

# Mineral Industry Surveys

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## BISMUTH IN THE FOURTH QUARTER 2002

Total bismuth consumption in the United States was 557,000 kilograms during the fourth quarter of 2002, slightly less than in the third quarter (table 1), according to the U.S. Geological Survey.

Comparisons of consumption indicate that each category of use was similar for the third and fourth quarters (table 2). Total estimated consumption for 2002 increased 1%, when compared with that of 2001.

The New York dealer price for bismuth as published in Platts Metals Week began the quarter at a price range of \$2.75C\$3.15 per pound. The price softened slightly to end the quarter at \$2.70C\$3.10 per pound.

**Reserves.**—Several bismuth-containing deposits are in varying stages of study. Verena Minerals Corp. (Canada) has a gold project in Brazil's Rio Grande do Norte state with the second phase of exploration now underway. Gold and tungsten values have been announced and bismuth values will be included at the feasibility stage (Verena Minerals Corporation, 2003§<sup>1</sup>).

Fortune Minerals Ltd. (Canada) announced the results of a preliminary assessment of its recently discovered NICO cobalt-gold-bismuth deposit near Yellowknife, Northwest Territories, Canada. This pre-feasibility assessment shows encouraging results based on initial metallurgical testing, an initial mine plan, including both underground and surface development, and in-house resource modeling (Fortune Minerals Ltd., 2003§).

Tiberon Minerals Ltd. (Canada) has released the results of a

pre-feasibility study on their 70% owned Nui Phao polymetallic deposit in Vietnam. These results have been encouraging for development of a mine anticipated to produce 3.5 million metric tons of ore annually with annual average production of 360 metric tons of bismuth in concentrate (Tiberon Minerals Ltd., 2003§).

**Uses.**—AlphaMed Inc. (MA) announced it has made the first generator shipments of its radium-224, which decays to lead-212 and bismuth-212. The production is funded by a grant from the Department of Energy to privatize production of this isotope. The by-product bismuth isotope is an alpha-emitting radioisotope that is used for research in radioimmunotherapy with important applications for the treatment of cancer (AlphaMed Inc., 2002§).

In anticipation of a European Union ruling banning lead in solders by 2006, Japan's Matsushita Electric Industrial Co. has begun production of lead-free solders based on alloys of tin, silver, bismuth and indium (Metal-Pages, 2002a§). Subsequent rulings were then announced by Japan, North America and Europe to eliminate lead solder from manufacturing processes (Metal-Pages, 2002b§).

**Production.**—The Bismuth Producers Association (BiPA) has taken over the former role of the Bismuth Institute in providing information and encouraging research and development into new uses for bismuth. The founding members of BiPA are Cía. Doe Run Perú, Met-Mex Peñoles, S.A., C.V.

### Notice

The U.S. Geological Survey (USGS) will no longer print paper copies of the *Mineral Industry Surveys* for mailing list distribution after release of the December 2002 report. The report will continue to be available on the USGS Web site at URL: <http://minerals.usgs.gov/minerals>.

If you would like to receive e-mail notification for future issues of the *Mineral Industry Surveys*, instructions are provided at <http://minerals.usgs.gov/minerals/pubs/listservices.html>.

(Mexico), and Sidech, S.A. (Belgium) with Hunan Shizhyuan Nonferrous Metals Co., Ltd. (China) joining recently.

Officials at one of China's major producers in Hunan province announced that they have reduced bismuth output to 250 metric tons per year or one-half of production capacity owing to low prices (Mining Journal, 2003).

### Reference Cited

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Verena Minerals Corporation, 2003 (January 20), Bonfim gold project phase II exploration program underway positive results continue: Toronto, Ontario, Canada, Verena Minerals Corporation. news release, accessed January 31, 2003, at URL <http://www.verena.com/>.

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<sup>1</sup>References that include a section twist (§) are found in the Internet References Cited section.

