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ZINC

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Zinc

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In 2011, U.S. production of recoverable zinc was 743,000 metric tons (t), a 3% increase from that of 2010 (table 1). The value of domestic mine production was approximately $1.74 billion. Alaska continued to be the dominant zinc-producing State, followed by, in descending order of quantity, Tennessee, Missouri, and Idaho. Domestic exports of zinc contained in ores and concentrates decreased by 12% to 660,000 t in 2011. Exports of zinc in concentrates were predominantly sent to the Republic of Korea (24%), Canada (23%), Spain (17%), and Japan (14%) (table 7). Imports for consumption of zinc contained in ores and concentrates decreased by 17% to 26,700 t from that in 2010. Estimated U.S. refined zinc production in 2011 was essentially unchanged at 248,000 t. Imports of refined zinc in 2011 increased by 7% to 716,000 t. Refined zinc was imported primarily from Canada (62%), Mexico (12%), Peru (9%), and Namibia (8%). Domestic exports of refined zinc increased by 14,800 t to 19,000 t in 2011. Globally, zinc mine production increased by 6% to 12.8 million metric tons (Mt); zinc metal production increased slightly to 13.1 Mt (tables 10, 11).

Legislative and Government Programs

In March, the U.S. Department of Commerce, International Trade Administration (ITA) began an antidumping and countervailing duty investigation of imports of galvanized steel wire from China and an antidumping investigation of imports of the same product from Mexico after a petition charging unfair trade practices was filed by five U.S. companies. In November, the ITA preliminarily determined that the imports of galvanized steel wire from the two countries were being sold in the United States at less than fair value. For China, the preliminary antidumping duties were determined to be 76.34% to 235.00% ad valorem depending on the manufacturer; most were at 127.09% ad valorem. For Mexico, the preliminary antidumping duties were 37.87% to 61.54% ad valorem, depending on the manufacturer. The ITA was to make its final determinations for both investigations no later than 135 days after publication of the preliminary determinations in the Federal Register (U.S. Department of Commerce, International Trade Administration, 2011a, b).

A U.S. stockpile of zinc has been maintained since 1967 for national defense purposes. In 1992, Public Law 102–484, which authorized the disposal of the entire inventory of zinc from the National Defense Stockpile (NDS), was signed. There were no sales of zinc during the fiscal year; sales of zinc from the NDS were suspended in August 2008 owing to concerns regarding domestic availability and access to various raw materials. At yearend 2011, the reported inventory of zinc decreased by 240 t from that of yearend 2010 to 7,250 t owing to several inventory adjustments that took place during the year.

Production

Mine.—In 2011, zinc was produced in four States, with Alaska as the leading zinc-producing State. Other zinc-producing States were Idaho, Missouri, and Tennessee. Domestic mine production of recoverable zinc in 2011 was 743,000 t, a 3% increase from that of 2010. A decrease in production in Idaho was offset by increases in the three other States, particularly in Tennessee at the Middle Tennessee zinc mine complex. Domestic mine production data were collected by the U.S. Geological Survey (USGS) from a base-metal voluntary survey of lode-mine production.

Alaska.—Teck Alaska Inc. (a subsidiary of Teck Resources Ltd., Vancouver, British Columbia, Canada) operated the open pit Red Dog zinc-lead mine in the Northwest Arctic Borough. Red Dog is comprised of several sedimentary-exhalative lead-zinc sulfide ore bodies. In 2011, ore was mined from the Main Pit and Aqqaluk deposits. Reserves from the Main Pit were expected to be exhausted in the first quarter of 2012, after which all ore would be mined solely from Aqqaluk. Zinc in concentrate production at Red Dog increased by 6% in 2011 from that of 2010 to 572,000 t owing to increased mill throughput. In 2011, approximately 30% of Red Dog's zinc concentrates was refined at Teck's metallurgical complex at Trail, British Columbia, Canada. Remaining concentrates were sent to Asia and Europe. Most of Red Dog's concentrates were sold through long-term contracts with the balance sold in the spot market. Reported reserves at yearend 2011 were 50.7 Mt of ore containing 16% zinc. Zinc in concentrate production in 2012 was projected to total between 525,000 and 545,000 t (Teck Resources Ltd., 2012a, p. 34; 2012b, p. 16, 32, 41).

In February 2010, two nonprofit groups appealed the U.S. Environmental Protection Agency's (EPA) renewal of Red Dog's water discharge permit, which had been issued in January 2010 with revised effluent conditions. Subsequently, the EPA postponed the permit renewal to consider and discuss the appeal with the State of Alaska. The prior water discharge permit was issued in 1998 and contained limitations for total dissolved solids that Red Dog would not be able to meet after the development of the Aqqaluk deposit. Teck continued mining at Red Dog in 2011 under the effluent limitations of the 2010 permit until the EPA finalized the renewal (Teck Resources Ltd., 2012b, p. 32).

