



2011 Minerals Yearbook

BARITE

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In 2011, primary barite production (sold or used by producers) totaled 710,000 metric tons (t) valued at an estimated \$61.2 million, and apparent consumption was 2.93 million metric tons (Mt). Imports were 2.32 Mt and exports were 98,000 t.

Barite is the mineralogical name for barium sulfate. In commerce, the mineral is sometimes referred to as barytes. In this report, the term primary barite refers to the first marketable product, which includes crude barite that usually has undergone simple beneficiation methods, such as jigging, tabling, washing, or more complex methods, such as flotation, heavy-media separation, and magnetic separation. Most barite ores require some upgrading to minimum purity or density levels.

The rebound in oil and gas prices in 2010 coupled with the wide spread use of horizontal drilling and hydraulic fracturing has encouraged increased exploration drilling in the United States. This has increased the demand for barite, which has resulted in U.S. production reaching the highest level since 1982.

Production

Domestic production and sales data for barite were derived from voluntary responses to the U.S. Geological Survey (USGS) canvass of 8 mines and 27 grinding plants. The USGS received responses from 3 mines and 24 grinding mills, representing 90% of the quantity of ground barite sold. Estimates were made using company production estimates, prior year data, and other industry data. Of the canvassed producing mines, four were in Nevada, and one was in Georgia. In addition, there was one mine under development in Washington and there were two idle mines in Nevada.

There were 23 grinding plants operating at the end of the reporting year. Most Nevada barite ore was ground at nearby company-owned grinding plants in Nevada, but the ore from NOV Minerals LP was shipped out of State to its grinding mill in Evanston, WY. Some run-of-mine ore or crude barite was shipped to Canada for grinding. In 2011, only small amounts of crude barite were shipped to plants on the U.S. Gulf Coast for grinding. This practice became uncommon when the cost of transport made Nevada barite uncompetitive with imported barite. Import prices for barite from China have increased substantially in the past few years, but shipments of barite to the Gulf Coast have remained rare. Demand in the Western United States and Western Canada has been so strong in recent years that Nevada barite producers have sold almost all their production to western customers.

Crude barite production was 710,000 t in 2011, an increase of 7% compared with that of 2010. The bulk of mine production was from Nevada, with a small amount from Georgia. The value of domestic production was an estimated \$61.2 million, an increase of 20% compared with the revised value for 2010. Only

one of the Nevada barite producers sells crude or run-of-mine ore so estimating the net selling value of the crude barite has been problematic. Value data reported to the USGS in the past were closer to production costs rather than net selling values. As a result, the estimated value for crude barite has been revised in table 1 for the years 2007–10.

In 2011, there were four active barite mines in Nevada—Big Ledge Mine (NOV Minerals) and Rossi Mine (Halliburton Energy Services-Baroid) in Elko County, and Argenta Mine (Baker Hughes Drilling Fluids) and Greystone Mine (M-I L.L.C. operating as M-I SWACO) in Lander County. In addition to these Nevada operations, there was one small barite producer in Georgia—New Riverside Ochre Co., Inc.

Kent Exploration Inc. made considerable progress in getting its Flagstaff Mountain barite project in Washington State into production. During the year, the company performed site preparation work; separated the historic stockpile into high grade and waste; and drilled, blasted, and stockpiled additional ore. The company screened the barite ore into two stockpiles—one of crushed fines for upgrading and one of minus 3/4 inch (19 millimeters) for further crushing and upgrading. The company was unable to complete the upgrading before winter weather conditions deteriorated on the mountain, so it erected a storage facility in the nearby town of Northport, WA. Northport is where a contractor was expected to process this material and to process future crude barite from the mine. Kent Exploration has a permit from the U.S. Bureau of Land Management to produce about 91,000 metric tons per year (t/yr) (100,000 short tons per year) of barite from the Flagstaff Mine (Kent Exploration Inc., 2012).

