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2014 Minerals Yearbook

CHROMIUM [ADVANCE RELEASE]

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Chromium

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U.S. chromium apparent consumption (including recycling) was 558,000 metric tons (t) on a contained-chromium basis in 2014, a 39% increase from that in 2013 (table 1). The increase in apparent industry demand was primarily a result of increased ferrochromium imports in 2014 compared with those in 2013. Chromium apparent consumption in 2014 was 74% of the recorded high in 2000.

Domestic reported consumption of chromium materials increased by 3% in 2014 compared with that of 2013. Steelmaking was the leading end use for chromium materials, accounting for 97% of consumption in 2014 (table 2).

Chromium exports increased by 7% to 250,000 t in 2014 compared with those of 2013, based on estimated chromium content of the chromite ore and chromium chemicals, ferroalloys, and metal (table 1). Chromium imports increased by 34% on a content basis to 637,000 t compared with those of 2013, based on U.S. Census Bureau trade data for chromite ore and chromium chemicals, ferroalloys, and metal.

The annual average import value of chromite ore in 2014, measured in dollars per metric ton of contained chromium, decreased by 29% from that in 2013; the annual average import value of ferrochromium, measured in dollars per kilogram of contained chromium, increased slightly from that in 2013; and the annual average import value of chromium metal (other, powder, and waste and scrap), measured in dollars per kilogram of metal, decreased slightly from that in 2013. Prices and unit values of specific grades of chromite ore and ferrochromium and various material forms of chromium metal are reported in tables 1 and (or) 3.

The Defense Logistics Agency Strategic Materials (DLA Strategic Materials), U.S. Department of Defense, stockpile of chromium ferroalloy in the National Defense Stockpile (NDS) decreased by 16% and chromium metal decreased by 3% compared with stocks at the beginning of the year (table 2). As a result, the amount of chromium materials in the NDS as a percent of apparent consumption at yearend declined to 15% in 2014 from 24% in 2013.

World production of chromite ore in 2014 decreased by 5% to 27.3 million metric tons (Mt) compared with the amount in 2013. South Africa was the leading producer of chromite ore (table 8). World production of ferrochromium increased by 10% to 11.7 Mt compared with the amount in 2013. China was the leading producer of ferrochromium (table 9).

Chromium is essential to stainless steel production by virtue of its oxide-forming properties and to some grades of alloy steel and superalloys because of its alloying properties. Among a variety of uses, chromium is a key component of certain widely used aluminum alloys.

Legislation and Government Programs

Stockpile.—The DLA Strategic Materials disposed of chromium materials under its fiscal year 2014 (October 1, 2013, through September 30, 2014) Annual Materials Plan (AMP) and announced that the fiscal year 2015 AMP set maximum disposal goals for chromium materials at 21,312 t of chromium ferroalloys and 136 t of chromium metal (Defense Logistics Agency Strategic Materials, 2014).

Other Programs.—Chromium is an essential trace element for human health. Some chromium compounds, however, are acutely toxic, chronically toxic, and (or) carcinogenic. The U.S. Environmental Protection Agency (EPA) regulates chromium releases into the environment and the Occupational Safety and Health Administration (OSHA) regulates workplace exposure to chromium.

Production

Domestic data for chromium materials were developed by the U.S. Geological Survey (USGS) by means of the monthly "Chromite Ores and Chromium Products" and "Consolidated Consumers" consumer surveys. Stainless and heat-resisting steel producers are the leading chromium consumers, and high-carbon ferrochromium is the leading chromium-containing material consumed.

The major marketplace chromium-containing materials are chromite ore and foundry sand; chromium chemicals, ferroalloys, and metal; and stainless steel. In 2014, the United States produced chromium chemicals and stainless steel. The United States is a major world producer of chromium chemicals and stainless steel.

Chromium Chemicals.—Elementis Chromium, a subsidiary of Elementis plc (United Kingdom), produced sodium dichromate from chromite ore at Castle Hayne, NC (Elementis plc, undated).

Consumption

The stainless steel industry is the leading consumer of chromium materials. The U.S. stainless steel industry produces more than 2 million metric tons per year (Mt/yr) of stainless steel and imported and exported stainless steel mill products and scrap in 2014, making it the leading consumer of chromium materials. AK Steel Corp. (AK), Allegheny Technologies Inc. (ATI), and North American Stainless (NAS) were the leading U.S. stainless steel producers.

AK produced stainless steel at Butler, PA, and Mansfield, OH. AK reported shipments of 787,000 t of stainless and electrical

steel in 2014 compared with 746,000 t in 2013 (AK Steel Corp. 2015, p. 17). ATI produced stainless steel at Brackenridge, Midland, and Latrobe, PA (Allegheny Technologies Inc., 2015, p. F–15). NAS [a subsidiary of Acerinox, S.A. (Spain)] produced stainless steel in Ghent, KY (Acerinox, S.A., 2015, p. 144).

Outokumpu Oyj (Finland) produced stainless steel in Calvert, AL. The Calvert plant delivered 541,000 t of stainless steel in 2014, a 16% increase compared with 465,000 t in 2013 (Outokumpu Oyj, 2015, p. 19).

Prices

Chromium materials are not openly traded. Purchase contracts are confidential between buyer and seller; however, trade journals report composite prices based on interviews with buyers and sellers. The U.S. Department of Commerce reports the declared value of U.S. imports and exports. Thus, industry publications and U.S. trade statistics are sources of chromium material prices and values, respectively (table 3).

Foreign Trade

Chromium-containing material exports from and imports to the United States included chromite ore; chromium chemicals, ferroalloys, metal, and pigments; and stainless steel (tables 4 and 6). Based on foreign trade statistics reported by the U.S. Department of Commerce for calendar year 2014, the value of foreign trade of these chromium materials, excluding stainless steel mill products and scrap, was $153 million for exports and $1,124 million for imports (table 1). A significant amount of chromium exits and enters the U.S. economy via stainless steel mill product and scrap trade. The value of foreign trade of chromium materials, including stainless steel mill products and scrap, was $3,649 million for exports and $4,259 million for imports.

World Industry Structure

World chromite ore production was estimated by the USGS to be 27.3 Mt (gross quantity of marketable ore) in 2014, down 5% from the amount in 2013. Most (83%) chromite ore was produced in four countries. The leading producer countries of chromite ore were South Africa (44%), Kazakhstan (14%), India (13%), and Turkey (12%) (table 8). World ferrochromium production was estimated by the USGS to be 11.7 Mt (gross quantity of marketable ferrochromium) in 2014, a 10% increase compared with the revised amount in 2013 (table 9). The leading producer countries of ferrochromium were China (38%), South Africa (31%), and Kazakhstan (10%) (table 9).

CRU International Ltd. (2015) estimated that world apparent consumption of high-carbon ferrochromium increased slightly to 11.121 Mt in 2014 compared with the revised amount (10.146 Mt) of 2013. World consumption was slightly less than CRU's estimate of world high-carbon ferrochromium production in 2014 (11.3 Mt).

