

Zinc

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World zinc consumption reached 7 545 000 t in 1996 according to preliminary figures from the International Lead and Zinc Study Group (ILZSG), similar to the 1995 level. Decreases in Europe and Japan were offset by increases in the Republic of Korea and in several other countries.

World mine production of zinc reached 7 007 000 t in 1996, an increase for the third consecutive year. Large increases from Australia and Canada, however, were largely offset by a 22% reduction in Chinese mine production.

World zinc metal production was 7 354 000 t, a slight increase from the total in 1995.

CANADIAN DEVELOPMENTS

Preliminary figures indicate that Canada's mine production of zinc totalled 1 234 600 t in 1996, a 10% increase over 1995 due primarily to a full year's production from the Faro operations in the Yukon and from higher-grade zones being mined at the Myra Falls mine in British Columbia. These factors were partially offset by lower production from the Brunswick mine in New Brunswick during the second half of the year.

Zinc metal production reached 715 600 t, slightly lower than 1995's total.

British Columbia

Westmin Resources Limited experienced ground control problems in the first quarter of 1996 at its Myra Falls zinc-copper mine near Campbell River. Despite the problems, Westmin expanded production for the year, primarily with the development of the higher-grade Battle zone. Meanwhile, exploration continues to increase reserves, which now stand at more than 13 Mt.

Cominco Ltd. began improvements to its Trail zinc refinery that are designed to increase its capacity by 20 000 t to 290 000 t/y of refined zinc by 1998. The improvements are in conjunction with the construction of Cominco's new Kivcet lead smelter at Trail.

Bethlehem Resources Corporation closed its Goldstream copper-zinc mine near Revelstoke in mid-January due to the exhaustion of reserves. The mine is on care and maintenance pending additional exploration. Goldstream had a capacity of 2000 t/y of zinc in concentrate.

Yukon

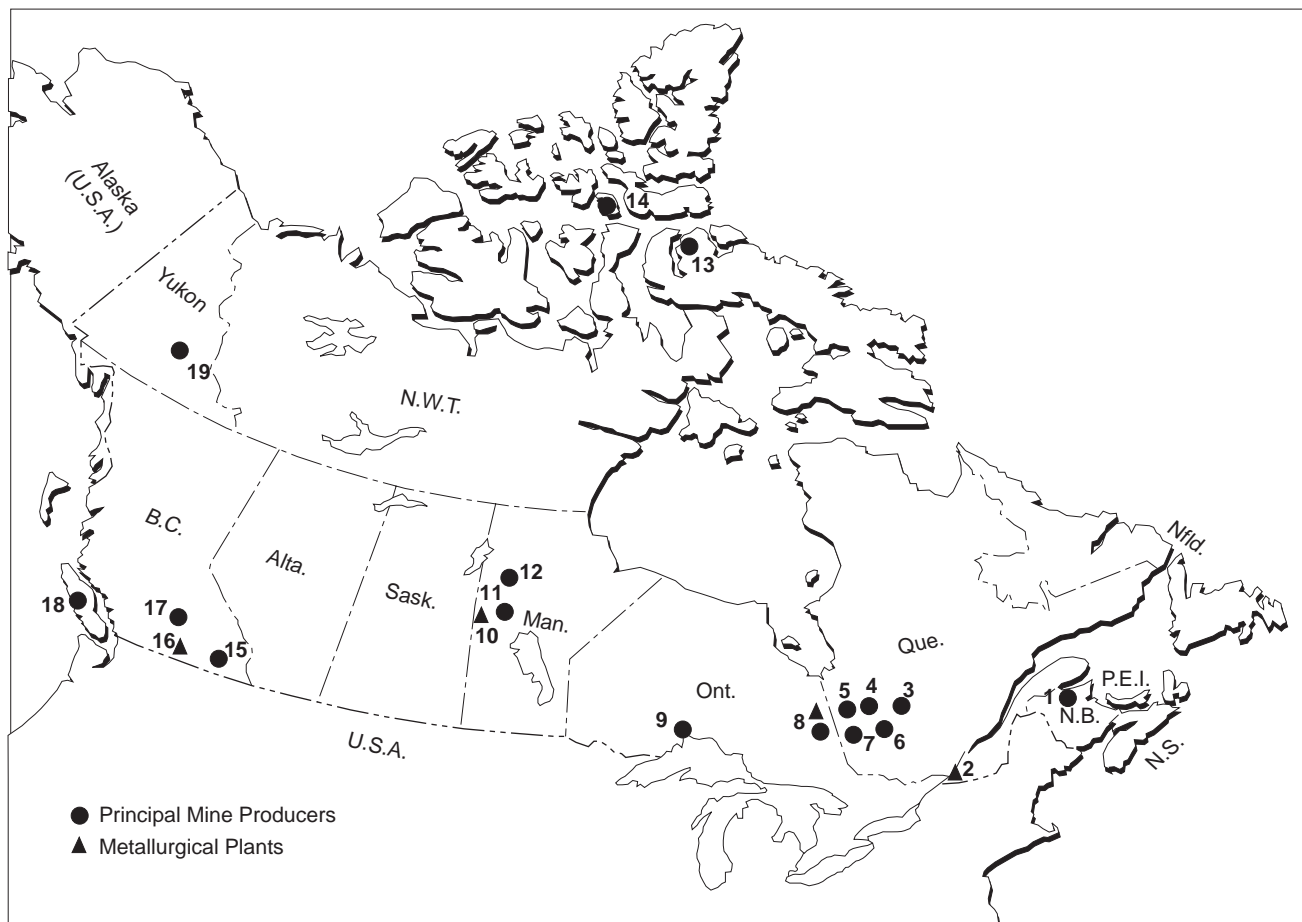
Anvil Range Mining Corporation suspended mining operations at its Faro complex on December 20 due to weak metal prices, a strong Canadian dollar, and lower-than-expected output. Three hundred of the 450-person work force were laid off and the remainder were to continue milling stockpiled ore until the end of March 1997. Half of the normal output of 150 000 t/y of zinc in concentrate was to be produced during this period. The company implemented an independent technical review after the announcement to determine what will be needed to restart operations. The review panel recommended that Anvil Range wait for prices to rise above US\$31/lb for lead and 47¢/lb for zinc. Anvil Range had improved lead and zinc grades and recoveries at Faro throughout 1996 before the closure.

Exploration for volcanogenic copper-lead-zinc deposits continued in the Finlayson Lake and Wolverine Lake area near Watson Lake. Cominco continued the evaluation of its Kudz Ze Kayah orebody, which could be exploitable by open-pit methods to produce 50 000 t/y of zinc in concentrate. Meanwhile, Westmin received encouraging results from surface drilling on the newly discovered Lynx zone at its Wolverine zinc-copper-lead project.

Northwest Territories

In July, Breakwater Resources Ltd. purchased the Nanisivik zinc mine on Baffin Island from Alberta Energy Company Ltd. Reserves there at the beginning of 1996 stood at 4.4 Mt grading 7.8% zinc and 0.4% lead, which represented six years of operation at the current production rate of about 50 000 t/y of zinc in concentrate.

Figure 1
Zinc Producers in Canada, 1996



Numbers refer to locations on map above.

ZINC MINES

- | | | | |
|---|--|---|---|
| 1. Brunswick #12 Heath Steele Caribou | Brunswick Mining and Smelting Corporation Limited Brunswick Mining and Smelting Corporation Limited Breakwater Resources Ltd. (to open 1996) | 10. Flin Flon Callinan Trout Lake | Hudson Bay Mining and Smelting Co., Limited Hudson Bay Mining and Smelting Co., Limited Hudson Bay Mining and Smelting Co., Limited |
| 3. Gonzague-Langlois | Cambior Inc. | 11. Photo Lake | Hudson Bay Mining and Smelting Co., Limited |
| 4. Isle Dieu Norita-East | Noranda Inc. Noranda Inc. | 12. Ruttan | Hudson Bay Mining and Smelting Co., Limited |
| 5. Selbaie | Les Mines Selbaie | 13. Nanisivik | Nanisivik Mines Ltd. |
| 6. Louvicourt | Aur Resources Inc./Novicourt Inc. | 14. Polaris | Cominco Ltd. |
| 7. Bouchard-Hébert | Les Ressources Audrey Inc. | 15. Sullivan | Cominco Ltd. |
| 8. Kidd Creek | Falconbridge Limited | 17. Goldstream | Bethlehem Resources Corporation |
| 9. Winston Lake | Inmet Mining Corporation | 18. Myra Falls | Westmin Resources Limited |
| | | 19. Faro (Grum) | Anvil Range Mining Corporation |

ZINC METALLURGICAL PLANTS

- | | |
|----------------|---|
| 2. Valleyfield | Canadian Electrolytic Zinc Limited |
| 8. Kidd Creek | Falconbridge Limited |
| 10. Flin Flon | Hudson Bay Mining and Smelting Co., Limited |
| 16. Trail | Cominco Ltd. |

San Andreas Resources Corporation completed negotiations with the Nahanni Butte Dene Band on the Prairie Creek Development Cooperation Agreement. The agreement will facilitate any future development of the company's Prairie Creek project where exploration so far has established a geological reserve of 10.6 Mt grading 13.1% zinc, 11.4% lead and 188 g/t silver.

Ontario

Deep drilling by Falconbridge Limited from the lower levels of the Kidd Creek No. 3 mine in Timmins proved the continuation of the orebody to at least 3000 m below the surface. An inferred resource of 17 Mt grading 8.4% zinc and 1.9% copper has been identified in this area. The feasibility of mining at such depths is currently being examined.

Inmet Mining Corporation continued development of the Pick Lake zone at its Winston Lake mine near Schreiber. When in full production in 1997, Pick Lake will replace the Winston Lake orebody as the main source of copper-zinc ore with a net loss of 8000 t/y for a total of 36 000 t/y of zinc in concentrate.

Quebec

Cambior Inc.'s Gonzague Langlois (formerly Grevet) zinc mine near Lebel-sur-Quévillon reached commercial production in January but experienced operational problems in its ore handling system and with excessive dilution of the orebody. Due to continuing low zinc prices, Cambior closed the mine on December 20 to carry out sub-level development in order to decrease dilution and also to make repairs to the ore pass. Production in 1996 was expected to be about 40 000 t of zinc in concentrate, compared to the 62 000 t forecast earlier in the year. The company expects to re-open the mine in the second quarter of 1997 under more favourable zinc market conditions.

Production improvements continued at the Bouchard-Hébert mine north of Rouyn in which Cambior owns a 100% interest through the operator, Audrey Resources Inc. An expanded grinding circuit increased its mill throughput to 2600 t/d.

In October, Noranda Inc. announced plans for a \$212 million capital expenditure on its copper and zinc operations over the next two years. The plans include a \$32 million expansion project at its zinc refinery at Salaberry-de-Valleyfield operated by subsidiary Canadian Electrolytic Zinc Limited. Capacity at the refinery would be increased by 20 000 t to 250 000 t/y of refined zinc by optimizing the hydrometallurgical process. Another \$29 million will be spent to implement a process developed at the Noranda Technology Centre in Pointe-Claire to treat the refinery's jarosite residues. Noranda will also re-open the Gallen open-pit mine near Rouyn-Noranda at a cost of \$9 million to compensate for development delays at its Bell Allard project at Matagami.