TABLE 1  
SALIENT BISMUTH STATISTICS 1/

(Kilograms, unless otherwise specified)

	2001	2002 e/				Total
		First quarter	Second quarter	Third quarter	Fourth quarter	
Consumption	2,200,000	546,000	564,000	561,000	557,000	2,230,000
Exports 2/	541,000	44,700	20,800	21,100	NA	NA
Imports for consumption	2,220,000	364,000	371,000	680,000	NA	NA
Price per pound, dealer, end of period	\$3.74	\$3.20	\$3.30	\$3.01	\$3.03	XX
Stocks, end of period, consumer	95,200	88,800	97,000	93,700	93,200	XX

e/ Estimated. NA Not available. XX Not applicable.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Comprises bismuth metal and the bismuth content of alloys and waste and scrap.

TABLE 2  
BISMUTH METAL CONSUMED IN THE UNITED STATES, BY USE 1/

(Kilograms)

Use	2001	2002 e/				Total
		First quarter	Second quarter	Third quarter	Fourth quarter	
Chemicals 2/	805,000	199,000	206,000	205,000	203,000	814,000
Bismuth alloys	981,000	241,000	250,000	248,000	246,000	985,000
Metallurgical additives	369,000	94,800	96,000	96,500	95,700	383,000
Other	45,000	11,000	11,500	11,500	11,300	45,300
Total	2,200,000	546,000	564,000	561,000	557,000	2,230,000

e/ Estimated.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Includes industrial and laboratory chemicals, cosmetics, and pharmaceuticals.

TABLE 3  
U.S. EXPORTS OF BISMUTH METAL, AND WASTE AND SCRAP,  
BY COUNTRY 1/

(Kilograms, metal content)

Country	2001	2002 2/				January-November
		September	Third quarter	October	November	
Australia	306	--	--	--	--	--
Belgium	194,000	--	--	--	--	759
Brazil	--	999	999	--	--	999
Canada	89,700	3,260	6,790	174	5,480	37,400
China	11,100	--	--	1,560	--	3,000
Dominican Republic	2,380	--	--	--	--	342
Germany	90,300	--	--	--	--	6
Hong Kong	101	18	38	21	22	332
Israel	1,000	--	128	--	--	167
Japan	--	--	--	--	--	66
Korea, Republic of	--	--	--	--	--	4
Malaysia	--	6,720	6,720	--	2,800	9,520
Mexico	91,100	2,040	6,130	325	--	32,300
Netherlands	36,600	--	--	--	--	5,990
Peru	872	--	--	--	--	4,000
Philippines	2,070	--	--	--	--	--
Russia	4,760	--	--	--	--	1,540
Singapore	260	--	--	--	--	150
United Kingdom	12,600	313	313	--	19,300	19,700
Venezuela	4,250	--	--	--	--	--
Total	541,000	13,300	21,100	2,080	27,600	116,000

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ December data were not available at the time of publication.

Source: U.S. Census Bureau.

TABLE 4  
U.S. IMPORTS FOR CONSUMPTION OF BISMUTH METAL, BY COUNTRY 1/

(Kilograms)

Country	2002 2/					
	2001	September	Third quarter	October	November	January-November
Bahamas, The	--	--	--	294	--	684
Belgium	728,000	72,500	230,000	72,400	72,300	634,000
Canada	42,500	1,460	8,950	2,480	1,140	47,200
China	501,000	--	218,000	20,000	28,400	373,000
Denmark	52	--	--	--	--	--
France	2,820	--	--	--	--	--
Germany	57,800	--	--	--	--	835
Hong Kong	--	--	19,100	--	19,600	58,500
Italy	506	--	208	--	--	208
Japan	6,950	--	280	380	400	3,150
Mexico	605,000	55,100	145,000	36,200	56,100	462,000
Netherlands	1,160	--	82	--	--	82
Peru	--	--	--	--	--	19,500
Spain	34,000	--	--	--	--	--
United Kingdom	241,000	17,400	57,200	--	18,900	145,000
Total	2,220,000	146,000	680,000	132,000	197,000	1,740,000

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ December data were not available at the time of publication.

Source: U.S. Census Bureau.