Capacity.—Rated capacity (table 7) is defined as the maximum quantity of product that can be produced in a period of time at a normally sustainable long-term operating rate, based on the physical equipment of the plant and given acceptable routine operating procedures involving labor, energy, materials, and maintenance. Capacity includes both operating plants and plants temporarily closed that can be brought into production within a short period of time with minimum capital expenditure. Because all countries and producers do not provide information about production capacity, historical chromium trade data have been used to estimate national production capacities. Reported production capacity changes result from both facility changes and increased knowledge about facilities. Production capacities have been estimated for the chromite ore, chromium chemical, chromium metal, ferrochromium, and stainless steel industries (table 7).

World Review

Albania.—Albania produced chromite ore and ferrochromium. Albania produced 652,000 t of chromite ore in 2014 compared with 521,000 t in 2013 and 34,900 t of ferrochromium in 2014 compared with 24,700 t in 2013 (tables 8, 9).

Albanian Nickel & Chrome sh.p.k. (ANC) (2015), formerly Metals Finance Albania sh.p.k, reported that Albania has been producing 25,000 to 32,000 metric tons per year (t/yr) of ferrochromium in recent years from a national production capacity of 60,000 t/yr of ferrochromium with plants at Elbasan and Burrel; however, the Burrel plant was idle in 2014. Albania exported about 60,000 t/yr of high-grade chromite ore, mainly to Europe, in the 1990s; however, since then the demand from China for low-grade chromite ore resulted in Albanian exports increasing to 500,000 to 600,000 t/yr since 2012, making Albania the fifth-leading chromite ore exporter in 2014. ANC reported that Albanian chromite ore reserves were 12.8 Mt with an average grade of 30% chromic oxide (Cr_2O_3) and a chromium-to-iron ratio of 3-to-1.

Australia.—Australia produced no chromite ore in 2014 compared with 355,000 t in 2013 (table 8). Consolidated Minerals Ltd. was Australia's sole producer of chromite ore in the form of lump and sands for use in the production of ferrochromium. Consolidated Minerals' Coobina Mine was located 80 kilometers southeast of Newman, Western Australia, and had an operating capacity of about 250,000 t/yr of high-grade ore until it stopped production in July 2013 and tenements were transferred to Mineral Resources Ltd. (Government of Western Australia Department of Mines and Petroleum, 2015, p. 44).

Brazil.—Brazil produced 490,000 t of chromite ore in 2014 compared with 486,000 t in 2013 and 185,000 t of ferrochromium in 2014 compared with 189,000 t in 2013 (tables 8, 9).

China.—China produced 200,000 t of chromite ore in 2014 compared with about the same amount in 2013 and 4.40 Mt of ferrochromium in 2014 compared with 4.00 Mt in 2013. China was the leading ferrochromium producer (tables 8, 9).

Sinosteel Corp. reported that it is a key world ferrochromium producer, with ownership interest in four plants. Sinosteel held 60% of ASA Metals (Pty.) Ltd. (South Africa), 50% of Tubatse Chrome Minerals (Pty.) Ltd. (South Africa), 67% of Zimasco Consolidated Enterprises (Zimbabwe), and Sinosteel Jilin Ferroalloy Co., Ltd. Through these holdings,

Sinosteel production capacity was 1.2 Mt/yr of ferrochromium (Sinosteel Germany GmbH, undated a, b).

Finland.—Finland produced chromite ore and ferrochromium. Finland produced 1.03 Mt of chromite ore in 2014 compared with 0.982 Mt in 2013 and 450,000 t of ferrochromium in 2014 compared with 434,000 t in 2013 (tables 8, 9). Finland was the sole producer of chromite ore in the European Union. Tasman Metals Ltd. (2015, p. 34–35, 49–62) acquired the Akanvaara and Koitelainen chromite projects in northeastern Finland (Lappi Maakunta).

India.—India produced chromite ore and ferrochromium. India produced 3.54 Mt of chromite ore in 2014 compared with 2.95 Mt in 2013 and 916,000 t of ferrochromium in 2014 compared with 800,000 t in 2013. India was a leading chromite ore producer (tables 8, 9).

From an installed production capacity of 1.69 Mt/yr, India produced 944,000 t (preliminary) of ferrochromium in fiscal year 2013–14, the same as that in fiscal year 2012–13. India exported 563,098 t and imported 30,541 t of ferrochromium in fiscal year 2013–14 compared with 511,214 t of exports and 33,726 t of imports in fiscal year 2012–13. India estimated 286,800 t (preliminary) of ferrochromium consumption in 2013–14 of which use was 90.2% for production of iron and steel; 9.6%, alloy steel; and 0.1%, foundry. Chromium ferroalloys were produced at plants in Andhra Pradesh, Chhattisgarh, Gujarat, Odisha, and West Bengal States. India's leading ferrochromium producers were Balasore Alloys Ltd., FACOR Alloys Ltd., GMR Technologies & Ind. Ltd., IDCOL Ferro Chrome Plant, Indian Metals & Ferro Alloys Ltd., Jindal Stainless Ltd., Jindal Steel & Power Ltd., Nava Bharat Ferro Alloys Ltd., Sri Vasavi Inds. Ltd., Rawat Ferro Alloys, Rohit Ferro Tech. P. Ltd., SAL Steel, Standard Chrome Ltd., and Utkal Manufacturing Services Ltd. (Indian Bureau of Mines, 2015).

Kazakhstan.—Kazakhstan produced 3.7 Mt of chromite ore in 2014, the same as that in 2013 and 1.20 Mt of ferrochromium in 2014 compared with 1.04 Mt in 2013. Kazakhstan was a leading chromite ore producer and a leading ferrochromium producer (tables 8, 9).

Eurasian Natural Resources Corp. PLC became Eurasian Natural Resources Corp. Ltd. (ENRC) in January. The ferroalloys division of ENRC is the leading producer of chromite ore and ferrochromium, with a 2013 production of 3.916 Mt of chromite ore and 1.124 Mt of ferrochromium (Eurasian Natural Resources Corp. Ltd., 2014, p. 3, 10–11).

Oman.—Oman produced chromite ore and ferrochromium. Oman produced 751,000 t of chromite ore in 2014 compared with 788,000 t in 2013 and 47,800 t of ferrochromium in 2014 compared with 20,600 t in 2013 (tables 8, 9).

Al Tamman Indsil Ferrochrome LLC operated a ferrochromium plant with two furnaces in the Sohar Freezone using Omani and imported chromite ore. Al Tamman started its first furnace in June 2013; its second furnace did not start producing until January 2014 owing to a shortage of chromite ore. Al Tamman has an annual ferrochromium production capacity of 75,000 t. Two other ferrochromium smelters were under construction in the Sohar Freezone: Metkore Alloys & Industries of India with a capacity of 165,000 t/yr and Gulf Mining Group with a capacity of 50,000 t/yr (Prabhu, 2015).

