



2013 Minerals Yearbook

BARITE [ADVANCE RELEASE]

BARITE

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In 2013, primary U.S. barite production (sold or used by producers) was estimated to be 723,000 metric tons (t) valued at an estimated \$82 million, and apparent consumption was 2.76 million metric tons (Mt). Imports for consumption were 2.24 Mt and exports were 199,000 t (table 1). Prices decreased slightly compared with 2012, but not enough to offset the increasing trend of the previous decade. World barite production remained steady at 9.11 Mt. Exploration and development of barite resources continued, especially in Africa, Mexico, and parts of Asia.

The United States was the world's fourth-ranked producer of barite, and the leading consumer. Continued strong demand for barite was driven by global production of natural gas and petroleum products. Increased production of gas and petroleum products was particularly strong in the United States where advances in the application of horizontal drilling and hydraulic fracturing in shale and other tight resources facilitated production in onshore regions.

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, and washing, or more complex methods, such as flotation, heavy-media separation, or magnetic separation. Most barite ores require some upgrading to minimum commercial purity or density levels. The primary use of barite is as a weighting agent in drilling muds.

Production

Domestic production and sales data for barite were derived from voluntary responses to the U.S. Geological Survey (USGS) canvas. In 2013, data were received from one of the five operating barite mines, representing approximately 38% of domestic barite sold or sent to company grinding mills. Data were received from 8 of the 23 grinding mills that operated during the year, representing 29% of the quantity of ground barite sold. Estimates for nonrespondents (mine and grinding mills) were made using company production estimates, prior-year data, and other industry data. Of the canvassed operating mines, four were in Nevada, and one was in Georgia.

In 2013, the leading companies that mined and ground barite in the United States were also major oil service companies. Information on the mines and mills can be found in table 2. Crude barite production was estimated to be 723,000 t in 2013, an increase of 9% compared with that of 2012. The bulk of mine production was from Nevada, with a small amount from Georgia. The estimated value of domestic production was \$82 million (table 1). Only one of the Nevada barite producers

sold crude or run-of-mine ore, making estimations of the value of the crude barite problematic.

There were 23 grinding mills that ground barite all or part of the year. Most Nevada barite ore was ground at nearby company-owned grinding mills. Some run-of-mine ore or crude barite from Nevada was shipped to Canada for grinding.

In addition to the 4 grinding mills in Nevada, 14 grinding mills operated along the coast of the Gulf of Mexico (6 in Louisiana and 8 in Texas). These stand-alone grinding mills processed imported crude barite that was primarily ground to American Petroleum Institute (API) specifications for the oil and gas drilling market, although some was ground for other uses. An additional five grinding mills in the Midwest and Southeast ground barite for use as extenders, fillers, and pigments, and also produced API-grade barite for the oil and gas drilling market.

Excalibar Minerals LLC announced plans to expand capacity at its Corpus Christi, TX, grinding facility, which processes barite for drilling and industrial applications. The company planned to add a new, fully automated 66-inch Raymond Roller Mill that was expected to become operational in the first quarter of 2014 (Excalibar Minerals LLC, 2013).

Baker Hughes Inc. drilled 43 holes totaling 3,030 meters (m) at Bravada Gold Corp.'s (Bravada) Shoshone Pediment project. The property, consisting of 70 claims located along the Battle Mountain-Eureka gold trend in Lander County, NV, is adjacent to areas of historic barite mining. The rights to the barite were leased to Baker Hughes with all other mineral rights being retained by Bravada. For the duration of the agreement, Baker Hughes was to pay all mining claim fees, royalties for any barite production, and provide drill splits to Bravada for further analysis (Bravada Gold Corp., undated).

