# POTASH

### By James P. Searls

### The term "potash" was originally applied to Legislation and Government Programs

The suspension agreement between the International Trade Administration of the U.S. Department of Commerce and the Canadian potash producers continued for another year. The U.S. Department of Justice, Anti-Trust Division, quietly continued its investigation of potash producers for price fixing.

The civil antitrust lawsuits for collusive pricing, in U.S. Federal District Court in St. Paul, MN, continued against the Canadian and some U.S. potash producers, in 1994. No trial date has been announced. No trial date has been announced concerning a similar, continuing lawsuit in a California State Court.

### Production

In the United States in 1994 the potash producers sold about 1.4 million  $tons^{\overline{1}}$  for a marketable potash value, f.o.b. mine, of about \$284 million, due to the steady or increasing prices for muriate of potash. Three mines have closed since 1978, and a fourth will probably close before 2010. It is possible that, if the price for KCl stays relatively steady, one of those closed mines may reopen because of mining technology improvements and the use of a different mill. Domestic production of potash declined by about 7% as one Carlsbad firm reduced standard muriate of potash production. This firm was not profitable enough to buy compactors to produce coarse and granular muriate of potash. Standard muriate of potash is rarely sold into the domestic market and shipping costs to reach foreign markets (such as China) for standard product are too high to sell at a profit given the present price in that market.

The U.S. Bureau of Mines developed potash domestic data from voluntary semiannual surveys of U.S. operations. Of the 11 survey requests sent to operations in both the first and second half of the year, 10 responded. Data from the responses are estimated to consist of about 97% of total production shown in table 1.

In 1994, the Carlsbad, NM, producers were Eddy Potash Inc., owned by Trans-Resources Inc.; IMC Global Operations Inc., owned by IMC Global Inc.; Mississippi Potash, Inc., owned by Mississippi Chemical Corp.; New Mexico Potash, Inc., owned by Trans-Resources; and Western Ag-Minerals Inc., owned by Rayrock Resources of Toronto, Canada.

In Utah, the potash producers during 1994 were Great Salt Lake Minerals Corp. (GSLMC), affiliated with Harris Chemical Group; Moab Salt Inc., owned by Texasgulf Chemical Co. of Elf Aquitaine Inc.; and Reilly-Wendover of Reilly Industries Inc. Late in 1994, GSLMC proposed the purchase of Reilly's Wendover facility; the purchase was not finalized by the end of the year.

In California, North American Chemical Co., managed by Harris Chemical Group, produced KCl and  $K_2SO_4$ . North American Chemical sells its potash product through the GSLMC office in Kansas.

In Michigan, Kalium Chemical Ltd. continued pilot-plant development of a deep ore body by solution mining technology to extract KCl from that ore.

Potash Corp. of Saskatchewan continued to market potash exports for three domestic producers as a cost-cutting effort.

### Consumption

According to the Potash & Phosphate Institute (P&PI), shipments of agricultural potash from Canadian and U.S. producers to U.S. consumers increased by 9% compared with those in 1993. Shipments of nonagricultural potash to U.S. consumers increased about 14% for a total increase in shipments of less than 10%.

The largest consuming region in the United States was the Corn Belt (Illinois, Indiana, Iowa, Missouri, and Ohio). It received about 44% of P&PI reported sales or about 2.17 million tons. The Corn Belt received 13% more potash in 1994 than in 1993. The second largest consuming region in the United States was the Lake States (Michigan, Minnesota, and Wisconsin) which took about 740,000 tons, 15% of P&PI sales, and a 9% increase from 1993. The third largest consuming region of potash was the southeastern states (Alabama, Florida, Georgia, and South Carolina), which took about 475,000 tons, 10% of P&PI sales and about 5% increase from 1993.

### Stocks

Yearend producers stocks decreased about

potassium carbonate-potassium hydroxide recovered in iron "pots" from washings of wood "ashes." Currently, "potash" is commonly used in connection with a variety of water soluble compounds, all containing the element potassium.

Potash can be potassium chloride (KCl or muriate of potash or MOP), potassium sulfate ( $K_2SO_4$  or sulfate of potash or SOP), potassium-magnesium sulfate ( $K_2SO_4MgSO_4$  or sulfate of potash magnesia), potassium nitrate (KNO<sub>3</sub> or saltpeter), or mixed sodium-potassium nitrate (Chilean saltpeter).

Potash is primarily a fertilizer that is important to society as part of the "Green Revolution." The Green Revolution slowed the conversion of fragile and marginal lands to crop lands, while allowing human populations to continue increasing by continuing to provide low cost food. Fixed nitrogen, water-soluble phosphorus, and water-soluble potassium are the main fertilizers. There are no substitutes for these three fertilizers, but there are minor, alternative sources, such as animal manure. These three fertilizers plus boron, calcium, magnesium, sulfur, zinc, as well as pesticides, disease-resistent seeds, mechanization, and the knowledge to use technologies, allow less than 2% of estimated 1994 U.S. working population to be farmers and still feed all the rest of the United States in 1992 for about 12.5% of averge personnel income.