Russia.—Russia produced chromite ore and ferrochromium. Russia produced 400,000 t of chromite ore in 2014 compared with 360,000 t in 2013 and 500,000 t of ferrochromium in 2014 compared with 488,000 t in 2013 (tables 8, 9).

Novotroitsk Plant of Chromium Compounds OJSC (NPCC) has produced chromium chemicals since 1963, aluminothermically produced chromium metal since 2000 with an annual capacity of 9,000 t, and low-carbon ferrochromium. NPCC planned to start production of degassed, electrolytically produced chromium metal in 2015, making it the second such producer after Polema JSC, in Tula (Argus Minor Metals, 2015, p. 12).

South Africa.—South Africa produced chromite ore and ferrochromium. South Africa produced 12 Mt of chromite ore in 2014 compared with 14.1 Mt in 2013 and 3.60 Mt of ferrochromium in 2014 compared with 3.40 t in 2013. South Africa was the leading chromite ore producer and a leading ferrochromium producer (tables 8, 9).

Of the 12 Mt of chromite ore imported by China in 2013, 6.7 Mt came from South Africa, about 80% of which came from the platinum sector, where chromite is a byproduct of some operations, and from small chromite miners unable to afford a smelter. In support of the Department of Mineral Resources policy to increase the value of South African mineral exports through beneficiation, the ferrochromium producers advocated that the state impose a tariff on exports of chromite ore; however, ferrochromium producers stopped advocating for that tax (Seccombe, 2014).

Outlook

Domestic and global consumption of chromium is expected to follow closely the trend in stainless steel production. U.S. stainless steel production was estimated by the American Iron and Steel Institute (2015) to be 2.633 Mt (gross quantity of stainless steel) in 2014, up 18% from that of 2013. Details of the outlook for the steel industry are discussed in the "Outlook" section of the Iron and Steel chapter of the 2014 USGS Minerals Yearbook, volume I, Metals and Minerals. According to the International Stainless Steel Forum (2015), world stainless and heat-resisting steel melt shop production (ingot/slab equivalent) increased by 5.43% to 41.685 Mt in 2014, compared with that in 2013.

Domestic reported consumption of chromium ferroalloy and metal in 2014 increased by 3% compared with that of 2013, indicating that chromium ferroalloy and metal consumption will be greater in 2015 than it was in 2014. The trend of global production from 2010 through 2014 indicates that the global chromite ore production in 2015 will be about 27 Mt and global ferrochromium production will be about 12 Mt.

Chromium metal is used primarily by the superalloy industry, followed by the aluminum and steel industries. The outlook for the aluminum industry is discussed in the "Outlook" section of the Aluminum chapter of the 2014 USGS Minerals Yearbook, volume I, Metals and Minerals.

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TABLE 1
SALIENT CHROMIUM STATISTICS[1]

		2010	2011	2012	2013	2014
U.S. supply:						
Components of U.S. supply, contained chromium:						
Domestic mines	metric tons	--	--	--	--	--
Secondary[2]	do.	144,000	147,000	146,000	150,000	157,000
Imports:						
Chromite ore	do.	43,800	70,300	90,800	54,100	58,300
Chromium chemicals	do.	5,120	4,270	5,880	5,860	6,020
Chromium ferroalloys	do.	305,000	311,000	302,000	266,000	375,000
Chromium metal	do.	13,000	13,600	15,300	13,700	17,400
Stainless steel mill products and scrap[2]	do.	133,000	132,000	140,000	135,000	180,000
Stocks, January 1:						
Government	do.	129,000	115,000	111,000	107,000	96,500
Industry[3]	do.	6,820	7,300	7,770	7,580 r	7,750
Total	do.	779,000	800,000	819,000	739,000	898,000
Distribution of U.S. supply, contained chromium:						
Exports:						
Chromite ore[4]	do.	1,390	1,930	6,930	2,670	2,090
Chromium chemicals	do.	21,600	20,600	17,700	16,800	15,700
Chromium ferroalloys and metal	do.	4,850	3,060	3,070	3,360	2,950
Stainless steel mill products and scrap	do.	246,000	206,000	206,000	212,000	230,000
Stocks, December 31:						
Government	do.	115,000	111,000	107,000	96,500	81,200
Industry[3]	do.	7,300	7,770	7,580 r	7,750 r	8,310
Total	do.	396,000	351,000	348,000	339,000	340,000
Consumption						
Apparent, contained chromium	do.	384,000	450,000	471,000	400,000	558,000
Reported:						
Chromite ore and concentrates, gross quantity	do.	W	W	W	W	W
Chromium ferroalloys:[5]						
Gross quantity	do.	423,000	429,000	435,000	435,000	449,000
Contained chromium	do.	248,000	248,000	251,000	248,000	257,000
Chromium metal, gross quantity	do.	4,540	4,490	4,470	4,270	4,190
Stocks, December 31, gross quantity:						
Government:						
Chromium ferroalloys	do.	154,000	150,000	144,000	129,000	108,000
Chromium metal	do.	4,430	4,230	4,090	4,090	3,960
Industry, consumer:						
Chromium ferroalloys[6]	do.	11,500	12,600	12,500	13,000	13,900
Chromium metal	do.	284	186	169	159	158
Other	do.	243	239	211 r	194 r	184
Prices, average annual:						
Chromite ore[7]	dollars per metric ton	208	216	168	162	182
Ferrochromium, contained chromium[8]	dollars per pound	1.17	1.15	1.08	1.00	1.07
Aluminothermic chromium metal, gross quantity[9]	do.	5.23	6.56	5.87	4.57	4.49
Value of trade:						
Exports	thousands	$131,000	$124,000	$145,000	$152,000	$153,000
Imports	do.	$1,010,000	$1,130,000	$1,100,000	$839,000	$1,120,000
Net imports[10]	do.	-884,000	-1,010,000	-952,000	-687,000	-971,000
Stainless steel:						
World production, contained chromium[11]	metric tons	5,370,000	5,710,000 r	5,870,000 r	6,550,000 r	7,070,000
U.S. production:						
Gross quantity[12]	metric tons	2,200,000	2,070,000	1,980,000	2,030,000	2,390,000 e
Contained chromium[13]	do.	383,000	353,000	343,000	354,000	420,000
Average grade, dimensionless[14]		0.1738	0.1703	0.1733	0.1744	0.1759
Shipments, gross quantity[15]		1,510,000	1,890,000	1,900,000	2,220,000	NA
Exports, gross quantity		508,000	558,000	590,000	603,000	803,000
Imports, gross quantity		585,000	605,000	668,000	570,000	729,000
Scrap, gross quantity:						
Receipts		846,000	866,000	858,000	882,000	921,000
Consumption		1,280,000	1,300,000	1,300,000	1,300,000	1,320,000

See footnotes at end of table.