In 2011, the leading companies that mined and ground barite in the United States were also major oil service companies, which included Baker Hughes Drilling Fluids (a division of Baker Hughes Inc.), Baroid Fluid Services (the drilling fluids and industrial barite subsidiary of Halliburton Energy Services, Inc.), M-I SWACO (a subsidiary of Schlumberger Ltd.), and National Oilwell Varco (NOV). These four companies operated barite mines with associated beneficiation mills and grinding plants in Nevada (or in the case of NOV in Wyoming) and also operated grinding plants in Louisiana and Texas.

At yearend 2011, there were 14 grinding operations on the coast of the Gulf of Mexico (6 in Louisiana and 8 in Texas) that produced barite to American Petroleum Institute (API) specifications. These stand-alone grinding plants primarily processed crude barite imported from China and India that was ground to API specifications for the oil and gas drilling market. Baker Hughes had single plants in Morgan City, LA, and Corpus Christi, TX. Baroid (Halliburton) had two plants in Louisiana at Lake Charles and Larose, and a single plant in Corpus Christi, TX. M-I SWACO (M-I LLC) operated single mills in Amelia, LA,

Brownsville, TX, and Galveston, TX. National Oilwell Varco operated a barite grinding plant in Houma, LA.

In addition to the barite mining companies, there were four other companies that operated grinding mills primarily designed to process imported crude barite. These included CIMBAR Performance Minerals, Inc. (Cartersville, GA), which operated plants in Chatsworth, GA, Mount Vernon, IN, Fountain Farm, MO, Wellsville, OH, and Houston, TX. The company ground imported barite and produced filler-grade barite, for uses such as paint and plastics, and API-grade barite for the oil and gas drilling market. In 2011, CIMBAR closed its Fountain Farm, MO, grinding plant, acquired a grinding plant in Wellsville, OH, and maintained its Cartersville, GA, plant on standby (it last operated in 2009). The Wellsville plant equipment was acquired from Astra Minerals, Inc. (Wellsville, OH) and the property and buildings from the Columbiana County Port Authority (CIMBAR Performance Minerals WV, LLC, 2011). Another major barite importer and grinder was Excalibar Minerals Inc. (a division of Newpark Resources, Inc. of Houston), which operated grinding mills in New Iberia, LA, Corpus Christi, TX, and Houston, TX. These mills primarily supplied barite to the oil and gas drilling market. The company also operated a grinding plant in Dyersburg, TN, which mostly served nondrilling markets. There were two other companies that ground imported barite—Huber Engineered Materials (part of J.M. Huber Corp.) with a grinding mill in Quincy, IL, and Milwhite, Inc. (a subsidiary of Mexico's Control MINAR, S.A. de C.V.) in Brownsville, TX.

Consumption

In 2011, apparent consumption of barite increased by 10% to 2.93 Mt compared with that in 2010 (table 1). Ground barite sales increased by 13% to 2.91 Mt in 2011 from 2.57 Mt in 2010. In 2011, sales by grinding plants in Louisiana increased slightly to 928,000 t, grinding plant sales in Texas increased by 25% to 1.13 Mt, while sales by plants in all other States increased by more than 13% to 848,000 t (table 2). About 2.75 Mt, or 95%, of barite sales from domestic crushers and grinders was for petroleum well-drilling markets, and the remaining 5% was for industrial end uses (table 3).

The leading application for barite is as a weighting agent in natural gas and oil field drilling muds to suppress high formation pressures and prevent blowouts. As a well is drilled, the bit passes through various formations, each with different characteristics. The deeper the hole, the more barite is needed as a percentage of the total mud mix. An additional benefit of barite is that it does not interfere with magnetic measurements taken in the borehole, either during logging-while-drilling or in separate drill hole logging.

Barite used for drilling petroleum wells can be black, blue, brown, buff, or gray depending on the ore body. Most barite needs to be ground to a small uniform size before it is used as a weighting agent in petroleum well-drilling mud based on specifications set by the API or the former Oil Companies' Materials Association.

The most important characteristic of barite used in drilling mud is its specific gravity (SG), and until 2010 the API specification called for a minimum SG of 4.2. After concerns

in the United States about dwindling reserves of 4.2 SG barite, the API issued a new edition of API Specification 13A, Specification for Drilling Fluids Materials (effective date, August 1, 2010). This new edition of Specification 13A added specifications for 4.1 SG barite, but also retained specifications for 4.2 SG barite.