Potassium chloride accounted for about 70% of potash sales by domestic producers; potassium sulfate was more than 15% of sales by domestic producers. For domestic consumption of potash when imports and exports also are considered, potassium chloride was about 95% of total consumption, while potassium sulfate was about 3% of consumption. It is estimated that 10% of total sales went to nonagricultural end uses. The weighted average price for all types and grades of potash rose slightly from that in 1993. Apparent domestic consumption of potash increased in 1994 by nearly 6% from 1993 as midwestern farmers gauged 1) the 1994 demand for crops after the 1993 floods and 2) the reduced farm commodity carryovers of calendar year 1993 or cropyear 1993-94.

23% compared with those of 1993. Yearend Canada in the second quarter of 1994. stocks represented about 17% of annual production or about 8.7 weeks of average production.

### Prices

The weighted average annual price, \$193.32 per ton f.o.b. mine, of U.S. potash sales of all types and grades was unchanged from 1993. The average price was \$188.60 for the first half of the year and \$199.05 for the second half of the year. The average annual price for the three grades of KCl (standard, coarse, and granular) was \$131.01, unchanged from 1993. For the full calendar year, standard grade KCl was \$124.78 per ton, down 4%; coarse grade, \$130.93 per ton, up 5%; and granular grade, \$134.69 per ton, up 6%.

### World Review

The world's potash producers remained in overcapacity for another year. Most producers around the world operated at partial capacity to maintain prices. Using an estimated world capacity of 29.9 million tons of capacity<sup>2</sup>, the world produced at about 75% of capacity. The Canadian potash industry again operated at about 70% capacity, 55% for Potash Corp. of Saskatchewan and 90% for all other Canadian producers. In the United States, New Mexico producers operated at about 85% capacity for the year. The former U.S.S.R. producers operated at about 60% capacity. One source<sup>3</sup> noted modest price increases of \$5 to \$15 per ton of muriate of potash product (much lower than the price increases for nitrogen/phosphorus compounds) on the world market between September 1993 and September 1994, due to Canadian and former U.S.S.R. efforts to raise prices by keeping producer stocks relatively low.

Belarus.—The Belarus potash mines operated at about 45% capacity for the year. As the exporter for Russia and Belarus, International Potash Corp. gained more control over potash exports from the former U.S.S.R. onto the world market in the first quarter of the year, and potash prices rose slightly.

Canada.-Vigoro Co., owner of Kalium Chemical and the Kalium Chemical solution mine in Belle Plaine, Saskatchewan, announced in November<sup>4</sup> that it was considering purchasing the assets of Central Canada Potash, a division of Noranda Minerals Inc., with an underground mine at Colonsay, Saskatchewan, Canada.

The Canadian Director of Investigations and Research, under the Competition Act, dropped the investigation of collusive price setting<sup>5</sup> in

Chile.-In Chile, Sociedad Quimica y Minera de Chile (Soquimich) announced plans to invest in the Minsal project<sup>6</sup> and bring about 50,000 tons per year of muriate of potash as feed for its high grade potassium nitrate production. Soquimich also started up the 50,000-ton-per-year potassium nitrate plant in November, which will use the Minsal muriate as feed to convert sodium nitrate to potassium nitrate. The KCl exporter of Canada, Canpotex Ltd., announced an agreement to invest in the Kap Resources project in Chile. This project will develop a caliche region just south of Soquimich for potassium nitrate and iodine.

China.—In September the Government of China issued a regulation that it would again become the sole importer of fertilizers into China.7

Japan.-In early October, the major fertilizer importer of Japan, Zen-Noh, agreed to a \$4 to \$5 per ton product, muriate of potash, increase with Canpotex Ltd., the major potash exporter of Canada. The agreements between these two firms are usually trend setters for the world market.

Jordan.-Peace between Israel and Jordan may allow each country's potash producer to use the other's transportation facilities to the ports of Ashdod or Aquaba. Arab Potash of Jordan opened a 240,000-ton-per-year muriate of potash plant in June.

Thailand.-The Udon Thani potash project, dropped by then Agrico Chemical and Thai Central Cement in 1986, has been carefully investigated for reserves of sylvinite (the ore leading to muriate of potash production) by Vancouver-based Asian Pacific Resources Ltd.8 The proposed Association of South-east Asian Nations project at Bamnet Narong to recover muriate of potash from carnallite was waiting for more promotion.

