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Mineral Industry Surveys

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FLUORSPAR IN THE FOURTH QUARTER 2003

Reported fluorspar consumption in the fourth quarter was 159,000 metric tons (t), a 3% decrease compared with the previous quarter and about 5% higher compared with the fourth quarter of 2002. Consumption of fluorspar for hydrofluoric acid (HF) and aluminum fluoride was 140,000 t, a decrease compared with the previous quarter and 11% higher compared with the fourth quarter of 2002.

Historical data on fluorspar or other subjects in the U.S. Bureau of Mines Minerals Yearbook is available from 1932 to 1993 at the following Web site: http://minerals.usgs.gov/minerals/pubs/usbmmyb.html. The information is provided courtesy of the University of Wisconsin Ecology and Natural Resources Collection.

Defense Stockpile

There were no sales of fluorspar during the fourth quarter of 2003. According to the latest report (February 2004) from the Defense National Stockpile Center, unsold stockpile material consisted of 4,430 t of acid grade, 68,200 t of metallurgical grade, and 20,000 t of sub-specification metallurgical grade. Material committed for sale pending shipment totaled about 67,400 t of acid grade and 595 t of metallurgical grade.

Industry News

Published prices for Chinese acid-grade fluorspar have increased significantly in the past 12 months. In December 2002, the reported price of Chinese acid grade, dry basis, at U.S. Gulf ports was $128 to $135 per metric ton, but by December 2003 the price had risen to $165 to $170 per metric ton. This trend has continued in early 2004, and by February the price was reported as $178 to $183 per metric ton.

The price of South African acid grade, free on board Durban, did not display a similar increase in price during 2003. This may have been because South Africa sells out its entire production and usually finalizes contracts during the fourth quarter of the prior year. As a result, the South African producers would not have had the opportunity to increase prices until contracts were negotiated for 2004. In December 2002, South African acid grade was reported at $105 to $125 per metric ton, and in December 2003, the price was unchanged. But South African prices jumped to $120 to $140 per metric ton in February 2004, which seems to support this argument (Industrial Minerals, 2002, 2003, 2004b).

These price increases are being driven by a shortage of acid grade on the world market as a result of China's continued reduction in their export quotas for fluorspar. China has decreased its exports of fluorspar by about 400,000 t in the last 4 years from 1.2 million metric tons to 800,000 t, and the quota for 2004 is reportedly 750,000 t.

South Africa's Witkop Fluorspar (Pty.) Ltd. continues work on the turnaround strategy initiated in the latter part of 2002. As part of the strategy, the company took its opencast mining operations back in-house and acquired four new articulated trucks and two excavators. These two factors will allow greater efficiencies and will present the opportunity to reduce costs. The flotation plant was improved in 2002, and, the company is in the process of adding more milling capacity that would bring the mill's total capacity to nearly 200 tons per hour.

The ore processed at Witkop reaches the mill in three different forms—clean dolomite rock, weathered altered dolomite, or as a 50:50 mix of the two. The weathered altered dolomite contains high quantities of silica, tremolite, and talc, which caused problems in the flotation process. After 2 years of testing, the company has come up with a combination of collectors and depressants that increased the recovery rates from between 75% and 80% to more than 90%. This has resulted in an 18% increase in concentrate production.

Finally, the company has investigated the orebody thoroughly through an extensive drilling program. This has allowed the establishment of best mining practice to efficiently mine Witkop's irregular orebody and maintain the target ore grade to the plant. The company has changed the size of the benches mined and reduced the size of explosive charges. This provides more even fragmentation and better ore clearing. The goal of these improvements will be to increase Witkop's production from its current output of about 110,000 tons per year to 180,000 tons per year (Lanham, 2004§[1]).

Tiberon Minerals Ltd. achieved another milestone in its

[1]References that include a section mark (§) are found in the Internet References Cited section.

efforts to develop the Nui Phao tungsten-fluorspar deposit in Vietnam when the Government of Vietnam granted the company an Investment License. The license gives legal standing to Nui Phao Joint Venture Mining Company Ltd. and grants an initial 30-year term, exclusive rights to mine and explore over an area of about 55 square kilometers, and establishes tax and royalty rates (Tiberon Minerals Ltd., 2004§).

