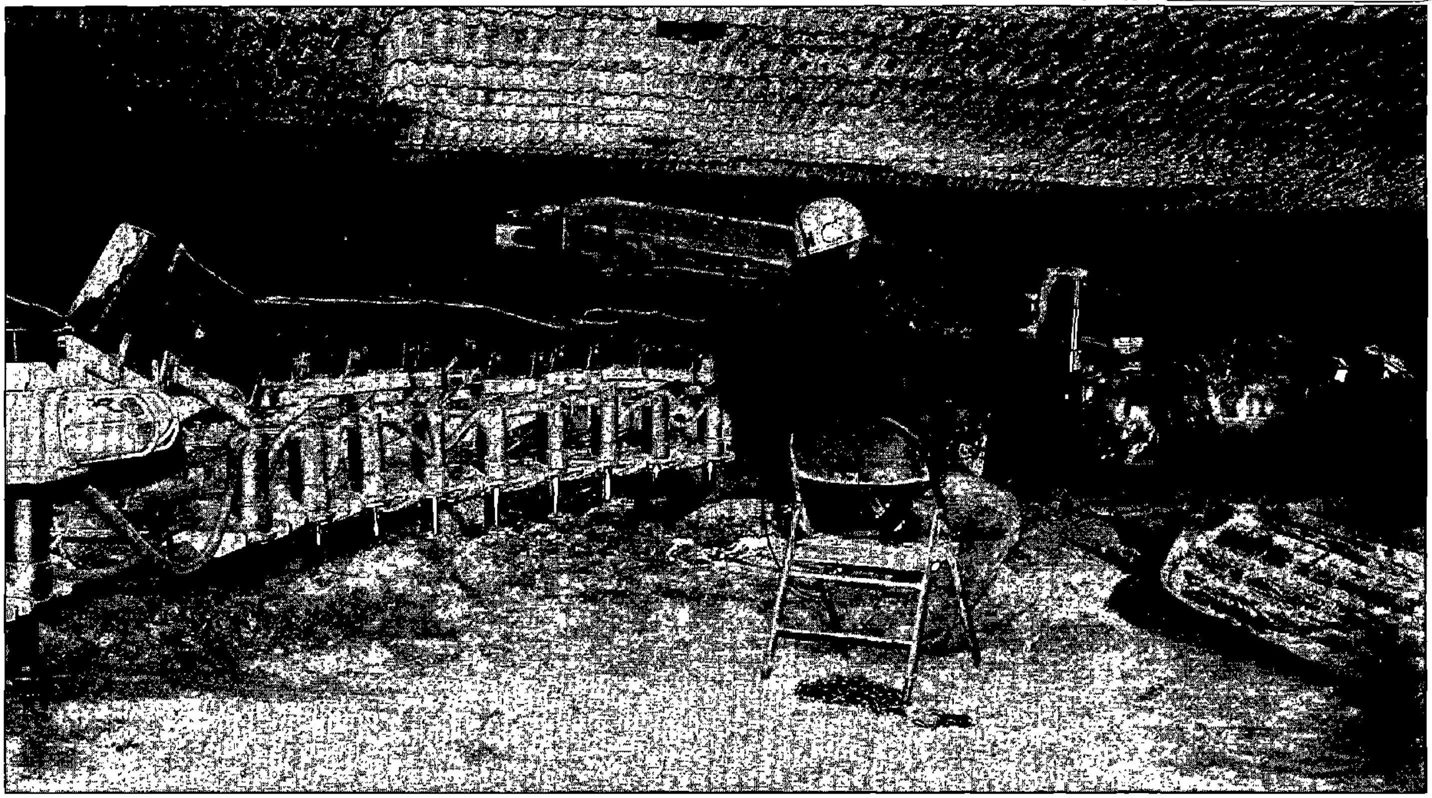
ANNUAL REPORT



POTASH

By James P. Searls

1993

U.S. DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

ANNUAL REPORT

PB94-213956

POTASH

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OF THE
INTERIOR

Bruce Babbitt
Secretary

BUREAU
OF
MINES

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COVER PHOTO:
The new continuous miners for 1.2-m (4-foot) high potash zones in Carlsbad, NM. (Photo courtesy of Mississippi Potash, Inc.)

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POTASH

By James P. Searls

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Potash is the third of the three essential nutrients for plant growth, fixed nitrogen, phosphorus, and potassium. There are no substitutes for these elements in lifeforms on this Earth. As fertilizers they are essential to the intensive agriculture system, which has allowed more people to live on the production of more food from less crop area.

U.S. potash production in terms of potassium oxide (K_2O) equivalent decreased about 12% compared with that of 1992 because of the permanent closure of a Carlsbad, NM, muriate of potash mine. Apparent consumption increased about 2% in spite of the summer floods because of relatively greater autumn applications of potash. Prices increased less than 2% owing to larger amounts of sulfate of potash (SOP) and sulfate of potash magnesia being sold relative to muriate of potash sales and the much higher unit prices for SOP and sulfate of potash magnesia. Yearend producers' stocks increased about 8% in terms of tons, K_2O.

DOMESTIC DATA COVERAGE

The U.S. Bureau of Mines developed potash domestic data from voluntary semiannual surveys of U.S. operations. Of the 12 survey requests sent to operations in the first half of the year, 10 responded, and data concerning the 11th was provided by another U.S. Department of the Interior agency. In the second half of the year, the 11th company was not in production. The 12th operation was estimated in both the first and second half of the year. Responses to the U.S. Bureau of Mines surveys and data from another agency provided about 97% of total production shown in table 3.

ANNUAL REVIEW

Issues

A muriate of potash operation closed permanently in April, and a receiver occupied the premises. The receiver sold movable equipment, but not plant or real estate, by auction in December. The holder of the bond for reclamation and abandonment refused to perform under the bond at the end of the year.

The Carlsbad potash industry considered an antidumping action against the former U.S.S.R. but filed a petition to the President under Section 406(d) of the Trade Act of 1974 for consultations with Belarus, Russia, and Ukraine. The Russian Foreign Economic Relations Ministry agreed to the concept of consultations, but consultations were not held concerning potash in 1993.

The suspension of the antidumping investigation against the Canadian potash producers by the U.S. Department of Commerce, International Trade Agency, was continued for another year.

