

# Barite

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Domestic barite production totaled over 900,000 tons, an increase of 10% compared with 1971 output. Barite production in Nevada increased 65%. Imports of crude barite advanced 29% compared with those in 1971, which were below average because of a temporary surcharge on dutiable im-

ports. Sales of ground and crushed barite produced from domestic and imported material rose 10% in quantity and 34% in value. Two barium-chemical plants were closed because of depressed market conditions.

**Table 1.—Salient barite and barium-chemical statistics**

(Thousand short tons and thousand dollars)

	1968	1969	1970	1971	1972
<b>United States:</b>					
<b>Barite (Primary):</b>					
Sold or used by producers .....	1 927	1,077	854	825	906
Value .....	<sup>1</sup> \$13,706	\$15,753	\$12,800	\$13,491	\$14,883
Imports for consumption .....	663	614	706	484	624
Value .....	\$5,666	\$5,549	\$6,314	\$4,468	\$5,643
Ground and crushed sold by producers .....	1,266	1,537	1,383	1,330	1,461
Value .....	\$30,563	\$37,297	\$34,234	\$34,020	\$45,590
Barium chemicals sold by producers .....	136	130	105	83	65
Value .....	\$18,811	\$19,101	\$16,961	\$15,488	\$13,869
<b>World: Production .....</b>	<b>3,769</b>	<b>4,238</b>	<b>4,338</b>	<b>4,231</b>	<b>4,260</b>

<sup>1</sup> Data not comparable to previous years.

**Table 2.—Barite (primary) sold or used by producers in the United States, by State**

(Thousand short tons and thousand dollars)

State	1971		1972	
	Quantity	Value	Quantity	Value
Alaska .....	102	1,075	W	W
Arkansas .....	W	W	W	W
California .....	W	W	4	34
Georgia .....	W	W	W	W
Missouri .....	232	3,606	213	3,637
Nevada .....	192	1,490	317	2,659
Tennessee .....	21	342	W	W
Undistributed .....	278	6,978	372	8,553
<b>Total .....</b>	<b>825</b>	<b>13,491</b>	<b>906</b>	<b>14,883</b>

W Withheld to avoid disclosing individual company confidential data; included with undistributed.

## DOMESTIC PRODUCTION

Barite was produced at 30 mines in seven States. Nevada supplied the largest tonnage, followed by Missouri and Arkansas.

Leading producing companies were

Dresser Minerals, Dresser Industries, Inc., with mines in Arkansas, Missouri, and Ne-

<sup>1</sup> Industry economist, Division of Nonmetallic Minerals.

vada; Milchem, Inc., with four mines in Missouri and four in Nevada; Baroid Div., NL Industries, Inc., with two mines in Missouri, one in Arkansas, one in Nevada, and one in Tennessee; and Inlet Oil Corp., with a mine in Alaska.

Ground and crushed barite was produced mainly in Arkansas, Missouri, and Nevada from domestic barite and in Louisiana and Texas from imported material. Processing plants were also located in Alaska, California, Georgia, Illinois, Tennessee, and Utah.

Dresser Minerals was constructing a new beneficiation plant at its Greystone mine,

southeast of Battle Mountain, Nev. The new plant was scheduled for completion in 1973.

The Missouri Geological Survey test-drilled four tailings ponds in the Washington County barite district to determine the quantity and size-grade distribution of the barite contained in them. Interest in the ponds was increasing as known barite reserves were progressively being depleted. A district inventory indicated a total of 67 ponds containing an estimated 1.9 million tons of barite. This was equivalent to nearly 10 years' supply at the current production rate.<sup>2</sup>

### CONSUMPTION AND USES

About 80% of the ground and crushed barite sold was used as a weighting agent in oil- and gas-well drilling muds; this use increased 139,000 tons. Barite usage for barium-chemical manufacturing decreased 35,000 tons. All other uses increased 18,000 tons.