Baker Hughes entered into a similar agreement with Geoinformatics Alaska Exploration Inc., a fully owned subsidiary of Kiska Metals Corp. (Kiska), for the exploration of barite on its Hilltop Property in Lander County, NV. The property consists of 82 unpatented lode mining claims on the western slope of the Shoshone Mountains and within the Cortez-Battle Mountain Trend. Although the property was originally acquired for its gold potential, the agreement excludes precious and base-metal products. Under the terms of the 3-year agreement, Baker Hughes will pay mining claim maintenance fees and have the option of entering into a 20-year mining lease, with Kiska receiving a royalty per ton of finished barite. Baker Hughes was also to make available any drill splits for further analytical work by Kiska (Kiska Metals Corp., 2013).

Consumption

In 2013, apparent consumption of barite decreased by 20% to 2.76 Mt compared with that in 2012 (table 1). The drop

in apparent consumption, which does not reflect changes in industry stocks, might suggest reduced demand for barite in 2013. However, it stands in contrast to sales of ground barite, which increased by 7% to 3.55 Mt, the third highest sales ever recorded, following only 1981 and 1982. The decrease in apparent consumption, which was strongly influenced by the volume of imports, was attributed to a 26% decrease in imported barite coupled with the grinding mills having accumulated substantial stocks in 2012. Grinding mills would have needed to import less barite in 2013, owing to the stockpiles of material accumulated the previous year.

Grinding mill sales in Louisiana decreased by about 5% to 1.12 Mt, and those in Texas increased slightly to 1.27 Mt compared to 1.25 Mt in 2012. However, sales by mills in all other States increased by 32% to 1.16 Mt from 877,000 t (table 3). Although mine production accounted for part of the increase, 80% was the result of increased sales of barite for well drilling by Midwestern grinding mills. About 3.44 Mt, or 97%, of barite sales from domestic crushers and grinders was for natural gas and petroleum well-drilling markets, and the remaining 3% was for industrial end uses (table 4). In 2013, sales of domestic and imported barite for industrial uses increased by 6% to 113,000 t (table 4).

Barite's role in the well-drilling industry is primarily as a weighting agent in drilling muds to suppress high formation pressures and to prevent blowouts. As a well is drilled, the bit passes through various formations, each with different characteristics. Deeper wells require more barite 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.

The color of barite used for drilling petroleum varies and can be black, blue, brown, buff, or gray. However, most barite needs to be ground to a small uniform size before it is used as a weighting agent in drilling mud based on specifications set by the API.

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, adding specifications for 4.1-SG barite (effective date, August 1, 2010). Aside from specific gravity, other specifications for 4.1-SG barite are the same as 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 such as calcium (American Petroleum Institute, 2010, p. 13–23, 83–96).

Industrial end uses such as barium chemicals, filler in paint and plastics, and powder coatings, 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 were used for sound reduction in engine compartments in automobiles, boats, and trucks. Barite was also used in the base coat of automobile finishes for smoothness and corrosion resistance and continued 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 Co. (Cartersville, GA) was the leading supplier of barite aggregate.

Environment

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 laws. 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).

Foreign Trade

In 2013, barite exports were 199,000 t (table 5), although a significant portion was likely re-exports of imported barite ground in the United States. Most exports of domestically mined barite went to Canada in the form of crude barite, which was ground in Canada and then consumed in oil and gas drilling in the western Provinces of Alberta, British Columbia, and Saskatchewan. Canada and Mexico accounted for more 94% of exports.

Combined imports of barite (crude and ground) totaled 2.24 Mt, a decrease of 23% compared with those of 2012 (table 1). Barite imports in 2013 were lower owing to grinding mills drawing down stocks. China continued to supply the largest percentage of imported barite, but its share of the total has dropped continually since 2007. In 2007, 98% of imported barite was from China, representing 86% of all barite sold and used in the United States. In 2013, China supplied 68% of total imports, representing 43% of that sold or used in the United States. India's share of imports steadily increased to 19% of the total in 2013 from 2% in 2007. Although contributing only 7% of total imports in 2013, barite imports from Mexico more than doubled to 148,000 t from 70,400 t in 2012 (table 6). Imports from Morocco made up most of the remaining 5%. Imports of the several forms of barite reported under the Harmonized Tariff Schedule nomenclature "Other sulfates of barium" were 15,800 t, which represented a 13% decrease compared with those of 2012 (table 6).