Several civil antitrust lawsuits were filled in California, Illinois, Minnesota, and New York in April. The cases were consolidated into one case in the Federal District Court in St. Paul, MN, where all information from a former employee for Potash Corp. of Saskatchewan (PCS) was considered tainting and disqualifying; all lawyers having direct or indirect contact with the former General Counsel were disqualified.

The U.S. Department of Justice, Anti-Trust Division, convened a grand jury in Cleveland, OH, to hear evidence concerning allegations of antitrust behavior by U.S. producers. Subpoenas were issued for company records concerning possible criminal activity.

Production

Domestic potash production, in terms of K_2O content, declined about 12% to 1.5 million metric tons[1] in 1993 from that in 1992. *(See tables 1 and 2.)* Of the total production for the year, 66% was standard, coarse, and granular muriate of potash (MOP), also known as potassium chloride (KCl), and 17% was SOP, also known as potassium sulfate. The remaining 17% of production included manure salts, soluble and chemical grades of muriate of potash, and sulfate of potash magnesia, also known as potassium magnesium sulfate. In muriate of potash, "standard," "coarse," and "granular" refer to their particle sizes and are known as the three muriates, a term that ignores the soluble and chemical grades. "Standard" and "soluble" grades of muriate of potash and sulfate of potash also have industrial end uses. "Manure salts" formerly referred to high-grade "run-of-mine" ore and was applied to a few crops; 25% K_2O sylvinite ore is approximately 40% KCl, which can be used on sugar beets. Currently, it refers to a mixture of white KCl and sodium chloride (NaCl or table salt) for industrial uses.

The New Mexico potash producers accounted for 81% of the total marketable potash salts production. The production of crude salts (ore) in New Mexico was 13.0 million tons, excluding Horizon Potash Corp.'s crude ore production, with an average K_2O content of 12.5%, a 2% decrease in ore grade from that of 1992. Four producers operated five mines at the end of 1993. *(See table 3.)* Horizon shut down permanently on April 23d, the day the petition for consultation with the potash producers of Belarus, Russia, and Ukraine was filed with the Office of the U.S. Trade Representative. The company cited the low price of potash in the southern United States and Latin America for its demise. About 340 employees were laid off. Other producers were Eddy Potash Inc., owned by Trans-Resources Inc.; IMC Fertilizers Inc. (IMCF); Mississippi Potash, Inc.; New Mexico Potash Corp., owned by Trans-Resources Inc.; and Western Ag-Minerals Co., owned by Rayrock Resources of Toronto, Canada. Mississippi Chemical Corp.'s potash mine became Mississippi Potash, Inc., a separate subsidiary on July 1. Mississippi Potash announced plans in August to (1) increase production by operating at full capacity rather than 10 days on and 4 days off, and (2) install a compactor bought from the closed potash refinery to increase granular MOP capacity. Mississippi Potash has more than 100 years of reserves and plans to serve some of the closed mine's former customers. *(See table 4.)*

All the New Mexico potash producers mined underground bedded ore zones and all except Western Ag-Minerals mined sylvinite ore (the mixture of sylvite and halite) from which muriate of potash originates and beneficiated the ore to 95%-pure (60% K_2O) muriate of potash. Several forms of beneficiation were used; the flotation of sylvite (potassium chloride) from halite (sodium chloride) was used at Eddy Potash and Mississippi Potash. The IMCF plant used both heavy-media separation and flotation. New Mexico Potash used hydrocyclones to wash away some of the 6% clay in the ore, leached the sylvite crystals, separated more clay in hydrocyclones and thickeners, then produced white muriate of potash in crystallizers. Western Ag-Minerals mined langbeinite ore and beneficiated the ore by dissolving the halite with water to liberate sulfate of potash magnesia (potassium magnesium sulfate). IMCF mined langbeinite ore that was beneficiated by heavy-media separation and flotation to produce sulfate of potash magnesia. With both langbeinite and sylvite products, IMCF reacted fractions of each potash product to produce sulfate of potash. Some muriate of potash from New Mexico was sold to a domestic potassium nitrate manufacturer who produced about 50,000 tons.

In Utah, Moab Salt Inc. produced muriate of potash for Texasgulf Inc., owned by Elf Aquitaine Inc., from an underground bedded sylvinite deposit by two-well solution mining and solar evaporation. The sylvinite salts from the solar ponds were beneficiated by flotation to separate sylvite from halite. Great Salt Lake Minerals Corp. (GSLMC), of Harris Chemical Group, produced sulfate of potash from the brines of the North Arm of the Great Salt Lake by solar evaporation and a proprietary process of fractional crystallization. GSLMC purchases muriate of potash from other sources for conversion to sulfate of potash owing to an excess of sulfate ions in the lake brine concentrate, but these purchases of muriate of potash were not factored into 1993 numbers owing to scheduling errors. The Reilly-Wendover operation of Reilly Industries produced muriate of potash and manure salts from near-surface brines at the west end of the Bonneville Lake.

In California, the muriate and sulfate of potash (and other products) operation at Searles Lake, owned by North American Chemical Corp. of Harris Chemical Group, continued to produce by solar evaporation and selective crystallization from the underground brines of the lake bed. This is the oldest (since 1915) inorganic potash production site in the United States.

In Michigan, Kalium Chemical Ltd. continued pilot plant efforts to develop the technology to extract and concentrate muriate of potash from a deep ore body.

Greensand, also known as glauconite, a natural silicate of aluminum, iron, magnesium, and potassium, was produced by Inversand Co., a subsidiary of Hungerford and Terry Inc., near Clayton, NJ. Production and sales information are withheld to avoid disclosing company proprietary data. Processed greensand was sold as a filter media for the removal of iron, manganese, and hydrogen sulfide from drinking water supply systems. Classified raw greensand was resold by Zook and Ranck Inc. as a soil conditioner and as a slowly released potash, with a K_2O equivalent between 5% and 10%, to the organic farmers of North America.