Hecla Mining Co.'s (Couer d'Alene, ID) underground Greens Creek Mine recovers metals from a polymetallic (gold-lead-silver-zinc) massive sulfide deposit located on Admiralty Island in the Tongass National Forest near Juneau. The mine produced gold and silver dore, as well as bulk lead-zinc, lead, and zinc concentrates, which were sold globally to smelters. In 2011, zinc in concentrate production decreased by 11% from that of 2010 to 59,900 t owing to lower mill throughput and lower zinc ore

grade. Reserves at yearend were 7.25 Mt of ore containing 9.2% zinc (Hecla Mining Co., 2012, p. 21, 35).

Historically, production costs at Greens Creek have been affected significantly by changes in fuel prices. In 2011, fuel costs accounted for approximately 13% of production costs, as compared with 6% in 2010. Greens Creek power is supplied by a local hydroelectric utility company and by onsite diesel generators. Reduced availability of hydroelectric power during 2011 caused an increased reliance on the more expensive generators (Hecla Mining Co., 2012, p. 23).

Idaho.—Hecla Mining operated the Lucky Friday Mine, an underground silver-lead-zinc mine in the Coeur d'Alene Mining District in northern Idaho, which produced silver-lead concentrate and zinc concentrate. All concentrates in 2011 were sent to Teck's facility at Trail for processing. Zinc in concentrate production at Lucky Friday decreased in 2011 by 1,800 t from that of 2010 to 6,630 t owing to lower mill throughput and zinc ore grade, as well as a halt in operations near yearend. In December, a rock burst injured seven employees at Lucky Friday, after which the Mine Safety and Health Administration ordered Hecla to remove loose backfill material in the primary shaft. Access to the mine was limited as Hecla removed the material and, as a result, production at Lucky Friday was suspended until early 2013. At yearend, reserves measured 3.35 Mt of ore containing 3.1% zinc (Hecla Mining Co., 2012, p. 24–25, 37).

During 2011, Hecla Mining continued early-stage development of an internal shaft (#4 Shaft), which would provide access to ore-grade mineralization deeper than the current mining level and extend Lucky Friday's mine life. Construction of the #4 shaft would take 3 years to complete (Hecla Mining Co., 2012, p. 25).

Missouri.—Doe Run Resources Corp. (St. Louis, MO) operated a series of production shafts that ran along the Viburnum Trend within the Mississippi Valley-type (MVT) lead-zinc-copper ore body in southeast Missouri. Doe Run processed the ore at four mills to produce primarily lead concentrates and, to a lesser extent, zinc and copper concentrates.

Tennessee.—Nyrstar NV (Balen, Belgium) owned and operated the East Tennessee and Middle Tennessee zinc mine complexes that recover ore from MVT zinc deposits. The East Tennessee mine complex (the Coy, Immel, and Young Mines) produced 49,000 t of zinc in concentrate in 2011, slightly less than the amount produced in 2010. Production during 2011 was less than originally projected by Nyrstar owing to unplanned maintenance of plant infrastructure and underground equipment, as well as a lower mill-head grade (Nyrstar NV, 2012a, p. 12–13).

The Middle Tennessee mine complex (the Cumberland, Elmwood, and Gordonsville Mines) continued to ramp up to full production capacity and produced 32,000 t of zinc in concentrate in 2011, an increase of 146% compared with that of 2010. During the year, Nyrstar repaired underground infrastructure at the Gordonsville Mine, which had been affected by prolonged water exposure. The Elmwood Mine was completely dewatered by the third quarter, and by yearend, all three mines were in commercial production. Concentrate from the Tennessee mines was sent to Nyrstar's Clarksville, TN, zinc refinery. Reserves totaled 2.36 Mt containing 3.65% zinc for the East Tennessee mines and 3 Mt containing 4.78% zinc for the Middle Tennessee mines (Nyrstar NV, 2012a, p. 12–14; 2012b).

Smelter.—Domestic zinc metal production data were estimated based on publicly available information to protect company proprietary data. In 2011, refined zinc was mainly produced in two States—Pennsylvania (Horsehead Holding Corp.'s Monaca facility) and Tennessee (Nyrstar's Clarksville facility). Refined zinc was also produced to a lesser extent by U.S. Zinc's (owned by Votarantim Metais, São Paulo, Brazil) recycling operations in Coldwater, MI, and Houston, TX. Estimated refined zinc production in 2011 was 248,000 t.

Primary.—Nyrstar's Clarksville electrolytic zinc refinery [125,000 metric tons per year (t/yr) capacity] was the only primary zinc smelter in the United States. Clarksville's feed mix was approximately 70% zinc concentrate from its Tennessee mines, 15% imported zinc concentrates, and 15% secondary zinc oxides. About one-half of zinc production was Special High Grade (SHG), and the other one-half was Continuous Galvanizing Grade (CGG). Byproducts included cadmium metal, copper cementate, copper sulfate, synthetic gypsum, and sulfuric acid. Refined zinc production in 2011 decreased by 8% from that of 2010 to 110,000 t partly owing to planned maintenance that took place during the third quarter. The roaster was shut down for 45 days while the company replaced the dome refractory, a once in 30-year event (Jetson, 2011; Nyrstar NV 2012a, p. 15–16).