The idea of using 4.1 SG barite was put forth in late 2006, and since then it has become widely adopted in the Western United States. Offshore drillers continue to use 4.2 SG barite as do onshore customers in other parts of the country that rely on imported barite.

Other barite specifications remain unchanged from the previous standard and are the same for 4.1 and 4.2 SG barite. They require that the barite be finely ground so that at least 97% of the material, by weight, can pass through a 200-mesh (Tyler) [75-micrometer (μm)] screen, and no more than 30%, by weight, can be less than 6 μm , effective diameter, which is measured using sedimentation techniques. Lastly, the ground barite may contain a maximum of no more than 250 milligrams per kilogram of water-soluble alkaline earth metals as calcium (American Petroleum Institute, 2010, p. 13–23, 83–96).

Common impurities in drilling-grade barite include quartz, chert, dolomite, siderite, and metallic oxide and sulfide compounds. These are normally insoluble, and as a result, standards limiting their concentrations have not been developed. In addition, the API standard does not address heavy-metal impurities, but barite derived from base-metal deposits may contain heavy metals such as cadmium and mercury and discharges of these may be regulated under environmental law. For example, U.S. environmental regulations pertaining to offshore drilling allow drilling waste discharges containing barite only if the barite contains less than 3 parts per million (ppm) cadmium and 1 ppm mercury (Drilling Waste Management Information System, undated).

Oil and gas prices correlate directly with the amount of exploration drilling being performed (the higher the prices the more drill rigs operating and vice versa) and the quantities of barite being consumed. In 2011, the U.S. economy continued its slow recovery from the 2008–09 recession, and while oil prices increased, natural gas prices actually decreased. Oil prices (U.S. spot price) increased by about 20% compared with those of 2010. In 2011, the monthly average was nearly \$95 per barrel compared with an average of about \$79 per barrel in 2010 (U.S. Energy Information Administration, 2012a). The U.S. monthly average natural gas price (wellhead), however, decreased to an average of \$3.95 per thousand cubic feet from an average of \$4.16 per thousand cubic feet in 2010 (U.S. Energy Information Administration, 2012b). The decrease in natural gas prices was the result of natural gas supplies outstripping consumption.

At yearend 2011, there were 313 more drill rigs exploring for oil or gas in the United States than were operating at yearend 2010. At the beginning of the year there were 1,694 rigs operating, but by November, the number had increased to near-record levels of 2,026 before decreasing slightly to 2,007 at yearend. As natural gas prices decreased, more rigs were shifted from drilling for natural gas to drilling for oil—the number of rigs drilling for oil increased to 1,193 at yearend 2011 from 765 in December 2010. The percentage of drill rigs exploring for oil

accounted for 59% of the total at yearend 2011, up from 45% at yearend 2010 (Baker Hughes Inc., 2012b).

In 2011, sales of domestic and imported barite for industrial uses increased by nearly 20% to 157,000 t (table 3). Industrial end uses such as barium chemicals (the largest by volume is barium carbonate), filler in paint and plastics, and powder coatings all require the barite to be ground to a small uniform size. The size depends on the use, but for paint- and plastic-grade material, it averages about 2 to 3 μm . Barite-containing materials that are used for sound reduction in engine compartments are gaining market share among automotive manufacturers. Barite also is used in the base coat of automobile finishes for smoothness and corrosion resistance and continues to be used in friction products for automobiles and trucks.

Barite used as an aggregate in “heavy” concrete or radiation-shielding concrete is crushed and screened to sizes ranging from 4.75 millimeters (0.187 inches) to 3.75 centimeters (1.5 inches) for the coarse grade. New Riverside Ochre (Cartersville, GA) is the leading supplier of barite aggregate.

Foreign Trade

In 2011, barite exports were 98,300 t, which was a decrease of about 10,000 t compared with those of 2010. Most exports went to Canada (87%) in the form of crude barite, which was ground in Canada and then consumed for oil and gas drilling in the western provinces of Alberta, British Columbia, and Saskatchewan. Most of the remaining exports went to Mexico (9%) and Brazil (1%) (table 4).