Consumption and Uses

According to the Potash & Phosphate Institute, shipments of agricultural potash from Canadian and United States producers increased by about 1% from 1992 to 1993. Shipments of nonagricultural potash increased 9% for a total (agricultural plus nonagricultural) increase of 2% from 1992 to 1993. The major States receiving agricultural potash from Canadian and United States producers, in decreasing order, were Illinois, Iowa, Ohio, Indiana, Minnesota, Missouri, and Wisconsin. *(See tables 5 and 6.)* These seven States received 53% of the total. Domestic producers accounted for 3% of agricultural shipments to Illinois, 4% of the agricultural shipments to Iowa, 7% of the agricultural shipments to Ohio, 5% of the agricultural shipments to Indiana, 1% of the agricultural shipments to Minnesota, 59% of the agricultural shipments to Missouri, and 1% of the agricultural shipments to Wisconsin. The major receiving States of domestically produced agricultural potash, in decreasing order, were Texas, Missouri, California, Kansas, Florida, Arkansas, and Louisiana, and these States received 63% of the total. The major States receiving domestically produced agricultural sulfates of potash (sulfate of potash and sulfate of potash magnesia) were, in decreasing order, Florida, California, Georgia, Kentucky, Ohio, and Texas. These six States accounted for 59% of the total. These figures do not account for the world. The potash import tonnage from the rest of the world is counted only at the port of entry and is not tracked to the State in which the potash is applied to the field.

The major States for shipments of nonagricultural potash from Canadian and United States producers, in decreasing order, were Alabama, Ohio, Delaware, Wisconsin, and Mississippi. These five States accounted for 75% of the total. Domestic producers supplied less than 1% of the first four States and 100% of Mississippi.

Stocks

Yearend producers' stocks increased 8% compared with those of 1992. Yearend stocks represented 20% of annual production or about 11 weeks of average production.

Prices

The average annual price, $193.06 per ton f.o.b. mine, of U.S. potash sales of all types and grades was about 2% greater than that of 1992. *(See table 7.)* The average price was $187.88 for the first half of the year and $200.91 for the second half of the year. The average annual price of the three grades of muriate was $127.84, down 6% from that of 1992. For the full calendar year standard grade averaged $130.56 per ton; coarse grade, $124.94 per ton; and granular grade, $126.95 per ton. The average annual price for all grades of sulfate of potash averaged $329.59 per ton, essentially unchanged.

Foreign Trade

Total potash exports from the United States as reported by the Bureau of the Census decreased 37% relative to those of 1992. *(See tables 8 and 9.)* Muriate of potash fell 49% and sulfate of potash fell 28%. Only sulfate of potash magnesia exports increased, about 14%. By half year, muriate of potash exports (in competition with the exports from the former U.S.S.R. states and others) to all countries decreased from 242,000 tons in the first half of 1992 to 184,000 tons in the second half of 1992, 121,000 tons in the first half of 1993, and 96,000 tons in the second half of 1993. Exports of muriate of potash to Latin America, where U.S. potash producers historically had transportation cost advantages, fell from 196,000 tons in the first half of 1992 to 148,000 tons in the second half of 1992, 100,000 tons in the first half of 1993, and finally 72,000 in the second half of 1993. Exports of muriate to Brazil declined from 106,000 tons in the first half of 1992 to 81,000 tons in the second half of 1992, 33,000 tons in the first half of 1993, and 29,000 tons in the second half of 1993. For 1993, 42% of all potash exports was muriate of potash shipments to Latin America while 17% of all potash exports was sulfate of potash shipments to the countries in and around the Pacific Ocean.

Potash imports for consumption into the United States as reported by the Bureau of the Census increased slightly relative to those of 1992. *(See tables 10 and 11.)* Imports of muriate of potash increased by less than 3% while sulfate of potash increased by nearly 29%. Potassium nitrate imports fell by 28%. Imports of muriate of potash from Canada increased to 3.84 million tons. Muriate of potash from Canada was about 90% of total potash imports and about 72% of total U.S. consumption of potash. Imports from the former U.S.S.R. (Russia, Belarus, and from those two countries passing through Latvia) rose by about 4% to 205,000 tons. These imports provided less than 5% of potash imports and less than 4% of total U.S. consumption of potash. Imports of muriate from Israel rose 94% to 142,000 tons.

World Review

World potash production was estimated to have declined about 13% from that of 1992. *(See table 12.)* Production has declined about 11 million tons in the past 5 years, a drop of 34.5% from the production level of 1988. World price, as exemplified by the per ton price of standard muriate of potash, f.o.b. Vancouver, Canada, was about $167 per ton ($100 per ton product) in January and February, jumping to about $182 per ton in March, and declining to about $177 per ton in December.[2] This price would have been lower had Canpotex Ltd. attempted to compete in the South American market where pricing was much lower.

Argentina.—Potasio Rio Colorado SA of Minera Tea has reported an ore grade of 27% to 28% K_2O. Minera Tea has written of a 150,000-ton-per-year K_2O muriate of potash for 25 years, which calculates to about a 5-million-ton reserve using solution mining technology. FMC Lithium International is investigating the Salar del Hombre Muerto for lithium production; potash may be a byproduct of the operation.

Belarus.—The potash producer in Belarus produced only 1.95 million tons from a capacity of 5.6 million tons in 1993 as it struggled with gas supply dislocations, reduced domestic consumption, and fluctuations in potash exports owing to several factors, such as loss of rail cars at new national boundaries, inability to coordinate train shipment arrivals with vessel arrivals, and transportation price increases. Domestic consumption has been suppressed partially because approximately one-quarter of the arable crop land was rendered unusable by fallout from the Chernobyl nuclear station accident in 1988. Potash was exported through the Latvian port of Ventspils. Belarus potash passed through Ventspils more easily than Russian potash. The Belarus potash producers announced their intent to jointly construct an exporting dock in Gdansk, Poland, with Gdansk port officials. Rail freight tariffs increased by 50% in October, but it is not clear how much this affected sales. Belarus sold through the export group AgroChemExport, a former state operation, through the year but the three large potash producers, including Beloruskalii, planned to form their own sales organization in 1994.

Bolivia.—FMC Lithium International has ceased consideration of the Salar de Uyuni for lithium production and the possible byproduct potash.

Brazil.—The potash mine in Sergipe Province was leased from Petrobrás S.A., the Brazilian national petroleum company, through its subsidiary Petrobrás Mineraçào S.A. (Petromisa) by Companhia Vale do Rio Doce, a state-owned mining company in January 1992. The operational branch is named Unidade Operacional do Rio Doce. The new operator planned to increase production, to a 180,000-ton-per-year rate, then up to a 300,000-ton-per-year rate. Reserves are estimated to be 12 million tons, and the ore grade was placed at 17.4% K_2O.

