COBALT

By Michael Hawkins

The Cobalt Development Institute (CDI) has developed a methodology to determine worldwide apparent refined cobalt demand. To date, figures are available for 1997 to 2001 and the first half of 2002. These figures do not include cobalt sulphate demand, other than that used in copper electro-winning operations, so are probably on the low side by about 2,500 t/y. Preliminary estimates indicate that apparent refined demand in 2002 was about 37,500 t. After adjusting the 2001 data to include cobalt sulphate data, this is a decline of about 4%.

Refined cobalt production by CDI members totaled 27,859 t, an increase of 1,407 t (5.3%) over that of 2001 after omitting data from Kasese Cobalt and Murrin Murrin, who are no longer members of the Institute. Overall, worldwide refined availability was about 988 t above that in 2001, totalling 40,959 t.

In the first month of the year, prices rose slightly from the low level of about US$6.80/lb noted at the end of 2001, then declined to about US$6.50/lb for both high and low grade metal by early April 2002. Prices then rose to a maximum for the year of about US$8.70/lb at the end of May. Thereafter, prices steadily declined as a result of slackening demand at a time when availability was increasing. By the end of the year, prices had fallen to about US$6.65/lb and US$6.20/lb for high and low-grade metal respectively.

Production

Table 1 illustrates refined cobalt production from CDI members for calendar years 1996 to 2002. The table does not include Kasese Cobalt or Murrin Murrin as these are no longer members of the Institute and their production is included in 'Other Cobalt Production' (Table 2).

Table 1 shows that overall production from members in 2002 increased by 1,407 t (5.3%) over that of 2001. The most significant increase was from Chambishi Metals which increased its production from its slag-treatment operation. The increase by Falconbridge to near capacity reflects a full year of production unaffected by strikes. The announcement by OMG at the end of October 2002 to reduce production by 20% had little effect on its 2002 production but will be noticed in 2003.

It is interesting to note that all nickel producers maintained their production volume during the year.

The increases in cobalt production were offset by a decrease from Gécamines of 1,050 t. The total from Gécamines includes 388 t toll-refined for other operations within the Democratic Republic of Congo.

Refined cobalt production and availability from other sources are shown in Table 2. The table includes production from Kasese Cobalt and Murrin Murrin,

and from Russia now that Norilsk Nickel has begun to publish its production statistics.

Table 2 shows an increase in production at the Murrin Murrin mine in Western Australia of 386 t over that of 2001. However, the total of 1,838 t is still only about 63% of production capacity, reflecting the continued technical problems still being experienced. The data for China are considered more accurate than in the past as a result of improved contacts. Data for Kasese and Bulong are estimates based on first half year production figures. At the end of August, Kasese Cobalt's operations in Uganda were placed on care-and-maintenance as a result of the prevailing low cobalt prices. No production figures have been available from the Bulong operation in Western Australia since ownership was transferred to Barclays in September.

The total production of refined cobalt from these sources, increased by 190 t during 2002.

Deliveries from the US Defense Logistics Agency (DLA) during the year were 609 t less than in 2001. Sales by the DLA totalled 1,481 t, which is 289 t less than in 2001. The lower sales probably reflected the general reduction in demand but some analysts believe that they could have been adversely affected by the new procedures introduced by the DLA in June to solicit sales through its web site, as opposed to the former sealed-bid system.

The difference in sales and deliveries meant that at year end, stocks of sold cobalt in DLA warehouses increased by 197 t to 878 t. Stocks of unsold cobalt in DLA warehouses totalled about 6,050 t, sufficient for sales for the next two and a quarter years at the maximum approved rate of 2,700 t per fiscal year.

Total cobalt availability from non-CDI members during 2002 totalled 13,100 t, a decrease of 419 t (or 3.1%) compared with 2001. The total availability of refined cobalt for 1997-2002 is shown in Table 3. These data show that overall availability in 2002 was 988 t up on 2001. The figures do not include production of refined cobalt from those companies treating various cobalt-containing intermediate products and scrap who do not report their figures.

Demand

Latest data indicate that refined cobalt demand in 2002 was about 4% less than in 2001, at about 37,500 t.

Without doubt the decline resulted from the continued depressed economies of the industrial nations. The major declines were noted in the superalloys and rechargeable battery sectors. The decline in superalloy demand was a reflection of the slowdown in commercial airline traffic following the September 11, 2001, terrorist attack in New York. However, a significant decrease in superalloy demand in land-based turbines was also noted.

Initial figures from the CDI/World Bureau of Metal Statistics and the US Geological Survey, suggest that demand in the US was about 9% lower than in 2001. The main reductions were seen in the chemicals, superalloys and

magnets sectors, which showed decreases of between 11% and 13%. These reductions were partly offset by increases in demand in the hard metals and special steels sectors.