Producers of barium chemicals from barite included Chemetron Corp., Huntington,

W. Va.; Chemical Products Corp., Cartersville, Ga.; Great Western Sugar Co., Johnstown, Colo.; Inorganic Chemicals Div., FMC Corp., Modesto, Calif.; Mallinckrodt Chemical Works, St. Louis, Mo.; PPG In-

<sup>2</sup> Wharton, H. M. Barite Ore Potential of Four Tailings Ponds in the Washington County Barite District, Missouri. Missouri Geol. Survey and Water Res. Rept. of Inv. 53, Rolla, Mo., 1972, 91 pp.

Table 3.—Ground and crushed barite sold, by use <sup>1</sup>

Use <sup>2</sup>	1970		1971		1972	
	Short tons	% of total	Short tons	% of total	Short tons	% of total
Barium chemicals <sup>3</sup> -----	146,038	10	140,843	10	105,589	7
Glass-----	49,642	4	( <sup>4</sup> )	--	( <sup>4</sup> )	--
Filler or extender:						
Paint-----	43,919	3	43,439	3	46,342	3
Rubber-----	25,489	2	( <sup>4</sup> )	--	( <sup>4</sup> )	--
Other filler-----	( <sup>4</sup> )	--	22,430	2	( <sup>4</sup> )	--
Well drilling-----	1,118,973	79	1,044,367	77	1,183,340	80
Other uses-----	24,565	2	104,318	8	142,183	10
Total-----	1,408,626	100	1,355,397	100	1,477,454	100

<sup>1</sup> Includes imported barite.

<sup>2</sup> Uses reported by producers of ground and crushed barite, except for barium chemicals.

<sup>3</sup> Quantities reported by consumers.

<sup>4</sup> Included with "Other uses" to avoid disclosing individual company confidential data.

Table 4.—Barium chemicals produced and sold by producers in the United States in 1972 <sup>1</sup>  
(Short tons)

Chemical	Plants	Produced	Sold by producers	
			Quantity	Value
Barium carbonate-----	5	44,611	35,569	\$5,247,301
Other barium chemicals <sup>2</sup> -----	( <sup>3</sup> )	38,880	30,576	8,621,979
Total <sup>4</sup> -----	7	83,491	66,145	13,869,280

<sup>1</sup> Only data reported by barium-chemical plants that consume barite are included.

<sup>2</sup> Includes black ash, blanc fixe, chloride, hydroxide, oxide, peroxide, sulfide, and other compounds for which separate data may not be revealed.

<sup>3</sup> Black ash, 1 plant; blanc fixe, 2; chloride, 3; oxide, 1; peroxide, 1; and sulfide, 1.

<sup>4</sup> A plant producing more than 1 product is counted only once in arriving at total.

dustries, Chemical Div., New Martinsville, W. Va.; and Sherwin Williams Chemicals, Coffeyville, Kans.

PPG Industries closed the barium plant at its New Martinsville, W. Va., complex and went out of the barium-chemicals business, owing to depressed markets. Sherwin Williams Chemicals ceased the manufacture of barium carbonate at its Ashtabula, Ohio, plant, but continued to manufacture the product at Coffeyville, Kans.

Use of industrial minerals in oil-well drilling muds was reviewed.<sup>3</sup> Barite and bentonite are by far the most important from the viewpoint of sales value; a variety of other mineral commodities, including lime, soda ash, mica, gypsum, rock salt, and graphite, are also used. The position of barite for mud-weighting purposes seems secure as long as prevailing drilling methods continue.

## PRICES

Prices of crude and ground barite generally are negotiated between buyer and seller. Prices of barite published in trade journals serve as a general guide and do not necessarily reflect actual transactions.

Quoted prices for imported crude barite decreased in 1972.

The average value per ton excluding container cost of crushed and ground barite f.o.b. plant was \$31.20 in 1972, compared with \$25.58 in 1971.

Table 5.—Price quotations for crude and ground barite in 1972

Item	Price per ton
Chemical and glass grade, f.o.b. shipping point, carload lots, short ton:	
Hand picked, 95% BaSO <sub>4</sub> , 1% iron.....	\$22.50-\$24.50
Water ground, 99.5% BaSO <sub>4</sub> , 325 mesh, 50-pound bags.....	55-78
Drilling-mud grade:	
Ground, 83-93% BaSO <sub>4</sub> , 3-12% iron, specific gravity 4.20-4.30, f.o.b. shipping point, carload lots, short ton.....	37-44
Crude, bulk, imported, specific gravity 4.20-4.30, c.i.f. gulf ports, short ton.....	14-18

Source: Engineering and Mining Journal.

