

Specialty Nonferrous Metals

ANTIMONY

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Canadian Developments

Canadian primary antimony production is estimated at 665 t (recoverable) in 1995, up from 540 t in 1994. Cominco Ltd. in British Columbia and Brunswick Mining and Smelting Corporation Limited (BMS) in New Brunswick produce antimony-lead alloy from concentrates from their own mines and from external sources. Table 1 shows the production of antimony in Canada for the period 1993-95. Antimony is also recycled in lead bullion recovered during the recycling of lead-acid batteries; Tonoli Canada Ltd. in Toronto and Nova Pb Inc. near Montréal are secondary lead smelters that process significant quantities of lead-acid batteries.

Canadian consumption data for antimony are provided in Tables 1 and 2. Due to the uncertainties with respect to possible double counting, total Canadian antimony consumption is the sum of antimony metal consumption plus a portion of the antimony in antimonial lead consumption (a value between Column 1 and the sum of Columns 1 and 2). Canadian consumption of antimony metal was reported at a record 1085 t in 1994, up from 689 t in 1993. During recent years, the amount of antimony metal used in making antimony-lead alloys has increased very significantly, while the amount used in making babbitt and for other uses has declined. In 1994, 1085 t of antimony metal were consumed in Canada, of which 999 t, or 92%, were for the production of antimony-lead alloys. Canada's major trading partner for antimony is the United States.

During 1995, Roycefield Resources Ltd. drove about 400 m of decline, drift and cross-cut to continue exploration work at its Beaver Brook deposit in Newfoundland, near Grand Falls. First discovered in

1988, the drill-indicated reserves have been classified into two zones: the Central Zone at 160 000 t grading 5.28% antimony, and the East Zone, with 1 026 000 t grading 4.62%. Exploration work is scheduled to continue into 1996, and a mine life of about nine to twelve years has been mentioned in press reports. A 450-t/d mill is planned for the project. The company is also considering the installation of a hydrometallurgical plant in order to upgrade its output to antimony oxide. Roycefield's costs are expected to be in the range of \$15 million. Subject to permitting, production could begin in late 1996 or early 1997.

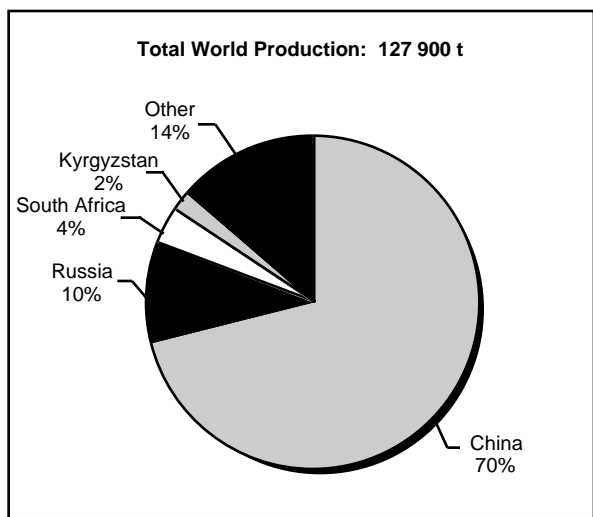
Work continued at the former Lake George antimony mine in New Brunswick with the intention of bringing the operation back into production by late February 1996. Production will be about 4000 t/y of antimony concentrates grading about 65% antimony. The mine operated from 1972 to 1989 when low prices forced its closure. With higher prices in 1994, Apocan Inc. decided in June 1994 to proceed with permitting and the rehabilitation work needed to re-open the mine. In October 1995, final permits were obtained for it to be re-opened.

World Developments

World antimony production was reported by the World Bureau of Metal Statistics (WBMS) as 127 900 t for 1994, and the leading producers (rounded to the nearest 100 t) were China (91 000 t), Russia (12 500 t), South Africa (4500 t), and Kyrgyzstan (2500 t). According to the WBMS, Canadian production in 1994 was 750 t, or 0.6% of the total.