The tariff on U.S. imports of crude barite is \$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. FTZ status means that the ground barite produced by these mills will be reported as imports for consumption and not as crude barite received from foreign suppliers. Grinding mills in FTZs are identified in table 2.

Stocks

Although the USGS does not collect data on stocks at mines or grinding mills, in 2012 it was reported that grinding mills that import barite were thought to have amassed substantial stocks. The significant decreases in apparent consumption and imports were attributed to the grinding mills drawing down stocks in 2013.

Transportation

In recent years, about 75% to 80% of U.S. barite consumption has been supplied by imports. 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 nearshore 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, mostly in the Gulf Coast region. The PAD districts were World War II divisions of the oil-producing areas of the United States; these designations continue to be used.

Prices

Because 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 was \$113 per metric ton (table 1).

Value data for ground barite, as reported to the USGS, do not necessarily represent open market prices. Because many of the U.S. barite grinding mills are owned by oil service companies, barite often is sold to the customer at a reduced price or at cost because the barite is simply a small part of the overall service contract. Taking this into account, compared with those of 2012, the average unit value for barite ground in Louisiana decreased by about \$8 per ton to \$175 per ton, the average unit value for all grades ground in Texas decreased slightly to \$188 per ton, and the sales value of barite ground in other States decreased by \$18 per ton to \$165 per ton (table 3). Barite for barium chemicals, fillers and extenders, and glass decreased by 6% to \$391 per ton in 2013 compared with that of 2012 (table 3).

The following is a discussion of yearend published price ranges for crude barite from major exporting countries. The yearend 2013 prices for barite from China, API grade, lump, including cost, insurance, and freight, U.S. Gulf Coast, was \$147 to \$154 per ton, a slight decrease from \$155 to \$160 per ton as reported in 2012. The import price for barite from India remained unchanged at \$157 to \$171 per ton. The import price of chemical-grade barite from China was also unchanged at

\$161 to \$180 per ton. Unground lump, API bulk, SG 4.20, free-on-board barite from Morocco decreased to \$105 to \$130 per ton in December 2013 compared with \$130 to \$140 per ton at yearend 2012 (Industrial Minerals, 2014).

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 drilling technology, has resulted in a substantial increase in worldwide exploration for oil and gas and with it, an increase in production and consumption of barite.

In descending order of production, China, India, Morocco, and the United States were the leading producers of barite in 2013. These four countries accounted for 82% of estimated world barite production.

Algeria.—A joint venture between Sonatrach Group, Africa's leading oil and gas company, and Manadjim El Djazair (Manal), Algeria's state-owned mining group, was formed to explore, develop, and produce barite from the Draissa deposit in Bechar Province in western Algeria. The new company, National Company for Barium (Barytal), is expected to have the capacity to produce 100,000 metric tons per year (t/yr) of barite by 2017 (Bariyo and O'Driscoll, 2014).

China.—A joint venture, The Tianzhu Chemical Mining Corp., formed between Rocky Mountain Industrial Development Co. (Rocky Mountain) and Hao Hua Chemical Group, is projected to produce as much as 500,000 t/yr of barite, which would make it the leading barite supplier in China. Rocky Mountain currently mines the Tianyun deposit of Guizhou. The joint venture will add an additional 3 square kilometers for mining. The higher specific gravity material will be sold to drilling markets, and lower specific gravity material will be used in chemical applications (Wu and Wilson, 2013).

Georgia.—JSC Ado Mining Georgia plans to build a barite concentrate beneficiation plant in the town of Chordi in northern Georgia. In 2012, the company acquired a 30-year license to mine the deposit. Construction of the plant, which is expected to have a production capacity of 60,000 t/yr, is expected to begin by the end of 2013 following completion of feasibility and environmental impact studies (Interfax Information Service, 2013).

India.—Owing to increasing internal consumption, the Andhra Pradesh Mineral Development Corp. Ltd. has considered proposals to change the ratio of exports in order to supply more crude ore to the country's domestic processing sector. From 2009 to early 2013, the number of grinding mills in India increased tenfold, from 15 to 150 (O'Driscoll, 2013).