Canada.—From an annual capacity of 12 million tons per year, Canadian potash companies produced 6.85 million tons in response to sales of only 7 million tons and efforts to reduce relatively large end-of-year stocks. Mines at Cory and Lanigan operated at about 30% capacity, and the sum of all the Canadian potash mine temporary closures was 142 mineweeks.[3] The Canadian average unit value of muriate of potash sales was C$79 per ton of product (C$129.50 per ton K_2O), a decrease of C$6 per ton of product from that of 1992. Operations at Saskatchewan mines produced about 85% of Canada's total potash production while operations at New Brunswick mines produced the remaining 15%. The Potash Corp. of Saskatchewan (PCS), with mines in Saskatchewan and New Brunswick, operated at 40% capacity for the year to control product inventories.

Rio Algom Ltd. sold its Potash Co. of America mines to PCS in September for C$160 million plus C$30 million of working capital. The sale included the solution mine at Patience Lake in Saskatchewan, the underground Penobsquis Mine near Sussex, New Brunswick, and the warehouse and dock in St. John, New Brunswick. The PCS news release[4] mentioned that Patience Lake "...produced 300,281 tons with 89 employees" in 1992 while the New Brunswick mine's capacity was placed at 716,683 tons and produced 671,324 tons of product in 1992 with 350 employees. Production from the Patience Lake Mine continued to be exported through the Canpotex while production from the Sussex Mine continued to be exported independently. Kalium Chemical announced a 5-year, C$45 million conversion of capacity from agricultural sales to nonagricultural grades of potash. The Province of Saskatchewan sold its last shares of PCS stock in December, ending the Province's 17 years of potash involvement, just after PCS acquired more than 50% of Provincial potash capacity. Since the autumn of 1986, the Province has not been in active management and has sold off shares. Formed as a crown corporation in 1976 with the aim of acquiring one-half of the Provincial potash capacity, the firm lost C$103 million (operating loss was put at C$47 million) on sales of 3,765,000 tons of product (or about C$27.45 lost per ton) in 1986 and was quickly privatized. Big Quill Resources, the Saskatchewan potassium sulfate (SOP) producer on Big Quill Lake, announced expansion plans, from 2,000 tons per year to about 10,000 tons per year, for an investment of C$550,000. It produced SOP from MOP and Big Quill Lake water, which is rich in sulfate ions, using ion exchange technology. Entreprise Minière et Chimique reported that Potacan Mining Co.'s Clover Hill Mine in New Brunswick reached profitability in 1992, earning C$9.2 million.

In April, there were several civil antitrust suits filed against the Canadian (and most of the United States) potash producers. The suits were filed in New York and Minnesota on behalf of several small fertilizer retailers. It was consolidated into one suit, including a later California suit, in U.S. District Court in St. Paul, MN. In December, any information from a former employee of PCS who was general counsel for some period of time was disqualified by the Federal judge for violating ethical obligations, and any lawyer who received information from that lawyer was declared tainted. The remaining lawyers had the option to refile an amended complaint. In November, both the Canadian Director of Investigation and Research, under the Competition Act, and the U.S. Justice Department's Anti-Trust Division commenced investigations of their respective potash industries.

Chile.—Minera Yolanda Ltda. received $9 million ($7 million in loans and $2 million in equity financing) from the Inter-American Investment Corp. for development of surface deposits of nitrates and iodine. The property is known as the Taltal Project, and Kap Resources Ltd. of Vancouver, British Columbia, Canada, continued to develop the property. Potassium nitrate, sodium nitrate, and iodine were the projected coproducts. Sociedad Quimica y Minera S.A. (Soquimich) purchased Molibdenos y Metales' 11.25% portion of the Minsal project, giving Soquimich 75% ownership of the property.

China.—Israel and China reported studies of a sulfate of potash project in southern China. China was considering participating in a 90,000-ton-per-year potassium nitrate expansion plant at Mishor Rotem in Israel. The agreement between Israel and China concerning the Qinghai project for 480,000 tons of MOP was finalized in early October.

Eritrea.—Newly separated from Ethiopia after 30 years of civil war, Eritrea has asked any mining company for help with its economy by exploiting what few minerals it has, including potash resources in the Dallol region.

European Community.—The European Commission reopened the investigation of the prices of Russian MOP after being informed by Western European potash producers that Russian potash was suspected of being sold at prices lower than the 1992 minimum prices. The European Commission also reviewed the combination of West German and former East German potash companies. The Commission acknowledged, late in the year, the German market dominance by the combination but considered that the former East German companies could not compete very well alone or as owned by someone else. The West German and former East German potash mining companies were allowed to combine but told to discontinue cooperation with Entreprise Minière et Chimique, the French potash producer, in European sales and in exports through Kali-Export.

France.—Entreprise Minière et Chimique (EMC) reported losses of F500 million in 1992 due to former U.S.S.R. dumping, a 30% decrease in French potash consumption due to the Common Agricultural Policy, and a price drop in France. The company will continue to need subsidies from the state to provide retirement funds for the employees and operating funds until the last Alsatian mine closes in 2004. After that, the company intended to continue mining potash in New Brunswick and Manitoba, Canada. The Government of France started a divestiture program of 21 holdings, including Société Nationale Elf Aquitaine, which owns the U.S. firm Texasgulf Chemical Co., which owns a small potash mine in Utah.

Germany.—The European Commission on Monopolies allowed Kali & Salz and Mitteldeutsche Kali to form a single company, but the single company will have to compete with French potash throughout Europe. The Commission noted that German potash capacity has dropped to about 56% of the preunification total. The unification will cost DM1.5 billion, paid through Treuhandanstalt to the new company. Kali und Salz will have to withdraw from Kali Export. Only in the Potash Co. of Canada (Potacan) joint venture can Kali and Salz and EMC continue to cooperate, but potash from that mine must be marketed separately and competitively in Europe.

India.—In June, the Ministry of Agriculture announced a program for reduced subsidies for imported muriate of potash. The subsidy will be Rs1,000 per ton of MOP, reducing prices from the Rs4,600 to 4,900 range down to Rs3,600 to 3,900 range.

Israel.—Israel was considering building a potassium nitrate plant in southern China along with a potassium sulfate plant. Israel formed a joint venture with Alkim Alkali Kimya of Turkey to build a potassium sulfate plant in Turkey.