France's Société Industrielle du Centre (SIC), which ceased production from its Rossignol Mine in 1997, made its last fluorspar shipments in January 2004. This leaves Société Generale de Recherches et d'Exploitation Minieres (SOGEREM) as the only French fluorspar producer (O. Jullin, Product Manager Fluorspar, SOGEREM, written commun., March 12, 2004).

Fluorochemical News

Bayer AG plans to form a new company, provisionally called NewCo, which will consist of large sections of the present Bayer Chemicals AG and some operations of Bayer MaterialScience AG. The new company will include Bayer's HF plant in Leverkusen, Germany, that produces HF mainly for merchant sales, but also produces HF for captive use in fluoroaromatics and other fluorine compounds. NewCo's management team is now in place and it is scheduled to be listed on the stock exchange under a new name in early 2005.

In response to increased costs for fluorspar, sulfur, and energy, in November 2003, Bayer announced a € 60 per ton increase on the price of HF to go into effect immediately or upon the conclusion of current contracts (Industrial Minerals, 2004a).

DuPont Fluoroproducts and Zhonghao New Materials Company, Ltd., announced they have completed formation of a joint venture to manufacture hydrofluorocarbon (HFC) blend refrigerants to support the fast-growing air conditioning and refrigeration industry in China. The new company, majority-owned by DuPont, is named DuPont 3F Fluorochemicals Changshu Company, Ltd., and is based in the Changshu Municipality, Jiangsu Province. The joint venture will produce R-404a, R-407c and R-410a refrigerant blends at a new facility in the Changshu Municipality. R-410a refrigerants should be available by April 2004; all products are scheduled to be fully available by mid-year (DuPont Fluoroproducts, 2004).

Honeywell Specialty Materials announced the availability of HFC-245fa for use as a refrigerant in lower pressure centrifugal chillers (LPCCs). The company states that its performance and environmental characteristics are comparable or superior to refrigerants currently used in LPCCs, and the thermodynamic efficiency of this next generation refrigerant approaches that of hydrochlorofluorocarbon-123 and surpasses that of HFC-134a (Honeywell International, 2004b§). The company also announced the launch of its new line of HFC-245fa-based flushing agents for air conditioning and refrigeration systems. The new product is designed to replace HCFC-141b, which was phased out at the end of 2002, and it is fully compatible with HFC-134a and R-410a (HFC-32 and HFC-125). Other applications for the specialty solvent include electronics cleaning and use as general aerosol solvents (Honeywell, 2004a§).

In January 2004, Japan's Daikin Industries, Ltd., suffered an explosion at its tetrafluoroethylene (C_2F_4) plant in Kashima, Ibaraki, Japan. Tetrafluoroethylene is a building block for the manufacture of fluorocarbon polymers. Daikin announced it would draw on its warehouse inventories and production at other plants to meet supply commitments (Daikin Industries, Ltd., 2004§).

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TABLE 1
SALIENT FLUORSPAR STATISTICS[1]

(Metric tons, unless otherwise specified)

	2002	2003				
	Fourth quarter	First quarter	Second quarter	Third quarter	Fourth quarter	Year to date
Imports for consumption:	155,000	182,000	90,400	151,000	143,000	567,000
Value per ton, c.i.f U.S. port, acid grade	$122	$129	$122	$141	$156	$137 [2]
Value per ton, c.i.f. U.S. port, metallurgical	$101	$85	$85	$85	$85	$85 [2]
Exports	5,390	8,170	8,090	7,330	7,100	30,700
End of quarter stocks, consumer	122,000	142,000	125,000 [r]	113,000 [r]	126,000	126,000
Fluorspar equivalent of imported hydrofluoric acid	34,000	47,900	51,000	32,800	35,500	167,000
Fluorspar equivalent of imported cryolite	4,860	1,480	6,650	845	758	9,740
Quarterly reported fluorspar consumption	151,000	147,000	138,000	164,000 [r]	159,000	608,000

[r]Revised.

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

[2]Average value.