As China is the dominant supplier, Chinese production, export decisions and data are influential in world antimony markets. In 1995, the China National Nonferrous Metals Import and Export Corporation reported that domestic production for 1994 was 82 400 t, of which about half came from Hunan Province. Antimony production has continued to increase significantly from 20 800 t in 1978 to 61 400 t in 1991, and to 82 400 t in 1994. (The corresponding estimates from the WBMS were 58 000 t in 1991, rising to 91 000 t in 1994.) From 1984 to 1989, the number of smelters increased from 21 to 344. In an attempt to increase returns to the state, China imposed a 20% export duty on antimony at the beginning of 1995. Subsequently, as prices declined

Figure 1
World Production of Antimony, 1994



Source: U.S. Bureau of Mines.

in 1995, producers agreed to cut production in an attempt to stabilize markets. In May, about 40 producers agreed to a 20% production cutback.

Starting in October, the Chinese Joint Committee on Antimony Producers announced that antimony smelters would stop purchases of ore, cut internal mine production by 50%, and set a minimum price of US\$4800/t. The intention was to reduce antimony output by 70%; mine closures reportedly followed this announcement. The market was also affected by frequent quality problems, with claims that some material exceeded specification limits for lead, arsenic and selenium. In the fall, the Chinese government announced that the export tax rebate would be reduced from 14% to 9% effective January 1, 1996.

Early in 1995, in Kyrgyzstan, attempts were made to privatize the 20 000-t/y Kadamdjaisk antimony smelter. There have been difficulties in obtaining, transporting and paying for concentrates normally obtained from the Yakutia region in Russia and from Tadjikistan. Despite the market advantage of the Kadamdjaisk plant (which can handle the high arsenic levels in the material from Yakutia), the smelter was reportedly concerned about maintaining its traditional relationship with the Russian mines; a privatized joint-stock company that could offer shares to antimony miners in Yakutia was seen as a way to maintain this relationship. There is also interest in developing domestic antimony properties in Kyrgyzstan to increase the feed to the smelter. Kadamdjaisk reportedly produced about 13 000 t of metal and trioxide in 1994.

In Bolivia, the Vinto low-lead tin smelter of Corporacion Minera de Bolivia announced plans in mid-year to produce 3200 t/y of by-product antimony trioxide,

down one third from 4800 t in 1994. Subsequently, production estimates were put at about 4500 t. Offers were entertained by the Government of Bolivia for sale of the smelter; four foreign companies were qualified by the government to bid for up to 50% of the smelter. However, questions about the sourcing of concentrates for the smelter threatened to delay the privatization.

In South Africa, Consolidated Murchison Mine announced plans to increase production. Production at the antimony-gold mine is currently 37 000 t/m of ore; this is forecast to rise to 40 000-45 000 t/m by the end of the century as markets permit. Additional reserves can be exploited as the tonnage rate is boosted.

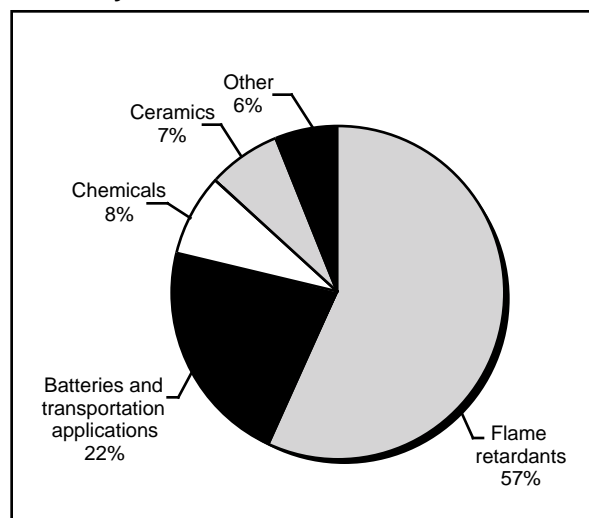
Avocet Ventures Inc. of Vancouver decided not to proceed with the re-opening of the Gagnerauld antimony mine at Les Brouzils, France. Reserves at the former mine had been estimated at 130 000 t of ore containing about 8000 t of antimony. A three-year mine life at a production rate of 2000-2500 t/y of antimony concentrates for the main deposit had been considered, with possible additional life from the exploitation of other antimony deposits in the Vendée region.