### Outlook

If funding is reduced for the U.S. Department of Agriculture, it is not clear for 1996 or beyond what the effect on farmers will be but it could easily cause more variability in planting and fertilization, and less predictability to the potash usage, season by season. This, in turn, may cause wider swings in potash availability and prices.

—, Nov. 21, 1994, p.1.

<sup>5</sup>Potash Corporation of Saskatchewan Inc., 1994 Annual Report, p. 6.

<sup>6</sup>Mining Journal (London), v. 322, No. 8274, May 6, 1994, p. 326.

<sup>7</sup>Fertilizer Markets, British Sulphur North America Inc., Sept. 26, 1994, p. 2. —, March 7, 1994, p. 3.

### **OTHER SOURCES OF INFORMATION**

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- Supply-Demand Statistics, monthly, quarterly, and annually for the North America.
- United Nations, Food & Agricultural Organization, Rome.

Annual Fertilizer Review.

<sup>&</sup>lt;sup>1</sup>All tonnages are reported in metric tons (tonnes), K<sub>2</sub>O equivalent, unless otherwise noted.

<sup>&</sup>lt;sup>2</sup>Potash Corporation of Saskatchewan, 1994 Annual Report, pp. 12-13, 26.

<sup>&</sup>lt;sup>3</sup>Fertilizer Markets, British Sulphur North America Inc., Sept. 19, 1994, p. 9.

#### TABLE 1 SALIENT POTASH 1/ STATISTICS

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

|  |         | 1990      | 1991      | 1992      | 1993      | 1994      |
|--|---------|-----------|-----------|-----------|-----------|-----------|
| United States:                               |         |           |           |           |           |           |
| Production                                   |         | 3,360     | 3,450     | 3,340     | 3,070     | 2,830     |
| K2O equivalent                               |         | 1,710     | 1,750     | 1,710     | 1,510     | 1,400     |
| Sales by producers                           |         | 3,390     | 3,330     | 3,470     | 3,030     | 2,970     |
| K2O equivalent                               |         | 1,720     | 1,710     | 1,770     | 1,480     | 1,470     |
| Value 3/                                     |         | \$303,000 | \$305,000 | \$334,000 | \$286,000 | \$284,000 |
| Average value per ton of product             | dollars | 89.46     | 91.52     | 96.45     | 94.36     | 95.62     |
| Average value per ton of K2O equivalent      | do.     | 176.80    | 178.20    | 189.36    | 192.72    | 193.20    |
| Exports 4/                                   |         | 1,020     | 1,260     | 1,330     | 935       | 997       |
| K2O equivalent                               |         | 470       | 624       | 663       | 415       | 462       |
| Value 5/                                     |         | \$136,000 | NA        | NA        | NA        | NA        |
| Imports for consumption 4/ 6/                |         | 6,950     | 6,860     | 7,010     | 7,200     | 7,920     |
| K2O equivalent                               |         | 4,160     | 4,160     | 4,250     | 4,360     | 4,740     |
| Customs value                                |         | \$546,000 | \$550,000 | \$580,000 | \$578,000 | \$642,000 |
| Consumption, apparent 7/                     |         | 9,330     | 8,930     | 9,150     | 9,300     | 9,890     |
| K2O equivalent                               |         | 5,410     | 5,240     | 5,350     | 5,430     | 5,750     |
| Yearend producers' stocks, K2O equivalent    |         | 303       | 343       | 283       | 305       | 234       |
| World: Production, marketable K2O equivalent |         | 27.500    | 26.100    | 23.900    | 20.300 r/ | 22,500    |

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/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits.

3/ F.o.b. mine.

4/ Excludes potassium chemicals and mixed fertilizers.

5/ F.a.s. U.S. port.

6/ Includes nitrate of potash.

7/ Calculated from sales plus imports minus exports.