Outlook

The global oil and gas industry has been in a period of rapid growth, fueled by both increased consumption in developing countries and increased hydrocarbon production by the United States. Advances in the application of horizontal drilling and hydraulic fracturing have allowed the domestic industry to flourish, and the United States is currently approaching crude oil production levels of the 1980s. Domestic barite consumption has

been commensurate with growth in the oil and gas sector. Barite sold or used by domestic grinding mills has been increasing since 2009, with the third highest amount ever recorded sold in 2013.

The long-term outlook for oil and gas is expected to remain strong, although global production currently exceeds demand and inventories are rising. In the middle of 2014, oil prices began to fall, and by the end of 2014 prices had dropped by almost 50% (U.S. Energy Information Administration, 2015a). The U.S. Energy Information Administration (EIA) projects that through 2016, global crude oil production will be relatively flat. Domestic production is still expected to continue to increase, although at a much slower pace. Historically, during periods of low oil and gas prices, producers have looked to cut costs by reducing the amount of exploration drilling, which is a key driver of barite consumption. However, the EIA expects that some development drilling will continue in key areas of the Bakken, Eagle Ford, Niobrara, and Permian Basins (U.S. Energy Information Administration, 2015b, p. 2).

Despite the pivotal role domestic shale development has played in recent years, little attention has been paid to the nature of its impact on barite consumption. Offshore drilling uses more barite per meter drilled than onshore wells, possibly close to four times more, because of higher formation pressures (Bleiwas and Miller, 2015). However, because well production declines more rapidly in shale than in conventional fields—with up to 40% less production in the second year of operation—new wells need to be drilled continuously to maintain production (Aquilera and Radetzki, 2013). Although less barite is used per well, it seems likely that the increase in barite consumption is due to the large number of onshore wells being drilled.

Evidence of increased consumption can be seen in the changing relationship between drilling rig counts and barite consumption. Although no relationship between rig counts and barite demand has been defined, consumption typically increases with higher rig counts and vice versa. In recent years, domestic barite consumption has increased despite decreases in rig count. Another interesting anomaly is that domestic barite sales in 2012 were 3.31 Mt, tying 1980 for the fourth highest on record. However, in 1980, the U.S. monthly average rig count was 2,909 rigs versus 1,919 in 2012 (Baker Hughes Inc., 2013).

The EIA and other industry analysts have already noted a breakdown in the relationship between oil and gas productivity in shale resources and rig count (U.S. Energy Information Administration, 2013). New metrics have been developed that are thought to better measure the productivity in these fields. One measure that may be of particular interest in understanding barite consumption is the Baker Hughes Well Count, which was introduced in 2013 as a way to identify onshore wells that are “significant consumers of oilfield services and supplies.” It does not include wells that are categorized as workover, plugged and abandoned, or completed (Baker Hughes Inc., 2014, p. 24). Owing to the introduction of pad drilling and rig mobility, a single onshore rig can now drill multiple wells at one site at a much faster rate. The barite industry may need to reevaluate measures of activity because of fundamental changes in the oil and gas market.

Although large-scale development in shale and tight oil resources is currently limited to North America, other countries

are eventually expected to follow suit. These developments are likely to significantly influence the oil and gas market, including the demand for oilfield supplies and services, for the foreseeable future. Although short-term volatility is expected, the current downturn may also be an opportunity to better understand the changing dynamics of barite consumption in the face of changing drilling technologies.