In Thailand, the Peak Union Company opened its 200-t/m plant in the fall, supplied by both domestic and imported Chinese material.

Consumption and Uses

Antimony is used in a variety of industrial applications. The U.S. Bureau of Mines estimated that consumption in various sectors of the U.S. economy in 1994 was: flame retardants, 57%; batteries and other

Figure 2
Antimony Markets in the United States



Source: U.S. Bureau of Mines.

transportation applications, 22%; chemicals, 8%; ceramics and glass decolourizing, 7%; and other, 6%. Antimony's primary application in Canada is for antimonial lead for use in motor vehicle batteries. In lead-acid batteries, antimony is alloyed with lead to increase rigidity and strength.

Prices

Over the period 1993-95, antimony prices¹ rose significantly from a base of about US\$1600/t to US\$5955/t in November 1994. Prices declined to US\$2975/t in June 1995 before climbing back to

¹ The price cited is mean of the average low and average high prices reported by the *Metal Bulletin*.

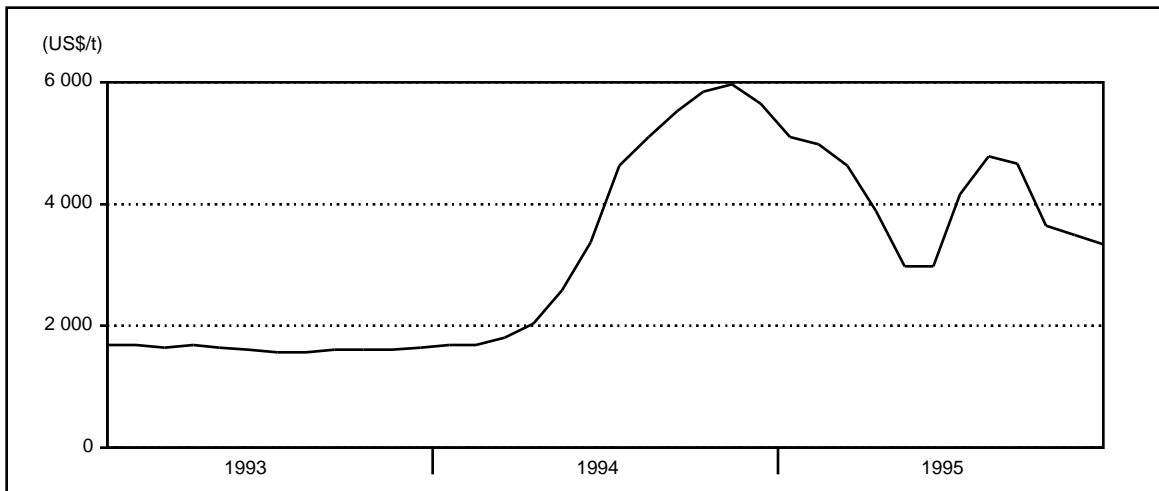
US\$4787/t in August, and then declined to an average of US\$3345/t in December 1995. Figure 3 shows the trend in monthly prices for the 1993-95 period.

Outlook

The outlook for antimony, as for many minor metals, is expected to be one of continued price volatility. China can be expected to continue to occupy a dominant position in the market as the leading supplier; the solidarity of Chinese producers will play a pivotal role in the question of whether prices are supported.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 70. (2) Information in this review was current as of January 31, 1996.

Figure 3
Antimony Prices, 1993-95
99.6% Regulus - Average Metal Bulletin Free Market Price



Source: *Metal Bulletin*.