New Brunswick

Noranda announced in late August that it was reducing zinc concentrate production at its Brunswick lead-zinc-copper mine near Bathurst due to seismic activity that prevented mining at planned levels. The reduction was expected to be 40 000 t of zinc in concentrate in 1996 with a further loss of 50 000 t in 1997. Noranda is revising the mining plan and the ground control program to ensure safe, optimum long-term operations at Brunswick.

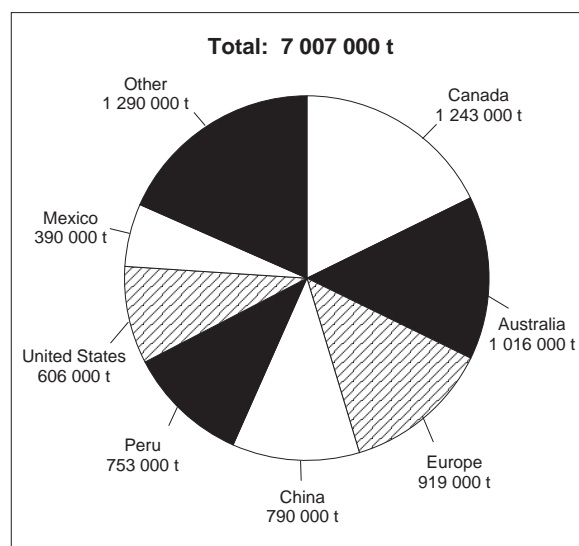
At its nearby Heath Steele mine, Noranda suspended production for two weeks in December to carry out an independent assessment after two accidents in November. In the first incident, one miner died and a second was injured on November 4 after a release of sulphur dioxide gas following a routine blasting operation. The second incident on November 29, again involving contact with noxious gases during underground mining, injured four miners.

Breakwater Resources completed approvals and financing for the re-opening of its Caribou lead-zinc-silver mine west of Bathurst and for the development of the nearby Restigouche deposit. The underground Caribou and open-pit Restigouche mines are expected to come on stream concurrently in mid-1997 and to eventually produce a total of 67 000 t/y of zinc in concentrate.

WORLD DEVELOPMENTS

World mine production of zinc was 7 007 000 t in 1996. Increased production from Canada, Australia and Peru was largely offset by a large decline in China. World zinc metal production reached 7 354 000 t, a slight increase from the total in 1995.

Figure 2
World Zinc Mine Production, 1996



Source: International Lead and Zinc Study Group.

Europe

European mine production of zinc continued its decline of recent years as preliminary ILZSG figures indicated a 5.5% decrease from 1995. Meanwhile, the profitability of many European zinc smelters remained poor, being based in a region with strong currencies, high operating costs and overcapacity relative to local demand.

ARCON International Resources Plc completed construction of its zinc-lead mine at Galmoy in County Kilkenny, Ireland, with commissioning in early 1997. The mine had an initial expected mine life of 13 years, but diamond drilling on the Galmoy property throughout the year has outlined additional resources at a higher grade than the original mineable reserve of 6.3 Mt grading 12% zinc equivalent. The Galmoy mine has a capacity of 66 000 t/y of zinc in concentrate.

Also in Ireland, Ivernia West Plc received planning permission in August from the County of Tipperary for development of its Lisheen zinc-lead deposit. Ivernia West hopes to begin construction for eventual start-up of the mine in 1998 if an appeal of the planning permit is upheld in January 1997. Lisheen would have a capacity of 175 000 t/y of zinc in concentrate.

Union Minière SA began its restructuring program announced in 1995 with an agreement with unions to eliminate almost 1700 jobs from its Belgian work force by the end of 1998. The company also plans to get rid of over 200 jobs at its French operations in the same period. The downsizing is necessary due to losses sustained in 1994 and 1995.

In Finland, Outokumpu Oy announced plans for a 55 000-t/y expansion at its Kokkola zinc refinery to be completed by the end of 1998. The US\$111 million expansion would involve the introduction of a new method developed by Outokumpu of direct atmospheric leaching of zinc concentrates to produce jarosite residue. The expansion would bring capacity at Kokkola to 225 000 t/y of refined zinc. Meanwhile, Outokumpu began production in May from its Mullikkorame deposit in central Finland. The new mine has a capacity of 16 000 t/y of zinc in concentrate. Its ore will be treated in the nearby Pyhasalmi concentrator.

TVX Gold Inc. began technical and environmental upgrading at the Stratonio and Olympias polymetallic mines at its Cassandra operations in Greece in March. The silver-lead-zinc producer has operated for over 30 years, but TVX acquired the operations in 1995 and plans to produce gold that had not been previously recovered from the refractory ore. TVX hopes to increase the 25 000-t/y zinc production capacity at Cassandra by 2000 t/y of zinc in concentrate by early 1997. Extensive definitional diamond drilling was carried out by TVX at Cassandra in 1996.

Boliden AB closed its Aznalcollar open-pit lead-zinc-copper mine in Spain in early November due to the exhaustion of reserves. Capacity at Aznalcollar was 53 000 t/y of zinc in concentrate. At the same time, Boliden opened the adjacent Los Frailes open-pit lead-zinc-copper mine at a cost of US\$100 million. Los Frailes is using the same infrastructure but has an increased capacity of 110 000 t/y of zinc in concentrate. The Aznalcollar mill was upgraded to handle an increase in throughput of 1.7 Mt/y of ore.

Navan Resources Plc began a feasibility study on developing its Aguas Tenidas project in Spain. With a mineable reserve of 13.4 Mt grading 1.3% copper, 5.7% zinc, 1.7% lead, 3 g/t gold and 38 g/t silver, the underground mine would utilize the mill of Minas de Almagrera SA, 20 km away, to produce 35 000 t/y of zinc in concentrate by 1998. Meanwhile, Navan Resources awaits permits to develop its open-pit Mazzaron lead-zinc mine, also in Spain.

The Dutch government extended Pasmenco Ltd.'s licence to store jarosite residues in existing ponds at its Budel zinc refinery until July 1999. The company has obtained an interim supply of low-iron concentrates to accomplish this given the delay in development of the Century zinc project in Australia due to extended Aboriginal land claim negotiations. Century is scheduled to supply about 390 000 t/y of low-iron concentrates to the Budel refinery once it comes on stream.

In Sweden, Boliden discovered high-grade zinc ore at depths of 900-1500 m below the surface in diamond drilling at its Renstromme mine. The ore, which continues to be outlined, averages 14% zinc, which is three times the grade at the existing mine. The mine had been expected to close due to the exhaustion of reserves within two years.

Platinova Resources Ltd. initiated prefeasibility studies on the building of a 170 000-t/y electrolytic zinc refinery at Nuuk, Greenland. Platinova is also seeking an operator for the proposed refinery. Meanwhile, drilling at the company's Peary Land project in north-eastern Greenland has discovered a new zone of zinc mineralization between the Discovery and Beach zones that contains a geological resource of 25 Mt grading 7% zinc and 1% lead. Platinova has indicated that it requires proven and probable reserves of at least 10 Mt grading 10% zinc for the project to be economic.

Australia

The mine production of zinc in Australia increased by 15% over 1995 due mainly to the contribution of the new McArthur River mine and settlement of the industrial dispute at Mount Isa. The continuation of Australia's long-term importance as a zinc producer seems likely with several mine and smelter projects now at an advanced stage.

In Queensland, the industrial dispute at MIM Holdings Ltd.'s Mount Isa mine ended in May with the acceptance of enterprise bargaining agreements covering the metallurgical plant, mine and service areas. Industrial action disrupted production at Mount Isa throughout 1995 and the early part of 1996.

Development of the huge Century zinc project remained on hold as negotiations on the Aboriginal land claim covering portions of the property had not been concluded by year-end. All development activity on the US\$870 million project was scaled back by RTZ Corporation PLC/CRA Limited in July after Aboriginal groups turned down a US\$48 million training, infrastructure and community benefits package. If put into production, Century would produce 450 000 t/y of zinc in concentrate.

A major concern at Century is the construction of a slurry pipeline over Aboriginal lands to carry concentrates from the proposed mine to loading facilities on the Gulf of Carpentaria. RTZ/CRA had requested special legislation from the Queensland government to allow the project to proceed, but later withdrew the request in favour of negotiating a consensus with Aboriginal groups under existing Native Title legislation. If unresolved by mid-February 1997, the issue will go to government arbitration. The Century issue is being watched closely in Australia, especially in light of an Australian High Court ruling in late December that the issuance of pastoral leases does not automatically extinguish Aboriginal land claims.

In early January 1997, RTZ/CRA announced that they would sell the Century and nearby Dugald River zinc-lead projects to Pasminco for \$US275 million subject to the issuance of leases following a successful Aboriginal land claim settlement.

The Broken Hill Proprietary Company Limited (BHP) began construction in January of its Cannington underground lead-zinc mine and concentrator, and of concentrate storage and shiploading facilities at Townsville on the Queensland coast. Commissioning of the concentrator is scheduled for October 1997 and, when in full production in 1998, Cannington will produce 50 000 t/y of zinc in concentrate.

Korea Zinc Co. Ltd. announced that it would build a 170 000-t/y electrolytic zinc refinery at Townsville. The Australian government pledged help for Korea Zinc to obtain Foreign Investment Review Board approval for the US\$423 million project, and the Queensland government subsequently approved an impact assessment study. The project is now in the permitting stage with expected start-up in 1999. A planned second stage would double its capacity by 2005.

In the Northern Territory, MIM encountered unexpected faulting at its McArthur River mine, which started production in 1995. Production there has

been lower than expected due to modifications in the underground mining method. The company retained contractors at the site to carry out further development work.

Pasminco opened its Potosi open-pit zinc-lead mine near Broken Hill in New South Wales early in the year. Production from Potosi, which has a capacity of 15 000 t/y of zinc in concentrate, is being treated at the company's nearby Broken Hill operations. Pasminco hopes that the contribution of Potosi, along with cost-cutting measures involving staff reductions, will extend the Broken Hill operations five years beyond their currently projected 10-year life.

A stope failure at Pasminco's Elura mine in March caused a 25% decrease in production in the first quarter of 1996. Its production returned to normal in April with the loss being partially offset by higher output at Broken Hill. Elura has a capacity of 77 000 t/y of zinc in concentrate.

Pasminco lost 2000 t of zinc production during a nine-day shut-down in April at its 90 000-t/y Cockle Creek zinc smelter in New South Wales. The closure was caused by a collapse of one third of the furnace's refractory lining. In February, Pasminco laid off 30 workers at the Cockle Creek smelter as part of an ongoing review of business operations. Pasminco plans to expand its capacity at Cockle Creek by 10 000 t of refined zinc in 1997 with environmental upgrading.

Production at Denehurst Ltd.'s Woodlawn mine decreased with the closure of the Currawong orebody. Zinc output in the financial year ended June 30 fell by over 23% to 45 000 t of zinc in concentrate. The company closed its Benambra zinc mine in Victoria in August due to low metal prices and poor metallurgical recoveries. The mine had a capacity of 12 000 t/y of zinc in concentrate.

