on stream, actual availability in 2001 was in fact 33 t down on 2000.

Total Refined Cobalt Availability (t)

	1997	1998	1999	2000	2001
CDI Members	21,383	26,319	27,045	27,785	28,538
Others	6,691	7,114	6,706	11,519	10,733
TOTAL	28,074	33,433	33,751	39,304	39,271

The major reasons for this decline were the lower than anticipated sales from the US Strategic Stockpile and lower exports from the CIS. However, continued technical problems at Murrin Murrin, Kasese and Bulong meant that these operations were not able to ramp up to full capacity during the year.

It is emphasised that that these production figures do not include the production of refined cobalt from many companies that treat various cobalt-containing intermediate products and scrap and do not report their numbers.

Demand

Published data suggest that refined cobalt demand in 2001 (excluding Russian demand, which is assumed to be met from domestic sources) was about 6% less than in 2000.

Despite indications of a slowing of the world's economies at the end of 2000, demand in the

first half of 2001 remained steady. However, in the second half of the year, a marked reduction in cobalt demand was noted as economies weakened. This was particularly noticeable in the rechargeable battery sector. Following the terrorist attack in New York on September 11, demand in the superalloys sector fell, primarily, as a result of a dramatic slowdown in commercial airline traffic. It should, however, be emphasised, that a slow down had already been projected; this incident only precipitated it earlier than anticipated.

Initial figures from the US Geological Survey suggest that demand for cobalt in the US was about 6% lower than in 2000. The major reductions were noted in the chemicals and magnet sectors, which showed an apparent decline in demand of nearly 14%. Demand in the superalloys sector actually increased slightly in the first eight months of the year and only registered a small decline following September 11. At the end of the year, the reduction in cobalt demand in superalloys was actually only about 3% compared with 2000. This, no doubt, reflects the fact that commercial aerospace applications only account for about 30% of the superalloys market. The reductions in demand noted, were partially offset by increases in demand in the cemented carbide and special steels sectors.

Without doubt, the most dramatic decline in cobalt demand was noted in Japan, as a result of the massive reduction in the worldwide demand for portable telephones in the second half of the year. However, falls in demand were also noted in the speciality steels and catalyst sectors. Estimates suggest the decline in cobalt demand in 2001 totalled about 12%.

Cobalt demand in Europe is estimated to have fallen only by about 4.4% compared with 2000. The fall was most prominent in the superalloys and speciality steels sectors.

Published data suggest that cobalt demand in China has steadily grown over the past decade. The hard metals sector, the largest

user of cobalt in China, is reported to have grown by over 18% in 2001. Unconfirmed reports suggest that Chinese refined cobalt demand in 2001 was about 3,600 t, an increase of about 30% over that of 2000. It is thought, however, that some of this metal was delivered into the national stockpile.

Health, Safety and the Environment

The major development in health, safety and environmental issues in 2001 was the adoption by the European Commission of a White Paper setting out the strategy for a new system for assessing chemicals, known as the REACH system. This contains the following three elements:

- Registration of basic information for around 30,000 substances submitted by companies in a central database. This will apply to all metals and their compounds.

Subject to certain conditions, the following are the deadlines for the submission of registration dossiers for substances exceeding an annual production volume of:

- 1,000 t - by the end of 2005 at the latest
- 100 t - by the end of 2008 at the latest.
- 1 t - by the end of 2012 at the latest.

- Evaluation of the registered information by the authorities for all substances exceeding a minimal production volume of 100 t or, in cases of concern, also for substances of lower tonnages. This evaluation will be carried out by the authorities and will include the development of substance tailored testing programmes focussing on the effects of long-term exposure. This will also apply to most metals and their compounds.
- Authorisation of substances which are carcinogenic, mutagenic or toxic to reproduction (CMRs) and persistent organic pollutants (POPs). Marketing and use of such substances will be authorised only if the safety of their application is demonstrated by industry.

Implications for the Cobalt Industry

Cobalt and its compounds are not currently included in the EU list of priority substances, which are subject to a comprehensive risk assessment. However, the new strategy means that in the future, the cobalt industry will be compelled to take responsibility for testing of, and carrying out risk assessments on, its products. Responsibility will not be restricted to cobalt producers but will extend to all processors, users and importers of cobalt-containing products, however small.