Jordan.—Arab Potash Co. Ltd. (APC) reported that potash was very important to the economy of Jordan. Potash exports accounted for 15% of total Jordan exports, and sales (all exports) were 3.3% of the Jordanian gross domestic product. APC announced plans in May to commence development of the bromine, magnesium, and sodium chloride resources of the Dead Sea. APC also has commenced studies for 75,000 tons per year of product of SOP in Safi or Aqaba and mentioned future plans for a potassium hydroxide, potassium carbonate, and potassium nitrate plant.

Russia.—The Russian agricultural economy was in turmoil as that economy continued to convert from planned production to independent production with no money and diminished state-allocated inputs. The producers of fertilizers, including potash, changed, temporarily, to exports to maintain production and cash-flow for the schools and hospitals of the mining towns. The potash production managers had to change managerial styles as they dealt with their changing cost structures and markets. Uralkalii (formerly Berezniki) and Sylvinit (formerly Solikamsk) combined produced 2.6 million tons from a capacity of 7.7 million tons.

Russian fertilizer consumption continued to decline as farmers did not receive free market prices for their production, therefore receiving little money for investment in fertilization. Russian potash shipments to Western Europe were restrained by a European Commission dumping duty. Potash exporters had to turn toward the rest of the world, especially Asia, to expand their market. India and China decreased imports in late 1992, and Russian potash exporters could only ship toward South America and Pacific Basin countries. A small but significant amount found its way into the Mississippi River Basin to add to U.S. potash producers' problems.

Some of Russia's potash exports passed through a Latvian port. Rail freight tariffs increased by 50% in October, but it is not clear how much this affected sales. Uralkali and Sylivinit sold through the export group AgroChemExport, a former state operation, throughout the year, but the three large potash producers, includingBeloruskalii, planned to form their own sales organization in 1994.

Spain.—The workers of Potasas del Llobregat struck in February over plans to release 347 of the 850 miners employed. The mine is now part of Teneo, still part of Instituto Nacional de Industria (INI), the large state holding company. The Teneo group is the profitable portion of INI, and the release of 347 workers was part of the "profitablility" plan.

Turkey.—Alkim Alkali Kimya was investigating a joint project with the Dead Sea Works Ltd. of Israel. The joint venture was constructing a pilot plant to investigate the solvent extraction of SOP. For the present this would be a pilot plant effort in Turkey. If successful, the companies were considering a 75,000-ton-per-year plant.

United Kingdom.—Minorco SA of Luxembourg announced in September an asset swap with Anglo-American Corp. that would transfer ownership of Cleveland Potash Ltd. to Minorco.

OUTLOOK

The world potash industry was in a situation of overcapacity in 1993 and seemed likely to remain so for at least a decade. The United States will lose more capacity (another mine) before the year 2000, but also has a workable solution mine in central Michigan seeking a solution to an unspecified problem(s). It seems likely to start up before the year 2000 because it is extremely close to the world's largest potash-consuming area and will use a mining technology that is relatively low cost. Some cautious development in Thailand may come on-stream around the turn of the century or shortly thereafter as a Canadian developer takes an in-depth look at the Udon Thani (silvinite) concession. The ASEAN Potash Mining Co. Ltd. (carnallite) concession in Thailand has problems with the disposition of magnesium chloride brine. The Government of China signed a joint venture with Israel to further develop the closed, nonmarine Qaidam Basin that contains Lake Qarhan; production on a large scale is still problematic. The Colorado River potash property in Argentina is apparently a small but high-quality resource in an undeveloped area. It will probably be viable when the region has more infrastructure.

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[1]All tonnages are reported in metric tons, K_2O equivalent, unless otherwise noted.

[2]The British Sulphur Corp. (London). Price Trends. Phosphorus & Potassium. No. 189, Jan.-Feb. 1994, p. 3.

[3]Personal communications with Michel Prud'homme, Canadian Dep. of Natural Resources.

[4]News Release. Potash Corp. of Saskatchewan Inc. Purchases Potash Co. of America Mines From Rio Algom. Sept. 6, 1993.

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TABLE 1
SALIENT POTASH[1] STATISTICS

(Thousand metric tons and thousand dollars, unless otherwise specified)

		1989	1990	1991	1992	1993
United States:						
Production		3,132	3,360	3,446	3,341	3,067
K_2O equivalent		1,595	1,713	1,749	1,705	1,506
Sales by producers		3,008	3,391	3,327	3,467	3,031
K_2O equivalent		1,536	1,716	1,709	1,766	1,484
Value[2]		$271,500	$303,300	$304,500	$334,406	$286,001
Average value per ton of product	dollars	$90.28	$89.46	$91.52	$96.45	$94.36
Average value per ton of K_2O equivalent	do.	$176.74	$176.80	$178.20	$189.36	$192.72
Exports[3]		945	1,016	1,256	1,330	935
K_2O equivalent		446	470	624	663	415
Value[4]		NA	$136,100	NA	NA	NA
Imports for consumption[3 5]		[6]5,618	6,952	6,862	[r]7,013	7,204
K_2O equivalent		[6]3,410	4,164	4,158	[r]4,248	4,363
Customs value		$501,300	$545,700	$549,600	[r]$580,435	$577,874
Consumption, apparent[7]		[6 7]7,680	9,327	8,933	[r]9,150	9,300
K_2O equivalent		[6]4,500	5,410	5,243	[r]5,351	5,432
Yearend producers' stocks, K_2O equivalent		307	303	343	283	305
World: Production, marketable K_2O equivalent		[r]29,276	[r]27,493	[r]26,136	[r]24,044	[e]20,864

[e]Estimated. [r]Revised. NA Not available.
[1]Includes muriate and sulfate of potash, potassium magnesium sulfate, and some parent salts. Excludes other chemical compounds containing potassium.
[2]F.o.b. mine.
[3]Excludes potassium chemicals and mixed fertilizers.
[4]F.a.s. U.S. port.
[5]Includes nitrate of potash.
[6]Imports probably underreported.
[7]Calculated from sales plus imports minus exports.