### TABLE 2

PRODUCTION, SALES, AND INVENTORY OF U.S. PRODUCED POTASH, BY TYPE AND GRADE 1/

#### (Thousand metric tons and thousand dollars)

|         | Produc  | ction   |  |  |  | Sold o  | or used  |  |  | Stor   | cks, end of 6  | -month perio   | od  |
|---------|---|---|--|--|--|---|--|--|--|--|--|--|---|
| Gross w | /eight  | K2O equ   | ivalent  | Gross w  | /eight   | K2O equ   | ivalent  | Value  | e/ 2/  | Gross w  | veight   | K2O equ  | ivalent   |
| 1993    | 1994  | 1993  | 1994   | 1993   | 1994   | 1993  | 1994   | 1993   | 1994   | 1993   | 1994   | 1993   | 1994  |
|         |   |   |  |  |  |   |  |  |  |  |  |  |   |
|         |   |   |  |  |  |   |  |  |  |  |  |  |   |
|         |   |   |  |  |  |   |  |  |  |  |  |  |   |
| 274     | 299   | 168   | 182  | 267  | 292  | 163   | 178  | 21,100   | 21,000   | 99   | 151  | 60   | 92  |
| 62      | 64  | 38  | 39   | 98   | 68   | 60  | 42   | 7,260  | 5,340  | 9  | 9  | 5  | 6   |
| 525     | 406   | 319   | 247  | 621  | 529  | 377   | 321  | 46,800   | 42,700   | 79   | 52   | 48   | 32  |
| 7       | 5   | 4   | 3  | 7  | 6  | 4   | 4  | W  | W  | 2  | (3/)   | 1  | (3/)  |
| 282     | 238   | 143   | 123  | 286  | 252  | 145   | 130  | 47,600   | 41,500   | 63   | 66   | 32   | 34  |
| 419     | 441   | 114   | 118  | 506  | 471  | 137   | 130  | W  | W  | 148  | 207  | 37   | 50  |
| 1,570   | 1,450   | 787   | 713  | 1,790  | 1,620  | 887   | 806  | 167,000  | 152,000  | 399  | 485  | 183  | 213   |
|         |   |   |  |  |  |   |  |  |  |  |  |  |   |
|         |   |   |  |  |  |   |  |  |  |  |  |  |   |
|         |   |   |  |  |  |   |  |  |  |  |  |  |   |
| 272     | 192   | 167   | 118  | 227  | 251  | 139   | 153  | 18,384   | 20,400   | 144  | 92   | 88   | 56  |
| 89      | 62  | 54  | 38   | 84   | 50   | 51  | 30   | 6,774  | 4,120  | 14   | 22   | 8  | 13  |
| 410     | 461   | 249   | 281  | 313  | 399  | 191   | 243  | 25,313   | 33,400   | 175  | 115  | 106  | 70  |
| 6       | 8   | 4   | 5  | 7  | 6  | 4   | 4  | W  | W  | 1  | 2  | 1  | 2   |
| 213     | 250   | 108   | 129  | 196  | 230  | 100   | 118  | 33,136   | 38,200   | 80   | 86   | 40   | 44  |
| 508     | 401   | 137   | 116  | 418  | 411  | 113   | 116  | W  | W  | 238  | 197  | 62   | 49  |
| 1,500   | 1,370   | 719   | 686  | 1,250  | 1,350  | 597   | 664  | 119,000  | 132,000  | 652  | 514  | 305  | 234   |
| 3,070   | 2,830   | 1,510   | 1,400  | 3,030  | 2,970  | 1,480   | 1,470  | 286,000  | 284,000  | XX   | XX   | XX   | XX  |
|         | Gross w<br>1993<br>274<br>62<br>525<br>7<br>282<br>419<br>1,570<br>272<br>89<br>410<br>6<br>213<br>508<br>8<br>1,500<br>3,070 | Produc           Gross weight           1993         1994           274         299           62         64           525         406           7         5           282         238           419         441           1,570         1,450           272         192           89         62           410         461           6         8           213         250           508         401           1,500         1,370           3,070         2,830 | Production           Gross weight         K20 equ           1993         1994         1993           274         299         168           62         64         38           525         406         319           7         5         4           282         238         143           419         441         114           1,570         1,450         787           272         192         167           89         62         54           410         461         249           6         8         4           213         250         108           508         401         137           1,500         1,370         719           3,070         2,830         1,510 | Production           Gross weight         K2O equivalent           1993         1994         1993         1994           274         299         168         182           62         64         38         39           525         406         319         247           7         5         4         3           282         238         143         123           419         441         114         118           1,570         1,450         787         713           272         192         167         118           89         62         54         38           410         461         249         281           6         8         4         5           213         250         108         129           508         401         137         116           1,500         1,370         719         686           3,070         2,830         1,510         1,400 | $\begin{tabular}{ c c c c c c c } \hline Production & Gross weight & K2O equivalent & Gross w \\ \hline 1993 & 1994 & 1993 & 1994 & 1993 \\ \hline 1993 & 1994 & 1993 & 1994 & 1993 \\ \hline 1993 & 1994 & 1993 & 1994 & 1993 \\ \hline 274 & 299 & 168 & 182 & 267 \\ \hline 62 & 64 & 38 & 39 & 98 \\ 525 & 406 & 319 & 247 & 621 \\ \hline 7 & 5 & 4 & 3 & 7 \\ 282 & 238 & 143 & 123 & 286 \\ \hline 419 & 441 & 114 & 118 & 506 \\ \hline 1,570 & 1,450 & 787 & 713 & 1,790 \\ \hline \\ 272 & 192 & 167 & 118 & 227 \\ \hline 89 & 62 & 54 & 38 & 84 \\ \hline 410 & 461 & 249 & 281 & 313 \\ \hline 6 & 8 & 4 & 5 & 7 \\ 213 & 250 & 108 & 129 & 196 \\ \hline 508 & 401 & 137 & 116 & 418 \\ \hline 1,500 & 1,370 & 719 & 686 & 1,250 \\ \hline \hline 3,070 & 2,830 & 1,510 & 1,400 & 3,030 \\ \hline \end{tabular}$ | $\begin{tabular}{ c c c c c c c } \hline Production & Gross weight & K2O equivalent & Gross weight \\ \hline 1993 & 1994 & 1993 & 1994 & 1993 & 1994 & 1993 & 1994 \\ \hline 1993 & 1994 & 1993 & 1994 & 1993 & 1994 & 1993 & 1994 \\ \hline 274 & 299 & 168 & 182 & 267 & 292 & 162 & 1$ | $\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$ | $\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$ | $\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$ | $\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$ | $\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$ | $\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$ | $ \begin{array}{ c c c c c c c c c c c c c c c c c c c$ |