Secondary.—Horsehead produced zinc metal—primarily Prime Western Grade (PW) and to a lesser extent, Special Special High Grade (SSHG)—and zinc oxide at its electrothermic zinc smelter (136,000 t/yr capacity) in Monaca. The zinc metal was sold in both jumbo ingot and slab form. The PW zinc was sold to hot-dip galvanizers and brass manufacturers, and the SSHG zinc was used as feed for the production of high-purity zinc alloys and powder. Zinc production at Monaca in 2011 increased by an estimated 10% from production in 2010. The plant operated at full capacity for the year, unlike in 2010, when the smelter was shut down for part of the year owing to an explosion that took place at the zinc oxide plant (Horsehead Holding Corp., 2012, p. 6, 7, 10).

Feedstock for the metal production was composed entirely of secondary materials; 74% of the feedstock was from Horsehead's electric arc furnace (EAF) dust recycling operations, and the balance was generally composed of purchased galvanizing residues, such as dross and skimmings. EAF dust is a waste product recovered from the air flow exiting electric arc furnaces during the steel recycling process and typically contains 10% to 20% zinc. Horsehead's five EAF dust recycling operations were in Barnwell, SC, Beaumont, TX, Calumet, IL, Palmerton, PA, and Rockwood, TN, and a hydrometallurgical metals recovery facility in Bartlesville, OK. In 2011, Horsehead recycled 503,000 t of EAF dust (Horsehead Holding Corp., 2012, p. 9).

In early 2011, Horsehead announced plans to build a solvent extraction/electrowinning (SX/EW) zinc production facility in Rutherford County, NC. The technology would generate SHG and CGG zinc in addition to PW zinc, and allow Horsehead to sell to new customers, including continuous galvanizers and

diecasters. The metal would also be certified as deliverable against London Metal Exchange, Ltd. (LME) contracts. According to Horsehead, the new plant would reduce the company's manufacturing costs owing to several benefits associated with the SX/EW technology as compared to the electrothermic technology employed at the Monaca facility, including higher labor productivity, higher zinc recovery, lower energy usage, and lower maintenance costs. Plant construction was estimated to cost between $350 and $375 million and was anticipated to be completed in the third quarter of 2013 (Horsehead Holding Corp., 2012, p. 2, 3, 35, 48).

Consumption

Changes in zinc consumption generally follow trends in industrial production or, more generally, global economic growth. Domestic apparent consumption of zinc in 2011 was 939,000 t, a 4% increase from apparent consumption in 2010. Reported U.S. zinc consumption in 2011 was 604,000 t, representing 64% of domestic apparent consumption. Reported slab zinc consumption data were collected by the USGS from a voluntary survey on zinc consumption by grade and end use.

According to reported data, galvanizing accounted for 82% of domestic zinc consumption in 2011 (table 6). Galvanized steel is used extensively in the automotive and construction industries. The American Iron and Steel Institute (2012, p. 25) reported that domestic shipments of galvanized steel in 2011 were 15.1 Mt, a 13% increase from those of 2010. Approximately 90% of the shipments was hot-dip galvanized, and the remaining 10% was electrogalvanized. Most of the zinc consumed domestically for galvanizing took place at continuous galvanizing plants, where steel sheet passes through a molten zinc bath at high speeds. Coating lines at continuous galvanizing plants are referred to as "light-gauge," "intermediate-gauge," or "heavy-gauge," depending on the thickness of the sheet. Galvanized steel produced from light-gauge lines was used in the construction industry. Most galvanized steel from medium-gauge lines was used to construct automotive body panels. The galvanized steel from heavy-gauge lines was predominantly used for automotive structural parts, culverts, and grain bins. There were an estimated 46 continuous galvanizing plants operated by 21 companies in the United States. The balance of zinc consumed for galvanizing took place at general galvanizing plants. At general galvanizing plants, fabricated steel shapes (for example, structural beams or fasteners) are immersed in a molten zinc bath individually or by batch. There were about 180 general galvanizing plants operated by 80 companies in the United States.

The next leading end use for zinc is brass and bronze. According to the Copper Development Association (2012, p. 14), the amount of zinc consumed domestically by brass mills, copper ingot makers, and copper foundries in 2011 was 230,000 t, a 3% decrease from the 236,000 t consumed in 2010.

Other end uses for zinc include—in descending order by quantity—zinc-base alloys for diecasting, chemicals, and zinc semimanufactures.

Prices

The annual average LME cash price for SHG zinc in 2011 increased slightly from that of 2010 to $2,192.89 per metric ton ($0.995 per pound). Prices decreased during the year reflecting the zinc metal surplus in the market and averaging $1.09 per pound during the first quarter, $1.02 per pound during the second quarter, $1.01 per pound during the third quarter, and $0.86 per pound during the fourth quarter. The annual average Platts North American producer price for SHG zinc in 2011, which was based on the LME cash price plus a premium, was $1.06 per pound. Monthly average North American SHG premiums began the year at about 5 cents per pound and rose to about 7.5 cents per pound by yearend. Increasing premiums are generally indicative of a tightening zinc supply in the North American market.