TABLE 2
PRODUCTION, SALES, AND INVENTORY OF U.S. PRODUCED POTASH, BY TYPE AND GRADE

(Thousand metric tons and thousand dollars)

Type and grade	Production				Sold or used						Stocks, end of 6-month period			
	Gross weight		K_2O equivalent		Gross weight		K_2O equivalent		Value[e, 1]		Gross weight		K_2O equivalent	
	1992	1993	1992	1993	1992	1993	1992	1993	1992	1993	1992	1993	1992	1993
January-June:														
Muriate of potash, 60% K_2O minimum:														
Standard	340	274	[r]207	168	351	267	214	163	[r]28,414	21,059	97	99	59	60
Coarse	92	62	57	38	123	98	75	60	[r]9,671	7,255	33	9	20	5
Granular	642	525	391	319	722	621	439	377	[r]59,063	46,826	132	79	80	48
Chemical	9	7	5	4	9	7	5	4	W	W	1	2	1	1
Potassium sulfate	246	282	125	143	305	286	154	145	[r]50,293	47,642	56	63	29	32
Other potassium salts[2]	398	419	106	114	497	506	129	137	W	W	143	148	31	37
Total[3]	1,728	1,569	891	787	2,007	1,786	1,016	887	[r]192,199	166,642	462	399	220	183
July-December:														
Muriate of potash, 60% K_2O minimum:														
Standard	324	272	198	167	320	227	195	139	26,700	18,384	98	144	60	88
Coarse	101	89	62	54	90	84	54	51	[r]7,426	6,774	45	14	28	8
Granular	533	410	323	249	492	313	299	191	[r]41,507	25,313	175	175	106	106
Chemical	7	6	4	4	7	7	4	4	W	W	1	1	1	1
Potassium sulfate	232	213	118	108	221	196	113	100	[r]37,591	33,136	68	80	34	40
Other potassium salts[2]	416	508	109	137	331	418	85	113	W	W	228	238	55	62
Total[3]	1,613	1,498	814	719	1,460	1,246	750	597	142,206	119,358	616	652	283	305
Grand total[3]	3,341	3,067	1,705	1,506	3,467	3,031	1,766	1,484	334,406	286,001	XX	XX	XX	XX

[e]Estimated. [r]Revised. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.
[1]F.o.b. mine.
[2]Includes soluble muriate, manure salts, and potassium magnesium sulfate.
[3]Data may not add to totals shown because of independent rounding.

TABLE 3
PRODUCTION AND SALES OF POTASH IN NEW MEXICO

(Thousand metric tons and thousand dollars)

Period	Crude salts[1] (mine production)		Marketable potassium salts				
			Production		Sold or used		
	Gross weight	K_2O equivalent	Gross weight	K_2O equivalent	Gross weight	K_2O equivalent	Value[e, 2]
1992:							
January-June	8,247	1,095	1,439	731	1,658	826	145,578
July-December	7,792	949	1,345	663	1,212	610	111,042
Total[3]	16,039	2,044	2,783	1,395	2,869	1,436	256,620
1993:							
January-June	6,323	794	1,292	637	1,488	725	125,753
July-December	6,640	822	1,254	581	1,010	465	90,105
Total[3]	12,963	1,616	2,546	1,218	2,497	1,190	215,858

[e]Estimated.
[1]Sylvinite and langbeinite.
[2]F.o.b. mine.
[3]Data may not add to totals shown because of independent rounding.

TABLE 4

SALIENT U.S. SULFATE OF POTASH[1] STATISTICS

(Thousand metric tons of K_2O equivalent and thousand dollars)

	1989	1990	1991	1992	1993
Production	166	219	230	243	251
Sales by producers	147	221	211	267	245
Value[2]	$47,355	$70,226	$67,432	$87,884	$80,778
Exports[3]	78	124	104	158	114
Value[4]	NA	$43,300	NA	NA	NA
Imports[3]	32	26	29	35	45
Value[5]	$11,700	$11,000	$11,800	$13,600	$17,300
Consumption, apparent[6]	101	123	136	[r]144	176
Yearend producers' stocks	42	39	58	34	40

[r]Revised. NA Not available.
[1]Excluding potassium magnesium sulfate.
[2]F.o.b. mine.
[3]Bureau of the Census.
[4]F.a.s. U.S. port.
[5]C.i.f. to U.S. port.
[6]Calculated from sales plus imports minus exports.

TABLE 5

SALES OF NORTH AMERICAN POTASH, BY STATE OF DESTINATION

(Metric tons of K_2O equivalent)

State	Agricultural potash		Nonagricultural potash	
	1992	1993	1992	1993
Alabama	86,341	92,549	169,071	161,919
Alaska	2,141	1,266	416	1,375
Arizona	3,649	2,814	782	1,093
Arkansas	62,225	54,791	602	850
California	85,358	89,505	7,333	8,441
Colorado	12,818	14,984	3,387	2,306
Connecticut	2,398	1,711	458	552
Delaware	20,779	17,666	47,968	53,351
Florida	169,878	147,210	1,545	2,014
Georgia	140,501	158,717	1,940	1,902
Hawaii	7,495	7,031	23	47
Idaho	29,381	38,798	223	411
Illinois	549,257	568,478	6,874	7,418
Indiana	310,805	317,234	3,269	3,632
Iowa	441,900	416,940	3,503	6,434
Kansas	47,723	48,121	4,166	5,680
Kentucky	127,890	124,814	674	759
Louisiana	125,756	143,579	2,461	2,834
Maine	6,734	5,890	705	670
Maryland	28,591	18,353	238	979
Massachusetts	10,776	3,729	290	413
Michigan	180,550	181,748	7,101	7,266
Minnesota	278,284	271,415	2,851	5,633
Mississippi	73,678	64,284	46,653	49,355
Missouri	253,652	237,382	3,035	4,918
Montana	13,374	15,849	68	86
Nebraska	32,772	37,635	1,310	2,315

See footnote at end of table.

TABLE 5—Continued

SALES OF NORTH AMERICAN POTASH, BY STATE OF DESTINATION

(Metric tons of K_2O equivalent)

State	Agricultural potash 1992	Agricultural potash 1993	Nonagricultural potash 1992	Nonagricultural potash 1993
Nevada	221	142	107	64
New Hampshire	452	708	243	221
New Jersey	4,289	5,278	823	670
New Mexico	7,437	3,328	12,465	18,296
New York	57,810	61,746	654	705
North Carolina	108,351	90,028	961	1,015
North Dakota	26,102	29,775	12	28
Ohio	348,282	383,063	66,048	73,707
Oklahoma	21,956	25,367	1,754	2,089
Oregon	34,724	34,473	1,373	1,278
Pennsylvania	58,048	52,293	2,517	3,124
Rhode Island	1,055	953	24	728
South Carolina	69,049	58,113	64	61
South Dakota	16,372	13,642	151	238
Tennessee	104,648	128,591	355	402
Texas	141,909	169,872	23,584	20,136
Utah	22,391	19,996	8,867	8,616
Vermont	8,262	6,254	833	138
Virginia	73,734	87,835	221	293
Washington	40,591	41,873	3,468	3,012
West Virginia	29,622	4,099	937	992
Wisconsin	206,267	227,250	33,427	50,757
Wyoming	2,531	3,154	1,299	1,792
Total[1]	4,488,808	4,530,326	477,132	521,016

[1]Data may not add to totals shown because of independent rounding.