Cobalt demand in Europe is estimated to have fallen by about 5% in 2002. The most dramatic decline was in the superalloys sector but declines were seen in all end-use sectors.

An increase in apparent demand of over 20% was noted in Asia during the year. The major increase was observed in Japan where improved activity in the rechargeable battery field was noted. Many analysts believe that this increase in apparent demand, resulted from restocking on the part of cobalt consumers at a time when cobalt prices were at their lowest for about 18 years.

Health, safety and environment

The major effort in health, safety and environmental issues in 2002 has been related to the proposed New Chemicals Policy (NCP) being adopted by the EU. The new policy will pose a number of challenges to industry, as it will reverse the burden of proof from the legislative authorities to industry. Under this policy, industry will be responsible for the safety of its products.

The new system for assessing both existing and new chemicals requires that all chemicals manufactured in, or imported into, the EU in amounts over 1 t/y, must be registered with the authorities. Those produced or imported in tonnages of over 100 t/y (or chemicals of concern at lower tonnages) must be evaluated by the authorities before they are allowed into the EU. Chemicals of high concern, which are carcinogenic, mutagenic, toxic to reproduction (CMRs), persistent, etc., will be authorised for use only if the safety of their application is guaranteed by industry. Deadlines are set for implementation of the policy, based on annual production/import volumes.

In order to assist industry in meeting the challenges of this new policy, the Cobalt Development Institute has designed and implemented a long-term strategic research programme to address human health and environmental risk. Through its health, safety and environment committee its objectives include:

- determining the safe use of cobalt to protect workers, users (customers), the public at large and the environment; and
- building relationships with the scientific community, regulatory bodies and other industrial organisations.

The CDI's mandate is to monitor scientific developments and regulatory developments while conducting the necessary research and participating in specific projects.

The NCP will require the cobalt industry to compile the necessary data, develop a health, safety and environmental understanding of cobalt-

containing products, and participate in risk assessment and risk management activities in order to ensure the industry has a licence to operate its plants and market access for its products

The CDI has been actively involved with other trade organisations and Eurometaux, concerning strategies and action plans needing to be developed by the European metals industry for discussion with the EU. It has also been collecting data on the identity and properties of cobalt compounds, their intended uses, estimated human and environmental exposure and production volumes towards carrying out preliminary risk assessments in the future.

It is anticipated that draft legislation will be published for consultation about mid-April 2003. Following consultation, it will be released by about the end of July, and discussed in the European Council by the end of 2003.

Price

The average cobalt price 1989-2002 graph illustrates the change seen in 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 end of 2001, the price of refined cobalt stood at about US$7.00/lb and US$6.50/lb for high and low grade metal respectively. In January, prices rose to about US$7.50/lb and US$7.00/lb by the end of that month, but thereafter declined steadily and by the end of March were about US$1.00/lb lower. At various times during this period there was no differential in the price of the two grades of metal which was attributable to the poor demand for high-grade metal and the need for high-grade producers to maintain sales. In April, prices began to increase slowly and reached peaks of US$8.80/lb and US$8.50/lb by the end of May.

However, this recovery was not sustained and although prices fluctuated, reflecting short-term market conditions, they declined steadily to about US$6.35/lb for both grades of metal by early November. Small fluctuations in price were noted for the remainder of the year but at year end, prices stood at about US$6.65/lb and US$6.20/lb for high and low grades respectively.

These prices are about US$0.80/lb lower than in early January and are the lowest recorded since about 1987.

National stockpiles

The DLA continued to sell cobalt from the US Strategic Stockpile. During the calendar year it sold 1,481 t, 289 t less than in 2001. Sales in the first half of the year totalled 632 t, 448 t less than in the first half of 2001. The lower sales probably reflected the reduction in cobalt demand noted in the first half of 2002 but June sales were low and could have resulted from the DLA’s new procedure of soliciting sales through its web site which was unpopular with many traders. Sales increased in the second half of the year, to 849 t, mainly as a result of a sale of 453 t in October via the DLA's negotiated bid tender procedure.

No sales from other national stockpiles were recorded in 2002, although, as in previous years, some material coming out of the CIS could have originated in the Russian stockpile.

Outlook

At the beginning of 2003 the outlook for cobalt was one of uncertain demand as a result of the worldwide economic recession and war in Iraq. It is estimated that at end of 2002 there was a surplus of about 5,000 t of cobalt overhanging the market. However, this was not considered excessive after taking into consideration its different forms and the transit times necessary for delivery to customers worldwide.