TABLE 1—Continued
SALIENT CHROMIUM STATISTICS[1]

		2010	2011	2012	2013	2014
Stainless steel:—Continued						
Scrap, gross quantity:—Continued						
Exports		937,000	656,000	624,000	644,000	548,000
Imports		195,000	169,000	155,000	226,000	329,000
Value of trade:						
Exports	thousands	$2,120,000	$2,510,000	$2,380,000	$2,360,000	$2,820,000
Imports	do.	$2,310,000	$2,650,000	$2,690,000	$2,180,000	$2,710,000
Scrap exports	do.	$936,000	$958,000	$804,000	$743,000	$674,000
Scrap imports	do.	$305,000	$295,000	$236,000	$211,000	$426,000
Net imports[10, 16]	do.	$433,000	$523,000	$260,000	$720,000	$361,000

[e]Estimated. [r]Revised. do. Ditto. W Withheld to avoid disclosing company proprietary data. -- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Calculated assuming chromium content of stainless steel and stainless steel scrap to average 17% chromium.
[3]Includes consumer stocks of chromium ferroalloys and metal and other chromium-containing materials.
[4]Calculated assuming chromite ore to average 44% Cr_2O_3, which is 68.42% chromium.
[5]Chromium ferroalloys, chromite ore, and other chromium-containing materials excluding chromium metal.
[6]Consumer stocks of high- and low-carbon ferrochromium and ferrochromium-silicon.
[7]Time-weighted average price of South African chromite ore that contains 44% Cr_2O_3 free on board (f.o.b.) South Africa as reported in Ryan's Notes.
[8]Time-weighted average U.S. price of imported high-carbon chromium that contains 49% to 51% chromium as reported in Ryan's Notes.
[9]Time-weighted average U.S. price of imported aluminothermic chromium metal as reported by Ryan's Notes.
[10]Negative data indicate that imports are greater than exports.
[11]Production estimated from publically available sources. Chromium content estimated at 17%.
[12]Source: American Iron and Steel Institute annual report of stainless and heat-resisting raw steel production and shipments.
[13]Estimated mass-weighted average of the mean chromium content of stainless steel production by grade.
[14]Ratio of estimated mass-weighted average chromium content of stainless steel production by grade to production. Uncertainty is approximately ± 0.01, owing to the range of chromium chemical specification limits by stainless steel grade.
[15]Source: American Iron and Steel Institute annual report of stainless and heat-resisting raw steel shipments.
[16]Includes stainless steel and stainless steel scrap.

TABLE 2
U.S. REPORTED CONSUMPTION AND STOCKS OF CHROMIUM PRODUCTS[1]

(Metric tons)

	2013		2014		Change[2]	
	Gross quantity	Chromium content	Gross quantity	Chromium content	Quantity	Percent
Consumption by end use:						
Alloy uses:						
Steel:						
Carbon steel	4,800	2,900	5,050	3,240	251	5
High-strength low-alloy steel	2,040	1,330	2,050	1,340	6	(3)
Stainless and heat-resisting steel	380,000	215,000	389,000	221,000	9,430	2
Fully alloy steel	14,700	8,760	19,500	11,800	4,820	33
Unspecified steel[4]	24,900	14,800	25,200	14,900	289	1
Superalloys	7,590	5,380	7,320	5,160	-272	-4
Other alloys and uses[5]	5,380	3,800	5,300	3,760	-87	-2
Total	439,000	252,000	453,000	261,000	14,400	3
Consumption by material:						
Low-carbon ferrochromium	25,400	16,800	28,100	18,600	2,730	11
High-carbon ferrochromium	379,000	219,000	391,000	226,000	11,900	3
Ferrochromium silicon	(6)	(6)	(6)	(6)	(6)	(6)
Chromium metal	4,270	4,270	4,190	4,190	10	(3)
Chromium-aluminum alloy	371	264	433	310	62	17
Other chromium materials	29,900	11,700	29,700	11,600	-238	-1
Total	439,000	252,000	453,000	261,000	14,400	3
Consumer stocks:						
Low-carbon ferrochromium	1,810	1,190	1,780	1,180	-23	-1
High-carbon ferrochromium	10,300	5,980	11,300	6,540	973	9
Ferrochromium silicon	(6)	(6)	(6)	(6)	(6)	(6)
Chromium metal	159	159	158	155	-1	-1
Chromium-aluminum alloy	(6)	(6)	(6)	(6)	(6)	(6)
Other chromium materials	1,000 r	423	1,030	434	26	3
Total	13,300	7,750	14,300	8,310	975	7
National Defense Stockpile stocks:[7, 8]						
Chromium ferroalloys:[9]						
High-carbon ferrochromium	85,100	60,800	73,500	52,500	-11,600	-14
Low-carbon ferrochromium	44,300	31,600	34,600	24,700	-9,660	-22
Chromium metal[10]	4,090	4,090	3,960	3,960	-130	-3

rRevised.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Change based on gross quantity of unrounded data of current year compared with that of previous year.
[3]Less than ½ unit.
[4]Includes electrical, tool, and unspecified steel end uses.
[5]Includes cast irons; welding and alloy hard-facing rods and materials; wear- and corrosion-resistant alloys; and aluminum, copper, magnetic, nickel, and other alloys.
[6]Withheld to avoid disclosing company proprietary data; included in "Other chromium materials."
[7]The source for stockpile information is the Defense Logistics Agency Strategic Materials (DLA Strategic Materials).
[8]The DLA Strategic Materials data are based on the "Total Uncommitted Inventory" of stockpile material D–1 report.
[9]Chromium content estimated using 71.4% chromium.
[10]Chromium content estimated using 100% chromium.

TABLE 3
VALUE OF IMPORTS AND U.S. PRICE QUOTATIONS FOR CHROMIUM MATERIALS[1]

Material		2013 Contained chromium	2013 Gross quantity	2014 Contained chromium	2014 Gross quantity
Value:[2, 3]					
Chromite ore:					
Not more than 40% chromic oxide	dollars per metric ton	2,020	350	2,910	442
More than 40% but less than 46% chromic oxide	do.	675	208	634	198
46% or more chromic oxide	do.	1,160	378	727	260
Average	do.	990	310	704	243
Ferrochromium:					
Not more than 0.5% carbon	do.	4,560	3,100	4,450	3,040
More than 0.5% but not more than 3% carbon	do.	3,510	2,390	3,730	2,580
More than 3% but not more than 4% carbon	do.	1,130	644	2,090	1,010
Average (not more than 4% carbon)	do.	4,250	2,890	4,190	2,830
More than 4% carbon	do.	1,840	1,000	1,960	1,080
Average (all grades)	do.	2,160	1,210	2,210	1,240
Chromium metal[4]	do.	XX	11,100	XX	11,000
Price:[5]					
Chromite ore:					
Turkey:					
36% to 38% Cr_2O_3	do.	1,080 [6]	272	(7)	(7)
40% to 42% Cr_2O_3	do.	1,040 [6]	291	982 [6]	277
46% to 48% Cr_2O_3	do.	NA	NA	1,020 [6]	286
South Africa:					
39% Cr_2O_3	do.	565 [6]	151	(7)	(7)
38% to 40% Cr_2O_3	do.	NA	NA	608 [6]	183
44% Cr_2O_3	do.	537 [6]	162	605 [6]	182
42% Cr_2O_3 UG2[8]	do.	NA	NA	558 [6]	160
High-carbon ferrochromium:					
49% to 51% chromium	cents per pound	100	XX	(7)	XX
47% to 55% chromium	do.	NA	XX	107	XX
60% to 65% chromium	do.	101	XX	(7)	XX
60% to 70% chromium	do.	NA	XX	114	XX
Low-carbon ferrochromium:					
0.05% carbon	do.	219	XX	227	XX
0.10% carbon	do.	203	XX	208	XX
0.15% carbon	do.	194	XX	201	XX
Chromium metal:					
Imported, aluminothermic	do.	XX	457	XX	449