Stocks

Commodity exchange inventories [LME and the Shanghai Futures Exchange (SHFE)] totaled 1.18 Mt of zinc at yearend, a 17% increase from those of 2010. Stocks of SHG zinc in global LME warehouses totaled 820,000 t at the close of 2011, a 17% increase from the closing stock level in 2010. Some analysts thought that much of the LME zinc stocks were held under arrangements that allowed financial institutions and traders to profit from the ongoing gap between contango and the cost of carry (the actual cost of insuring, financing, and storing zinc). At yearend 2011, New Orleans warehouses held 62% (511,000 t) of global LME zinc stocks. LME warehouses in New Orleans, LA, were primarily owned by Pacorini Metals AG (a subsidiary of Glencore International AG) and Metro International Trade Services (a subsidiary of Goldman Sachs Group, Inc.). About 10% (85,000 t) of LME zinc stocks was held in Detroit warehouses. At yearend 2011, the SHFE held 364,000 t of zinc, an 18% increase from that of 2010 (International Lead and Zinc Study Group, 2012d, p. 55).

Aside from the United States, China is the only other country to hold a stockpile of zinc. China's State Reserve Bureau (SRB) manages the stockpile, which at yearend 2011, contained 109,000 t of zinc, unchanged from the stock level at yearend 2010 (International Lead and Zinc Study Group, 2012d, p. 55).

Mergers and Acquisitions

In February, Vedanta Resources Plc (London, United Kingdom) completed the acquisition of Anglo American plc's zinc assets for $1.3 billion as part of Vedanta's strategy to become the world's leading integrated lead and zinc producer. These assets included the Lisheen lead-zinc mine in Ireland, Skorpion zinc mine in Namibia, and a majority stake in Black Mountain Mining, which included the Black Mountain Mine and the Gamsberg zinc project in South Africa. Vedanta produced 215,000 t of zinc in concentrate at the Black Mountain and Lisheen Mines and 145,000 t of refined zinc from the Skorpion Mine in its 2011–12 fiscal year ending March 31, 2012 (Vedanta Resources plc, 2011a, b; 2012, p. 41).

Nyrstar acquired Canadian-based zinc mining company Breakwater Resources in August, increasing Nyrstar's zinc in concentrate production capacity by 140,000 t/yr as well as its mining production capacity of copper, lead, gold, and silver. Breakwater's assets included four polymetallic mines—the El Mochito Mine (Honduras), the El Toqui Mine (Chile), the Langlois Mine (Quebec, Canada), and the Myra Falls Mine (British Columbia, Canada). The acquisition of the four mines would increase Nyrstar's upstream integration to 43% from 31% by yearend 2012 (Nyrstar NV, 2011a, b; 2012a, p. 14).

World Review

Global zinc mine production increased by 6% in 2011 from that of 2010 to approximately 12.8 Mt (table 10). Most of this increase was attributed to a 16% year-on-year increase in Chinese mine production. Zinc mine production in Mexico also rose significantly owing to increased output at Goldcorp Inc.'s polymetallic Penasquito Mine in 2011 from that of 2010 as the mine continued to ramp up to full design capacity (approximately 204,000 t/yr of zinc in concentrate). Peru had the most significant contraction in zinc production in 2011 from that of 2010 mostly owing to decreased zinc in concentrate production from the Antamina copper-zinc mine (a joint venture between BHP Billiton Ltd., Mitsubishi Corp., Teck, and Xstrata plc) owing to lower zinc grades and reduced processing of copper-zinc ores. China (34% share of global production), Australia (12%), and Peru (10%) were the three leading producers of zinc in concentrate in 2011 (Goldcorp Inc., 2012; Teck Resources Ltd, 2012a, p. 27).

Global zinc mine capacity increased 380,000 t by yearend. Most of this increase took place in India, where Hindustan Zinc Ltd. (Udaipur, India) expanded zinc production capacity at its Rampura Agucha and Sindesar Khurd zinc-lead mines by 175,000 t/yr. Other significant additions to capacity included the commissioning Xstrata's Handlebar Hill project (40,000 t/yr of zinc in concentrate production capacity) at Mt. Isa in Australia and Yukon Zinc's Wolverine project (53,000 t/yr of zinc in concentrate production capacity) in Canada (International Lead and Zinc Study Group, 2012c, p. 6).

Global zinc metal production increased slightly in 2011 from that of 2010 to 13.1 Mt (table 11) owing to production increases in China, India, and the Republic of Korea. Zinc metal production in China rose slightly in 2011 from that of 2010. Chinese zinc smelters were reported to have cut their production rates during the fourth quarter owing to low treatment charges and zinc prices. In India, increased production at Hindustan Zinc's Rajpura Dariba 210,000-t/yr zinc smelter, which was commissioned in 2010 and reached full capacity in the second quarter of 2011, accounted for most of India's rise in production. In the Republic of Korea, manufacturing improvements undertaken at Young Poong Corp.'s Sukpo refinery expanded zinc production capacity to 350,000 t/yr from 280,000 t/yr and contributed to the overall year-on-year increase in production in the country. China (40% share of global production), the Republic of Korea (6%), India (6%), and Canada (5%) were the leading producers of refined zinc metal in 2011 (Antaike Lead, Zinc, and Tin Monthly, 2011; Hindustan Zinc Ltd., 2011; Young Poong Corp., 2012).