References Cited

- American Petroleum Institute, 2010, Specification for drilling fluids materials—ANSI/API Specification 13A (18th ed.): Washington, DC, American Petroleum Institute, 109 p.
- Aquilera, R.F., and Radetzki, Marian, 2013, Shale gas and oil—Fundamentally changing global energy markets: *Oil & Gas Journal*, v. 111, no. 12, December 2. (Accessed March 30, 2015, at <http://www.ogj.com/articles/print/volume-111/issue-12/exploration-development/shale-gas-and-oil-fundamentally-changing-global-energy-markets.html>.)
- Baker Hughes Inc., 2013, Worldwide rig counts—Current & historical data: Houston, TX, Baker Hughes Inc. (Accessed January 8, 2015, via <http://phx.corporate-ir.net/phoenix.zhtml?c=79687&p=irol-rigcountsintl>.)
- Baker Hughes Inc., 2014, Baker Hughes 2013 annual report: Houston, TX, Baker Hughes Inc., 120 p. (Accessed April 10, 2015, at http://public.bakerhughes.com/2013-annual-report/downloads/bakerhughes2013_annual_report_full.pdf.)
- Bariyo, Allan, and O’Driscoll, Mike, 2014, Barite jv established to develop Draissa deposit for drilling grades: *Industrial Minerals*, no. 556, January, p. 17.
- Bleiwas, D.I., and Miller, M.M., 2015, Barite—A case study of import reliance on an essential material for oil and gas exploration and development drilling: U.S. Geological Survey Scientific Investigations Report 2014–5230, 6 p. (Accessed April 8, 2015, at <http://pubs.usgs.gov/sir/2014/5230/pdf/sir2014-5230.pdf>.)
- Bravada Gold Corp., [undated], Bravada projects—Shoshone Pediment property: Vancouver, British Columbia, Canada, Bravada Gold Corp. (Accessed March 23, 2015, at <http://www.bravadagold.com/en/projects/shoshone-pediment-property/index.php>.)
- Drilling Waste Management Information System, [undated], Fact sheet—Discharge to ocean: Argonne, IL, Argonne National Laboratory. (Accessed September 22, 2010, at <http://web.ead.anl.gov/dwm/techdesc/discharge/index.cfm>.)
- Excalibar Minerals LLC, 2013, Excalibar Minerals to expand Corpus Christi operations: The Woodlands, TX, Newpark Resources, Inc. news release, September 3. (Accessed January 12, 2015, at <http://www.newpark.com/news/2013/excalibar-minerals-to-expand-corpus-christi-operations>.)
- Industrial Minerals, 2014, Prices: *Industrial Minerals*, January, no. 556, p. 52.
- Interfax Information Service, 2013, Ado Mining to put \$4.5 mln into new barite concentrate facility in Georgia: Interfax Information Service news release, August 22. (Accessed January 12, 2015, at <http://www.interfax.com/newsinf.asp?id=438962>.)
- Kiska Metals Corp., 2013, Kiska enters exploration agreement with Baker Hughes: Vancouver, British Columbia, Canada, Kiska Metals Corp. news release, June 6. (Accessed March 16, 2015, at <http://www.kiskametals.com/s/News.asp?ReportID=587108>.)
- O’Driscoll, Mike, 2013, Industrial Minerals inside edge—29 January 2013: *Industrial Minerals*, January 29. (Accessed April 1, 2015, via <http://www.indmin.com>.)
- U.S. Energy Information Administration, 2013, Today in energy—Highlights of the new drilling productivity report: U.S. Energy Information Administration, October 22. (Accessed March 30, 2015, at <http://www.eia.gov/todayinenergy/detail.cfm?id=13471>.)
- U.S. Energy Information Administration, 2015a, Crude oil prices down sharply in fourth quarter of 2014: U.S. Energy Information Administration, January 6. (Accessed April 7, 2015, at <http://www.eia.gov/todayinenergy/detail.cfm?id=19451>.)
- U.S. Energy Information Administration, 2015b, Short-term energy outlook (STEO): U.S. Energy Information Administration, March, 52 p. (Accessed May 12, 2015, at <http://www.eia.gov/forecasts/steo/archives/mar15.pdf>.)
- Wu, Rocky, and Wilson, Ian, 2013, New JV forms largest barite company in China: *Industrial Minerals*, no. 554, November, p. 24–25.

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

Barite. Ch. in Mineral Commodity Summaries, annual.
 Barite. Ch. in United States Mineral Resources, Professional Paper 820, 1973.
 Historical Statistics for Mineral and Material Commodities in the United States. Data Series 140.