do. Ditto. NA Not available. XX Not applicable.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Mass-weighted average based on customs value and quantity of imported material.
[3]Reported by the U.S. Census Bureau.
[4]Average for all grades.
[5]Source: Ryan's Notes.
[6]Based on average C_2O_3 content.
[7]Discontinued.
[7]Upper Group 2.

TABLE 4
U.S. EXPORTS OF CHROMIUM MATERIALS, BY TYPE[1]

HTS[2] code	Type	2013 Quantity (metric tons)	2013 Value (thousands)	2014 Quantity (metric tons)	2014 Value (thousands)	Principal destinations in 2014 (Quantity in metric tons, value in thousands)
2610.00.0000	Chromite ore and concentrates, gross quantity	8,530	$3,040	6,060	$4,150	Canada (3,030, $1,240); Taiwan (1,650, $1,790); Mexico (926, $605).
	Metal and alloy, gross quantity:					
8112.21.0000	Unwrought chromium powders	379	7,640	354	8,560	Japan (69, $794); Brazil (43, $457); Germany (39, $1,340); Taiwan (39, $2,310); United Kingdom (33, $591); Mexico (30, $590); China (18, $407); Singapore (17, $586).
8112.22.0000	Chromium metal waste and scrap	7	125	35	527	Canada (12, $90); United Kingdom (11, $214); China (8, $143); Mexico (2, $23); Belgium (1, $23); Philippines (1, $20); Japan (1, $14).
8112.29.0000	Chromium metal other than unwrought powders and waste and scrap	470	11,200	268	8,800	Taiwan (138, $3,750); Germany (18, $282); Israel (13, $364); India (11, $178); Republic of Korea (10, $875); United Kingdom (9, $471); France (8, $433); Mexico (7, $339); Japan (7, $161).
	Total chromium metal	856	19,000	658	17,900	
	Chromium ferroalloys:					
7202.41.0000	High-carbon ferrochromium:[3]					
	Gross quantity	4,460	6,580	3,850	6,250	Canada (1,310, $2,140); Brazil (926, $1,640); Thailand (307, $453); Mexico (290, $414); Australia (234, $510); Chile (233, $205).
	Contained chromium	2,320	XX	1,940	XX	
7202.49.0000	Low-carbon ferrochromium:[4]					
	Gross quantity	379	698	839	1,770	Canada (727, $1,420); Mexico (91, $303); Argentina (17, $22); Peru (3, $18); Colombia (2, $8).
	Contained chromium	169	XX	339	XX	
7202.50.0000	Ferrochromium-silicon:					
	Gross quantity	16	23	36	43	Canada (all).
	Contained chromium	6	XX	13	XX	
	Total chromium ferroalloys:					
	Gross quantity	4,850	7,300	4,730	8,060	
	Contained chromium	2,500	XX	2,290	XX	
	Chemicals, gross quantity:					
	Chromium oxides:					
2819.10.0000	Chromium trioxide	15,000	54,300	15,500	67,200	Brazil (2,460, $8,350); South Africa (2,140, $10,600); New Zealand (1,310, $4,300); India (1,080, $3,180); United Kingdom (1,050, $3,220); Italy (865, $2,840); Indonesia (834, $2,090); Republic of Korea (670, $2,940); Germany (578, $2,010); Taiwan (509, $2,060); Chile (504, $1,790); China (393, $12,000); Spain (367, $1,250).
2819.90.0000	Other	5,580	31,400	4,250	23,900	Spain (853, $4,380); United Kingdom (802, $3,260); Belgium (405, $1,050); Canada (370, $2,210); Brazil (325, $1,540); Germany (274, $2,310); Taiwan (192, $1,240); Romania (162, $509); Japan (157, $1,000).
	Total chromium oxides	20,600	85,700	19,800	91,200	
2833.29.4000	Chromium sulfates	128	701	207	1,100	Mexico (90, $440); Republic of Korea (69, $336); Taiwan (20, $100); United Kingdom (8, $41); Hong Kong (8, $40); Colombia (3, $57); Belgium (3, $22); Malaysia (3, $13); Chile (2, $29); Suriname (2, $9).
	Salts of oxometallic or peroxometallic acids:					
2841.90.4500	Zinc and lead chromate	7	366	12	490	Mexico (6, $108); Vietnam (3, $28); South Africa (3, $323); Colombia (1, $22).
2841.30.0000	Sodium dichromate	14,800	27,100	13,500	24,400	Japan (9,260, $17,200); Canada (2,610, $3,620).
2841.50.1000	Potassium dichromate	101	199	56	147	Taiwan (21, $81); Mexico (20, $34); Netherlands (9, $8); Iraq (5, $5); Colombia (1, $7).

See footnotes at end of table.

TABLE 4—Continued
U.S. EXPORTS OF CHROMIUM MATERIALS, BY TYPE[1]

HTS[2] code	Type	2013 Quantity (metric tons)	2013 Value (thousands)	2014 Quantity (metric tons)	2014 Value (thousands)	Principal destinations in 2014 (Quantity in metric tons, value in thousands)
	Chemicals, gross quantity:—Continued					
	Salts of oxometallic or peroxometallic acids:—Continued					
2841.50.9100	Other	207	2,260	235	2,140	Canada (101, $566); Taiwan (41, $198); Mexico (27, $146); South Africa (18, $432).
	Total salts	15,100	29,900	13,800	27,200	
3206.20.0000	Pigments and preparations, gross quantity	649	6,090	430	3,170	Mexico (256, $1,270); Canada (49, $410); Antigua and Barbuda (21, $66); Qatar (16, $133); Jamaica (12, $62).

XX Not applicable.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Harmonized Tariff Schedule of the United States of America.
[3]More than 4% carbon.
[4]Not more than 4% carbon.

Source: U.S. Census Bureau.