Source: Potash & Phosphate Institute.

TABLE 6

SALES OF NORTH AMERICAN MURIATE OF POTASH TO U.S. CUSTOMERS, BY GRADE

(Thousand metric tons of K_2O equivalent)

Grade	1989	1990	1991	1992	1993
Agricultural:					
Standard	310	263	251	271	262
Coarse	2,036	1,882	1,862	1,988	1,984
Granular	1,658	1,658	1,482	1,651	1,692
Soluble	342	334	349	383	395
Total	4,346	4,137	3,944	4,293	4,333
Nonagricultural:					
Soluble	116	131	85	107	415
Other	305	314	387	365	106
Total[1]	421	445	473	472	521
Grand total[1]	4,767	4,582	4,417	4,765	4,853

[1]Data may not add to totals shown because of independent rounding.

Source: Potash & Phosphate Institute.

TABLE 7

PRICES[1] OF U.S. POTASH, BY TYPE AND GRADE

(Dollars per metric ton of K_2O equivalent)

Type and grade	1991 January-June	1991 July-December	1992 January-June	1992 July-December	1993 January-June	1993 July-December
Muriate, 60% K_2O minimum:						
Standard	[r]126.22	[r]127.11	[r]132.77	137.05	128.88	132.61
Coarse	[r]143.17	129.17	[r]128.71	136.38	121.04	132.08
Granular	[r]135.62	[r]129.97	134.64	138.99	124.08	132.62
All muriate[2]	[r]133.18	[r]128.95	133.48	138.04	125.08	132.54
Sulfate, 50% K_2O minimum	315.67	324.32	325.87	334.03	327.76	332.24

[r]Revised.

[1]Average prices, f.o.b. mine, based on sales.

[2]Excluding soluble and chemical muriates.

TABLE 8

U.S. EXPORTS OF POTASH, BY TYPE

	Approximate average K_2O content (percent)	Quantity (metric tons) Product	Quantity (metric tons) K_2O equivalent
1992:			
Potassium chloride, all grades	61	[r]708,474	[r]432,169
Potassium sulfate	51	[r]309,812	[r]158,004
Potassium magnesium sulfate	22	[r]292,630	[r]64,378
Potassium nitrate	45	[r]18,597	[r]8,368
Total	XX	[r]1,329,513	[r]662,919
1993:			
Potassium chloride, all grades	61	361,193	220,328
Potassium sulfate	51	223,180	113,822
Potassium magnesium sulfate	22	332,855	73,228
Potassium nitrate	45	17,782	8,002
Total	XX	935,010	415,380

[r]Revised. XX Not applicable.

Source: Bureau of the Census.

TABLE 9
U.S. EXPORTS OF POTASH, BY COUNTRY

(Metric tons of product)

Country	Potassium chloride		Potassium sulfates, all grades[1]		Potassium nitrate		Total[2]	
	1992	1993	1992	1993	1992	1993	1992	1993
Argentina	5,884	85	4,589	2,556	—	—	[r]10,473	2,641
Australia	[r]16,399	2,732	8,525	7,985	—	—	[r]24,924	10,717
Bangladesh	—	—	—	1,513	—	—	—	1,513
Belize	1,813	1,169	276	—	—	—	2,089	1,169
Bolivia	4,375	120	—	—	—	—	4,375	120
Brazil	[r]311,983	102,965	750	2,552	—	—	[r]312,733	105,517
Canada	8,515	4,327	[r]87,849	109,012	4,914	4,404	[r]101,278	117,743
Chile	[r]32,464	32,773	[r]16,426	25,917	—	—	48,890	58,690
China	—	—	[r]161,417	111,659	—	—	[r]161,417	111,659
Colombia	1	1,999	4,551	7,289	1	—	4,553	9,288
Costa Rica	[r]53,806	28,014	[r]38,166	26,588	—	—	[r]91,972	54,602
Cote d'Ivoire	—	—	4,200	—	—	—	4,200	—
Dominican Republic	[r]27,005	9,759	7,184	2,733	18	19	[r]34,207	12,511
Ecuador	[r]22,533	13,837	4,490	3,500	—	—	[r]27,023	17,337
Fiji	3,447	—	—	—	—	—	3,447	—
France	[r]44,579	—	—	—	6	—	[r]44,585	—
Guatemala	9,748	—	5	2,105	—	—	9,753	2,105
Honduras	5,951	2,999	2,174	16,438	—	—	8,125	19,437
Indonesia	3	—	[r]11,567	84	—	—	11,570	84
Italy	6,091	21,549	16,000	—	—	1	[r]22,091	21,550
Jamaica	3,249	2,800	—	—	12	—	3,261	2,800
Japan	[r]16,384	28,077	[r]127,951	115,160	9,098	9,041	[r]153,433	152,278
Korea, Republic of	6,117	6,435	646	8,030	2	2	6,765	14,467
Malaysia	—	—	—	25,219	—	—	—	25,219
Mexico	[r]63,436	50,830	[r]50,127	59,642	4,434	4,294	[r]117,997	114,766
Nicaragua	1,500	—	1,500	—	—	—	3,000	—
Panama	[r]14,282	4,183	2,905	996	—	—	[r]17,187	5,179
Peru	7,047	5,638	4,000	4,727	—	—	[r]11,047	10,365
Philippines	14,990	6	[r]14,499	1	—	—	[r]29,489	7
Saudi Arabia	—	—	1	3,300	—	1	1	3,301
South Africa, Republic of	—	—	[r]11,021	—	2	—	[r]11,023	—
Spain	1,000	—	—	19	—	—	1,000	19
Sweden	538	1,460	—	22	—	—	538	1,482
Thailand	—	10,286	5,000	10,383	—	—	5,000	20,669
Trinidad and Tobago	2,431	2,386	—	—	—	—	2,431	2,386
United Kingdom	[r]15,513	6	11	—	—	—	[r]15,524	6
Uruguay	7,266	—	—	—	—	—	7,266	—
Venezuela	5	25,914	[r]15,267	2,917	—	—	[r]15,272	28,831
Zimbabwe	—	—	—	5,050	—	—	—	5,050
Other	[r]119	844	[r]1,345	638	[r]110	20	[r]1,574	1,502
Total[2]	[r]708,474	361,193	[r]602,442	556,035	[r]18,597	17,782	[r]1,329,513	935,010

[r]Revised.
[1]Includes potassium magnesium sulfate.
[2]Data may not add to totals shown because of independent rounding.