e/Estimated. W Withheld to avoid disclosing company proprietary data; included in "Total." XX Not applicable.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits, may not add to totals shown.

2/ F.o.b. mine.

3/ Less than 1/2 unit.

4/ Includes soluble muriate, manure salts, and potassium magnesium sulfate.

### TABLE 3 PRODUCTION AND SALES OF POTASH IN NEW MEXICO 1/

### (Thousand metric tons and thousand dollars)

|               |                   |                          | Marketable potassium salts |                   |                 |                   |             |  |  |  |  |
|---------------|-------------------|--------------------------|----------------------------|-------------------|-----------------|-------------------|-------------|--|--|--|--|
| Period        | Crude<br>(mine pr | e salts 2/<br>roduction) | Prod                       | luction           | Sold or used    |                   |             |  |  |  |  |
|               | Gross<br>weight   | K2O<br>equivalent        | Gross<br>weight            | K2O<br>equivalent | Gross<br>weight | K2O<br>equivalent | Value e/ 3/ |  |  |  |  |
| 1993:         |                   | _                        |                            | _                 |                 |                   |             |  |  |  |  |
| January-June  | 6,320             | 794                      | 1,290                      | 637               | 1,490           | 725               | 126,000     |  |  |  |  |
| July-December | 6,640             | 822                      | 1,250                      | 581               | 1,010           | 465               | 90,100      |  |  |  |  |
| Total         | 13,000            | 1,620                    | 2,550                      | 1,220             | 2,500           | 1,190             | 216,000     |  |  |  |  |
| 1994:         |                   |                          |                            |                   |                 |                   |             |  |  |  |  |
| January-June  | 6,400             | 814                      | 1,200                      | 570               | 1,370           | 670               | 120,000 r/  |  |  |  |  |
| July-December | 6,220             | 762                      | 1,110                      | 539               | 1,070           | 513               | 97,800      |  |  |  |  |
| Total         | 12,600            | 1,580                    | 2,300                      | 1,110             | 2,450           | 1,180             | 218,000     |  |  |  |  |

e/ Estimated. r/ Revised.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

2/ Sylvinite and langbeinite.

3/ F.o.b. mine.

# TABLE 4 SALIENT U.S. SULFATE OF POTASH STATISTICS $1/\ 2/$

### (Thousand metric tons of K2O equivalent and thousand dollars)

|                          | 1990     | 1991     | 1992     | 1993     | 1994     |
|--------------------------|----------|----------|----------|----------|----------|
| Production               | 219      | 230      | 243      | 251      | 252      |
| Sales by producers       | 221      | 211      | 267      | 245      | 248      |
| Value 3/                 | \$70,200 | \$67,400 | \$87,900 | \$80,800 | \$75,700 |
| Exports 4/               | 124      | 104      | 158      | 114      | 139      |
| Value 5/                 | \$43,300 | NA       | NA       | NA       | NA       |
| Imports 4/               | 26       | 29       | 35       | 45       | 36       |
| Value 6/                 | \$11,000 | \$11,800 | \$13,600 | \$17,300 | \$19,000 |
| Consumption, apparent 7/ | 123      | 136      | 144      | 176      | 145      |
| Yearend producers stocks | 39       | 58       | 34       | 40       | 44       |

NA Not available.

1/ Excluding potassium magnesium sulfate.

2/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits.

3/ F.o.b. mine.

4/ Bureau of the Census.

5/ F.a.s. U.S. port.

6/ C.i.f. to U.S. port.

7/ Calculated from sales plus imports minus exports.