Pasminco re-opened its Hercules zinc-lead mine in Tasmania in October after reaching an agreement with Mancala Pty. Ltd. to operate the mine. The Hercules mine, which closed in 1986, has a capacity of 8000 t/y of zinc in concentrate. The ore will be milled at Pasminco's nearby Rosebery mill. Pasminco is planning to expand capacity at Rosebery by 16 000 t to 71 000 t/y of zinc in concentrate with further increases dependent upon results from deep exploration drilling that is currently under way.

Pasminco is implementing a US\$68 million co-treatment process to treat iron-bearing wastes from its EZ zinc refinery in Tasmania at the company's BHAS refinery in Port Pirie, South Australia. This will allow the EZ refinery to cease the dumping of jarosite residue at sea by the end of 1997.

Western Metals Ltd.'s Goongewa lead-zinc mine in the Kimberley region of Western Australia, which opened in 1995, has allowed a greater throughput at the company's Cadjebut mill where the Goongewa ore

is being treated. Western Metals is currently developing the nearby Kapok orebody which, when in production in March 1997, will replace the Cadjebut and Goongewa mines with no change in capacity. Modifications are being carried out at the Cadjebut mill to handle the Kapok ore, which has a higher lead grade.

Western Metals has completed a feasibility study on its Blendevalle deposit, which has a mineable reserve of 14.8 Mt grading 7.5% zinc and 2.4% lead. Blendevalle, also in the vicinity of the Cadjebut mine, could start up in late 1998 at a capital cost of US\$74 million with a capacity of 106 000 t/y of zinc in concentrate.

United States

Cominco discovered a new zone of zinc-lead-silver mineralization in exploration drilling near its Red Dog mine in Alaska. The zone is immediately north and at greater depth than the Aqqaqaluk orebody discovered in 1995. The Aqqaqaluk deposit contains an inferred reserve of 76 Mt grading 13.7% zinc, 3.6% lead and 66 g/t silver. The discoveries have prompted Cominco to undertake an expansion at Red Dog that would raise its capacity by 170 000 t to 495 000 t/y of zinc in concentrate by 1999.

The Greens Creek silver-zinc-lead mine of Greens Creek Mining Co. restarted mining in June and milling at the end of July. The mine, situated on Admiralty Island in Alaska, closed in 1993 but subsequent drilling discovered a new higher-grade orebody. The mine, which was re-opened at a capital cost of US\$87 million, has a capacity of 45 000 t/y of zinc in concentrate.

ASARCO Incorporated closed its Leadville zinc-lead mine in Colorado at the end of 1996 due to depressed metal prices. The mine, with a capacity of 15 000 t/y of zinc in concentrate, is on care and maintenance status pending an improvement in metal prices. In August, the Leadville mill closed due to a structural failure of the building.

Savage Resources Ltd. applied for government approval to increase capacity at its Clarksville, Tennessee zinc refinery to 260 000 t/y of refined zinc. The company plans to initiate a feasibility study on a possible US\$350 million expansion after receiving the approval. The refinery was built in 1979 to handle low-iron concentrates and an expansion will be contingent on the availability of such concentrates in the future. Clarksville underwent a minor upgrading in 1996 that raised its capacity by 3000 t to 104 000 t/y of refined zinc.

Korea Zinc acquired Big River Zinc Corp., which operates the 82 000-t/y Sauget, Illinois zinc refinery. After completion of the US\$53 million purchase, Big River Zinc indicated that it was studying the possibility of expanding the refinery by 32 000 t/y while improving environmental performance. Korea Zinc also acquired a 25% interest in the New Bergin

silver-lead-zinc mine of Chief Consolidated Mining Company (50%) and Akiko Gold Resources Ltd. (25%), located in Utah. Feasibility studies are under way on the possible re-opening of the mine, which closed in 1978, to produce 9000 t/y of zinc in concentrate. Exploration to increase reserves at the mine is also in progress.

Cominco acquired, in March, RFC Resource Finance Corporation, which owns the Pend Oreille zinc-lead mine in Washington. Cominco plans to re-open the mine, which closed in 1977, to produce 42 000 t/y of zinc in concentrate by 2000. The opening would coincide with the closure of Cominco's nearby Sullivan mine in British Columbia. Reserves at Pend Oreille stand at 3.2 Mt grading 9.1% zinc and 1.3% lead.

Rio Algom Limited and Exxon Corporation announced their intention to bring on stream their 50/50 joint-venture Crandon copper-zinc mine in Wisconsin. The mine, which is currently at the permitting stage, would produce 150 000 t/y of zinc in concentrate beginning in the early 2000s. Crandon has a reserve of 55 Mt grading 9.4% zinc and 0.4% copper.

Hecla Mining Company is studying development of the Gold Hunter deposit adjacent to its Lucky Friday silver-lead-zinc mine in Idaho. The deposit, containing 5 Mt grading 291 g/t silver, 4.1% lead and 1.2% zinc, could be in production by late 1997.

In November, the U.S. General Accounting Office (GAO) released its report reviewing the Defense Logistics Agency's (DLA) zinc sales program. The investigation by the GAO was ordered in late 1995 by the U.S. House Subcommittee on Military Readiness following complaints by the U.S. zinc industry and the American Zinc Association. They argued that the 45 400 t of stockpile zinc proposed for sale in fiscal year 1998 was too high when the actual U.S. market for the grades of slab zinc in the stockpile were considered instead of the total U.S. market for all grades of zinc. The GAO concluded that the DLA zinc sales policy was proper and that the agency had adequate policies and procedures in place to avoid undue disruption of the markets.

Latin America

Industrias Penoles SA de CV announced in March that it planned to upgrade its Turreon zinc refinery in Mexico. The company is evaluating the Kivcet and Ausmelt processes for the US\$200 million upgrade that would raise capacity by 30 000 t to 160 000 t/y of refined zinc while ensuring better environmental performance.

Penoles is developing its US\$70 million Madero copper-zinc mine in Zacatecas State. When in production in 1998 the mine will have a capacity of 96 000 t/y of zinc in concentrate. The company also signed an exploration agreement with Dowa Mining

Co. Ltd. and Sumitomo Corp., both of Japan, to explore the Rey de Plata mine in Guerrero State near the producing Tizapa lead-zinc mine in which all three companies have a stake.

Peru experienced labour unrest early in the year. A nine-day strike took place at Compania Minera Milpo S.A.'s Milpo mine in March. Workers at Perubar S.A.'s Perubar mine also went on strike for one week in March. In April, a 19-day dispute took place at Compania Minera Atacocha S.A.'s Atacocha mine. All of the disputes arose over demands for better working conditions, including higher wages.

The privatization of the assets of state-owned Centromin in Peru met with mixed results in 1996. In May, the Antamina copper deposit was auctioned to Rio Algom and Inmet Mining. Upon acquiring Antamina, the new owners began a feasibility study on developing an open-pit copper mine that would also have a capacity to produce 192 000 t/y of zinc in concentrate by the early 2000s.

An intended auction of Centromin's Yauricocha copper-lead-zinc mine was cancelled in September when no bids were received despite interest from 10 companies from several countries. A second auction in November was also postponed due to a lack of bidders. However, Centromin did manage to sell its Yauliyacu lead-zinc-copper mine to Brazil's Parapanema SA for US\$13 million. Parapanema also promised to invest \$100 million in the area over five years.

The new Iscaycruz zinc-lead mine in Peru, owned by Empresa Minera Especial Iscaycruz SA, started milling in July. The \$53 million mine has a capacity of 55 000 t/y of zinc in concentrate and is the largest zinc producer in Peru. Its production was partially suspended in November for a brief period due to its failure to comply with administrative formalities. Meanwhile, the company is seeking joint-venture partners to develop two additional lead-zinc orebodies that could justify doubling its zinc capacity to 110 000 t/y of zinc in concentrate.

The Cajamarquilla zinc refinery in Peru has been exceeding its production capacity since being acquired by Cominco and Marubeni Corporation from state-owned Minero Peru S.A. in 1995. Cominco began a small expansion of the refinery that will result in its capacity increasing by 20 000 t to 120 000 t/y of refined zinc. A feasibility study on a further expansion to 230 000 t/y by 1999 has been completed and a decision is expected in 1997. Cominco has engaged a consultant to provide advice on acquiring additional electricity for the project. Meanwhile, Cominco has also acquired an interest in the Colquijirca zinc-lead mine and the San Gregorio zinc deposit, both in Peru.

Compania Minera Milpo S.A. began a US\$17 million program of infrastructure upgrades and exploration

at its Milpo mine in Peru. The program includes an expansion of the concentrator, deepening of the shaft, and 9000 m of diamond drilling. Capacity at the mine would increase by 5000 t to 42 000 t/y of zinc in concentrate.

Brazilian zinc producer Companhia Paraibuna de Metais merged with three other Brazilian nonferrous metals and metal products producers to form a new company called Companhia Brasileira de Metais Nao Ferrosos, with tin producer Paranapanema SA as the group's holding company. After the merger, Paraibuna began building a new 60-MW hydro-electric plant in Minas Gerais State that the company hopes will reduce electricity costs by 75% at its 76 000-t/y Juiz de Fora zinc refinery.

Companhia Mercantil de Industrial Inga carried out improvements to jarosite storage ponds at its 42 000-t/y Itaguaí electrolytic zinc refinery after a leak in February that was triggered by torrential rains. The contaminated jarosite-bearing water reached a mangrove swamp that is the source of a considerable portion of Rio de Janeiro's food supply.

Russia

Russian metal producers continued to face rising energy, transportation and fuel costs in 1996. A lack of investment capital also hindered technological and environmental upgrades and the maintenance of equipment.

One exception to the lack of investment is the Chelyabinsk zinc smelter where a modernization and expansion program, funded by a loan from the European Bank for Reconstruction and Development, is due to be completed by 1998. The expansion will raise the smelter's capacity by 70 000 t to 220 000 t/y of refined zinc.

Glencore International AG commissioned a feasibility study on raising capacity at the Dalpolimetal mining complex in the Russian Far East. The US\$33 million upgrade would include the Nickolayevsky and Sovietsky underground mines and the accompanying concentrator, and would boost capacity by 24 000 t to 48 000 t/y of zinc in concentrate by 2000. Glencore is attempting to raise financing for the project.

In the Altai region, additional capacity from the modernization of the Rubtsovskoye copper-lead-zinc mine was partially offset by the closure of the Zolotushinsky lead-zinc mine with a net increase of 19 000 t/y of zinc in concentrate.

Asia

The China National Nonferrous Metals Industry Corporation forecasts strong growth in Chinese zinc demand to 2000 and beyond, especially in the die-casting and galvanizing sectors. Throughout the year, domestic zinc prices in China remained higher than

London Metal Exchange (LME) prices. However, despite this and an 8% reduction in rebates on value-added tax for zinc metal exports, the level of zinc exports in 1996 increased by over 18% compared to 1995.