Assignment of the correct harmonized tariff schedule (HTS) number by importers is sometimes problematic. As a result, in prior years, adjustments were made in an attempt to classify imports of crude natural barite, ground barite, and other sulfates of barium by type and use. These adjustments involved separating, by unit value, imports intended for use in drilling muds (crude and ground barite), and all other uses (other sulfates of barium). Beginning in 2008 this practice was discontinued, and the data shown in table 5 for 2010 and 2011 are as reported by the U.S. Census Bureau.

Combined imports of barite (crude and ground) totaled 2.30 Mt, an increase of 10% compared with those of 2010. China accounted for 87% of the total, with India (7%) and Morocco (3%) making up most of the rest. Imports for the several forms of barite reported under the HTS nomenclature “Other sulfates of barium” were 15,100 t, which represents an increase of nearly 3% compared with those of 2010 (table 5).

There is a tariff on U.S. imports of crude barite of \$1.25 per metric ton, but there is no tariff on imports of ground barite. As a result, the major importers of crude barite have applied for and received foreign trade zone (FTZ) status for many of their grinding mills in the United States. Beginning in 2007, FTZ status has been approved for Baker Hughes’ grinding plants in Morgan City, LA, and Corpus Christi, TX; Excalibar’s grinding plants in Corpus Christi, TX, and New Iberia, LA; Halliburton’s grinding plants in Corpus Christi, TX, and Westlake, LA; and M-I SWACO’s grinding plants in Amelia, LA, and Galveston, TX. In August 2011, Halliburton received FTZ approval for its new grinding plant in Larose, LA. FTZ status means that

the ground barite produced by these mills will be reported as imports for consumption and not crude barite received from foreign suppliers (International Trade Administration, undated).

Transportation

In recent years, about 80% of U.S. barite consumption has been supplied by imports (primarily from China). Most barite imports are shipped in handymax-size bulk carriers (typically 35,000- to 60,000-t deadweight tonnage). After being ground to API specifications, barite is transferred directly to containers on barges docked in canals, lakes, and rivers near the grinding mills for bulk delivery to offshore drilling platforms. These near-shore barite staging locations also are convenient to the clusters of onshore areas with significant petroleum production in the Petroleum Administration for Defense (PAD) District 3. The PAD districts were World War II divisions of the oil-producing areas of the United States; these designations continue to be used.

Prices

Since very little primary barite was sold by domestic barite mining companies, value data for primary barite were to a large extent estimated. The average estimated sales value for primary barite from mines and their associated beneficiation plants in the United States increased to about \$86 per metric ton, an increase of about \$9 per metric ton compared with the revised value for 2010 (table 1).

Compared with those of 2010, the average sales value for barite ground in Louisiana increased by about \$28 per ton to \$172 per ton, while the sales value for drilling-grade barite ground in Texas increased slightly to \$167 per ton. The average value for all grades ground in Texas was increased by \$4 per ton to \$173 per ton, while the sales value of barite ground in other States increased to about \$158 per ton (table 2). Barite for barium chemicals, filler and extender, and glass decreased by 7% to about \$310 per ton for 2011 compared with that of 2010 (table 3).

Internationally, barite prices have steadily risen during the past decade. China has been the preferred source of the majority of barite imported into the United States. Chinese barite prices have risen because of currency revaluation, increased national and local taxes, increased port fees, higher diesel fuel prices, increased mine safety and environmental costs, trucking load restrictions, and longer truck and rail shipping distances. A recent analysis has calculated that these factors have resulted in a 6-fold increase in the free-on-board (f.o.b.) price of Chinese barite since 2003. India and Morocco have had their own causative factors that have driven up their prices (Allen, 2012; Newcaster, 2012).

The December 2011 United States published import prices for barite from China, API grade, lump, including cost, insurance, and freight, U.S. Gulf Coast, were in a range of \$136 to \$150 per ton compared with \$100 to \$108 per ton in December 2010. The import price for Indian barite increased to a range \$165 to \$170 per ton compared with \$107 to \$112 per ton in December 2010. The import price of chemical-grade barite from China was essentially unchanged in December 2011 at \$135 to \$145 per ton compared with \$138 to \$145 per ton in December 2010.