Zinc smelter production capacity increased by 370,000 t/yr in 2011, of which, 350,000 t/yr was in China. Xstrata increased production capacity by 20,000 t/yr at the Nordenham smelter in Germany (International Lead and Zinc Study Group, 2012c, p. 6).

According to the International Lead and Zinc Study Group (ILZSG) (2012b), global zinc consumption rose slightly in 2011 from that of 2010 to 12.8 Mt owing primarily to increased consumption in China (2%), Europe (1.2%), and the United States (3.6%). Leading zinc-consuming-countries included China, 43%; the United States, 7%; India, 4%; and the Republic of Korea, 4%. ILZSG's data indicated a surplus production of 347,000 t in the zinc metal market in 2011 compared with 247,000 t in 2010 (International Lead and Zinc Study Group, 2012d, p. 46–47).

Outlook

ILZSG forecast global zinc consumption in 2012 to increase by 4% from that in 2011 to 13.4 Mt. China's apparent consumption was expected to rise by 7% as the economy grows at a somewhat slower rate. Japanese consumption was forecast to increase by 7% owing to reconstruction following the tsunami. Notable increases in consumption were also expected in Brazil, India, the Republic of Korea, Turkey, and the United States. European consumption was forecast to remain flat in 2012 (International Lead and Zinc Study Group, 2012a, b).

On the supply side, mine production was expected to increase by 4% to 13.5 Mt in 2012. In Latin America, increased zinc production in Peru at the Cerro Linda, Colquijirca, Pachapaqui, and Santander Mines were expected to offset a further decrease in production at Antamina. Production was also anticipated to increase in Bolivia and Mexico; Mexico's production increasing owing to the continual ramp up at the Penasquito Mine. African production was projected to rise owing to the opening of the Perkoa Mine in Burkina Faso. Mine output was also expected to increase in Australia, China, Finland, India, Kazakhstan, Portugal, Russia, and Uzbekistan. Global refined metal production was expected to increase by 4% to 13.7 Mt owing mostly to production increases in Asia. A substantial amount of smelter capacity has been added in China recently, and production in 2012 was forecast to increase owing to expansions undertaken at Baiyin Nonferrous in Gansu Province, Jinding Zinc in Yunnan Province, and Yugang Gold and Lead Group in Henan Province. In Japan, production should recover after the earthquake and tsunami. Ongoing capacity expansions at Korea Zinc's Onsan refinery should lead to a production increase in the Republic of Korea. Increased production was also anticipated in India owing to increased output at Hindustan Zinc's operations. Overall, zinc metal production in 2012 was forecasted to surpass consumption by about 250,000 t (International Lead and Zinc Study Group, 2012a, b).

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TABLE 1
SALIENT ZINC STATISTICS[1]

		2007	2008	2009	2010	2011
United States:						
Production:						
Domestic ores, contained zinc	metric tons	803,000	778,000	736,000	748,000	769,000
Domestic ores, recoverable zinc	do.	769,000	748,000	710,000	723,000	743,000
Value, recoverable zinc	thousands	$2,620,000	$1,470,000	$1,220,000	$1,620,000	$1,740,000
Refined zinc:						
At primary smelters	metric tons	121,000	125,000	94,000	120,000	110,000
At secondary smelters[e]	do.	157,000	161,000	109,000	129,000	138,000
Total	do.	278,000	286,000	203,000	249,000	248,000
Exports:						
Ores and concentrates, zinc content	do.	816,000	725,000	785,000	752,000	660,000
Refined zinc	do.	8,070	3,250	2,960	4,200	19,000
Imports for consumption:						
Ores and concentrates, zinc content	do.	271,000	63,200	74,200	32,200	26,700
Refined zinc	do.	758,000	725,000	686,000	671,000	716,000
Reported stocks of refined zinc, December 31:						
Producer and consumer	do.	55,000	58,100 [r]	84,800 [r]	108,000 [r]	114,000
Government stockpile	do.	7,730	7,490	7,490	7,490	7,250 [2]
Consumption, refined zinc:						
Reported	do.	438,000 [r]	387,000 [r]	459,000 [r]	558,000 [r]	604,000
Apparent[3]	do.	1,040,000	1,010,000	893,000	907,000	939,000
Price[4]						
North American	cents per pound	154.40	88.93	77.91	101.98	106.24
London Metal Exchange, cash	do.	147.03	85.01	75.06	97.99	99.47
World production:						
Mine	thousand metric tons	11,100 [r]	11,800 [r]	11,500 [r]	12,200 [r]	12,800
Smelter	do.	11,400	11,700	11,400 [r]	12,800 [r]	13,100

[e]Estimated. [r]Revised. do. Ditto.
[1]Data are rounded to no more than three significant digits, except prices; may not add to totals shown.
[2]Government stocks decreased from prior year owing to an inventory adjustment.
[3]Domestic production plus net imports, plus adjustments for Government and industry stock changes. Apparent consumption from 2007 through 2010 do not reflect reported stock changes. Stock increases from 2007 through 2010 result from an increased response from industry rather than an actual increase in stock levels.
[4]Special High Grade. Source: Platts Metals Week.