Zinc smelter capacity in China continues to increase faster than mine capacity, resulting in increased imports of zinc concentrate for satisfying local demand and for toll smelting. Also, exports of zinc concentrate have decreased due to rising concentrate prices. However, a large portion of China's domestic concentrates originates from small-scale mines, which often results in uncertainty of domestic supply. Meanwhile, Chinese producers of refined zinc face increasing costs as the prices for zinc concentrate and electricity are rising. China's large zinc companies have been reorganizing and integrating mine/smelter operations in recent years to reduce costs. However, small zinc smelters, which make up a considerable portion of Chinese zinc production, are being hit especially hard.

China's zinc smelter capacity expanded by 195 000 t/y in 1996, including a 100 000-t/y expansion at the state-owned Zhuzhou electrolytic refinery in Hunan Province and a 70 000-t/y expansion at the state-owned Shaoguan ISF (imperial smelting furnace) smelter in Guangdong Province. A further 25 000-t/y expansion at the state-owned Longnan electrolytic refinery is under way. In contrast, no new zinc mines opened in China in 1996 and new mine projects are only expected to add 41 000 t/y of zinc in concentrate within the next two years.

Chinese authorities raised the export tax on refined zinc from 5% to 20% on July 1, which prompted the Zhuzhou smelter to stop exports from the port of Guangzhou. This resulted in a return to the former tax level several weeks later.

Zinc demand in India has continued to rise, prompting several zinc refinery expansions. Binani Zinc Ltd. is expanding its electrolytic refinery by 10 000 t to 40 000 t/y of refined zinc by 1999, with a further 20 000 t/y planned by 2001. Hindustan Zinc Ltd. is undertaking 10 000-t/y expansions at each of its Visakhapatnam and Debari electrolytic refineries to be completed by 1999 and 2000 respectively. Meanwhile, the Indian government approved a joint venture between Hindustan Zinc and BHP of Australia to explore for copper, lead, zinc and gold deposits in Rajasthan State.

The construction of three new zinc refineries is under way in Iran. A new electrolytic zinc refinery at Yazd in central Iran is scheduled to be at its full capacity of 28 000 t/y of refined zinc and 2000 t/y of zinc in zinc sulphate by 1997. A second refinery on Qeshm Island, with a capacity of 10 000 t/y of refined zinc, is due for commissioning in March 1997. In addition, a new 60 000-t/y zinc refinery in northern Iran is being planned for the late 1990s.

Refined zinc production in Japan decreased by over 10% in 1996 from the 1995 level as the rationalization in the Japanese zinc smelting industry took effect. This resulted in an increase in imports of refined zinc. Mitsui Mining and Smelting Co. Ltd. adopted Ausmelt smelter technology to recover lead-zinc fume from slag at the Hachinohe ISF lead and zinc smelter in which it shares an interest with a number of other Japanese companies.

Prefeasibility studies were completed by Arabian Shield Development Company on a possible new electrolytic zinc refinery in Saudi Arabia. The refinery, with a capacity of 200 000 t/y of refined zinc, would incorporate Sherritt pressure leach technology. Meanwhile, construction of Arabian Shield's Al Masane copper-zinc mine in Saudi Arabia awaits successful financing. The mine would have a capacity of 31 000 t/y of zinc in concentrate.

Expansion of Padaeng Industry Co. Ltd.'s Tak zinc refinery in Thailand continued toward an early 1997 start-up. The US\$30 million project will raise capacity by 31 000 t to 105 000 t/y of refined zinc. The company is also upgrading its Rayong zinc calcine plant to handle an anticipated increase in imports of sulphide zinc concentrate, primarily from Australia, as a result of the eventual closure of its Mae Sod mine in Tak Province. The Mae Sod mine, which produces silicate zinc ores, was closed during September and October 1996 due to heavy monsoons. Padaeng Industry plans to blend the remaining silicate ore at Mae Sod with imported sulphide concentrates in order to extend the life of the mine.

Turkey's Cinkur zinc refinery was sold to Kayseri Maden Metal Ticaret, a consortium of Iranian state-controlled companies. Following privatization, the refinery was upgraded, raising its capacity by 15 000 t to 33 000 t/y of refined zinc.

Africa

Gencor Industrial Development Corp. is studying the feasibility of building a new 220 000-t/y zinc refinery in South Africa. The refinery site would be either at East London or Port Elisabeth, both in Eastern Cape Province. The plans provide for the proposed refinery to double its capacity should such a move be required in the future. Gencor expects to complete the feasibility study by March 1997.

Inmet Mining suspended operations at its 48%-owned Bougrine lead-zinc mine in October after evaluating the capital required to lower operating costs. Inmet wrote off \$35 million earlier in the year, but was still liable for \$33 million in loan guarantees at the time of the decision. The Tunisian government is seeking a new investor for the mine.

American Mineral Fields Ltd. and Anglo American Corporation reached agreement with the government of Zaire to study the rehabilitation of the Kipushi

copper-zinc mine in Zaire. The Kipushi mine closed in 1993 due to a lack of operating capital for spare parts resulting in a loss in capacity of 65 000 t/y of zinc in concentrate. The remaining mineable reserves at Kipushi stand at 23 Mt grading 13.8% zinc and 2.1% copper, for a mine life of 20 years with additional ore known to exist at depth.

In Zambia, former employees of Zambia Consolidated Copper Mines Limited signed a contract to buy 85% of the assets of the Kabwe lead-zinc mine that closed in 1994. Known as the Kabwe Power and Metal Company, the group is studying re-opening the mine in 1999 by reprocessing Kabwe's waste dump material to produce lead and zinc oxide. This would result in the production of 18 000 t/y of contained zinc. Kabwe Power is also seeking financing to redevelop the mine.

SECONDARY ZINC

Zinc from secondary sources has become increasingly important in recent years. Figures from the International Lead and Zinc Study Group (ILZSG) indicate that the total recovery of zinc from secondary materials in the Western World in 1995 was 1.9 Mt. Secondary zinc includes high-purity zinc refined from the treatment of Electric Arc Furnace (EAF) dusts, remelted zinc of a purity less than 98.5% zinc, and scrap zinc used in the production of zinc alloys.

With the increasing use of zinc galvanized steel in the automobile and construction industries, secondary zinc from EAF dusts has become a significant source of zinc. These dusts contain various other elements in a form that renders untreated dusts inappropriate for disposal in standard landfill sites. Consequently, before May 1995, EAF dusts for disposal had to be put into landfills for hazardous wastes in the United States. The decreasing space available at such sites and the associated increases in disposal costs provided a further incentive for recycling.

However, in May 1995, the U.S. Environmental Protection Agency (EPA) ruled that EAF dusts can be dumped in municipal landfill sites rather than in hazardous waste sites if the material has been treated to stabilize it. Currently, the Super Detox chemical process developed by Bethlehem Steel Corporation is the sole commercial process capable of doing this. As vehicles manufactured in the 1980s begin to be recycled, the recovery of zinc from flue dusts should increase.

In recent years, technologies for recycling zinc-bearing materials have been developed. The Waelz kiln is the most common method of processing EAF dusts. Waelz oxides are treated in imperial smelting furnaces for the production of refined zinc. The requirement of Waelz kilns to be near their feed source, i.e., steel mill complexes, would suggest that

treatment of these dusts will be most important in the United States, Japan and Western Europe.

Kawasaki Steel Corporation of Japan announced the development of a new pyrometallurgical process to treat EAF dusts. Dusts are injected into a vessel together with coke and air and heated to 2000°C. Molten zinc rises to the surface of the vessel. Kawasaki hopes to begin construction of the first commercial plant using this process by 1998.

Engitec Impianti SpA of Italy has developed the Ezinex metallurgical process for recovering zinc from EAF dusts. The process involves leaching EAF dust with an ammonium and alkali chloride in a leaching reactor. The leach solution is purified and electrolytically refined. An iron-rich residue from the leaching process is recyclable to electric arc furnaces. The Australian recycling company Waraluck Ltd. plans to construct a US\$25 million dust treatment plant in Melbourne, Australia, to produce 10 000 t/y of prime western grade zinc from 24 000 t/y of EAF dusts using the Ezinex process beginning in the first quarter of 1998.

Canada does not currently process EAF dusts. However, Phillip Environmental Ltd. of Hamilton, Ontario, began construction in September of a \$25 million plant in Hamilton to recycle 70 000 t/y of EAF residues using a proprietary zinc-iron plasma process that converts these residues into zinc, lead and iron products. The new plant should be operational in the third quarter of 1997. Phillip Environmental eventually plans to initiate a second-phase process involving alkaline zinc electrowinning.

The secondary recovery of zinc is also increasingly being achieved by the dezincing of galvanized steel before remelting in electric arc furnaces. Metal Recovery Technologies Inc. of the United States began commercial operations at its dezincing plant in Chicago on October 1. The facility had been operating on a pilot plant scale since 1992, and its upgrade cost US\$10 million. The process was developed in cooperation with the American Iron and Steel Institute and the U.S. Department of Energy. Metal Recovery Technologies has signed an agreement with Essex Trading Company to treat 68 000 t/y of scrap to produce 1800 t/y of high-grade zinc.

The fertilizer and chemical industries also make use of zinc-bearing wastes to create zinc sulphate and chloride compounds. The chemicals are then used in the production of fertilizer micro-nutrients.

CONSUMPTION AND USES

World zinc consumption grew by only 0.1% to 7 545 000 t in 1996. The high rate of apparent zinc consumption in 1995 was partially the result of overstocking by end-use consumers in anticipation of higher prices in 1996. In the first half of 1996, there

was a net decrease in consumption compared to the same period in 1995 as these excess stocks were worked off. The consumption of zinc increased in the second half of 1996 as demand remained strong, particularly in North America, China and Southeast Asia, excluding Japan. In Japan, weak demand from the galvanizing sector is partially a result of the shift by Japanese companies in recent years to offshore production facilities.

Galvanizing has been maintaining its importance as the principal use of zinc, representing 48% of zinc consumption in 1995. Zinc is used extensively in the automotive and construction industries for corrosion protection and remains the most cost-effective means of protecting steel against corrosion. The galvanization of steel is the fastest growing use of zinc; it has grown steadily in recent years at the expense of almost all other end uses, and this trend is expected to continue in the future.

Galvanized steel is used in automobile construction to protect steel from corrosion. Zinc coatings act as a physical barrier and as a sacrificial oxidant. The oxide, in turn, acts as a further barrier to corrosion. The brightest prospects for galvanized steel in the automobile industry are currently in Asia. Japanese and other Asian manufacturers are using increasing amounts of galvanized sheet in response to demands for enhanced corrosion protection. In North America where galvanized steel is already extensively used in automobile construction, applications of dual-sided galvanized steel have become increasingly important for exposed body surfaces.

Galvanized steel is also used in construction for structural components, roofing, siding and reinforcement bars. Zinc and zinc-aluminum thermally sprayed coatings are used for the long-term corrosion protection of large steel structures such as bridges and hydro-electric transmission towers.

With the relatively high cost of lumber, fabricated hot-dipped structural steel is becoming cost-competitive for use in residential home construction. The number of steel-framed homes built yearly in the United States has risen steadily and is estimated to reach 250 000 in 1997. The U.S. steel industry hopes to capture 25% of the housing market (350 000 homes per year) by 2000, which would require 200 000 t/y of zinc. In Japan, where the housing market is booming, steel industry organizations are lobbying the government to issue permits for the construction of steel-framed houses.