Import prices for Moroccan barite were unavailable, but unground lump, API bulk, free-on-board Morocco increased to a range of \$108 to \$113 per ton in December 2011 compared with \$84 to \$89 per ton in December 2010 (Industrial Minerals, 2010; 2011).

World Review

Fueled by the rapid expansion of the economies of developing countries such as Brazil, China, and India, the demand for oil and gas has risen rapidly. This increase in demand, plus improvements in technology, has resulted in a substantial increase in worldwide exploration for oil and gas and with it an increase in consumption of barite. Although the Baker Hughes international rotary rig count does not include rigs drilling in the Caspian region, onshore China, Cuba, Iran, North Korea, Russia, or Sudan, it is a good indicator of international oil and gas exploration trends. Internationally, the average monthly number of drill rigs operating in 2011 was 3,465, which was the highest number since 1985 (Baker Hughes Inc., 2012a).

China.—In 2011, China exported 2.89 Mt of barite, which was an increase of 12% compared with that of 2010. This was, however, insufficient to keep up with the 16% increase in drill rigs operating worldwide. This export quantity was also substantially less than what was exported in 2008 when China produced an estimated 4.6 Mt and exported 3.88 Mt. China's production has decreased an approximately 11% since 2008. Chinese barite production has decreased because of the depletion of reserves in some traditional mining areas and the combination of stricter environmental and mine health and safety regulations that are forcing some smaller mines out of business.

India.—Despite flooding in 2010 of the Andhra Pradesh Mineral Development Corporation Ltd. (APMDC) barite mine, barite exports in 2010 apparently increased compared with those of 2009. Exports for 2010 and 2011 were approximately the same at 1 Mt. The export price of Indian crude barite increased to \$142 to \$146 per metric ton at yearend 2011, nearly double that of yearend 2010.

IBC Ltd. (Chennai) (formerly Indian Barytes and Chemicals Ltd.) announced plans to increase its barite production capacity to 300,000 t/yr in anticipation of strong demand. With the surge in oil and gas exploration worldwide, Chinese production expected to decrease, and prices rising, conditions appear to be excellent for increased output by IBC. India is ideally located to supply barite to the Middle Eastern market, where consumption has effectively doubled in the past 18 months (Elliot, 2011).

Ireland.—Sunrise Resources Plc (Macclesfield, United Kingdom) announced the completion of a positive concept study suggesting that a profitable underground barite mining operation could be developed at Derryginagh in southwest Ireland with an output of at least 50,000 metric tons per year. This was based on initial estimates of mining and processing capital and operating costs and using published barite sales prices. Following this study, metallurgical test work continued with the objective to define a low cost gravity separation process for production of high-grade barite and a drilling program was in progress to evaluate the resource potential of the barite vein (Sunrise Resources Plc, 2011).

Outlook

In the future, natural gas's share of U.S. power generation is expected to increase because of lower capital costs, relatively low natural gas prices, and stricter environmental controls on powerplant emissions. Many coal-fired powerplants are either being converted to natural gas or they are being shutdown owing to their age and the expected economic burden of complying with pollution control regulations. A large percentage of new powerplants expected to be built in coming years are likely to be natural-gas fired. A switch from coal to natural gas in new powerplants would likely provide a boost to domestic drilling and increase the demand for barite.

Drilling for oil and gas in the United States and the rest of the world ramped up rapidly after the 2008–09 recession. Worldwide demand for barite is expected to remain strong owing to the high level of oil and gas exploration. Barite supplies, however, are expected to be tight as a result of decreased Chinese production. This supply shortage coupled with factors such as increased costs for mining, inland transportation, and higher taxes in China has resulted in significantly higher prices for barite sourced from the major exporters. With China, India, Morocco, and the United States accounting for more than 80% of the world's barite supply, prices are expected to remain high until additional barite resources are developed. There are some projects in the pipeline, but more efforts may need to be taken by mining companies, oil service companies, and investors to address the increasing needs of the oil and gas industry.