Source: Bureau of the Census.

TABLE 10
U.S. IMPORTS FOR CONSUMPTION OF POTASH, BY TYPE

	Approximate average K_2O content (percent)	Quantity (metric tons)		Value (thousands)	
		Product	K_2O equivalent[e]	Customs	C.i.f.
1992:					
Potassium chloride	61	[r]6,869,502	[r]4,190,396	[r]$551,808	[r]$648,996
Potassium sulfate	51	[r]67,746	[r]34,550	[r]11,779	[r]13,617
Potassium nitrate	45	[r]39,067	[r]17,580	[r]11,267	[r]12,575
Potassium sodium nitrate mixtures	14	[r]36,914	[r]5,168	[r]5,581	[r]6,197
Total	XX	[r]7,013,229	[r]4,247,695	[r]580,435	[r]681,385
1993:					
Potassium chloride	61	7,050,036	4,300,522	548,639	649,061
Potassium sulfate	51	87,308	44,527	15,437	17,343
Potassium nitrate	45	28,140	12,663	7,827	8,752
Potassium sodium nitrate mixtures	14	38,907	5,447	5,971	6,573
Total	XX	7,204,391	4,363,159	577,874	681,729

[e]Estimated. [r]Revised. XX Not applicable.

Source: Bureau of the Census, as adjusted by the U.S. Bureau of Mines.

TABLE 11
U.S. IMPORTS FOR CONSUMPTION OF POTASH, BY COUNTRY

Country	Metric tons of product										Total value (thousands)			
	Potassium chloride		Potassium sulfate		Potassium nitrate		Potassium sodium nitrate		Total[1]		Customs		C.i.f.	
	1992	1993	1992	1993	1992	1993	1992	1993	1992	1993	1992	1993	1992	1993
Belarus	59,159	197,535	—	—	—	—	—	—	59,159	197,535	$5,064	$16,331	$5,756	$18,596
Belgium	2,000	3,000	7,751	15,787	21	—	—	—	9,772	18,787	1,625	2,919	1,915	3,462
Canada	[r]6,345,120	6,401,456	1,064	2,768	4	14	8,556	12,266	[r]6,354,744	6,416,504	[r]508,245	497,123	[r]600,047	589,641
Chile	—	—	—	—	13,882	13,822	28,155	26,587	42,037	40,409	7,788	7,764	8,663	8,627
Denmark	—	—	—	—	264	1,224	—	—	264	1,224	97	458	117	557
Dominican Republic	—	—	49	—	—	169	—	—	49	169	11	61	13	67
France	1,500	—	1,977	—	—	—	2	—	3,479	—	543	—	658	—
Germany	72,120	64,398	56,902	67,139	5	247	—	—	129,027	131,784	14,991	15,849	17,633	18,229
Israel	120,006	232,359	—	—	24,697	12,554	—	—	144,703	244,913	19,881	25,738	21,888	28,575
Japan	68	6	3	407	11	25	198	56	280	494	191	309	226	347
Jordan	—	7,298	—	—	—	—	—	—	—	7,298	—	647	—	788
Latvia	62,158	34,539	—	—	—	—	—	—	62,158	34,539	4,619	2,300	5,264	2,820
Netherlands	127	28	—	1,200	25	—	—	—	152	1,228	36	262	45	264
Poland	—	—	—	—	106	36	—	—	106	36	56	19	68	24
Russia	184,938	109,077	—	—	50	43	—	—	184,988	109,120	15,215	7,911	16,286	9,510
Sweden	818	21	—	—	—	—	—	—	818	21	68	20	77	22
Ukraine	21,200	—	—	—	—	—	—	—	21,200	—	1,887	—	2,596	—
United Kingdom	288	319	—	7	—	—	—	—	288	326	115	156	133	193
Other	([2])	—	([2])	—	[r]1	6	([2])	—	1	6	2	6	2	6
Total[1]	[r]6,869,502	7,050,036	[r]67,746	87,308	[r]39,067	28,140	[r]36,914	38,907	[r]7,013,229	7,204,391	[r]580,435	577,874	[r]681,385	681,729

[r]Revised.
[1]Data may not add to totals shown because of independent rounding.
[2]Revised to zero.

Source: Bureau of the Census.

TABLE 12
MARKETABLE POTASH: WORLD PRODUCTION, BY COUNTRY[1]

(Thousand metric tons of K_2O equivalent)

Country	1989	1990	1991	1992	1993[e]
Belarus	—	—	—	[r]3,311	[2]1,947
Brazil	97	66	101	[r]85	[2]173
Canada	[r]7,333	[r]6,989	[r]7,406	[r]7,270	[2]6,841
Chile[e]	[r]45	[r]50	[r]55	[r]55	55
China[e]	[r]42	[r]29	[r]32	[r]21	25
France	1,195	1,292	1,129	[r]1,141	1,000
Germany:					
Eastern states	[r]3,200	2,653	—	—	—
Western states	[r]2,188	[r]2,307	—	—	—
Total	[r]5,388	[r]4,960	[r]3,855	[r]3,473	3,250
Israel	1,273	1,311	1,320	[r e]1,320	1,300
Italy	112	[r]68	31	[r]86	80
Jordan	792	841	[r]818	[r]808	800
Russia	—	—	—	[r]3,454	[2]2,597
Spain	741	[r]686	[r]585	[r]594	600
Ukraine	—	—	—	[r]197	160
U.S.S.R.[3]	10,200	9,000	[e]8,560	—	—
United Kingdom	462	488	[r]495	[r]524	[2]530
United States	1,595	1,713	1,749	1,705	[2]1,506
Total[4]	[r]29,276	[r]27,493	[r]26,136	[r]24,044	20,864

[e]Estimated. [r]Revised.
[1]Table includes data available through May 4, 1994.
[2]Reported figure.
[3]Dissolved in Dec. 1991.
[4]Data may not add to totals shown because of independent rounding.