## FOREIGN TRADE

Canada and Singapore were the principal countries receiving natural barium sulfate and carbonate exports (mostly ground barite) from the United States. The exports increased from 24,000 tons in 1971 to 52,000 tons in 1972.

Imports of crude barite increased 29% compared with those in 1971. The increase can be attributed in large part to the removal of a 10% ad valorem surcharge that was in effect during the last half of 1971. Declared values of crude barite at foreign ports were as follows for the indicated countries: Ireland, \$9.85; Mexico, \$10.40; and Peru, \$5.47. Imported barite was

ground at processing plants in Louisiana and Texas. About 1,300 tons of crushed or ground witherite was imported from the United Kingdom.

Imports of precipitated barium carbonate rose over 600%. The large increase was due mainly to reduced domestic supplies of the chemical because of plant closures. West Germany supplied most of the precipitated barium carbonate. Imports of blanc fixe and barium chloride also increased appreciably.

<sup>3</sup> Jones, G. K. Industrial Minerals in Oil-Well Drilling, Ind. Miner. (London), No. 60, September 1972, pp. 9-31.

Table 6.—U.S. exports of natural barium sulfate and carbonate

Country	1971		1972	
	Short tons	Value (thousands)	Short tons	Value (thousands)
Argentina	20	\$2	--	--
Brazil	237	9	165	36
Canada	8,449	325	35,158	1,383
Colombia	200	7	--	--
Ecuador	--	--	122	23
El Salvador	--	--	80	--
Guatemala	--	--	620	4
Honduras	--	--	100	5
Indonesia	5,385	193	--	--
Jamaica	--	--	50	3
Japan	--	--	38	1
Korea, Republic of	--	--	1,599	58
Malagasy Republic	252	9	--	--
Malaysia	--	--	26	1
Mexico	22	2	69	5
Peru	90	3	--	--
Philippines	1,055	40	24	1
Singapore	7,570	159	13,622	317
South Africa, Republic of	--	--	123	6
Surinam	116	4	--	--
Venezuela	380	17	578	22
Total	23,776	770	52,379	1,866

Table 7.—U.S. exports of lithopone

Year	Short tons	Value (thousands)
1970	1,541	\$523
1971	545	425
1972	1,395	458

Table 8.—U.S. imports for consumption of barite, by country  
(Thousand short tons and thousand dollars)

Country	1971		1972	
	Quantity	Value	Quantity	Value
<b>Crude barite:</b>				
Canada	71	601	20	228
France	--	--	( <sup>1</sup> )	3
Greece	50	491	67	807
Ireland	107	810	154	1,517
Italy	23	319	--	--
Mexico	99	887	140	1,456
Morocco	23	273	41	500
Nicaragua	--	--	16	119
Peru	111	1,087	186	1,018
Total	434	4,468	624	5,648
<b>Ground barite:</b>				
Canada	( <sup>1</sup> )	3	( <sup>1</sup> )	3
Colombia	( <sup>1</sup> )	5	--	--
France	( <sup>1</sup> )	12	( <sup>1</sup> )	4
Mexico	( <sup>1</sup> )	2	--	--
United Kingdom	--	--	( <sup>1</sup> )	3
Total	( <sup>1</sup> )	22	( <sup>1</sup> )	10

<sup>1</sup> Less than 1/2 unit.

Table 9.—U.S. imports for consumption of barium chemicals

Year	Lithopone		Blanc fixe (precipitated barium sulfate)		Barium chloride		Barium hydroxide	
	Short tons	Value (thou- sands)	Short tons	Value (thou- sands)	Short tons	Value (thou- sands)	Short tons	Value (thou- sands)
1970.....	87	\$19	2,866	\$495	1,558	\$166	--	--
1971.....	81	13	3,522	576	1,446	167	--	--
1972.....	84	17	6,412	1,691	7,316	938	63	\$12
	Barium nitrate		Barium carbonate precipitated		Other barium compounds			
	Short tons	Value (thousands)	Short tons	Value (thousands)	Short tons	Value (thousands)	Short tons	Value (thousands)
1970.....	786	\$118	1,416	\$117	525	\$258		
1971.....	832	139	1,120	91	799	313		
1972.....	685	126	8,316	841	716	334		