### TABLE 5

### SALES OF NORTH AMERICAN POTASH, BY STATE OF DESTINATION 1/

### (Metric tons of K2O equivalent)

| State          | Agricultura | l potash  | Nonagricultur                | ral potash    |
|----------------|-------------|-----------|------------------------------|---------------|
|                | 1993        | 1994      | 1993                         | 1994          |
| Alabama        | 92,500      | 91,800    | 162,000                      | 201,000       |
| Alaska         | 1,270       | 657       | 1,380                        | 717           |
| Arizona        | 2,810       | 4,760     | 1,090                        | 1,100         |
| Arkansas       | 54,800      | 73,700    | 850                          | 939           |
| California     | 89,500      | 93,600    | 8,440                        | 9,010         |
| Colorado       | 15,000      | 14,200    | 2,310                        | 3,270         |
| Connecticut    | 1,710       | 3,450     | 552                          | 1,520         |
| Delaware       | 17,700      | 21,400    | 53,400                       | 40,800        |
| Florida        | 147,000     | 159,000   | 2,010                        | 2,560         |
| Georgia        | 159,000     | 163,000   | 1,900                        | 1,850         |
| Hawaii         | 7,030       | 4,380     | 47                           | 57            |
| Idaho          | 38,800      | 40,300    | 411                          | 964           |
| Illinois       | 568,000     | 607,000   | 7,420                        | 8,960         |
| Indiana        | 317,000     | 403,000   | 3,630                        | 4,640         |
| Iowa           | 417,000     | 455,000   | 6,430                        | 7,280         |
| Kansas         | 48,100      | 51,600    | 5,680                        | 7,760         |
| Kentucky       | 125.000     | 118.000   | 759                          | 943           |
| Louisiana      | 144,000     | 139,000   | 2,830                        | 3,330         |
| Maine          | 5.890       | 5.630     | 670                          | 1,030         |
| Maryland       | 18.400      | 33.600    | 979                          | 564           |
| Massachusetts  |             | 4.540     | 413                          | 876           |
| Michigan       | 182.000     | 198.000   | 7.270                        | 7.330         |
| Minnesota      | 271.000     | 305.000   | 5.630                        | 6,960         |
| Mississippi    | 64 300      | 62,300    | 49,400                       | 53,300        |
| Missouri       | 237.000     | 263.000   | 4.920                        | 4.510         |
| Montana        | 15 800      | 17,500    | .,> 20                       | 114           |
| Nebraska       | 37 600      | 40,000    | 2,320                        | 2.070         |
| Nevada         | 142         | 302       | <u>-</u> ,5 <u>-</u> 0<br>64 | 112           |
| New Hampshire  |             | 738       | 221                          | 184           |
| New Jersev     | 5280        | 7 120     | 670                          | 1 1 2 0       |
| New Mexico     | 3,330       | 6 480     | 18,300                       | 15,800        |
| New York       | 61 700      | 60,900    | 705                          | 1 310         |
| North Carolina | 90,000      | 109,000   | 1 0 2 0                      | 1,210         |
| North Dakota   | 29,800      | 32 400    | 28                           | 29            |
| Ohio           | 383,000     | 447,000   | 73 700                       | 86 800        |
| Oklahoma       | 25 400      | 33,600    | 2,090                        | 2,760         |
| Oregon         | 34 500      | 35,400    | 1,280                        | 1,320         |
| Pennsylvania   | 52,300      | 71,500    | 3,120                        | 4,260         |
| Rhode Island   |             | 742       | 728                          | 1,550         |
| South Carolina | 58 100      | 64 100    | 61                           | 295           |
| South Dakota   | 13 600      | 17 900    | 238                          | 312           |
| Tennessee      | 129,000     | 122,000   | 402                          | 397           |
| Texas          | 170,000     | 177 000   | 20 100                       | 22 600        |
| Utah           | 20,000      | 4 380     | 8 620                        | 3 740         |
| Vermont        | 6 250       | 5 610     | 138                          | 171           |
| Virginia       | 87 800      | 81 600    | 203                          | 232           |
| Washington     | 41 900      | 47 000    | 3 010                        | 232           |
| West Virginia  | 41,500      | 2 820     | 992                          | 2,390         |
| Wisconsin      | 227.000     | 2,020     | 50 800                       | 60.800        |
| Wyoming        |             | 239,000   | 1 700                        | 07,000<br>878 |
| Total          | 4 530 000   | 4 940 000 | 521.000                      | 502 000       |
| i otal         | 4,550,000   | 4,240,000 | 521,000                      | 592,000       |

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

Source: Potash & Phosphate Institute.