TABLE 2
CONSUMPTION OF FLUORSPAR BY END USE AND ASSAY RANGE[1]
(DOMESTIC AND FOREIGN IN THE UNITED STATES)

(Metric tons)

	Third quarter 2003			Fourth quarter 2003			
End use or product	More than 97% calcium fluoride	Not more than 97% calcium fluoride	Total	More than 97% calcium fluoride	Not more than 97% calcium fluoride	Total	2003 Year to date
Hydrofluoric acid and aluminum fluoride	142,000	--	142,000	140,000	--	140,000	523,000
Metallurgical	5,480	10,300 [r]	15,700 [r]	4,150	8,550	12,700	55,800
Other uses or products[2]	6,690	--	6,690	6,530	--	6,530	29,100
Total	154,000	10,300 [r]	164,000 [r]	150,000	8,550	159,000	608,000
Stocks, end of quarter[3]	81,400 [r]	31,700 [r]	113,000 [r]	99,200	27,200	126,000	126,000

[r]Revised. -- Zero.

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

[2]Includes acid grade used in enamel, glass and fiberglass, steel castings, and welding rod coatings.

[3]Stocks data include distributor stocks (excluding National Defense Stockpile holdings) and consumer stocks for hydrofluoric acid and aluminum fluoride.

TABLE 3

U.S. IMPORTS FOR CONSUMPTION OF FLUORSPAR, BY COUNTRY AND VALUE[1,2]

	2002		2003									
	Fourth quarter		First quarter		Second quarter		Third quarter		Fourth quarter		Year to date	
	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)	Quantity (metric tons)	Value[3] (thousands)
Containing more than 97% calcium fluoride:												
China	128,000	$15,600	115,000	$15,100	14,700	$2,010	111,000	$16,200	94,900	$15,700	336,000	$49,000
France	39	13	--	--	40	13	--	--	42	14	82	27
Germany	--	--	--	--	17	11	--	--	--	--	17	11
Japan	2,910	344	--	--	--	--	--	--	--	--	--	--
Mexico	11,200	1,330	11,900	1,380	16,800	1,820	15,500	1,950	12,100	1,740	56,300	6,890
Mongolia	--	--	--	--	--	--	20	3	--	--	20	3
South Africa	11,900	1,470	24,800	3,020	52,700	6,410	15,000	1,870	28,000	3,580	120,000	14,900
Spain	--	--	19,100	2,540	--	--	--	--	--	--	19,100	2,540
United Kingdom	276	34	20	3	44	22	46	21	445	53	555	99
Total	154,000	18,800	171,000	22,000	84,300	10,300	142,000	20,000	135,000	21,100	533,000	73,400
Containing not more than 97% calcium fluoride:												
Canada	37	12	--	--	--	--	--	--	--	--	--	--
Mexico	596	52	11,300	955	6,150	525	9,010	762	7,390	629	33,800	2,870
Total	633	64	11,300	955	6,150	525	9,010	762	7,390	629	33,800	2,870
Grand total	155,000	18,900	182,000	23,000	90,400	10,800	151,000	20,800	143,000	21,800	567,000	76,300

-- Zero.

[1]Imports for consumption include imports of immediate entry, and warehouse withdrawals.

[2]Data are rounded to no more than three significant digits; may not add to totals shown.

[3]Cost, insurance, and freight at U.S. ports.

Source: U.S. Census Bureau.

TABLE 4

IMPORTS FOR CONSUMPTION OF HYDROFLUORIC ACID[1]

	2002		2003									
	Fourth quarter		First quarter		Second quarter		Third quarter		Fourth quarter		Year to date	
	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)	Quantity (metric tons)	Value[2] (thousands)
Canada	5,830	$6,940	8,580	$10,000	11,000	$12,500	6,990	$8,060	7,360	$8,050	33,900	$38,600
Japan	283	724	389	978	184	442	311	755	250	608	1,130	2,780
Mexico	16,200	15,200	22,800	22,100	22,600	21,900	13,900	12,900	15,500	14,600	74,800	71,500
Other[3]	392	559	202	307	261	368	656	836 [r]	555	545	1,670	2,060
Total	22,700	23,500	32,000	33,400	34,000	35,200	21,800	22,600 [r]	23,700	23,800	111,000	115,000

[r]Revised.

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

[2]Cost, insurance, and freight at U.S. ports.

[3]Includes China, France, Germany, Italy, the Republic of Korea, the Netherlands, Switzerland, Taiwan, and the United Kingdom.

Source: U.S. Census Bureau.