TARIFFS

Item No.	Description					
		MFN	Canada GPT	USA	United States Canada	EU MFN
2617.10	Antimony ores and concentrates	Free	Free	Free	Free	Free
2825.80	Antimony oxides	Free	Free	Free	Free	10.5%
2918.13.10.10	Antimony potassium tartrates	Free	Free	Free	Free	7.4%
8110.00	Antimony and articles thereof, including waste and scrap					
8110.00.10	Unwrought antimony; not alloyed; powders, not alloyed	Free	Free	Free	Free	7.8%
8110.00.20	Unwrought antimony, alloyed; waste and scrap; powders, alloyed; articles of antimony	Free	Free	Free	Free	6.4%

Sources: Customs Tariff, effective January 1996, Revenue Canada; Harmonized Tariff Schedule of the United States, 1996; The "Bulletin International des Douanes," Journal Number 14 (17th Edition), European Union, 1994-1995, "Conventional" column.

TABLE 1. CANADA, ANTIMONY PRODUCTION, IMPORTS AND EXPORTS, 1993-95, AND CONSUMPTION, 1990-94

Item No.	1993		1994		1995 ^p		
	(tonnes)	(\$000)	(tonnes)	(\$000)	(tonnes)	(\$000)	
PRODUCTION							
	New Brunswick	167	365	197	1 056	249	1 745
	Manitoba	3	6	2	13	2	17
	British Columbia	396	866	341	1 826	413	2 896
	Total	566	1 237	540	2 894	665	4 658
IMPORTS							
2617.10	Antimony ores and concentrates						
	United States	5	17	29	102	16	55
	People's Republic of China	—	—	7	25	15	50
	Total	5	17	37	128	30	106
2825.80	Antimony oxides						
	United States	817	2 558	1 183	5 606	1 289	8 107
	United Kingdom	545	1 654	468	2 451	245	2 182
	People's Republic of China	108	383	92	582	153	1 022
	Belgium	20	112	10	86	40	435
	Germany	—	—	—	—	1	3
	Total	1 490	4 710	1 752	8 728	1 728	11 750
2918.13.10.10	Antimony potassium tartrates						
	People's Republic of China	9	24	8	21	28	131
	Italy	16	43	21	54	16	41
	United States	27	71	4	9	5	12
	South Africa	—	—	—	—	4	10
	Total	53	138	33	86	53	195
8110.00.10	Unwrought antimony, not alloyed; powders, not alloyed						
	United States	86	262	69	230	111	386
	Venezuela	—	—	—	—	100	126
	People's Republic of China	102	274	223	803	73	290
	Germany	—	—	—	—	2	8
	Total	188	537	292	1 033	286	812
8110.00.20.00	Unwrought antimony; waste and scrap; powders, alloyed; articles of antimony						
	United States	15	46	11	44	69	260
	People's Republic of China	4	10	48	176	58	243
	Bolivia	—	—	—	—	9	37
	Other countries	2	9	3	11	1	5
	Total	21	66	62	232	138	547
EXPORTS							
2617.1	Antimony ores and concentrates						
	United States	1 497	1 004	1 307	1 113	1 547	1 564
	Dominican Republic	—	—	24	17	—	—
	Total	1 497	1 004	1 331	1 131	1 547	1 564
2825.80	Antimony oxides						
	United States	—	—	...	2	—	—
	Total	—	—	...	2	—	—
8110.00	Antimony and articles thereof, including waste and scrap						
	United States	42	381	45	439	120	534
	Brazil	—	—	...	1	—	—
	Total	42	381	45	440	120	534
CONSUMPTION¹							
		1990^a	1991^a	1992	1993	1994^p	
		(kilograms)					
Antimony metal used for, or in the production of:							
	Antimonial lead	176 169	231 892	235 623	606 712	999 127	
	Babbitt	72 218	69 945	61 903	55 341	64 541	
	Other uses ²	45 934	104 384	58 437	26 489	21 195	
	Total	294 321	406 221	355 963	688 542	1 084 863	
Held by consumers on December 31 ¹		13 805	20 248	99 872	41 123	80 123	

Sources: Natural Resources Canada; Statistics Canada.