TABLE 2
MINE PRODUCTION OF RECOVERABLE ZINC
IN THE UNITED STATES, BY STATE[1]

(Metric tons)

State	2010	2011
Alaska[2]	628,000	631,000
Other[3]	94,400	111,000
Total	723,000	743,000

[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Data based, in part, on publicly available information.
[3]Includes production from Idaho, Missouri, Tennessee.

TABLE 3
LEADING ZINC-PRODUCING MINES IN THE UNITED STATES IN 2011, IN ORDER OF OUTPUT[1]

Rank	Mine	County and State	Operator	Source of zinc
1	Red Dog	Northwest Arctic, AK	Teck Alaska Inc.	Zinc-lead ore.
2	Greens Creek	Juneau, AK	Hecla Mining Co.	Zinc-silver ore.
3	East Tennessee Zinc Complex[2]	Jefferson and Knox, TN	Nyrstar NV	Zinc ore.
4	Middle Tennessee Zinc Complex[3]	Smith, TN	do.	Do.
5	Brushy Creek	Reynolds, MO	Doe Run Resources Corp.	Lead ore.
6	Lucky Friday	Shoshone, ID	Hecla Mining Co.	Silver ore.
7	Buick	Iron, MO	Doe Run Resources Corp.	Lead ore.
8	Fletcher	Reynolds, MO	do.	Do.
9	Viburnum (#29 and #35)	Washington and Iron, MO	do.	Do.
10	Sweetwater	Reynolds, MO	do.	Do.

Do., do. Ditto.
[1]The mines on this list accounted for more than 99% of recoverable U.S. zinc mine production in 2011.
[2]Includes the Coy, Immel, and Young Mines.
[3]Includes the Cumberland, Elmwood, and Gordonsville Mines.

TABLE 4
REPORTED PRODUCTION OF ZINC PRODUCTS
FROM ZINC-BASE SCRAP IN THE UNITED STATES[1]

(Metric tons)

Products	2010	2011
Redistilled slab zinc	130,000	141,000
Other zinc metal products[2]	2,190	2,930
Zinc in chemical products	W	W
Zinc dust	22,400	22,700

W Withheld to avoid disclosing company proprietary data.
[1]Data are rounded to no more than three significant digits.
[2]Includes electrogalvanizing anodes, remelt die-cast slab, and other metal alloys.

TABLE 5
ZINC RECOVERED FROM SCRAP PROCESSED IN THE UNITED STATES, BY TYPE OF SCRAP[1]

(Metric tons)

	2010	2011
Type of scrap:		
New scrap:		
Zinc-base	90,700	93,400
Copper-base	118,000 r	120,000
Magnesium-base	123	91
Total	208,000	213,000
Old scrap:		
Zinc-base	114,000	114,000
Copper-base	8,330 r	8,470
Aluminum-base	650 r	863
Magnesium-base	14	14
Total	123,000	123,000
Grand total	332,000 r	336,000

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

TABLE 6
U.S. REPORTED CONSUMPTION OF ZINC IN 2011, BY INDUSTRY USE AND GRADE[1]

(Metric tons)

Industry use	Special High Grade	High Grade	Continuous Galvanizing Grade	Controlled Lead Grade	Prime Western	Remelt and other grades	Total
Galvanizing	75,900	105,000	237,000	115	77,700	96	496,000
Zinc-base alloys	40,200	169	--	--	--	--	40,400
Brass and bronze	33,700	6,500	--	--	218	--	40,400
Other	27,500	--	--	--	107	22	27,600
Total	177,000	111,000	237,000	115	78,000	118	604,000

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

TABLE 7
U.S. EXPORTS OF ZINC ORES AND CONCENTRATES, BY COUNTRY[1]

	2010		2011	
	Quantity (metric tons, zinc content)	Value (thousands)	Quantity (metric tons, zinc content)	Value (thousands)
Australia	48,800	$61,800	51,700	$80,900
Belgium	33,500	39,000	28,900	40,900
Canada	146,000	192,000	150,000	246,000
China	60,300	79,800	27,200	39,900
Costa Rica	2	15	7	21
El Salvador	5	18	23	89
Finland	32,500	39,500	35,500	56,700
France	3	14	--	--
Germany	33,300	37,400	--	--
India	--	--	36	86
Israel	190	108	17	198
Italy	12,200	13,500	--	--
Japan	139,000	154,000	95,000	138,000
Korea, Republic of	130,000	142,000	157,000	223,000
Mexico	(2)	4	1	4
Panama	4	22	5	21
Singapore	62	168	24	102
Spain	116,000	143,000	114,000	171,000
United Kingdom	51	29	7	7
Total	752,000	903,000	660,000	997,000

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Less than ½ unit.