TABLE 5
U.S. IMPORTS FOR CONSUMPTION OF FERROCHROMIUM, BY COUNTRY[1]

Country	Not more than 0.5% carbon (HTS[2] code 7202.49.5090)			More than 0.5% carbon, but not more than 3% carbon (HTS[2] code 7202.49.5010)			More than 3% carbon, but not more than 4% carbon (HTS[2] code 7202.49.1000)			More than 4% carbon (HTS[2] code 7202.41.0000)			Total all grades		
	Gross quantity (metric tons)	Cr content (metric tons)	Value (thousands)	Gross quantity (metric tons)	Cr content (metric tons)	Value (thousands)	Gross quantity (metric tons)	Cr content (metric tons)	Value (thousands)	Gross quantity (metric tons)	Cr content (metric tons)	Value (thousands)	Gross quantity (metric tons)	Cr content (metric tons)	Value (thousands)
2013:															
Albania	--	--	--	--	--	--	--	--	--	1,730	1,180	$2,340	1,730	1,180	$2,340
Belgium	--	--	--	--	--	--	60	44	$31	--	--	--	60	44	31
Brazil	396	251	$850	--	--	--	--	--	--	--	--	--	396	251	850
China	80	36	261	--	--	--	--	--	--	--	--	--	80	36	261
France	1	1	4	--	--	--	--	--	--	--	--	--	1	1	4
Germany	6,240	4,360	24,800	2,090	1,390	$3,040	--	--	--	--	--	--	8,340	5,750	27,900
India	120	79	630	--	--	--	--	--	--	2,590	1,570	3,320	2,710	1,650	3,950
Japan	1,530	1,060	6,600	--	--	--	--	--	--	--	--	--	1,530	1,060	6,600
Kazakhstan	405	106	585	3,790	2,620	9,410	--	--	--	71,300	49,300	87,000	75,500	52,000	97,000
Malta and Gozo	20	14	69	--	--	--	--	--	--	--	--	--	20	14	69
Netherlands	--	--	--	--	--	--	--	--	--	199	131	295	199	131	295
Russia	24,700	16,800	69,900	7,470	5,160	19,700	310	167	207	14,500	9,500	18,700	46,900	31,600	108,000
South Africa	500	316	1,350	460	250	958	--	--	--	294,000	145,000	262,000	295,000	146,000	264,000
Sweden	13	12	64	--	--	--	--	--	--	4,900	3,250	9,100	4,910	3,260	9,160
Taiwan	108	74	299	--	--	--	--	--	--	--	--	--	108	74	299
Turkey	2,400	1,710	7,680	--	--	--	--	--	--	22,000	14,500	30,300	24,400	16,200	38,000
Zimbabwe	--	--	--	--	--	--	--	--	--	4,090	2,310	4,340	4,090	2,310	4,340
Total	36,500	24,800	113,000	13,800	9,410	33,100	370	210	238	416,000	227,000	417,000	466,000	262,000	564,000
2014:															
Albania	--	--	--	--	--	--	--	--	--	1,730	1,150	2,590	1,730	1,150	2,590
Belgium	--	--	--	--	--	--	28	15	15	--	--	--	28	15	15
Brazil	714	442	1,720	162	99	393	--	--	--	3,040	1,550	2,600	3,920	2,100	4,720
China	462	289	1,310	--	--	--	9	6	22	--	--	--	472	295	1,330
Colombia	--	--	--	--	--	--	--	--	--	21	14	34	21	14	34
Finland	--	--	--	--	--	--	--	--	--	100	53	99	100	53	99
Germany	8,530	5,980	32,900	--	--	--	--	--	--	299	208	500	8,830	6,190	33,400
India	146	96	836	--	--	--	--	--	--	11,000	6,850	13,100	11,200	6,950	14,000
Japan	2,170	1,510	8,660	--	--	--	--	--	--	--	--	--	2,170	1,510	8,660
Kazakhstan	5,020	3,470	12,500	6,140	4,280	15,400	--	--	--	106,000	73,300	146,000	117,000	81,000	174,000
Latvia	--	--	--	--	--	--	--	--	--	440	307	770	440	307	770
Mexico	109	70	568	--	--	--	--	--	--	--	--	--	109	70	568
Oman	--	--	--	--	--	--	--	--	--	1,190	640	1,200	1,190	640	1,200
Poland	--	--	--	41	23	75	--	--	--	--	--	--	41	23	75
Russia	24,000	16,400	67,600	8,150	5,630	21,600	--	--	--	15,700	10,300	21,100	47,900	32,400	110,000
South Africa	1,560	870	3,700	--	--	--	3,000	1,450	3,030	387,000	191,000	364,000	391,000	194,000	371,000
Sweden	1	1	3	--	--	--	--	--	--	6,700	4,420	11,400	6,700	4,420	11,400
Turkey	657	461	2,150	--	--	--	--	--	--	27,100	17,700	39,100	27,800	18,200	41,300
Zimbabwe	--	--	--	--	--	--	--	--	--	34,500	18,700	36,700	34,500	18,700	36,700
Total	43,400	29,600	132,000	14,500	10,000	37,400	3,040	1,470	3,060	595,000	327,000	640,000	656,000	368,000	812,000

See footnotes at end of table.

TABLE 5—Continued
U.S. IMPORTS FOR CONSUMPTION OF FERROCHROMIUM, BY COUNTRY[1]

-- Zero.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Harmonized Tariff Schedule of the United States of America.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF CHROMIUM MATERIALS, BY TYPE[1]