Galvanized steel studs have a number of advantages over wood, including less volatile prices, less weight, immunity to warping or termites, fire resistance, and recyclability. However, disadvantages include their tendency to bend or dent if improperly handled and the need for specialized training and tools.

A number of zinc alloy coatings have been developed over the years that have superior qualities over pure

zinc in specific applications. These include Galfan (90% zinc, 5% aluminum, and the remainder rare earth elements) and Galvalume (55% aluminum, 43.4% zinc and 1.6% silicon), as well as zinc-iron and zinc-nickel alloys. Galfan, for example, exhibits higher formability and paintability than other coatings, and zinc-nickel alloys reduce the reactivity of high-silicon steels.

Canada's hot-dipped galvanized steel and Galvalume capacity of 1 902 000 t/y is located in Ontario at the facilities of Dofasco Inc. and Stelco Inc. in Hamilton and DNN Galvanizing Corporation in Windsor, as well as in Quebec at Sorevco in Coteau-du-Lac.

The manufacture of brass and bronze is the second most important use of zinc, accounting for 18.5% of consumption in 1995. These alloys are used in plumbing fittings, heating and air conditioning components, and other products. The consumption of brass and bronze is highly dependent on the performance of the construction industry and the 3.6% increase in this end use over 1994 reflects a continuing improvement in economic activity in many countries.

The third most important use of zinc, accounting for 13.4% of consumption in 1995, is in the die-casting industry for products such as builders' hardware and automobile fittings. The goal of weight reduction in automobiles for increased fuel efficiency has led to a reduction in the use of zinc die-castings, although the increased number of cars being sold has led to overall increases in zinc consumption. The development of new alloys and manufacturing techniques, such as thin-walled die-casting, has taken place in recent years to make zinc alloy castings more competitive relative to plastics and other substitute materials. Zinc castings also have the ability to hold closer tolerances than aluminum castings.

One promising series of alloys is ACuZinc, which contains 5-11% copper and 2.8-4% aluminum, with the balance being zinc. These alloys increase the durability and performance or reduce the thickness of automotive die-castings compared to many other zinc alloys.

The balance of zinc consumption is for such items as zinc semi-manufactures, oxides, chemicals and zinc dust. Zinc oxide is an important component in the manufacture of tires and rubber products. Rolled zinc has been a popular roofing material in parts of Europe for many years.

In Canada, copper-electroplated rolled zinc is used in the manufacture of one-cent coin blanks. The Royal Canadian Mint produces about 700 million one-cent coins annually, which consumes about 1600 t/y of zinc. In the United States where production of the one-cent coin consumes 35 000 t/y of zinc, talks were held in July on the future of the U.S. penny. The government claims that it lost US\$8 million-\$9 million in 1994 when manufacturing and distribution costs are

taken into account. Abolition of the penny is opposed by several groups, including the American Zinc Association, who argue that it would result in the loss of jobs in the zinc mining and refining industry.

Increased research has been conducted in recent years into the use of zinc in batteries. A long run-time rechargeable zinc-air battery for use in portable personal computers is currently being developed that is designed to provide power up to 10 times longer than conventional batteries and to provide more energy density by weight than nickel-cadmium or nickel-metal hydride batteries.

Zinc-air batteries are also being tested for use in electric vehicle fleets in Germany and Sweden. Electric Fuel Corporation, which is pioneering zinc-air technology, delivered in July nine Mercedes-Benz MB 410E electric vans powered by its zinc-air battery system for driver orientation at Deutsche Post AG facilities in Bremen, Germany. This two-year program is expected to build over 50 vans and pick-up trucks designed to evaluate the potential for converting 25 000 postal vehicles to the Electric Fuel Corporation zinc-air battery system.

Electric Fuel Corporation announced in November that it had finalized an agreement with Israel Electric Corporation, the national electric utility in Israel, to jointly market its zinc-air energy system for electric vehicles in Israel, Egypt, Jordan, Lebanon, Syria and the Palestinian Authority. Meanwhile, Edison SpA of Italy installed a refuelable 484-lb Electric Fuel Corporation zinc-air battery in a sub-compact car. The vehicle will be used as a demonstration prototype for the European market for electric passenger cars.

INTERNATIONAL LEAD AND ZINC STUDY GROUP

The International Lead and Zinc Study Group was formed in 1959 to improve market information and to provide opportunities for regular intergovernmental consultations on lead and zinc markets. Particular attention is given to providing regular and frequent information on supply and demand and on the outlook for lead and zinc.

The Study Group is headquartered in London, England. Its membership includes most major lead- and zinc-producing and consuming countries. While it has an extensive information-gathering and dissemination role, the Group has no market intervention powers. It holds a general session each year in the fall. Member countries' delegations include industry representatives as advisors. Canada has been an active member since its inception.

The Study Group held a very successful conference in May in Beijing, China, entitled "The Future of Lead and Zinc - Asia and the World." The conference

examined trends in the production and consumption of lead and zinc, technological advances in metals processing, recycling initiatives, and environmental issues.

The 41st Session of the Study Group was held in Vienna, Austria, in October 1996 and was attended by representatives of 29 member countries as well as by observers from several nations and organizations. The 1996 session examined statistical trends, current new mine and smelter projects, trade patterns, and changes to the U.S. Strategic Stockpile, as well as certain environmental issues. In particular, member countries expressed concern that implementation of the Basel Convention may impose restrictions on recyclable materials among OECD countries and between OECD and non-OECD countries. The Study Group agreed to undertake a study demonstrating the impact of the Basel Convention on trade among OECD countries and between OECD and non-OECD countries.

PRICES AND STOCKS

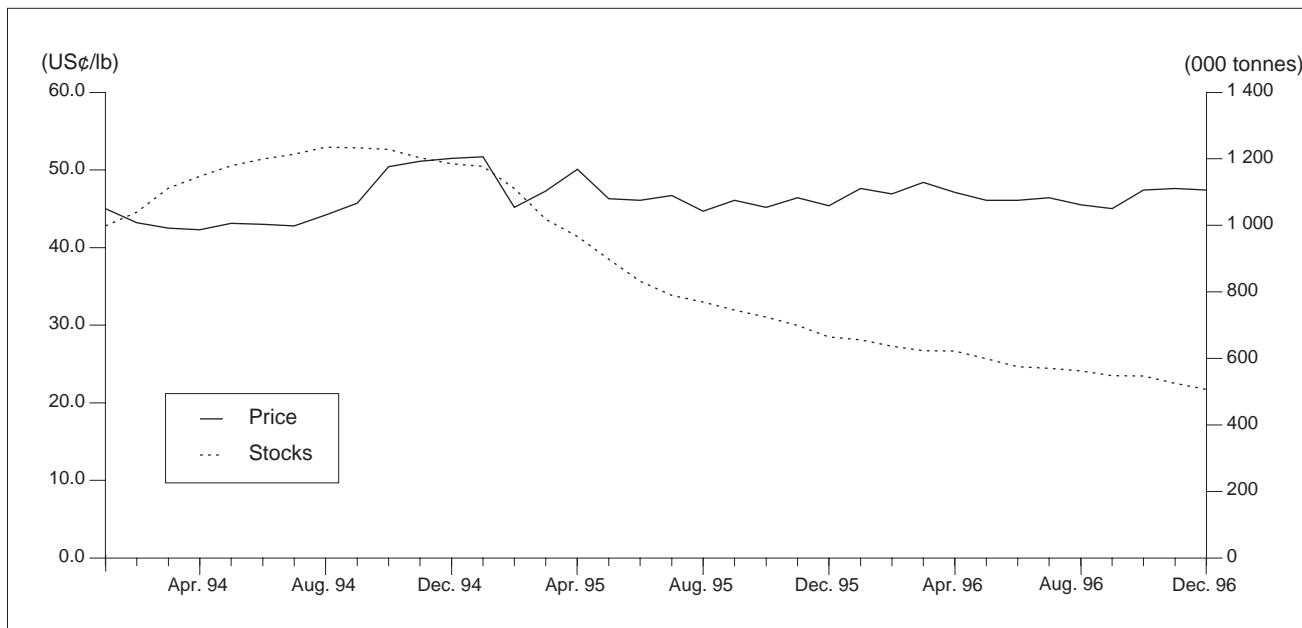
Zinc prices traded within a 5.4¢/lb range and averaged US46.5¢/lb in 1996, a slight decrease from 46.8¢/lb in 1995. Speculative activity in the zinc market was overshadowed by a slowdown in the rate of stock reductions, sluggish demand in Europe and Japan, and the tendency of Chinese zinc producers to sell into the international zinc market when prices approached higher domestic prices. News of several suspensions in mine production late in the year, however, added to the improving sentiment about zinc.

Zinc started the year at US45.4¢/lb, but rose to the year's high of 49.8¢/lb on March 13 on the news that Spanish zinc producer Asturiana de Zinc SA had transferred its futures position of almost 600 000 t of zinc to the Swiss trading company Glencore International AG. This calmed fears that such a large amount of zinc might be sold in a way that would disrupt zinc markets. However, a continued slowdown in LME stock reductions sparked subsequent speculative selling and the price of zinc reached its low for the year of 44.4¢/lb on July 16.

Zinc prices remained suppressed throughout the summer period as increases from fund buying on strengthening fundamentals were tempered by Chinese selling into international markets. The price of zinc closed the year at 47.4¢/lb.

Zinc stocks began the year at 1 114 000 t, including 664 700 t on the LME. Although LME stocks continued to fall throughout 1996, the rate of the reduction slowed, particularly during the period from July to mid-October. Although LME stocks dropped by 520 500 t in 1995, they fell by only 157 900 t in 1996. Total stocks stood at 912 000 t at the end of the year, representing 6.3 weeks of world consumption, including 506 800 t on the LME.

Figure 3
LME Zinc Stocks vs. LME Settlement Prices, 1994-96



Source: Reuters.

Note: End-of-month data.

OUTLOOK

An increase of 3.1% in world zinc consumption in 1997 to 7 769 000 t is forecast, following a slight increase in 1996. An upturn in European zinc demand is forecast for 1997 with strong growth continuing in Asia, particularly Korea. In contrast, only slight increases are predicted for the United States and China, with demand remaining static in Japan.

Worldwide, galvanizing will remain the dominant end use for zinc, followed by brass and bronze manufacture and then by zinc-based alloys, including die-casting. In Canada, die-casting will remain the second most important end use of zinc after galvanizing. Although currently among the least developed end uses of zinc in China, die-casting is expected to grow rapidly in that country as the toy, automobile and household appliance industries expand, thereby increasing the demand for zinc.

World mine production of zinc is expected to reach 7 200 000 t in 1997, 2.5% higher than in 1996 but lower than previous forecasts due to a number of temporary suspensions and cutbacks announced in late 1996 and in January 1997. World zinc metal production is forecast to increase by 3.6% in 1997 to 7 582 000 t after a slight decrease in 1996.