Other

Barite. Ch. in Mineral Facts and Problems, U.S. Bureau of Mines Bulletin 675, 1985.

Barium Minerals. Ch. in Industrial Minerals and Rocks (7th ed.), Society for Mining, Metallurgy, and Exploration, Inc., 2006.
 Barytes. British Geological Survey Mineral Profile, September 2005.
 Economics of Barytes, The (10th ed.). Roskill Information Services Ltd., 2006.

TABLE 1
 SALIENT BARITE STATISTICS¹

(Thousand metric tons and thousand dollars)

	2009	2010	2011	2012	2013
United States:					
Barite, primary:					
Sold or used by producers:					
Quantity	396	662	710	666	723
Value ^e	31,800	51,000	61,200	74,500	81,900
Exports:					
Quantity	49	109	98	151	199
Value	10,200	17,800	17,300	42,200	58,900
Imports for consumption: ²					
Quantity	1,430	2,110	2,320	2,920	2,240
Value	129,000	196,000	245,000	430,000	352,000
Consumption, apparent ³	1,780	2,660	2,930	3,430	2,760
Crushed and ground, sold or used by processors: ⁴					
Quantity	2,410	2,570	2,910	3,310	3,550
Value	320,000	398,000	490,000	618,000	625,000
World, production ^e	6,660 ^r	7,950	7,350 ^r	9,060 ^r	9,110 ^e

^eEstimated. ^rRevised.

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

²Includes crude, ground, and other barite imports.

³Sold or used by producers plus imports minus exports.

⁴Includes imports.

TABLE 2
ACTIVE BARITE MINES AND GRINDING MILLS IN THE UNITED STATES IN 2013

State and operator (owner)	County/Parish	Mine/Mill	Foreign Trade Zone
Mines:			
Georgia, New Riverside Ochre Co.	Bartow	New Riverside Ochre	
Nevada:			
Baker Hughes Drilling Fluids (Baker Hughes Inc.)	Lander	Argenta	
Halliburton Energy Services (Halliburton Co.)	Elko	Rossi	
M-I L.L.C., operating as MI-SWACO (Schumberger Ltd.)	Lander	Greystone	
NOV Minerals LP (National Oilwell Varco Inc.)	Elko	Big Ledge	
Grinding mills:			
Georgia, CIMBAR Performance Minerals	Bartow	Chatworth	
Illinois, J.M. Huber Engineered Minerals Division (J.M. Huber Corp.)	Adams	Quincy	
Indiana, CIMBAR Performance Minerals	Posey	Mt. Vernon	
Louisiana:			
Baker Hughes Drilling Fluids (Baker Hughes Inc.)	St. Mary	Morgan City	No. 124, Gramercy, LA.
Halliburton Energy Services (Halliburton Co.)	Calcasieu	Lake Charles	No. 087, Lake Charles, LA.
Do.	Lafourche	Larose	No. 124, Gramercy, LA.
Excalibar Minerals L.L.C. (Newpark Resources, Inc.)	Iberia	New Iberia	Do.
M-I L.L.C., operating as MI-SWACO (Schumberger Ltd.)	St. Mary	Amelia	Do.
NOV Minerals LP (National Oilwell Varco, Inc.)	Terrebonne	Houma	
Nevada:			
Baker Hughes Drilling Fluids (Baker Hughes Inc.)	Lander	Barite Grinding Plant	
Halliburton Energy Services (Halliburton Co.)	Eureka	Dunphy	
M-I L.L.C., operating as MI-SWACO (Schumberger Ltd.)	Lander	Battle Mountain	
NOV Minerals LP (National Oilwell Varco, Inc.)	Elko	Osino	
Ohio, CIMBAR Performance Minerals	Columbiana	Wellsville	
Tennessee, Excalibar Minerals L.L.C. (Newpark Resources, Inc.)	Dyer	Dyersburg	
Texas:			
Baker Hughes Drilling Fluids (Baker Hughes Inc.)	Nueces	Corpus Christi	No. 122, Corpus Christi, TX.
Halliburton Energy Services (Halliburton Co.)	do.	do.	Do.
CIMBAR Performance Minerals	Harris	Houston	
Excalibar Minerals L.L.C. (Newpark Resources, Inc.)	do.	do.	
Do.	Nueces	Corpus Christi	No. 122, Corpus Christi, TX.
M-I L.L.C., operating as MI-SWACO (Schumberger Ltd.)	Cameron	Brownsville	
Do.	Galveston	Galveston	No. 036, Galveston, TX.
Milwhite Inc. (Control MINAR, S.A. de C.V.)	Cameron	Brownsville	