Table 10.—U.S. imports for consumption of crude, unground,  
and crushed or ground witherite

Year	Crude, unground		Crushed or ground	
	Short tons	Value (thousands)	Short tons	Value (thousands)
1970.....	--	--	182	\$35
1971.....	417	\$22	94	20
1972.....	--	--	1,311	169

## WORLD REVIEW

**Canada.**—Barite output in Canada decreased owing to operating difficulties at the Walton mine, Dresser Minerals Division, Dresser Industries, Inc., in Nova Scotia. The mine flooded late in 1970, and the only production after that time has come from stockpiles and quarried material.

International Mogul Mines, Ltd., continued to evaluate the Lake Ainslie barite-fluorite deposits on Cape Breton Island in Nova Scotia. A preliminary economic appraisal indicated production of drilling-mud-grade barite and sub-acid-grade fluor-spar from the deposits would be unprofitable.<sup>4</sup>

**Indonesia.**—IMCO Services, Division of Halliburton Co., was building a barite-grinding plant at Makassar. The plant was to be operational in 1973.<sup>5</sup>

**Ireland.**—Milchem, Inc., was constructing a barite flotation plant for treatment of the Irish Base Metals, Ltd., tailings pond in County Galway. Plant capacity was estimated at 60,000 tons of concentrate per year.<sup>6</sup>

**Pakistan.**—Following the discovery of large barite reserves in three outlying districts, the government of Baluchistan Prov-

ince planned to build a barite-grinding plant at Khuzdar. The bulk of the output was to be exported.<sup>7</sup>

**U.S.S.R.**—A new 3,000-foot-deep central hoisting shaft was completed at the Atchisai lead-barite mining complex in southern Kazakhstan. The new deep shaft gave access to the troughs of the steeply folded synclines. The ore in the anticlines and flanks of the folds was being mined through the Mirgalimsay and Mirginskialie shafts.<sup>8</sup>

**United Kingdom.**—The United Kingdom imports about three-fourths of its barite requirements.<sup>9</sup> Morocco is the largest source. Imports, which currently total about 75,000 tons per year, are increasing

<sup>4</sup> Zurowski, M. Barite-Fluorite Deposits of Lake Ainslie—An Appraisal from an Economic Viewpoint. Can. Min. and Met. Bull., v. 65, No. 728, December 1972, pp. 60–63.

<sup>5</sup> Mining Engineering. V. 25, No. 1, January 1973, p. 27.

<sup>6</sup> The Mines Magazine Golden, Colo. V. 63, No. 1, January 1973, p. 20.

<sup>7</sup> Industrial Minerals (London). No. 63, December 1972, p. 50.

<sup>8</sup> World Mining. Soviet Lead-Barite Mine Expansion Plan Complete. V. 8, No. 12, November 1972, p. 45.

<sup>9</sup> Collins, R. S. Barium Minerals. Miner. Res. Div., Inst. Geol. Sci. (London), 1972, 44 pp.

rapidly because of exploration for oil and gas in the North Sea. Domestic barite production comes from mines in Derbyshire and Yorkshire. Production of witherite (natural barium carbonate) ended when the Settlingstones mine in Northumberland closed in 1969.

Clay Cross Co., Ltd., planned to produce

8,000 tons of byproduct barite annually at its new fluorspar heavy-media separation plant at Milltown in Derbyshire.<sup>10</sup> The barite will be used mainly for drilling muds.

<sup>10</sup> Industrial Minerals (London). Clay Cross Fluorspar Expansion. No. 64, January 1973, p. 29.