HTS[2] code	Type	2013 Quantity (metric tons)	2013 Value[3] (thousands)	2014 Quantity (metric tons)	2014 Value[3] (thousands)	Sources in 2014 (Quantity in metric tons, value in thousands)
	Chromite ore:					
2610.00.0020	Not more than 40% Cr_2O_3:					
	Gross quantity	6,380	$2,230	27	$12	Canada (22, $7); South Africa (5, $5).
	Cr_2O_3 content	1,610	XX	6	XX	
2610.00.0040	More than 40%, but less than 46% Cr_2O_3:					
	Gross quantity	68,400	14,200	45,900	9,090	South Africa (45,900, $9,080); France (8, $4).
	Cr_2O_3 content	30,800	XX	21,000	XX	
2610.00.0060	46% or more Cr_2O_3:					
	Gross quantity	98,400	37,200	123,000	32,000	South Africa (122,000, $29,500); Canada (1,190, $2,430); Belgium (9, $24);
	Cr_2O_3 content	46,700	XX	64,300	XX	Italy (8, $5).
	Total chromite ore:					
	Gross quantity	173,000	53,600	169,000	41,100	
	Cr_2O_3 content	79,100	XX	85,200	XX	
	Chromium ferroalloys:					
	Ferrochromium:					
7202.49.5090	Not more than 0.5% carbon:					
	Gross quantity	36,500	113,000	43,400	132,000	Russia (24,000, $67,600); Germany (8,530, $32,900); Kazakhstan (5,020,
	Cr content	24,800	XX	29,600	XX	$12,500); Japan (2,170, $8,660); South Africa (1,560, $3,700); Brazil (714, $1,720); Turkey (657, $2,150); China (462, $1,300); India (146, $836); Mexico (109, $568); Sweden (1, $3).
7202.49.5010	More than 0.5%, but less than 3% carbon:					
	Gross quantity	13,800	33,100	14,500	37,400	Russia (8,150, $21,600); Kazakhstan (6,140, $15,400); Brazil (162, $393);
	Cr content	9,410	XX	10,000	XX	Poland (41, $75).
7202.49.1000	More than 3%, but less than 4% carbon:					
	Gross quantity	370	238	3,040	3,060	South Africa (3,000, $3,030); Belgium (28, $15); China (9, $22).
	Cr content	210	XX	1,470	XX	
7202.41.0000	More than 4% carbon:					
	Gross quantity	416,000	417,000	595,000	640,000	South Africa (387,000, $364,000); Kazakhstan (106,000, $146,000); Zimbabwe
	Cr content	227,000	XX	327,000	XX	(34,500, $36,700); Turkey (27,100, $39,100); Russia (15,700, $21,100); India (11,000, $13,100); Sweden (6,700, $11,400); Brazil (3,040, $2,600); Albania (1,730, $2,590); Oman (1,190, $1,200); Latvia (440, $770); Germany (299, $500); Finland (100, $99); Colombia (21, $34).
7202.50.0000	Ferrochromium-silicon:					
	Gross quantity	12,000	16,200	17,400	25,000	Kazakhstan (17,300, $24,900); Germany (40, $76).
	Cr content	4,230	XX	7,330	XX	
	Total chromium ferroalloys:					
	Gross quantity	478,000	580,000	673,000	837,000	
	Cr content	266,000	XX	375,000	XX	
	Chromium metal, gross quantity:					
8112.21.0000	Unwrought chromium powders	3,350	39,800	5,540	61,000	China (2,980, $30,900); United Kingdom (1,630, $18,600); France (420, $5,620); Russia (340, $2,890); Belgium (112, $1,620); Germany (31, $971); India (19, $206); Japan (1, $126); Taiwan (1, $28).
8112.22.0000	Waste and scrap	70	684	98	1,180	United Kingdom (48, $528); Germany (15, $135); Japan (12, $212); Singapore (11, $118); Brazil (6, $32); Taiwan (5, $119); France (1, $31).

See footnotes at end of table.

TABLE 6—Continued
U.S. IMPORTS FOR CONSUMPTION OF CHROMIUM MATERIALS, BY TYPE[1]

HTS[2] code	Type	2013 Quantity (metric tons)	2013 Value[3] (thousands)	2014 Quantity (metric tons)	2014 Value[3] (thousands)	Sources in 2014 (Quantity in metric tons, value in thousands)
8112.29.0000	Other than waste and scrap	10,200	112,000	11,800	130,000	Russia (3,860, $31,900); France (3,400, $36,300); China (2,570, $21,300); United Kingdom (1,530, $16,700); Canada (237, $19,300); Germany (129, $3,190); Spain (71, $536); Japan (11, $558); Taiwan (2, $35); New Zealand (1, $27); Malaysia (1, $21).
	Total chromium metal	13,700	152,000	17,400	192,000	
	Chemicals, gross quantity:					
	Chromium oxides and hydroxides:					
2819.10.0000	Chromium trioxides	7,010	23,800	7,560	24,300	Turkey (5,280, $15,400); Kazakhstan (1,230, $3,630); China (797, $3,850); South Africa (113, $380); Colombia (79, $640); Spain (32, $263); Germany (17, $58); Canada (8, $29); France (5, $39); Taiwan (1, $10).
2819.90.0000	Other	2,880	12,200	2,600	11,500	China (910, $4,950); Germany (829, $5,260); Canada (812, $907); United Kingdom (20, $159); Colombia (19, $160); Republic of Korea (3, $33); Malaysia (3, $14); Italy (1, $5).
	Total oxides	9,900	36,000	10,200	35,800	
2833.29.4000	Sulfates of chromium	490	547	303	321	Turkey (270, $276); China (32, $42); Germany (1, $3).
	Salts of oxometallic or peroxometallic acids:					
2841.90.4500	Chromates of lead and zinc	83	389	112	744	Colombia (42, $208); China (42, $113); Japan (29, $422).
2841.30.0000	Sodium dichromate	171	470	70	159	China (51, $123); South Africa (19, $35).
	Other chromates and dichromates; Peroxochromates:					
2841.50.1000	Potassium dichromate	1	13	7	53	Colombia (5, $22); India (2, $22).
2841.50.9100	Other	707	2,660	848	3,040	Austria (773, $2,710); Colombia (51, $199); Taiwan (15, $69); France (6, $26); China (3, $28).
	Total salts	962	3,530	1,040	3,990	
2849.90.2000	Chromium carbide	132	3,280	238	5,040	China (156, $3,090); Canada (31, $876); United Kingdom (27, $413); Norway (16, $128); Germany (6, $352); Austria (2, $175).
	Total chromium chemicals	11,500	43,400	11,700	45,200	
	Pigments and preparations based on chromium, gross quantity:					
3206.20.0010	Chrome yellow	695	4,620	534	3,520	Canada (421, $2,990); Colombia (74, $318); Mexico (23, $101); China (11, $79); Germany (4, $30); France (2, $7).
3206.20.0020	Molybdenum orange	274	2,430	431	3,010	Canada (224, $1,840); Colombia (191, $1,110); Germany (10, $26); Mexico (4, $23); China (1, $7); India (1, $7).
3206.20.0030	Zinc yellow	79	268	25	92	China (18, $60); Mexico (7, $32).
3206.20.0050	Other	342	2,480	261	1,930	France (85, $298); China (54, $804); Poland (38, $239); India (19, $137); Hong Kong (17, $64); Japan (17, $100); Germany (13, $134); Netherlands (11, $37); Canada (6, $54); Mexico (1, $27).
	Total pigments	1,390	9,800	1,250	8,560	

XX Not applicable.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Harmonized Tariff Schedule of the United States of America.
[3]Customs import value generally represents a value in the foreign country, and therefore, excludes U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise into the United States

TABLE 7
ESTIMATED WORLD PRODUCTION CAPACITY (CHROMITE ORE, FERROCHROMIUM, CHROMIUM METAL, CHROMIUM CHEMICALS, AND STAINLESS STEEL) AND CONSUMPTION FOR SELECTED COUNTRIES[1]

(Thousand metric tons of contained chromium)