The main objective of the proposed new Chemical Strategy is to provide a high level of protection for human health and the environment, while ensuring the efficient functioning of the internal market and stimulating innovation and competitiveness in the industry.

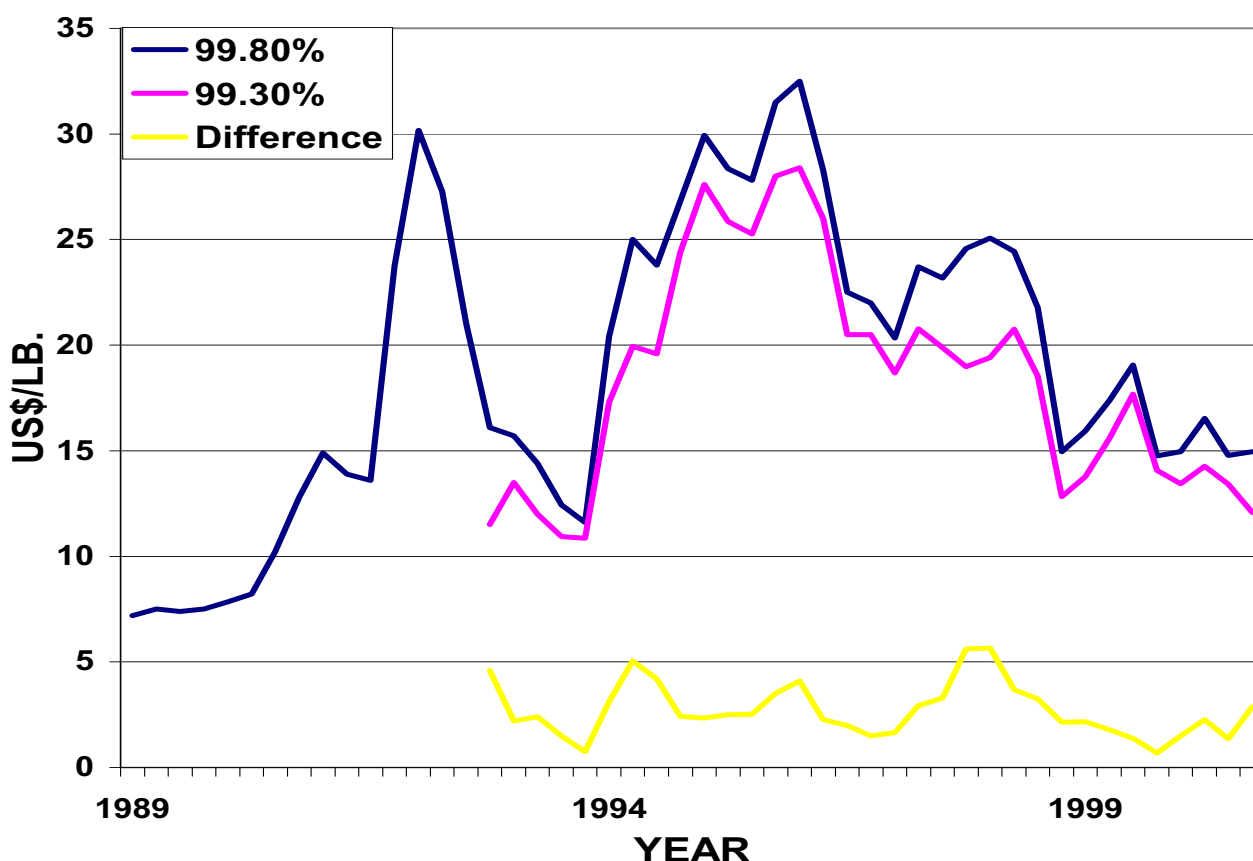
The reason for drawing up this strategy was that the existing EU Chemical Policy does not provide adequate protection because:

- The present system distinguishes between 'existing substances', ie, all chemicals declared to be on the market in September 1981, and 'new substances' ie, those placed on the market since that date.
- There is a general lack of knowledge about the properties and the uses of existing substances. Also, the existing risk-assessment process is slow and resource-intensive and does not allow the system to work efficiently and effectively.

The CDI is actively involved with other trade associations and Eurometaux concerning strategies and action plans needing to be developed by the European metals industry for discussion with the EU.