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TABLE 1
 SALIENT BARITE STATISTICS¹

(Thousand metric tons and thousand dollars)

| | 2007 | 2008 | 2009 | 2010 | 2011 |
|--|----------------------|----------------------|----------------------|----------------------|--------------------|
| United States: | | | | | |
| Barite, primary: | | | | | |
| Sold or used by producers: | | | | | |
| Quantity | 455 | 648 | 396 ^r | 662 | 710 |
| Value | 32,000 ^r | 47,300 ^r | 31,800 ^r | 51,000 ^r | 61,200 |
| Exports: | | | | | |
| Quantity | 15 | 62 | 49 | 109 | 98 |
| Value | 6,300 | 10,500 | 10,200 | 17,800 | 17,300 |
| Imports for consumption: ² | | | | | |
| Quantity | 2,600 | 2,620 | 1,430 | 2,110 | 2,320 |
| Value | 193,000 | 208,000 | 129,000 | 196,000 | 245,000 |
| Consumption, apparent ³ | 3,040 | 3,210 | 1,770 | 2,660 | 2,930 |
| Crushed and ground, sold or used by processors: ⁴ | | | | | |
| Quantity | 2,980 | 2,840 | 2,410 ^r | 2,570 | 2,910 |
| Value | 315,000 ^r | 325,000 ^r | 320,000 ^r | 398,000 ^r | 490,000 |
| World, production | 7,970 ^r | 8,730 ^r | 6,670 ^r | 8,130 ^r | 8,370 ^e |

^eEstimated. ^rRevised.

¹Data are rounded to no more than three significant digits.

²Includes crude, ground, and other barite imports.

³Sold or used plus imports minus exports.

⁴Includes imports.

TABLE 2
CRUSHED AND GROUND BARITE SOLD OR USED BY PROCESSORS
IN THE UNITED STATES, BY STATE^{1,2}

| State | 2010 | | | 2011 | | |
|--------------------|------------------|---------------------------------|----------------------|------------------|---------------------------------|-------------------|
| | Number of plants | Quantity (thousand metric tons) | Value (thousands) | Number of plants | Quantity (thousand metric tons) | Value (thousands) |
| Louisiana | 7 | 915 | \$132,000 | 6 | 928 | \$160,000 |
| Texas | 8 | 907 | 153,000 | 8 | 1,130 | 196,000 |
| Other ³ | 11 | 748 | 112,000 ^r | 11 | 848 | 134,000 |
| Total | 26 | 2,570 | 398,000 ^r | 25 | 2,910 | 490,000 |

^rRevised.

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

²Includes imports.

³Includes Georgia, Illinois, Indiana, Missouri, Nevada, Ohio, Tennessee, and Wyoming.

TABLE 3
CRUSHED AND GROUND BARITE SOLD OR USED BY PROCESSORS
IN THE UNITED STATES, BY USE^{1,2}

(Thousand metric tons and thousand dollars)

| Use | 2010 | | 2011 | |
|---|----------|----------------------|----------|---------|
| | Quantity | Value | Quantity | Value |
| Barium chemicals, filler and (or) extender, glass | 131 | 43,800 | 157 | 48,700 |
| Well drilling | 2,440 | 354,000 ^r | 2,750 | 441,000 |
| Total | 2,570 | 398,000 ^r | 2,910 | 490,000 |

^rRevised.

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

²Includes imports.

TABLE 4
U.S. EXPORTS OF NATURAL BARIUM SULFATE (BARITE), BY COUNTRY¹

| Country | 2010 | | 2011 | |
|----------------------|------------------------|--------------------|------------------------|-------------------|
| | Quantity (metric tons) | Value (thousands) | Quantity (metric tons) | Value (thousands) |
| Brazil | 1,470 | \$1,020 | 1,470 | \$1,380 |
| Canada | 97,200 | 13,600 | 85,600 | 10,400 |
| Costa Rica | 204 | 144 | 225 | 165 |
| Mexico | 5,500 | 1,610 | 8,620 | 4,460 |
| Mozambique | -- | -- | 692 | 197 |
| Oman | 402 | 109 | 468 | 109 |
| Trinidad and Tobago | 409 | 174 | 306 | 97 |
| Other ^{2,3} | 3,410 ^r | 1,150 ^r | 860 | 483 |
| Total | 109,000 | 17,800 | 98,300 | 17,300 |

^rRevised. -- Zero.