	Production capacity in 2014					Chromium consumption[2]		
Country	Ore	Ferro-chromium	Metal	Chemicals	Stainless steel	2012	2013	2014
Afghanistan	2	--	--	--	--	NA	NA	NA
Albania	159	20	--	--	--	-30	-86 r	48
Argentina	--	--	--	13	--	21	21	24
Australia	--	--	--	--	--	(3) r	20	-1
Austria	--	--	--	--	12	33 r	29 r	30
Belgium	--	--	--	--	240	133	172 r	135
Brazil	158	94	--	--	73	140 r	146 r	128
Canada	--	--	--	--	--	17 r	18 r	17
China	60	2,420	15	140	3,650	3,670	4,640	4,000
Finland	296	229	--	--	211	87 r	141 r	168
France	--	--	12	--	55	52 r	59 r	60
Germany	--	18	1	--	256	243 r	208 r	151
Greece	(3)	--	--	--	--	1	1	1
India	1,300	546	(3)	31	465	540 r	571 r	890
Iran	126	10	--	2	--	-29 r	-34 r	-19
Italy	--	--	--	--	289	289 r	221 r	232
Japan	--	11	1	17	567	425 r	415 r	482
Kazakhstan	1,140	689	--	37	--	-546 r	141 r	161
Korea, Republic of	--	--	--	--	367	287 r	299 r	277
Madagascar	40	--	--	--	--	NA	NA	NA
Mexico	--	--	--	--	--	9	7	9
Oman	240	--	--	--	--	90	71	86
Pakistan	54	--	--	3	--	-77 r	44 r	-69
Philippines	11	--	--	--	--	11	11 r	15
Russia	210	153	16	31	17	305 r	236 r	234
Slovenia	--	--	--	--	24	14	21	18
South Africa	4,250	1,910	--	23	90	-40 r	114 r	-517
Spain	--	--	--	--	160	101	94	114
Sudan	19	--	--	--	--	2	NA	NA
Sweden	--	51	--	--	100	7 r	21 r	18
Taiwan	--	--	--	--	232	155 r	156 r	144
Turkey	992	84	--	17	--	360 r	321 r	315
Ukraine	--	--	--	--	25	19	7 r	13
United Kingdom	--	--	8	--	56	14 r	13 r	19
United States	--	--	--	38	437	342 r	342 r	342
Vietnam	12	--	--	--	--	NA r	NA r	NA
Zimbabwe	180	151	--	--	--	62	27	-40
Total	9,260	6,380	53	352	7,320	XX	XX	XX

rRevised. NA Not Available. XX Not applicable. -- Zero.

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

[2]Estimated based on U.S. Geological Survey reported chromite ore production and trade statistics assuming that chromite ore and chromium ferroalloys and metal trade are reported in gross quantity.

[3]Less than ½ unit.

TABLE 8
CHROMITE: WORLD PRODUCTION, BY COUNTRY[1, 2, 3]

(Metric tons, gross weight)

Country	2010	2011	2012	2013	2014
Afghanistan[4]	5,727	6,204	6,000 e	3,309 r	6,369
Albania[5]	328,322	330,938	380,349	521,080 r	652,463
Australia	180,000	323,800	452,300	355,000 r	--
Brazil[6]	520,129	542,512	472,501 r	485,981 r	490,000 e
China[e]	200,000	200,000	200,000	200,000	200,000
Finland	598,000	692,527	425,217	981,752	1,034,750
Greece[e, 4]	1,400	1,200	1,200	1,200	1,200
India	3,426,000	4,326,000	2,923,000	2,950,000	3,540,000 e
Iran	394,000 r	440,000 r	411,566 r	344,169 r	400,000 e
Kazakhstan[e]	3,760,000	3,800,000	3,590,000 [7]	3,700,000	3,700,000
Madagascar, exports	134,500	66,700	111,500	88,000 r	100,000 e
Oman	801,856	616,700	602,225	787,645	751,200
Pakistan	257,000	148,000	179,000	110,000 r	69,000
Philippines	14,807	25,483	36,628	35,281 r	47,056
Russia, marketable[e]	699,000 [7]	662,000 [7]	552,000 r	360,000 r	400,000
South Africa	11,340,000 r	11,411,400 r	11,549,900 r	14,126,300 r	12,000,000 e
Sudan	56,823	64,128	75,000 r	30,870	61,334
Turkey	1,904,461	2,901,027	3,600,000 r	3,200,000 r	3,400,000 e
United Arab Emirates	25,000	--	--	--	--
United States	NA	NA	NA	--	--
Vietnam[e]	40,000	40,000	40,000	40,000	40,000
Zimbabwe	510,000	599,079	408,475 r	355,142 r	400,000 e
Total	25,200,000 r	27,200,000 r	26,000,000 r	28,700,000 r	27,300,000

[e]Estimated. [r]Revised. -- Zero. NA Not available.

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

[2]Includes data available through December 14, 2015.

[3]Figures for all countries represent marketable output.

[4]Gross weight estimated assuming an average grade of 44% chromic oxide (Cr_2O_3).

[5]Ore grade was 18% to 42% chromic oxide (Cr_2O_3).

[6]Average chromic oxide (Cr_2O_3) content was as follows: 2010—49.7%; 2011—45.2%; 2012—45% (estimated); 2013—40% (estimated); and 2014—not available.

[7]Reported figure.

TABLE 9
FERROCHROMIUM: WORLD PRODUCTION, BY COUNTRY[1, 2]

(Metric tons, gross weight)

Country[3]	2010	2011	2012	2013	2014
Albania	23,233	28,694 r	24,018 r	24,692 r	34,897
Brazil[4]	277,114	145,122	165,532	189,088 r	185,000 e
China	2,400,000	2,700,000	3,040,000	4,001,660 r	4,399,600
Finland	238,000 r	231,000	230,130 r	434,250 r	449,570
Germany[e]	18,300	18,500	17,800	17,500	17,000
India[e, 5]	850,000	830,000 r	800,000 r	800,000 r	915,890 [6]
Japan	16,208	17,217	19,392	21,700 r	20,000 e
Kazakhstan	1,311,302	1,289,917	1,305,566	1,036,680 r	1,200,000 e
Oman	--	--	--	20,630	47,810
Romania	14,000	--	--	--	--
Russia	607,570 r	565,900 r	546,360 r	487,810 r	500,000 e
South Africa[7]	3,607,132	3,425,911	3,063,257	3,400,000 r	3,601,050
Sweden	64,800 r	81,500 r	39,850 r	49,000 r	67,000
Turkey[e]	50,000 r	40,000 r	40,000 r	35,000 r	35,000
Zimbabwe	146,000	140,000	137,534 r	150,060 r	214,110
Total	9,620,000 r	9,510,000 r	9,430,000 r	10,700,000 r	11,700,000

[e]Estimated. [r]Revised. -- Zero.
[1]World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes data available through December 14, 2015.
[3]Chile and Iran are known to have produced ferrochromium, but information is inadequate to make reliable estimates of output levels.
[4]Includes high- and low-carbon ferrochromium.
[5]Reported on a fiscal year basis, which is from April 1 to March 31. Includes ferrochrome and charge chrome.
[6]Reported figure.
[7]Includes high- and low-carbon ferrochromium and ferrochromium-silicon.