Source: U.S. Census Bureau.

TABLE 8
U.S. EXPORTS OF ZINC COMPOUNDS[1]

	2010		2011	
	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)
Chromates of zinc or of lead	35	$362	4	$396
Lithopone	725	3,350	316	1,510
Zinc chloride	1,920 [r]	2,950	1,800	2,860
Zinc oxide	16,700	36,700	31,600	51,300
Zinc sulfate	1,870	2,360	285	588
Zinc sulfide	5,600	7,950	5,310	6,890

[r]Revised.
[1]Data are rounded to no more than three significant digits.

Source: U.S. Census Bureau.

TABLE 9
U.S. IMPORTS FOR CONSUMPTION OF ZINC COMPOUNDS[1]

	2010		2011	
	Quantity (metric tons, gross weight)	Value (thousands)	Quantity (metric tons, gross weight)	Value (thousands)
Chromates of zinc or of lead	168	$701	144	$628
Lithopone	1,300	1,560	1,190	1,670
Zinc chloride	405	1,290	255	1,290
Zinc oxide	94,300	185,000	90,000	181,000
Zinc sulfate	37,500	32,300	53,900	51,700
Zinc sulfide	2,570	4,770	2,510	4,320

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

Source: U.S. Census Bureau.

TABLE 10
ZINC: WORLD MINE PRODUCTION, BY COUNTRY[1, 2]

(Metric tons, zinc content of concentrate and direct shipping ore, unless otherwise specified)

Country	2007	2008	2009	2010	2011
Argentina	27,025	30,349	31,869	32,566 r	39,100
Armenia	2,585	4,200	4,158 r	8,659 r	8,884
Australia	1,514,000	1,519,000	1,290,000	1,479,000	1,515,000
Bolivia	214,053	383,619	430,879	411,409	427,129
Bosnia and Herzegovina e	2,600	4,700	3,400	5,500 r	5,500
Brazil	193,887	173,933	172,688 r	211,203 r	211,300 p
Bulgaria	12,200	10,600	7,600 r	7,600 r, e	7,600 e
Burma	10,000	7,000	6,000	7,000	7,000 e
Canada	630,485	750,502	698,901	648,905	611,577 p
Chile	36,453	40,519	27,801	27,662	36,602
China	3,040,000	3,340,000	3,330,000	3,700,000	4,310,000
Congo (Kinshasa)	18,500	13,523	12,843	9,223	11,000 e
Finland	38,900	27,800	30,233	55,562	64,115
Georgia e	400	400	300	300	300
Greece	19,549	22,694	18,126	19,976	20,000 e
Guatemala	20,000	14,000	--	--	--
Honduras	29,211	28,462	36,370	33,839	26,000
India	538,900	613,600	695,000	700,000	710,000
Iran e	100,000	69,267 3	72,048 r, 3	80,000 r	120,000
Ireland	400,898	398,158	385,670	342,434	340,000 e
Kazakhstan	445,000 r	446,000 r	442,000 r	459,000 r	495,000
Korea, North e	70,000	50,000	30,000	40,000	50,000
Korea, Republic of	2,034	1,836	2,221	355	700 e
Kosovo 4	2,460	4,900	5,600 r	6,500 r	6,200
Laos	3,000	2,200	3,400	3,400 r, e	3,400 e
Macedonia	24,000	29,000	35,000	35,000 e	36,000
Mexico	426,509	397,306	384,478	518,429	631,859
Mongolia	77,350	71,800	78,800	56,300	52,300
Morocco	57,700	96,900	48,600	61,900	60,000
Namibia	196,435 r	183,719 r	199,256 r	205,324 r	194,950
Pakistan	--	--	1	10	15
Peru	1,444,381	1,602,597	1,512,931 r	1,470,450	1,255,899
Philippines	7,394	1,619	10,035	9,268	18,609
Poland	129,600	132,400	115,500	73,000 r, e	68,000 e
Portugal	24,380	39,254	501	6,421 r	4,227
Romania	1,000	--	--	--	--
Russia e	185,000	204,000	225,000	269,000	280,000 e
Saudi Arabia	716	3,663	4,952 r	4,897 r	4,700 e
Serbia e	1,000 3	1,000	1,000	1,000	3,000
South Africa	30,859	29,002	28,159	35,824	36,000 e
Spain	--	--	1,200	17,318	33,200
Sweden	214,576	188,048	192,538	198,686	194,429
Tajikistan	--	--	--	--	8,000 e
Thailand	32,921	17,811	34,000	25,529	29,664
Turkey	71,000	73,000	78,000	88,000 e	90,000
United States 5	803,000	778,000	736,000	748,000	769,000
Uzbekistan	--	--	--	--	15,000 e
Vietnam e	45,600	42,000 r	38,000 r	36,000	36,000
Total	11,100,000 r	11,800,000 r	11,500,000 r	12,200,000 r	12,800,000

eEstimated. pPreliminary. rRevised. -- Zero.

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

[2]Table includes data available through July 7, 2012.