— Nil; ... Amount too small to be expressed; ^p Preliminary.^a Increase in number of companies being surveyed.¹ Available data as reported by consumers. ² Includes solder, type metal and miscellaneous uses.

Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, CONSUMPTION AND CONSUMERS' STOCKS OF ANTIMONY,¹ 1970, 1975 AND 1980-94

	Consumption		On Hand at End of Year	
	Antimony Metal	Antimonial Lead Alloy ²	Antimony Metal	Antimonial Lead Alloy ²
	(kilograms)			
1970	518 007	635 212	131 501	91 563
1975	454 164	723 155	116 760	170 478
1980	369 732	643 983	42 389	51 405
1981	209 829	691 180	35 105	151 400
1982	161 034	605 502	39 799	76 979
1983	169 648	560 705	24 381	130 104
1984	342 705	648 413	33 524	23 319
1985	184 993	826 846	24 512	20 298
1986	539 655	759 876	28 422	104 360
1987	540 147	692 750	21 172	164 782
1988	585 600 ^r	989 100 ^r	7 386 ^r	142 961 ^r
1989 ^a	442 942 ^r	1 075 354 ^r	17 023	135 977 ^r
1990	294 321	922 127	13 805	99 882
1991	406 221	924 728	20 248	131 779
1992	355 963	829 795	99 872	149 850
1993	688 542	727 064	41 123	125 341
1994 ^p	1 084 863	704 904	80 123	134 718

Source: Natural Resources Canada.

^p Preliminary; ^r Revised.

^a Increase in number of companies being surveyed.

¹ Available data, as reported by consumers. ² Antimony content of primary and secondary antimonial-lead alloys.

TABLE 3. WORLD MINE PRODUCTION OF ANTIMONY, 1990-94

Country	1990	1991	1992	1993	1994p
(tonnes)					
EUROPE					
Austria	250	—	—	—	—
France	—	760	—	—	—
Yugoslavia	409	400	300	100	100 ^e
Total	659	1 160	300	100	100
AFRICA					
Morocco	172	157	184	— ^r	—
South Africa	4 815	4 176	3 951	4 100	4 534
Zimbabwe	66	104	165	50	35
Total	5 053	4 437	4 300	4 150	4 569
ASIA					
Pakistan	38	—	—	—	—
Thailand	537	96	150	907	696
Turkey	552	288	258	104	100 ^e
Total	1 127	384	408	1 011	796
AMERICAS					
Bolivia	8 454	7 287	6 022	5 556 ^r	7 050
Canada	658	469	948	673 ^r	750
Guatemala	868	590	275	90	230
Honduras	25	—	—	—	—
Mexico	2 614	2 753	1 064	1 494	1 758
Peru	307	227	311 ^r	219 ^r	385
United States	500	500	500	300 ^r	300
Total	13 426	11 826	9 120 ^r	8 332	10 473
OCEANIA					
Australia	1 274	1 500	1 701	1 700 ^e	1 700
EASTERN COUNTRIES^e					
People's Republic of China	54 800	58 300	59 400	60 000 ^r	60 800
Czechoslovakia	917	297	240	—	400
Kyrgyzstan	1 656	1 394 ^r	1 289 ^r	1 075 ^r	2 500
Romania	400	300	400	—	—
Russia	11 500 ^r	11 000 ^r	8 000 ^r	7 000 ^r	7 000
Tadjikistan	4 281 ^r	4 500 ^r	3 352 ^r	3 024 ^r	1 000
Ex-U.S.S.R.
Other countries	70	80	800	—	—
Total	73 624 ^r	75 871 ^r	73 481 ^r	71 099 ^r	71 700 ^r
Total world	95 163 ^r	95 178 ^r	89 310 ^r	86 392 ^r	89 338

Sources: Natural Resources Canada; International Consultative Group on Nonferrous Metal Statistics.

— Nil; .. Not available; ^e Estimated; ^p Preliminary; ^r Revised.