### TABLE 6 SALES OF NORTH AMERICAN MURIATE OF POTASH TO U.S. CUSTOMERS, BY GRADE 1/

### (Thousand metric tons of K2O equivalent)

| Grade            | 1993   | 1994  |
|------------------|--------|-------|
| Agricultural:    |        |       |
| Standard         | 262    | 257   |
| Coarse           | 1,980  | 2,340 |
| Granular         | 1,690  | 1,680 |
| Soluble          | 395    | 467   |
| Total            | 4,330  | 4,750 |
| Nonagricultural: |        |       |
| Soluble          | 106 2/ | 97    |
| Other            | 415 2/ | 490   |
| Total            | 521    | 587   |
| Grand total      | 4.850  | 5.340 |

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.2/ For 1993 nonagricultural data were revised.

Source: Potash & Phosphate Institute.

### TABLE 7 PRICES 1/ OF U.S. POTASH, BY TYPE AND GRADE

### (Dollars per metric ton of K2O equivalent)

|                           | 1        | 993       | 1994     |          |  |
|---------------------------|----------|-----------|----------|----------|--|
| Type and grade            | January- | July-     | January- | July-    |  |
|                           | June     | December  | June     | December |  |
| Muriate, 60% K2O minimum: |          |           |          |          |  |
| Standard                  | 128.88   | 132.60 r/ | 117.78   | 132.90   |  |
| Coarse                    | 121.04   | 130.10 r/ | 127.37   | 135.14   |  |
| Granular                  | 124.08   | 132.62    | 142.32   | 137.61   |  |
| All muriate 2/            | 125.08   | 132.30 r/ | 133.08   | 135.74   |  |
| Sulfate, 50% K2O minimum  | 327.76   | 332.24    | 319.73   | 322.40   |  |

r/ Revised.

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

2/ Excluding soluble and chemical muriates.

### TABLE 8U.S. EXPORTS OF POTASH, BY TYPE 1/

|                                | Approxi-  |           |            |
|--------------------------------|-----------|-----------|------------|
|                                | mate      | Quanti    | ity        |
|                                | average   | (metric t | ions)      |
|                                | K2O       |           |            |
|                                | content   | Product   | K2O        |
|                                | (percent) |           | equivalent |
| 1993:                          |           |           |            |
| Potassium chloride, all grades | 61        | 361,000   | 220,000    |
| Potassium sulfate              | 51        | 223,000   | 114,000    |
| Potassium magnesium sulfate    | 22        | 333,000   | 73,200     |
| Potassium nitrate              | 45        | 17,800    | 8,000      |
| Total                          | XX        | 935,000   | 415,000    |
| 1994:                          |           |           |            |
| Potassium chloride, all grades | 61        | 419,000   | 256,000    |
| Potassium sulfate              | 51        | 273,000   | 139,000    |
| Potassium magnesium sulfate    | 22        | 298,000   | 63,700     |
| Potassium nitrate              | 45        | 6,510     | 2,930      |
| Total                          | XX        | 997,000   | 462,000    |

XX Not applicable.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

Source: Bureau of the Census.

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

(Metric tons of product)