**Table 11.—Barite: World production by country**  
(Short tons)

Country <sup>1</sup>	1970	1971	1972 <sup>p</sup>
<b>North America:</b>			
Canada .....	147,251	120,765	73,000
Mexico .....	351,738	308,362	238,147
United States <sup>2</sup> .....	854,132	825,000	906,000
<b>South America:</b>			
Argentina .....	<sup>r</sup> 27,392	22,641	<sup>e</sup> 22,600
Brazil <sup>e</sup> .....	28,200	47,100	51,000
Chile .....	1,700	1,413	2,864
Colombia .....	7,519	6,382	<sup>e</sup> 7,000
Peru .....	<sup>r</sup> 260,499	<sup>e</sup> 260,000	<sup>e</sup> 260,000
<b>Europe:</b>			
Austria .....	347	870	223
Czechoslovakia <sup>e</sup> .....	8,300	8,300	8,300
France .....	<sup>r</sup> 104,477	121,254	<sup>e</sup> 121,000
Germany, East <sup>e</sup> .....	33,000	33,000	33,000
Germany, West .....	454,798	450,693	406,434
Greece <sup>3</sup> .....	<sup>r</sup> 59,625	93,635	<sup>e</sup> 94,000
Ireland .....	243,600	216,160	<sup>e</sup> 220,000
Italy .....	239,555	222,144	200,365
Poland <sup>e</sup> .....	55,000	61,000	55,000
Portugal .....	<sup>r</sup> 1,190	1,268	<sup>e</sup> 1,300
Romania <sup>e</sup> .....	128,400	128,000	128,000
Spain .....	93,219	91,789	<sup>e</sup> 93,000
U.S.S.R. <sup>e</sup> .....	314,000	331,000	342,000
United Kingdom <sup>e</sup> .....	<sup>r</sup> 29,000	<sup>r</sup> 29,000	29,000
Yugoslavia .....	87,886	71,308	<sup>e</sup> 66,000
<b>Africa:</b>			
Algeria <sup>4</sup> .....	56,927	40,234	57,902
Egypt, Arab Republic of .....	237	321	<sup>e</sup> 330
Kenya .....	493	819	692
Morocco .....	93,421	93,117	102,779
South Africa, Republic of .....	<sup>r</sup> 3,199	3,265	2,775
Swaziland .....	373	159	<sup>(5)</sup>
Tunisia .....	2,134	1,965	1,310
<b>Asia:</b>			
Burma .....	14,840	25,312	28,627
China, People's Republic of <sup>e</sup> .....	165,000	154,000	171,000
India .....	<sup>r</sup> 82,500	64,700	50,831
Iran <sup>e</sup> .....	83,000	66,000	<sup>e</sup> 66,000
Japan .....	72,674	63,096	66,659
Korea, North <sup>e</sup> .....	132,000	132,000	132,000
Pakistan .....	2,060	3,265	2,643
Thailand .....	18,177	70,040	107,024
Turkey .....	<sup>r</sup> 32,566	31,468	<sup>e</sup> 34,000
<b>Oceania: Australia .....</b>			
	47,193	30,156	<sup>e</sup> 27,000
<b>Total .....</b>	<b><sup>r</sup> 4,337,622</b>	<b>4,231,001</b>	<b>4,259,810</b>

<sup>e</sup> Estimate. <sup>p</sup> Preliminary. <sup>r</sup> Revised.

<sup>1</sup> In addition to the countries listed, Bulgaria, Philippines, and Southern Rhodesia also produce barite, but available information is inadequate to make reliable estimates of output levels.

<sup>2</sup> Sold or used by producers.

<sup>3</sup> Barite concentrates; total crude output reported as follows in short tons: 1970—114,270; 1971—153,110; 1972—153,000 (estimate).

<sup>4</sup> Ground barite; total crude output reported as follows in short tons: 1970—80,906; 1971—80,534; 1972—66,000 (estimate).

<sup>5</sup> Less than  $\frac{1}{2}$  unit.

<sup>6</sup> Year beginning March 21 of that stated.

**TECHNOLOGY**

A Canadian patent was issued on the froth flotation of barite or celestite ores. The aqueous pulp of ore was treated with the required reagents, including as an improved collector for the values, a fatty acid taurate amide of prescribed formula or a

mixture of fatty acid taurate amides. The values were selectively floated in the froth.<sup>11</sup>

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<sup>11</sup> Wyman, E. A. (assigned to Minister of Energy, Mines, and Resources). Froth Flotation of Barite or Celestite Ore. Can. Pat. 914,809, Nov. 14, 1972.