[3]Reported figure.

[4]On February 17, 2008, the Kosovo Assembly declared independence from Serbia.

[5]Reported zinc content in both lead and zinc concentates.

TABLE 11
ZINC: WORLD SMELTER PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

Country[3]	2007	2008	2009	2010	2011
Algeria, primary[e]	30,000	30,000	30,000	30,000	30,000
Argentina:					
Primary	42,876	39,479	32,989	39,540 [r]	44,000 [e]
Secondary	3,430	3,158	2,639	3,163 [r]	3,000 [e]
Total	46,306	42,637	35,628	42,703 [r]	47,000 [e]
Australia:					
Primary[4]	502,000	499,000	525,000	499,000	507,000
Secondary[e]	6,000	6,000	6,000	6,000	6,000
Total	508,000	505,000	531,000	505,000	513,000
Belgium, primary	241,300 [r]	239,000 [r]	14,000 [r]	260,000	282,000
Brazil, primary	265,126	248,874	242,136 [r]	288,107 [r]	288,000 [p, e]
Bulgaria, primary and secondary	99,992	99,699	92,676	88,000	90,000 [e]
Canada, primary	802,103	764,312	685,504	691,222	662,151
China, primary and secondary[e]	3,740,000	4,000,000	4,280,000	5,160,000	5,220,000
Finland, primary	305,543	297,722	295,049	307,144	307,352
France, primary	129,110	117,861	161,000	163,000	164,000
Germany, primary and secondary[e]	294,735 [5]	292,284 [5]	153,000	165,000	170,000
India, primary and secondary	453,800	567,800	614,000 [r]	700,000 [r]	795,000
Iran[e]	90,000	60,000	65,000	65,000	60,000
Italy, primary and secondary[e]	109,000	100,000	100,000	105,000 [r]	100,000
Japan:					
Primary	495,632	502,910	435,905 [r]	470,057 [r]	444,446
Secondary	143,063	147,957	136,844 [r]	140,597 [r]	134,401
Total	638,695	650,867	572,749 [r]	610,654 [r]	578,847
Kazakhstan, primary and secondary	358,226	365,572	327,873	318,858 [r]	320,000 [e]
Korea, North, primary and secondary[e]	75,000	75,000	75,000	75,000	75,000
Korea, Republic of, primary	670,000 [r]	738,000	751,179	717,100	828,735
Kosovo, primary[6]	--	--	5,487	5,500 [e]	5,500 [e]
Mexico, primary	321,932	305,409	385,400 [r]	328,100 [r]	322,100
Namibia[7]	150,080	145,400	153,815	151,688	146,000
Netherlands, primary	224,838	239,462	224,000	254,000 [r]	261,000
Norway, primary	157,027	145,469	138,973	148,862	153,200
Peru, primary	162,375	190,324	149,494	261,978	313,714
Poland, primary and secondary	142,000	142,600	139,100	135,000 [r]	156,000
Romania, primary and secondary	58,000	62,000	4,000 [e]	--	--
Russia, primary and secondary[e]	260,000	260,000	205,000 [r]	240,000 [r]	245,000
South Africa, primary	101,000	87,000	87,000	90,000	73,000
Spain, primary and secondary	494,090	456,050	500,776	505,000 [r]	489,000
Thailand, primary	99,337	107,753	104,695	100,000 [e]	103,366
United States:					
Primary	121,000	125,000	94,000	120,000	110,000
Secondary[e]	157,000	161,000	109,000	129,000	138,000
Total	278,000	286,000	203,000	249,000	248,000
Uzbekistan, primary[e]	71,800 [5]	70,445 [5]	40,000	40,000	45,000
Grand total	11,400,000	11,700,000	11,400,000 [r]	12,800,000 [r]	13,100,000
Of which:					
Primary	4,740,000	4,750,000 [r]	4,400,000 [r]	4,810,000 [r]	4,940,000
Secondary	309,000	318,000	255,000 [r]	279,000 [r]	281,000
Undifferentiated	6,320,000	6,630,000	6,710,000 [r]	7,710,000 [r]	7,870,000

[e]Estimated. [p]Preliminary. [r]Revised. -- Zero.

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

[2]Wherever possible, detailed information on raw material source of output (primary—directly from ores, and secondary—from scrap) has been provided. In cases where raw material source is unreported and insufficient data are available to estimate the distribution of the total, that total has been left undifferentiated (primary and secondary). To the extent possible, this table reflects metal production at the first measurable stage of metal output.Table includes data available through July 7, 2012.

TABLE 11—Continued
ZINC: WORLD SMELTER PRODUCTION, BY COUNTRY[1, 2]

(Metric tons)

[3]In addition to the countries listed, Israel also produces small amounts of secondary zinc, but available information is inadequate to make reliable estimates of output levels.
[4]Excludes zinc dust.
[5]Reported figure.
[6]On February 17, 2008, the Kosovo Assembly declared independence from Serbia.
[7]Special high-grade electrowon cathodes from Anglo American plc's Skorpian solvent extraction-electrowinning plant.