Price

The figure below illustrates the average quarterly *Metal Bulletin* free-market price quotation for cobalt since 1989 for 99.8% and 99.3% min. cobalt. Based on quarterly



averages, the graph does not show short-term price fluctuations. At the beginning of 2001, the price of refined cobalt stood at US\$13.60/lb and US\$11.00/lb for high and low grade metal respectively. In the first quarter, prices of each grade fluctuated, but firmed to approximately US\$14.00/lb and US\$12.60/lb, respectively, by mid-March. They then declined to about US\$11.50/lb and US\$9.00/lb by mid-May but recovered to US\$12.50/lb and US\$11.30/lb by early June.

These fluctuations reflected short-term adjustments in the market resulting from the effects of the strike at Falconbridge and delays in ramping up to full production by the newly commissioned refineries at Murrin Murrin, Kasese and Bulong. Overall, however, these potential difficulties in supply could not prevent the fall seen in the cobalt price over the remainder of the year as worldwide demand declined. By year end, prices had fallen to about US\$7.00/lb and US\$6.50/lb for high- and low-grade metal respectively. These year-end prices are between US\$4.0/lb and US\$6.0/lb lower than at the beginning of the year, and are the lowest recorded since 1989.

As well as the decline in the overall price, there has been a narrowing of the price differential between the two grades of cobalt from about US\$2.50/lb at the beginning of the year to about US\$0.30/lb at year-end. The narrowing probably resulted from the increased availability of high-grade metal following the settlement of the strike at Falconbridge. Also, following the events of September 11, and announcements of cuts in production by aero-engine manufacturers, demand for high-grade metal fell and it was occasionally being offered for sale at prices near to, or even lower than, Russian material in an attempt to maintain sales.

The low prices quoted in the final quarter of 2001 resulted in a number of cobalt producers requesting the DLA to reduce sales from the US Strategic Stockpile in an attempt to stabilise markets.

National Stockpiles

The DLA continued to sell cobalt from the US Strategic Stockpile. In this calendar year it sold only 1,770 t, 1,308 t less than in 2000. Of this, about 1,211 t was sold in the first quarter of the year before prices began to come under pressure. In the first quarter, nearly 50% of sales comprised high-grade metal reflecting fears of supply disruptions resulting from the strike at Falconbridge.

In the second half of the year, many of the monthly awards were lower than the tonnage offered, as prices bid were considered too low by the DLA and not accepted.

No sales from other national stockpiles were recorded in 2001 although some of the material arriving from the CIS could have originated from the Russian stockpile.

Outlook

The general outlook for 2002 is one of very uncertain demand as markets remain quiet. In the first few months of the year a slight improvement in the US economy has been noted. However, this had not been translated into increased demand by the end of the first quarter of the calendar year. These uncertainties meant that consumers continued to reduce stocks where possible and only purchased cobalt as, and when, needed. A slight rally in price was noted in early January this year, following the Christmas holidays but the price of high-grade metal fell below US\$7.00/lb by mid February and was still at that level at the end of March. Initial observations indicate that at these low prices a number of cobalt processors began utilising refined cobalt instead of processing cobalt containing intermediates and/or scrap.

On the supply side, the DLA has continued to sell small quantities of cobalt, albeit, well below the monthly tonnage on offer. At the end of January, the DLA announced proposals to change the manner in which it will offer cobalt to the market in future. Under these proposals, cobalt will be offered sporadically each month via the DLA website. Although the

tonnage approved for sale under its annual plan will not change, these plans will dramatically change the manner in which cobalt is supplied to the market. In spite of objections from many quarters of industry at the end of March, the DLA announced plans to begin sales via its website in June 2002.

The perception of industry persists, that a massive increase in the supply of cobalt is imminent, but major uncertainties still remain. For instance, Chambishi Metals announced that production from its slag-treating operation will not reach production capacity until at least the second half of 2002. Furthermore, the announcement by Anglo-American that it will terminate its involvement in Konkola Copper Mines in Zambia and not supply cobalt

concentrate to Chambishi Metals beyond 2002 will also restrict Chambishi Metal's production unless it can secure feed from elsewhere. Murrin Murrin, Kasese and Bulong continue to struggle with their operations and it is uncertain when these projects will attain full production capacity. Difficulties in the Democratic Republic of Congo mean that Gécamines' production remains uncertain.

In spite of these supply uncertainties, the general consensus is that supplies are more than sufficient to meet short-term demand. However, it should be noted that cobalt is used in relatively specialised applications and any sudden increase in demand could result in at least some short-term tightness in supplies.