With continued low zinc prices, a number of temporary suspensions announced late in 1996 and early 1997 will lower the availability of zinc concentrate, adding to a strong metal deficit already predicted for

1997. Beyond 1997, much will depend on the fate of the large Century zinc-lead project in Australia with its expected zinc capacity of 450 000 t/y of zinc in concentrate. However, further exploration successes, like those recently at the Red Dog mine in Alaska, will likely ensure adequate zinc concentrate supplies in the longer term.

The high rate of capacity utilization seen in zinc smelters in recent years will likely continue in 1997. Zinc metal production is not expected to meet demand and the difference will be reflected in a continued decline in stocks, particularly on the LME. Stocks, which represented 6.3 weeks of world consumption at the end of 1996, should drop to about 5 weeks by the end of 1997. This, combined with continued strong world demand and increased speculative activity, should result in an improvement in zinc prices. The average price of zinc in 1997 is forecast to be US54¢/lb.

Beyond 1997, world zinc consumption is forecast to grow by an average 2.8%/y to 2005. Demand will be strongest in Asia (with the exception of Japan), with China, Thailand and Korea being particularly strong. Strong industrial growth is expected to take place in Asia as infrastructure and manufacturing expand to meet the need for consumer goods and services. As a result, the per capita use of zinc in Asia, which is currently about one seventh of that in Europe, is expected to rise steadily. An increased use of zinc in Asia will also likely result from the continued shifting of operations away from countries with high labour costs and strong currencies.

A limited amount of additional smelter capacity in the West is expected before 2000 compared to planned new mine capacity. According to the ILZSG's *New Mine and Smelter Projects* report for committed smelter projects expected to come on stream in this period, a net difference of 376 000 t is indicated. Also, lower capacity utilization in China is forecast due to rising production costs. These factors will likely lead to a continued reduction in stock levels and upward pressure on prices. This should result in a gradual increase in prices from a range, in constant cents, of US54¢-64¢/lb in 1998 to US62¢-72¢/lb by 2003. A decline for the remainder of the forecast period to US52¢-62¢/lb by 2005 is then predicted due to a cyclical downturn in zinc markets.

Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 70. (2) Information in this review was current as of January 31, 1997.

TARIFFS

| Item No. | Description | Canada | | | United States | EU | Japan ¹ |
|--------------------------|---|--------|------|------|-------------------------|----------|--------------------|
| | | MFN | GPT | USA | Canada | MFN | GATT |
| 2603.00 2603.00.00.30 | Copper ores and concentrates Zinc content | Free | Free | Free | Free | Free | Free |
| 2607.00 2607.00.00.30 | Lead ores and concentrates Zinc content | Free | Free | Free | 0.1¢/kg on lead content | Free | Free |
| 2608.00 2608.00.00.30 | Zinc ores and concentrates Zinc content | Free | Free | Free | 0.1¢/kg on lead content | Free | Free |
| 2616.10 2616.10.00.30 | Silver ores and concentrates Zinc content | Free | Free | Free | Free | Free | Free |
| 26.20 | Ash and residues (other than from the manufacture of iron or steel), containing metals or metallic compounds, containing mainly zinc | | | | | | |
| 2620.11 | Hard zinc spelter | Free | Free | Free | 0.1% | Free | Free |
| 2817.00 | Zinc oxide; zinc peroxide | 9% | Free | 1% | Free | 9.4% | 4.8% |
| 28.33 | Sulphates; alums; peroxosulphates (persulphates) | | | | | | |
| 2833.26 | Of zinc | Free | Free | Free | Free | 6.9% | 4.3% |
| 79.01 | Unwrought zinc | | | | | | |
| 7901.11 | Zinc, not alloyed: Containing by weight 99.99% or more of zinc | Free | Free | Free | 0.1% | 2.5% | 4.8-6.52 yen/kg |
| 7901.12 | Containing by weight less than 99.99% of zinc | Free | Free | Free | 0.1-1.9% | 2.5-2.9% | 4.8-6.52 yen/kg |
| 7901.20 | Zinc alloys: | | | | | | |
| 7901.20.10 | Containing by weight 90% or more but less than 97.5% of zinc | Free | Free | Free | 1.9% | 2.5% | 6-6.4 yen/kg |
| 7901.20.20 | Containing by weight less than 90% of zinc | 8.8% | 6% | 1.7% | 1.9% | 2.5% | Free-6 yen/kg |
| 7902.00 | Zinc waste and scrap | Free | Free | Free | Free | Free | 1.1% |
| 79.03 | Zinc dust, powders and flakes | | | | | | |
| 7903.10 | Zinc dust | Free | Free | Free | Free | 3.3% | 4.7% |
| 7903.90 | Other: | | | | | | |
| 7903.90.10 | Powders, not alloyed | Free | Free | 0.4% | Free | 3.3% | 4.7% |
| 7903.90.20 | Alloyed powders; flakes | Free | Free | 1% | 0.9% | 3.3% | 4.7% |
| 7904.00 | Zinc bars, rods, profiles and wires | | | | | | |
| 7904.00.10 | Bars, rods or profiles, containing by weight 90% or more of zinc | Free | Free | Free | 0.4% | 6.2% | 4.1% |
| 7904.00.21 | Bars, rods or profiles; wire, coated or covered | 4% | 1% | 1% | 0.4% | 6.2% | 4.1% |
| 7904.00.22 | Wire, not coated or covered | 4% | 1% | 0.8% | 0.4% | 6.2% | 4.1% |
| 7905.00 | Zinc plates, sheets, strip and foil containing by weight 90% or more of zinc | | | | | | |
| 7905.00.11 | Of a thickness exceeding 0.15 mm but less than 4.75 mm, for making offset printing plates; of a thickness exceeding 0.15 mm but less than 4.75 mm, not polished, coated on one side with acid-resisting material, imported for use by grinders and polishers, to be prepared for use in photo-engraving | Free | Free | Free | 0.4% | 6.2% | 5.5% |
| 7905.00.19 | Other: | 3.1% | 1% | 0.5% | 0.4% | 6.2% | 5.5% |
| 7905.00.20 | Containing by weight less than 90% of zinc | 3.1% | 1% | 1% | 0.4% | 6.2% | 5.5% |
| 7906.00 | Zinc tubes, pipes, and tube or pipe fittings (for example, couplings, elbows, sleeves) | 3.2% | 1% | 1% | 0.3% | 6.2% | 4.1% |
| 7907.00 | Other articles of zinc | | | | | | |
| 7907.00.10 | Gutters, roof capping, skylight frames and other fabricated building components | 5.9% | 3% | 1% | 0.3-0.5% | 5.8% | 4.1% |
| 7907.00.20 | Anodes for electroplating | Free | Free | Free | 0.3-0.5% | 5.8% | 4.7% |
| 7907.00.30 | Discs or slugs, containing by weight 90% or more of zinc | 4% | Free | 0.5% | 0.3-0.5% | 5.8% | 4.7% |
| 7907.00.90 | Other | 5.9% | 4% | 1% | 0.3-0.5% | 5.8% | 4.7% |

Sources: Customs Tariff, effective January 1997, Revenue Canada; Harmonized Tariff Schedule of the United States, 1997; The "Bulletin International des Douanes," Journal Number 14 (18th Edition), European Union, 1995-1996, "Conventional" column; Customs Tariff Schedules of Japan, 1996.

¹ GATT rate is shown; lower tariff rates may apply circumstantially.

Note: Where there is a tariff "range," a complete match of the HS code was not available; therefore, the high and low for the product in question are shown.

TABLE 1. CANADA, ZINC PRODUCTION AND TRADE, 1995 AND 1996, AND CONSUMPTION, 1993-95

| Item No. | 1995 | | 1996P | | |
|--------------------------|---|-----------|-----------|-----------|---------|
| | (tonnes) | (\$000) | (tonnes) | (\$000) | |
| PRODUCTION | | | | | |
| All forms ¹ | | | | | |
| New Brunswick | 330 760 | 468 026 | 291 860 | 405 977 | |
| Quebec | 171 578 | 242 783 | 200 290 | 278 603 | |
| Ontario | 155 523 | 220 065 | 120 028 | 166 959 | |
| Manitoba | 78 478 | 111 047 | 88 778 | 123 490 | |
| British Columbia | 135 912 | 192 315 | 157 521 | 219 111 | |
| Yukon | 42 293 | 59 844 | 145 335 | 202 160 | |
| Northwest Territories | 180 159 | 254 925 | 184 018 | 255 969 | |
| Total | 1 094 703 | 1 549 004 | 1 187 829 | 1 652 270 | |
| Mine output ² | 1 121 172 ^r | .. | 1 234 563 | .. | |
| Refined ³ | 720 346 ^r | .. | 715 553 | .. | |
| EXPORTS | | | | | |
| 2608.00.30 | Zinc content in zinc ores and concentrates | | | | |
| | Germany | 108 531 | 94 014 | 111 220 | 114 033 |
| | Belgium | 140 920 | 86 681 | 133 601 | 82 951 |
| | Spain | 76 191 | 61 219 | 100 581 | 66 284 |
| | South Korea | 40 547 | 17 958 | 78 128 | 38 924 |
| | Finland | 48 288 | 43 587 | 28 521 | 36 050 |
| | Italy | 42 777 | 28 543 | 51 241 | 31 921 |
| | China | - | - | 64 419 | 23 580 |
| | Japan | 21 660 | 11 504 | 34 569 | 22 448 |
| | Sweden | 12 609 | 16 477 | 15 463 | 21 125 |
| | Norway | 19 148 | 15 693 | 16 221 | 16 654 |
| | Other countries | 93 736 | 72 080 | 72 772 | 53 935 |
| | Total | 604 407 | 447 756 | 706 736 | 507 905 |
| 2600.00 | Zinc content in other ores and concentrates ⁴ | | | | |
| | | 5 167 | 1 548 | 1 699 | 878 |
| 2603.00.30 | Zinc content in copper | | | | |
| | | - | - | - | - |
| 2607.00.30 | Zinc content in lead | | | | |
| | | 5 167 | 1 548 | 1 608 | 717 |
| 2616.10.30 | Zinc content in silver | | | | |
| | | - | - | 91 | 161 |
| 2620.11 | Ash and residues containing hard zinc spelter | | | | |
| | United States | 5 | 2 | 176 | 192 |
| | India | 202 | 149 | 59 | 52 |
| | Total | 207 | 151 | 235 | 244 |
| 2620.19 | Ash and residues containing mainly zinc, n.e.s. | | | | |
| | United States | 8 848 | 8 006 | 10 927 | 10 149 |
| | India | 1 299 | 993 | 235 | 199 |
| | Taiwan | 81 | 103 | 41 | 47 |
| | South Korea | 86 | 139 | 51 | 26 |
| | Total | 10 314 | 9 241 | 11 254 | 10 421 |
| 2817.00 | Zinc oxide; zinc peroxide | | | | |
| | United States | 24 788 | 39 554 | 28 561 | 43 749 |
| | Brazil | 405 | 681 | 276 | 482 |
| | Japan | 15 | 29 | 219 | 394 |
| | Netherlands | 54 | 91 | 108 | 166 |
| | Hong Kong | 36 | 73 | 72 | 118 |
| | Other countries | 38 | 61 | 138 | 224 |
| | Total | 25 336 | 40 489 | 29 374 | 45 133 |
| 2833.26 | Zinc sulphate | | | | |
| | | 35 | 91 | 41 | 148 |
| 7901.11 | Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc | | | | |
| | United States | 281 132 | 424 726 | 367 667 | 549 101 |
| | Taiwan | 11 577 | 16 222 | 13 452 | 19 878 |
| | Philippines | 3 389 | 5 083 | 12 103 | 18 230 |
| | Indonesia | 2 058 | 5 381 | 9 836 | 15 464 |
| | Japan | 3 645 | 5 327 | 6 826 | 10 208 |
| | Hong Kong | 1 684 | 2 481 | 3 757 | 5 523 |
| | Malaysia | 316 | 579 | 2 719 | 4 236 |
| | Singapore | 2 595 | 3 819 | 2 783 | 3 918 |
| | Thailand | 1 817 | 2 699 | 2 526 | 3 912 |
| | Other countries | 3 408 | 5 153 | 2 588 | 3 744 |
| | Total | 311 621 | 471 470 | 424 257 | 634 214 |