Do., do. Ditto.

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

State	2012			2013		
	Number of plants	Quantity (thousand metric tons)	Value (thousands)	Number of plants	Quantity (thousand metric tons)	Value (thousands)
Louisiana	6	1,180	\$217,000	6	1,120	\$196,000
Texas	8	1,250	241,000	8	1,270	239,000
Other ³	10	877	160,000	9	1,160	190,000
Total	24	3,310	618,000	23	3,550	625,000

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

²Includes imports.

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

TABLE 4
CRUSHED AND GROUND BARITE SOLD OR USED BY PROCESSORS
IN THE UNITED STATES, BY USE^{1,2}

(Thousand metric tons and thousand dollars)

Use	2012		2013	
	Quantity	Value	Quantity	Value
Barium chemicals, filler and (or) extender, glass	107	44,500	113	44,200
Well drilling	3,210	574,000	3,440	581,000
Total	3,310	618,000	3,550	625,000

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

²Includes imports.

TABLE 5
U.S. EXPORTS OF NATURAL BARIUM SULFATE (BARITE), BY COUNTRY¹

Country	2012		2013	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Angola	776	\$257	785	\$317
Brazil	673	697	125	76
Cameroon	--	--	3,440	1,510
Canada	90,600	13,600	112,000	17,800
Chile	550	192	6	18
Costa Rica	144	111	--	--
Denmark	1,740	728	--	--
Marshall Islands	2,130	2,250	--	--
Mexico	38,600	15,800	74,200	35,800
Trinidad and Tobago	129	38	2,300	814
United Kingdom	13,600	7,210	1,810	424
Venezuela	1,170	921	3,310	1,140
Other	325	454 ^r	859	1,050
Total	151,000	42,200	199,000	58,900

^rRevised. -- Zero.

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

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF BARITE, BY COUNTRY¹

Country	2012		2013	
	Quantity (metric tons)	Value ² (thousands)	Quantity (metric tons)	Value ² (thousands)
Crude:				
China	710,000	\$120,000	322,000	\$51,000
India	190,000	27,500	132,000	17,900
Japan	1	9	2	12
Liberia	--	--	57	22
Mexico	41,500	4,410	58,600	6,480
Morocco	137,000	15,500	43,900	5,330
Pakistan	12,000	1,370	--	--
South Africa	15,200	1,820	--	--
Thailand	15	6	--	--
United Kingdom	1,340	95	158	119
Total	1,110,000	171,000	557,000	80,900
Ground:				
Canada	186	51	76	40
China	1,520,000	202,000	1,190,000	186,000
Egypt	11,000	2,390	--	--
Germany	1,210	878	1,230	921
India	207,000	24,800	288,000	34,400
Italy	3	4	--	--
Japan	2,710	469	2,650	457
Macao	--	--	22,800	2,420
Mexico	27,200	3,440	89,200	13,300
Morocco	22,300	2,370	70,500	10,900
Netherlands	76	52	--	--
Thailand	22	12	--	--
Total	1,790,000	237,000	1,670,000	248,000
Other sulfates of barium:				
Belgium	--	--	40	219
China	5,270	4,440	6,390	5,910
Germany	8,740	13,800	6,600	12,900
Israel	⁽³⁾	2	--	--
Italy	1,810	2,260	2,140	2,860
Japan	587	1,450 ^r	508	1,240
Mexico	1,630	370	--	--
Netherlands	--	--	38	23
Switzerland	54	58	72	87
Total	18,100	22,300	15,800	23,300