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

²Includes countries with full year quantities of less than 200 metric tons in 2011.

³Includes Angola (2011), Cameroon (2010), China, Colombia (2011), Ecuador, Egypt (2010), Equatorial Guinea (2010), France, Germany (2010), Guatemala (2010), Haiti (2011), India (2011), Indonesia (2011), Israel (2010), Japan (2011), Republic of Korea (2011), Lebanon (2010), Malaysia (2010), Russia (2010), Singapore (2010), Thailand, and United Arab Emirates (2011).

Source: U.S. Census Bureau.

TABLE 5
U.S. IMPORTS FOR CONSUMPTION OF BARITE, BY COUNTRY¹

| Country | 2010 | | 2011 | |
|----------------------------------|---------------------------|-----------------------------------|---------------------------|-----------------------------------|
| | Quantity (metric tons) | Value ² (thousands) | Quantity (metric tons) | Value ² (thousands) |
| Crude: | | | | |
| Canada | 8 | \$3 | -- | -- |
| China | 754,000 | 75,900 | 638,000 | \$80,500 |
| India | 45,500 | 4,690 | 112,000 | 15,000 |
| Malaysia | 636 | 18 | 3,080 | 87 |
| Mexico | 18,100 | 1,390 | 37,100 | 3,080 |
| Morocco | 54,900 | 5,180 | 59,000 | 6,200 |
| Norway | 230 | 60 | -- | -- |
| Total | 873,000 | 87,300 | 850,000 | 105,000 |
| Ground: | | | | |
| Canada | 8,060 | 510 | 139 | 46 |
| China | 1,170,000 | 87,000 | 1,380,000 | 114,000 |
| Germany | 1,150 | 582 | 1,200 | 669 |
| India | 38,400 | 3,050 | 55,200 | 5,070 |
| Italy | 27 | 5 | 1 | 3 |
| Japan | 1,690 | 365 | 2,010 | 373 |
| Mexico | -- | -- | 3,710 | 378 |
| Morocco | -- | -- | 11,600 | 1,070 |
| Netherlands | 4 | 3 | 18 | 24 |
| Spain | 19 | 12 | 19 | 8 |
| Switzerland | -- | -- | 2,870 | 290 |
| Thailand | -- | -- | 20 | 12 |
| United Kingdom | 86 | 43 | 18 | 14 |
| Total | 1,220,000 | 91,500 | 1,450,000 | 121,000 |
| Other sulfates of barium: | | | | |
| China | 4,380 | 2,940 | 5,050 | 3,900 |
| Denmark | 5 | 4 | -- | -- |
| Germany | 7,640 | 10,700 | 6,960 | 10,600 |
| Ghana | -- | -- | 18 | 58 |
| Italy | 1,920 | 1,720 | 2,050 | 2,360 |
| Japan | 670 | 1,630 | 647 | 1,440 |
| Mexico | -- | -- | 401 | 90 |
| Netherlands | 130 | 58 | -- | -- |
| Switzerland | -- | -- | 20 | 18 |
| Taiwan | -- | -- | 2 | 5 |
| United Kingdom | (3) | 8 | 1 | 6 |
| Total | 14,700 | 17,000 | 15,100 | 18,500 |

-- Zero.

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

²Cost, insurance, and freight value.

³Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF BARIUM CHEMICALS¹

| | 2010 | | 2011 | |
|----------------------------|---------------------------|-----------------------------------|---------------------------|-----------------------------------|
| | Quantity (metric tons) | Value ² (thousands) | Quantity (metric tons) | Value ² (thousands) |
| Chloride | 352 | \$431 | 609 | \$725 |
| Oxide, hydroxide, peroxide | 4,290 | 4,940 | 3,740 | 5,030 |
| Carbonate, precipitated | 2,780 | 2,530 | 2,860 | 5,250 |

¹Data are rounded to no more than three significant digits.

²Cost, insurance, and freight value.

Source: U.S. Census Bureau.