TABLE 1 (cont'd)

| Item No. | | 1995 | | 1996P | |
|-------------------------|---|----------------------|----------------------|----------|---------|
| | | (tonnes) | (\$000) | (tonnes) | (\$000) |
| EXPORTS (cont'd) | | | | | |
| 7901.12 | Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc | | | | |
| | United States | 186 520 ^r | 287 166 ^r | 135 208 | 204 152 |
| | Hong Kong | 2 079 | 3 432 | 5 723 | 8 965 |
| | New Zealand | 1 917 | 2 638 | 4 147 | 5 791 |
| | Japan | 2 059 | 3 102 | 3 529 | 5 673 |
| | Taiwan | 11 636 | 15 638 | 3 472 | 5 344 |
| | Indonesia | 8 547 | 8 965 | 2 110 | 4 819 |
| | Philippines | 4 346 | 6 000 | 1 137 | 1 859 |
| | Thailand | 1 543 | 2 088 | 644 | 1 154 |
| | Other countries | 2 912 | 3 266 | 1 377 | 2 590 |
| | Total | 221 559 ^r | 332 295 ^r | 157 347 | 240 347 |
| 7901.20 | Zinc alloys, unwrought | | | | |
| | China | 104 | 93 | 127 | 213 |
| | United States | 2 | 4 | 21 | 42 |
| | Australia | — | — | ... | 28 |
| | Hong Kong | 1 311 | 1 489 | — | — |
| | Other countries | 1 348 | 1 509 | — | — |
| | Total | 2 765 | 3 095 | 148 | 283 |
| 7902.00 | Zinc waste and scrap | | | | |
| | United States | 38 946 | 25 795 | 27 587 | 15 009 |
| | Taiwan | 1 996 | 2 069 | 681 | 666 |
| | China | — | — | 106 | 112 |
| | Other countries | 321 | 250 | 107 | 85 |
| | Total | 41 263 | 28 114 | 28 481 | 15 872 |
| 7903.10 | Zinc dust | | | | |
| | United States | 4 878 | 11 317 | 4 567 | 9 582 |
| | Other countries | 45 | 48 | — | — |
| | Total | 4 923 | 11 365 | 4 567 | 9 582 |
| 7903.90 | Zinc powders and flakes | | | | |
| | United States | 2 414 | 3 905 | 1 662 | 2 998 |
| | Other countries | 20 | 52 | 69 | 144 |
| | Total | 2 434 | 3 957 | 1 731 | 3 142 |
| 7904.00 | Zinc bars, rods, profiles and wire | | | | |
| | United States | 25 ^r | 192 ^r | 64 | 303 |
| | Other countries | — | — | 57 | 59 |
| | Total | 25 ^r | 192 ^r | 121 | 362 |
| 7905.00 | Zinc plates, sheets, strip and foil | | | | |
| | United States | 64 | 254 | 29 | 224 |
| | Total | 64 | 254 | 29 | 224 |
| 7906.00 | Zinc pipes or tubes and fittings | | | | |
| | United States | 475 | 6 956 | 638 | 6 198 |
| | Total | 475 | 6 956 | 638 | 6 198 |
| 7907.00 | Other articles of zinc | | | | |
| | United States | 1 717 | 10 439 | 1 705 | 9 735 |
| | Other countries | 64 | 270 | 149 | 387 |
| | Total | 1 781 | 10 709 | 1 854 | 10 122 |
| IMPORTS | | | | | |
| 2608.00.00.30 | Zinc content in zinc ores and concentrates | 176 628 | 115 331 | 181 783 | 86 660 |
| 2603.00.00.30 | Zinc content in copper ores and concentrates | 100 | 135 | 31 | 19 |
| 2607.00.00.30 | Zinc content in lead ores and concentrates | — | — | 362 | 312 |
| 2616.10.00.30 | Zinc content in silver ores and concentrates | 7 205 | 5 109 | 4 711 | 3 410 |
| 2620.11 | Ash and residues containing hard zinc spelter | — | — | ... | 1 |
| 2620.19 | Ash and residues containing mainly zinc, n.e.s. | 340 | 250 | 178 | 159 |
| 2817.00 | Zinc oxide; zinc peroxide | 5 956 | 7 962 | 6 357 | 7 432 |
| 2833.26 | Zinc sulphate | 3 238 | 2 278 | 4 581 | 2 894 |

TABLE 1 (cont'd)

| Item No. | | 1995 | | 1996 ^P | |
|-------------------------|---|----------|---------|-------------------|---------|
| | | (tonnes) | (\$000) | (tonnes) | (\$000) |
| IMPORTS (cont'd) | | | | | |
| 7901.11 | Zinc, not alloyed, unwrought, containing by weight 99.99% or more of zinc | 3 443 | 5 491 | 1 585 | 2 405 |
| 7901.12 | Zinc, not alloyed, unwrought, containing by weight less than 99.99% of zinc | 510 | 800 | 655 | 957 |
| 7901.20 | Zinc alloys, unwrought | 7 814 | 13 860 | 9 411 | 15 836 |
| 7902.00 | Zinc waste and scrap | 2 128 | 1 794 | 2 132 | 1 970 |
| 7903.10 | Zinc dust | 491 | 868 | 536 | 1 154 |
| 7903.90 | Zinc powders and flakes | 667 | 1 322 | 1 114 | 1 960 |
| 7904.00 | Zinc bars, rods, profiles and wire | 514 | 1 501 | 691 | 1 714 |
| 7905.00 | Zinc plates, sheets, strip and foil | 647 | 2 013 | 720 | 2 098 |
| 7906.00 | Zinc pipes and tubes or pipe fittings | 1 353 | 6 221 | 1 217 | 6 248 |
| 7907.00 | Other articles of zinc | 3 883 | 13 729 | 3 954 | 16 175 |
| | Total Imports | 214 917 | 178 664 | 220 018 | 151 404 |

| | 1993 ^a | | | 1994 | | | 1995 | | |
|--|-------------------|-----------|---------|---------|-----------|---------|---------|-----------|---------|
| | Primary | Secondary | Total | Primary | Secondary | Total | Primary | Secondary | Total |
| | (tonnes) | | | | | | | | |
| CONSUMPTION^{5,6} | | | | | | | | | |
| Zinc used for or in the production of: | | | | | | | | | |
| Copper alloys (brass, bronze, etc.) | x | x | 2 850 | x | x | 3 536 | x | x | 3 402 |
| Galvanizing: electro | x | x | 2 205 | x | x | 1 746 | x | x | 1 923 |
| hot dip | x | x | 62 750 | x | x | 67 179 | x | x | 72 419 |
| Zinc die-cast alloys | x | x | 20 557 | x | x | 25 936 | x | x | 29 206 |
| Other products (including rolled and ribbon zinc, zinc oxides) | x | x | 24 071 | x | x | 26 494 | x | x | 26 455 |
| Total | 108 687 | 3 745 | 112 432 | 122 502 | 2 388 | 124 890 | 131 255 | 2 151 | 133 406 |
| Consumer stocks, year-end | 9 084 | 610 | 9 694 | 8 093 | 414 | 8 507 | 8 583 | 60 | 8 643 |

Sources: Natural Resources Canada; Statistics Canada.

- Nil; . . Not available; . . . Amount too small to be expressed; n.e.s. Not elsewhere specified; P Preliminary; r Revised; x Confidential.

^a Increase in number of companies being surveyed.

¹ New refined zinc produced from domestic primary materials (concentrates, slags, residues, etc.) plus estimated recoverable zinc in ores and concentrates shipped for export. ² Zinc content of ores and concentrates produced. ³ Refined zinc produced from domestic and imported ores. ⁴ Includes HS classes 2603.00.30, 2607.00.30 and 2616.10.30. ⁵ Consumer survey does not represent 100% of Canadian consumption and is therefore consistently less than apparent consumption. ⁶ Due to sensitivity in some end-use categories, a breakdown of primary and secondary sources is not provided in order to be consistent.

Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, ZINC PRODUCTION AND EXPORTS,¹ 1975, 1980 AND 1985-96

| | Production | | Exports | | |
|-------------------|------------------------|----------------------|--------------------------|----------------------|------------------------|
| | All Forms ² | Refined ³ | In Ores and Concentrates | Refined | Total |
| | (tonnes) | | | | |
| 1975 | 1 055 151 | 426 902 | 705 088 | 247 474 | 952 562 |
| 1980 | 883 697 | 591 565 | 434 178 | 471 949 | 906 127 |
| 1985 | 1 049 275 | 692 406 | 396 103 | 555 621 | 951 724 |
| 1986 | 988 173 | 570 981 | 450 249 | 427 176 | 877 425 |
| 1987 | 1 157 936 | 609 909 | 613 185 | 441 227 | 1 054 412 |
| 1988 | 816 885 | 703 206 | 816 885 | 551 521 | 1 368 407 |
| 1989 | 614 223 | 669 677 | 614 223 | 495 060 | 1 109 284 |
| 1990 | 716 185 | 591 786 | 716 185 | 452 251 | 1 168 436 |
| 1991 | 566 815 | 660 552 | 566 815 | 520 508 | 1 087 323 |
| 1992 | 678 172 | 671 702 | 678 172 | 509 744 | 1 187 916 |
| 1993 | 455 953 | 659 881 | 455 953 | 493 265 | 949 218 |
| 1994 | 976 309 | 690 965 | 450 320 | 551 168 | 1 001 488 |
| 1995 | 1 094 703 | 720 346 ^r | 609 575 | 533 180 ^r | 1 142 755 ^r |
| 1996 ^p | 1 187 829 | 715 553 | 708 435 | 581 604 | 1 290 039 |

Sources: Natural Resources Canada; Statistics Canada.

^p Preliminary; ^r Revised.

¹ Beginning in 1988, exports are based on the new Harmonized System and may not be in complete accordance with previous method of reporting. Ores and concentrates include HS classes 2608.00.30, 2603.00.30, 2607.00.30 and 2616.10.30. Refined includes HS classes 7901.11 and 7901.12. ² New refined zinc produced from domestic primary materials (concentrates, slags, residues, etc.) plus estimated recoverable zinc in ores and concentrates shipped for export. ³ Refined zinc produced from domestic and imported ores.