^rRevised. -- 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 7
U.S. IMPORTS FOR CONSUMPTION OF BARIUM CHEMICALS¹

	2012		2013	
	Quantity (metric tons)	Value ² (thousands)	Quantity (metric tons)	Value ² (thousands)
Barium chloride	2,650	\$2,410	2,890	\$2,850
Barium oxide, hydroxide, peroxide	3,120	5,720	2,790	5,480
Barium carbonate, precipitated	4,310	9,400	2,140	4,890

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

²Cost, insurance, and freight value.

Source: U.S. Census Bureau.

TABLE 8
BARITE: WORLD PRODUCTION, BY COUNTRY^{1, 2}

(Metric tons)

Country	2009	2010	2011	2012	2013 ^c
Afghanistan ^{e, 3}	2,000	2,000	2,000	2,000	2,000
Algeria	38,000	42,000	40,000	40,000	40,000
Argentina	3,416	2,944	5,528	4,200	4,000
Australia ^{4, 5}	17,000 ^r	17,000 ^r	11,000	13,000	14,000 ⁴
Bolivia ⁴	2,069	7,845	21,297	21,157 ^r	30,476 ⁴
Brazil, beneficiated	49,847	41,385	7,039 ^r	3,025 ^r	--
Bulgaria ^e	14,300	350	120	--	--
Burma	7,623	8,975	30,000	21,539 ^r	31,295 ⁴
Canada ^e	15,000	22,000	22,000 ^r	22,000 ^r	22,000
China ^e	3,000,000	4,000,000	3,030,000 ^r	4,200,000	4,000,000
Egypt	1,100	3,600	4,000 ^e	4,000	4,000
Germany ⁴	45,606	55,887	55,342	52,030 ^r	52,000
India	1,200,000	1,300,000	1,350,000	1,700,000	1,738,824 ⁴
Iran ³	361,217	326,275	271,454 ^r	270,000 ^r	270,000
Italy ^e	3,500	3,500	3,500	3,500	3,500
Kazakhstan, marketable ^e	170,000	200,000	200,000	250,000	250,000
Laos	12,460 ^r	17,500	2,500 ^r	21,900 ^r	22,000
Malaysia	22,390	1,000	--	--	--
Mexico	152,790	143,225	134,727	139,997	200,000
Morocco	586,937	572,429	769,504	1,021,400 ^r	1,005,000
Nigeria ^{e, 6}	19,400	19,000	19,000	20,000	20,000
Pakistan	56,333 ^r	49,038 ^r	56,202 ^r	48,510 ^r	118,471 ⁴
Peru	27,881	52,275	87,848 ^r	79,451 ^r	52,491 ⁴
Russia ^e	63,000	60,000	63,000	63,000	63,000
Slovakia, concentrate ^e	8,000	13,000	14,000	14,000	14,000
Spain	2,814	2,050	-- ^r	-- ^r	--
Thailand	51,895	33,465	67,703	64,499 ^r	65,000
Turkey	213,187	172,618	250,786	200,000 ^r	250,000
United Kingdom ⁷	36,000	34,099 ^r	31,000	30,000 ^r	30,000
United States ⁸	396,000	662,000	710,000	666,000	723,000
Vietnam ^e	75,000	85,000	85,000	85,000	85,000
Other ⁹	1,608	622	613	628	628
Total ^e	6,660,000 ^r	7,950,000	7,350,000 ^r	9,060,000 ^r	9,110,000

^eEstimated. ^rRevised. -- Zero.

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

²Includes data available through May 15, 2014.

³Data are for fiscal year beginning March 21 of that stated.

⁴Reported figure.

⁵As reported by the government of South Australia.

⁶Considerably more barite is produced, but it is considered to be commercially unusable.

⁷As reported by the British Geological Survey.

⁸Crude barite sold or used by producers.

⁹Includes Armenia, Bosnia and Herzegovina, and Portugal.