In the first two months of 2003, cobalt prices rose steadily but in March increased rapidly to reach about US$10.20/lb and US$8.50/lb for high and low grade metal respectively by the end of the month. The rapid increase in price was attributable to an increase in demand by battery producers in Asia who sought alternative suppliers following a change in sales strategy by OMG and the latter's announcement to reduce production. An increase in demand was also noted in the superalloy sector as producers began restocking after running down their inventories during 2002. Unfounded rumours of problems with the slag treatment furnace at Chambishi Metals in Zambia in the middle of March, reinforced the fears of a supply shortage.

On the supply side, the DLA continued to offer cobalt for sale, and in March, sold a total of 680 t of low grade metal by negotiated bid.

In contrast to the beginning of 2002, the perception of industry is one of a potential tightness in supply as a result of OMG’s reduced production, continued technical difficulties at Murrin Murrin and the closure of Kasese Cobalt in August 2002. New projects on the drawing board, such as Ravensthorpe, Goro and Voisey’s Bay are proceeding or have good backing but none will be able to supply any cobalt to the market till at least 2006. The only possibility of increases in supply in the next three years arise from OMG, Murrin Murrin, Chambishi Metals and/or China. Any increase in supplies from China will be dependent on imports of feed materials as China has limited domestic supplies of cobalt-containing ores. Jinchuan, China’s largest cobalt producer is actively seeking joint ventures with mining companies throughout the world to secure feed materials in order to increase its production.

The technical problems at Murrin Murrin are not projected to be resolved until at least 2004 and the probability that Konkola Mines will cease supplying concentrates to Chambishi later this year could limit increases in production from Zambian operations.

In spite of positive reports from American Mineral Fields regarding the development of the Kolwesi tailings project in the Democratic Republic of Congo (DRC), financial support still has to be secured. The peace accord recently concluded in the DRC could enable Gécamines to commence

implementing its recovery plans announced at the CDI conference in Paris in 2002, but no significant increase in cobalt production is envisaged in 2003.

Since cobalt is used in relatively specialised applications and cannot be easily substituted by alternative materials, any increase in demand could result in a tightness in supplies.

Table 1 – CDI Members' Refined Production (t)

	1997	1998	1999	2000	2001	2002
CTT	220	241	470	1,200	1,200	1,100
Falconbridge	3,417	3,851	4,009	3,433	3,314	3,993
Gécamines	2,808	4,490	5,180	4,320	3,199	2,149
ICCI	2,250	2,640	2,770	2,855	2,943	3,065
Inco	1,500	1,740	1,420	1,470	1,450	1,480
OMG	5,000	5,250	6,200	7,700	8,100	8,200
QNI	1,395	1,539	1,520	1,818	1,863	n/a
Sumitomo	263	329	221	311	350	354
Zambia	3,949	5,011	3,946	*2,316	*2,789	*4,344
Eramet	159	172	180	204	199	176
Umicore	1,200	1,200	950	1,110	1,090	1,135
TOTAL	**21,383**	**26,319**	**26,885**	**26,439**	**26,452**	**27,859**

* Chambishi Metals only.

Table 2 – Other Refined Cobalt Production/Availability (t)

	1997	1998	1999	2000	2001	2002
Brazil	266	364	630	792	889	960
Bulong			79	192	203	*200
China	1,200	1,200	1,200	1,200	1,470	1,842
India	110	120	120	206	250	270
Mopani Copper				1,026	1,876	1,800
RSA	294	320	320	320	252	256
Russia	3,800	3,700	4,000	4,100	4,600	4,200
Kasese			77	420	634	*450
Murrin Murrin			83	925	1,452	1,838
TOTAL	**5,670**	**5,704**	**6,509**	**9,181**	**11,626**	**11,816**
DLA Deliveries	1,621	2,310	1,679	3,083	1,893	1,284
TOTAL	**7,291**	**8,014**	**8,188**	**12,264**	**13,519**	**13,100**
DLA Sales	1,684	1,948	2,234	3,078	1,770	1,481
DLA Sales+	7,634	9,582	11,816	14,894	16,664	18,145
DLA Deliveries+	7,018	9,328	11,007	14,090	15,983	172,67

* Estimates, + Cumulative

Table 3 – Total Refined Cobalt Availability (t)

	1997	1998	1999	2000	2001	2002
CDI Members	21,383	26,319	26,885	26,439	26,452	27,859
Others	7,291	8,014	8,188	12,264	13,519	13,100
TOTAL	**28,674**	**34,333**	**35,073**	**38,703**	**39,971**	**40,959**

Average Cobalt Price 1989-2002