TABLE 3. WESTERN WORLD, PRIMARY ZINC STATISTICS, 1992-96

| | 1992 | 1993 | 1994 | 1995 | 1996 ^p |
|--------------------------------|--------------|-------|-------|-------|-------------------|
| | (000 tonnes) | | | | |
| Mine production (zinc content) | 5 699 | 5 249 | 5 172 | 5 318 | 5 596 |
| Metal production | 5 445 | 5 468 | 5 374 | 5 474 | 5 469 |
| Metal consumption | 5 390 | 5 558 | 5 862 | 6 279 | 6 281 |

Source: International Lead and Zinc Study Group.

^p Preliminary.

TABLE 4. WORLD MINE PRODUCTION OF ZINC, 1992-96

| | 1992 | 1993 | 1994 | 1995 | 1996 ^p |
|----------------------|--------------|-------|-------|-------|-------------------|
| | (000 tonnes) | | | | |
| EUROPE | | | | | |
| Finland | 31 | 22 | 17 | 16 | 26 |
| Ireland | 194 | 194 | 194 | 184 | 164 |
| Poland | 152 | 151 | 151 | 155 | 153 |
| Russia | 158 | 154 | 147 | 131 | 130 |
| Spain | 208 | 171 | 151 | 172 | 143 |
| Sweden | 171 | 167 | 160 | 169 | 161 |
| Others | 246 | 188 | 148 | 145 | 142 |
| Subtotal | 1 160 | 1 047 | 968 | 972 | 919 |
| AFRICA | | | | | |
| Morocco | 23 | 66 | 79 | 80 | 78 |
| Namibia | 36 | 28 | 33 | 30 | 33 |
| South Africa | 72 | 78 | 76 | 74 | 77 |
| Others | 70 | 31 | 17 | 43 | 43 |
| Subtotal | 201 | 203 | 205 | 227 | 231 |
| OCEANIA | | | | | |
| Australia | 1 014 | 1 007 | 928 | 882 | 1 016 |
| AMERICAS | | | | | |
| Bolivia | 144 | 123 | 101 | 146 | 153 |
| Brazil | 119 | 138 | 146 | 136 | 136 |
| Canada | 1 325 | 1 004 | 1 011 | 1 121 | 1 235 |
| Mexico | 352 | 370 | 381 | 364 | 390 |
| Peru | 626 | 668 | 690 | 690 | 753 |
| United States | 551 | 513 | 598 | 644 | 606 |
| Others | 104 | 85 | 81 | 87 | 103 |
| Subtotal | 3 221 | 2 901 | 3 008 | 3 188 | 3 376 |
| ASIA | | | | | |
| China | 758 | 775 | 990 | 1 011 | 790 |
| India | 153 | 156 | 147 | 154 | 152 |
| Iran | 66 | 77 | 75 | 62 | 62 |
| Japan | 134 | 119 | 101 | 95 | 81 |
| Kazakstan | 258 | 207 | 152 | 155 | 165 |
| Korea, D.P.R. | 120 | 110 | 90 | 90 | 80 |
| Thailand | 69 | 69 | 59 | 14 | 21 |
| Turkey | 32 | 32 | 34 | 65 | 73 |
| Others | 74 | 62 | 53 | 41 | 41 |
| Subtotal | 1 664 | 1 607 | 1 701 | 1 687 | 1 465 |
| Total, World | 7 260 | 6 765 | 6 810 | 6 956 | 7 007 |
| Total, Western World | 5 699 | 5 249 | 5 172 | 5 318 | 5 596 |

Source: International Lead and Zinc Study Group.
^p Preliminary.

TABLE 5. WORLD ZINC METAL PRODUCTION, 1992-96

| | 1992 | 1993 | 1994 | 1995 | 1996p |
|----------------------|--------------|-------|-------|-------|-------|
| | (000 tonnes) | | | | |
| EUROPE | | | | | |
| Belgium | 217 | 210 | 211 | 211 | 208 |
| Finland | 171 | 170 | 173 | 177 | 176 |
| France | 304 | 310 | 309 | 314 | 324 |
| Germany | 383 | 381 | 360 | 322 | 327 |
| Italy | 253 | 254 | 256 | 260 | 262 |
| Netherlands | 218 | 214 | 212 | 208 | 211 |
| Poland | 130 | 134 | 137 | 131 | 135 |
| Russia | 186 | 203 | 138 | 166 | 180 |
| Spain | 368 | 342 | 296 | 364 | 363 |
| Others | 245 | 272 | 261 | 274 | 313 |
| Subtotal | 2 610 | 2 639 | 2 511 | 2 591 | 2 663 |
| AFRICA | | | | | |
| Algeria | 25 | 29 | 24 | 24 | 24 |
| South Africa | 83 | 96 | 94 | 99 | 99 |
| Others | 26 | 11 | 1 | — | — |
| Subtotal | 134 | 136 | 119 | 123 | 123 |
| AMERICAS | | | | | |
| Argentina | 35 | 31 | 35 | 35 | 38 |
| Brazil | 180 | 183 | 198 | 197 | 163 |
| Canada | 672 | 670 | 691 | 720 | 716 |
| Mexico | 151 | 209 | 209 | 223 | 223 |
| Peru | 126 | 159 | 161 | 160 | 172 |
| United States | 400 | 382 | 356 | 363 | 366 |
| Subtotal | 1 564 | 1 634 | 1 650 | 1 699 | 1 678 |
| ASIA | | | | | |
| China | 719 | 857 | 1 017 | 1 077 | 1 119 |
| India | 137 | 150 | 157 | 159 | 151 |
| Japan | 729 | 696 | 666 | 664 | 597 |
| Kazakstan | 261 | 224 | 172 | 165 | 165 |
| Korea, D.R.P. | 120 | 115 | 100 | 100 | 90 |
| Korea, Republic of | 253 | 270 | 271 | 279 | 287 |
| Others | 169 | 157 | 149 | 151 | 146 |
| Subtotal | 2 388 | 2 469 | 2 532 | 2 595 | 2 555 |
| OCEANIA | | | | | |
| Australia | 332 | 317 | 318 | 322 | 327 |
| Total, World | 7 028 | 7 195 | 7 130 | 7 330 | 7 354 |
| Total, Western World | 5 445 | 5 468 | 5 374 | 5 474 | 5 469 |

Source: International Lead and Zinc Study Group.
 — Nil; P Preliminary.

TABLE 6. WORLD ZINC CONSUMPTION, 1992-96

| | 1992 | 1993 | 1994 | 1995 | 1996p |
|----------------------|--------------|-------|-------|-------|-------|
| | (000 tonnes) | | | | |
| EUROPE | | | | | |
| Belgium | 189 | 211 | 225 | 250 | 250 |
| France | 258 | 219 | 241 | 272 | 250 |
| Germany | 532 | 495 | 519 | 505 | 495 |
| Italy | 300 | 300 | 320 | 345 | 337 |
| Russia | 260 | 164 | 114 | 130 | 142 |
| Spain | 112 | 119 | 139 | 179 | 180 |
| United Kingdom | 190 | 196 | 206 | 224 | 219 |
| Others | 573 | 572 | 558 | 595 | 598 |
| Subtotal | 2 414 | 2 276 | 2 322 | 2 500 | 2 471 |
| AFRICA | | | | | |
| South Africa | 85 | 87 | 92 | 95 | 94 |
| Others | 54 | 64 | 55 | 60 | 63 |
| Subtotal | 139 | 151 | 147 | 155 | 157 |
| OCEANIA | | | | | |
| Australia | 119 | 142 | 173 | 180 | 177 |
| New Zealand | 19 | 21 | 24 | 24 | 24 |
| Subtotal | 138 | 163 | 197 | 204 | 201 |
| AMERICAS | | | | | |
| Brazil | 112 | 126 | 147 | 174 | 180 |
| Canada | 126 | 134 | 147 | 148 | 151 |
| Mexico | 107 | 111 | 118 | 119 | 153 |
| United States | 1 043 | 1 224 | 1 176 | 1 241 | 1 218 |
| Others | 135 | 143 | 147 | 147 | 150 |
| Subtotal | 1 523 | 1 638 | 1 735 | 1 829 | 1 852 |
| ASIA | | | | | |
| China | 551 | 530 | 655 | 750 | 760 |
| India | 140 | 155 | 192 | 202 | 214 |
| Japan | 784 | 719 | 721 | 752 | 724 |
| Korea, Republic of | 272 | 301 | 318 | 350 | 372 |
| Taiwan | 128 | 171 | 170 | 205 | 193 |
| Others | 466 | 509 | 522 | 583 | 601 |
| Subtotal | 2 341 | 2 385 | 2 578 | 2 842 | 2 864 |
| Total, World | 6 555 | 6 613 | 6 979 | 7 530 | 7 545 |
| Total, Western World | 5 390 | 5 558 | 5 862 | 6 279 | 6 281 |

Source: International Lead and Zinc Study Group.
 P Preliminary.

TABLE 7. CANADA, ZINC METAL CAPACITY, 1996

| Company and Location | Annual Rated Capacity |
|---|-----------------------------------|
| | (000 tonnes of slab zinc) |
| PRIMARY | |
| Canadian Electrolytic Zinc Limited (CEZ) Valleyfield, Quebec | 230 |
| Falconbridge Limited Timmins, Ontario | 133 |
| Hudson Bay Mining and Smelting Co., Limited (HBMS) Flin Flon, Manitoba | 95 |
| Cominco Ltd. Trail, British Columbia | 272 |
| Total primary, Canada | 730 |
| SECONDARY | |
| Federated Genco Ltd. Burlington, Ontario | Closed |
| Purity Zinc Metals Co. Ltd. Stoney Creek, Ontario | Phasing out secondary refining |
| Total secondary, Canada | — |

Source: Natural Resources Canada.
— Nil.

TABLE 8. MONTHLY AVERAGE ZINC PRICES, 1995 AND 1996

| | North American Special High Grade | LME Special High Grade Settlement |
|--------------|---|---|
| | (US¢/lb) | |
| 1995 | | |
| January | 60.9 | 52.5 |
| February | 55.8 | 46.8 |
| March | 54.5 | 46.4 |
| April | 55.3 | 48.1 |
| May | 54.0 | 47.0 |
| June | 52.0 | 45.8 |
| July | 52.4 | 46.6 |
| August | 51.2 | 46.0 |
| September | 50.0 | 44.7 |
| October | 49.7 | 44.4 |
| November | 52.0 | 46.8 |
| December | 50.1 | 46.2 |
| Year average | 53.2 | 46.8 |
| 1996 | | |
| January | 50.6 | 46.2 |
| February | 50.7 | 47.0 |
| March | 51.2 | 48.3 |
| April | 50.6 | 47.4 |
| May | 50.5 | 47.0 |
| June | 49.6 | 45.8 |
| July | 49.9 | 45.4 |
| August | 51.3 | 45.7 |
| September | 51.4 | 45.4 |
| October | 51.1 | 45.5 |
| November | 53.3 | 47.5 |
| December | 52.8 | 47.0 |
| Year average | 51.1 | 46.5 |

Sources: *Metals Week*; Reuters.