TABLE 7
BARITE: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Metric tons)

| Country | 2007 | 2008 | 2009 | 2010 | 2011 ^c |
|-----------------------------|------------------------|------------------------|------------------------|------------------------|----------------------|
| Algeria | 63,098 | 60,088 | 38,000 | 42,000 ^r | 40,000 |
| Argentina | 37,979 | 3,170 | 3,416 | 2,944 ^r | 3,000 |
| Armenia ^c | 600 | 600 | 500 | 550 | 600 |
| Australia ^c | 16,000 | 21,000 | 20,000 | 21,000 ^r | 22,000 |
| Bolivia | 8,245 | 10,900 | 2,069 | 7,845 | 21,297 ³ |
| Brazil, beneficiated | 13,311 | 23,276 | 49,847 ^r | 41,385 ^r | 41,400 ^p |
| Bulgaria ^c | 51,000 | 40,000 | 14,300 | 500 ^r | 500 |
| Burma | 6,813 | 5,679 | 7,623 | 8,975 | 9,000 |
| Canada | 9,000 | 12,000 | 15,000 ^c | 22,000 ^c | 22,000 |
| China ^c | 4,400,000 | 4,600,000 | 3,000,000 | 4,000,000 | 4,100,000 |
| Germany | 88,265 ^r | 78,941 | 45,606 | 55,887 ^r | 70,000 |
| India ^c | 1,000,000 | 1,100,000 | 1,200,000 | 1,300,000 ^r | 1,350,000 |
| Iran ⁴ | 249,495 | 226,590 | 361,217 ^r | 400,000 ^{r,c} | 350,000 |
| Italy ^c | 5,000 | 5,000 | 3,500 | 3,500 | 3,500 |
| Kazakhstan | 130,000 | 170,000 | 170,000 | 200,000 ^c | 200,000 |
| Laos ^c | 29,000 | 29,000 | 29,000 | 29,000 | 29,000 |
| Mexico | 185,921 | 140,066 | 151,791 | 143,225 ^r | 156,645 ³ |
| Morocco | 664,700 ^r | 725,060 ^r | 586,937 ^r | 572,429 ^r | 600,000 |
| Nigeria ^{c,5} | 5,000 | 5,000 | 19,400 ^{r,3} | 19,000 ^r | 20,000 |
| Pakistan | 48,044 | 56,500 ^r | 60,000 ^r | 55,000 ^r | 58,000 |
| Peru | 27,372 ^r | 45,213 ^r | 27,881 ^r | 50,942 ^r | 86,790 ³ |
| Russia ^c | 63,000 | 63,000 | 63,000 | 60,000 | 62,000 |
| Slovakia, concentrate | 11,000 | 12,950 | 8,000 ^c | 10,000 ^c | 10,000 |
| Spain | 26,770 ^r | 11,100 | 2,814 ^r | 2,814 ^r | 3,000 ^p |
| Thailand ⁶ | 8,631 | 9,180 | 51,895 | 33,465 ^r | 35,000 |
| Turkey | 184,041 | 482,740 | 213,187 | 250,000 ^c | 230,000 |
| United Kingdom ^c | 55,000 | 50,000 | 50,000 | 50,000 | 50,000 |
| United States ⁷ | 455,000 | 648,000 | 396,000 ^r | 662,000 | 710,000 ³ |
| Vietnam ^c | 120,000 | 90,000 | 75,000 | 85,000 | 85,000 |
| Other ⁸ | 2,620 ^{r,c} | 3,934 ^r | 3,617 ^r | 3,660 ^{r,c} | 3,610 |
| Total | 7,960,000 ^r | 8,730,000 ^r | 6,670,000 ^r | 8,130,000 ^r | 8,370,000 |

^cEstimated. ^pPreliminary. ^rRevised.

¹World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Table includes data available through July 6, 2012.

³Reported figure.

⁴Data are for fiscal year beginning March 21 of that stated.

⁵Considerably more barite is produced, but it is considered to be commercially unusable.

⁶Data for 2007–10 reported by Thailand Department of Primary Industries and Mines, data for 2011 from United States Geological Survey.

⁷Crude barite sold or used by producers.

⁸Includes Afghanistan, Bosnia and Herzegovina, Chile, Colombia, Egypt, Guatemala, and Poland.