|                           |           |          | Potassium | sulfate, |           |         |         |         |
|---------------------------|-----------|----------|-----------|----------|-----------|---------|---------|---------|
| Country                   | Potassium | chloride | all grad  | es 2/    | Potassium | nitrate | Tota    | al      |
|                           | 1993      | 1994     | 1993      | 1994     | 1993      | 1994    | 1993    | 1994    |
| Argentina                 | 85        | 98       | 2,560     | 3,290    |           |         | 2,640   | 3,380   |
| Australia                 | 2,730     | 140      | 7,990     | 10,800   |           | 20      | 10,700  | 10,900  |
| Bangladesh                |           |          | 1,510     |          |           |         | 1,510   |         |
| Barbados                  |           | 930      |           |          |           |         |         | 930     |
| Belgium                   | 362       | 208      |           | 4,450    |           | 14      | 362     | 4,680   |
| Belize                    | 1,170     | 2,440    |           |          |           |         | 1,170   | 2,440   |
| Bolivia                   | 120       | 1,690    |           |          |           |         | 120     | 1,690   |
| Brazil                    | 103,000   | 15,500   | 2,550     | 12,600   |           |         | 106,000 | 28,100  |
| Canada                    | 4,330     | 4,680    | 109,000   | 71,400   | 4,400     | 5,240   | 118,000 | 81,300  |
| Chile                     | 32,800    | 50,300   | 25,900    | 22,300   |           |         | 58,700  | 72,600  |
| China                     |           |          | 112,000   | 132,000  |           |         | 112,000 | 132,000 |
| Colombia                  | 2.000     | 23.000   | 7.290     | 3,500    |           |         | 9,290   | 26,500  |
| Costa Rica                | 28.000    | 24,100   | 26.600    | 44,500   |           |         | 54,600  | 68,700  |
| Cote d'Ivoire             |           |          |           | 6,500    |           |         |         | 6,500   |
| Dominican Republic        | - 9.760   | 23.600   | 2.730     | 3,330    | 19        | 9       | 12.500  | 26.900  |
| Ecuador                   | 13.800    | 29.400   | 3,500     |          |           | 4       | 17.300  | 37.900  |
| Egypt                     |           |          |           | 468      |           |         |         | 468     |
| El Salvador               | -         | 3 300    | 2         | 1.670    |           |         | 2       | 4 970   |
| Fiii                      | -         | 2 980    | 2         | 1,070    |           |         | 2       | 2 980   |
| France                    |           | 2,980    |           |          |           |         |         | 2,980   |
| Guatemala                 |           | 11 100   | 2 1 10    | 4 500    |           |         | 2 1 10  | 15 600  |
| Guatemaia                 |           | 2 000    | 2,110     | 4,500    |           |         | 2,110   | 2 000   |
| Uluiti                    |           | 2,990    |           | 2        |           |         |         | 2,990   |
| Haiu                      | - 2 000   | 0.060    | 16 400    | 8 220    |           |         | 10 400  | 18 200  |
| Honduras                  | - 5,000   | 9,900    | 10,400    | 8,250    |           |         | 19,400  | 18,200  |
| Indonesia                 |           | 22.400   | 64        |          |           |         | 04      | 22 400  |
| Italy                     | - 21,500  | 55,400   |           | /        | 1         |         | 21,600  | 55,400  |
| Jamaica                   | - 2,800   |          |           |          |           |         | 2,800   | 156000  |
| Japan                     | _ 28,100  | 20,700   | 115,000   | 136,000  | 9,040     | 1       | 152,000 | 156,000 |
| Jordan                    |           |          | 5/        |          |           |         | 57      |         |
| Korea, Republic of        | - 6,440   | 3,850    | 8,030     | 6,070    | 2         | 4       | 14,500  | 9,930   |
| Kuwait                    |           |          | 59        |          |           |         | 59      |         |
| Malaysia                  |           | 27,300   | 25,200    | 43       |           |         | 25,200  | 27,300  |
| Martinique                | 420       | 4,000    | 1         |          |           |         | 421     | 4,000   |
| Mexico                    | _ 50,800  | 40,000   | 59,600    | 59,000   | 4,290     | 1,190   | 115,000 | 100,000 |
| New Zealand               |           | 2,410    |           | 6        |           |         |         | 2,410   |
| Nicaragua                 |           | 2,700    |           | 1,010    |           |         |         | 3,710   |
| Panama                    | 4,180     | 6,040    | 996       | 800      |           |         | 5,180   | 6,840   |
| Peru                      | 5,640     | 22,200   | 4,730     | 5,420    |           |         | 10,400  | 27,700  |
| Philippines               | 6         | 8,670    | 1         | 55       |           |         | 7       | 8,720   |
| Russia                    | 62        | 119      |           |          |           |         | 62      | 119     |
| Saudi Arabia              |           |          | 3,300     | 1,100    | 1         |         | 3,300   | 1,100   |
| Singapore                 |           |          | 205       | 149      |           |         | 205     | 149     |
| South Africa, Republic of |           |          |           | 266      |           |         |         | 266     |
| St. Lucia                 |           |          |           | 65       |           |         |         | 65      |
| Sweden                    | 1,460     | 731      | 22        |          |           |         | 1,480   | 731     |
| Switzerland               |           |          |           | 298      |           |         |         | 298     |
| Taiwan                    |           | 20       | 180       | 140      |           |         | 180     | 160     |
| Thailand                  | 10,300    | 10,300   | 10,400    | 3,560    |           | 4       | 20,700  | 13,800  |
| Trinidad and Tobago       | 2.390     | 1.620    | ·         | 142      |           |         | 2,390   | 1.770   |
| Turkey                    |           |          |           | 102      |           |         |         | 102     |
| Uruguav                   |           | 3.100    |           | 723      |           |         |         | 3.820   |
| Venezuela                 | 25,900    | 97       | 2.920     | 13.700   |           | 6       | 28,800  | 13,800  |
| Zimbawe                   |           |          | 5.050     | 5.000    |           |         | 5.050   | 5.000   |
| Other                     | - 6       | 54       | 153       | 118      | 20        | 24      | 179     | 196     |
| Total                     | 361.000   | 419.000  | 556.000   | 563.000  | 17.800    | 6.520   | 935.000 | 997.000 |
|                           | 201,000   |          |           |          | ,         | -,-=-   | ,,      | ,,      |

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown. 2/ Includes potassium magnesium sulfate.

Source: Bureau of the Census.

|                                  | Approxi-  |            |               |             |           |  |
|----------------------------------|-----------|------------|---------------|-------------|-----------|--|
|                                  | mate      | Quantit    | ty            | Value       |           |  |
|                                  | average   | (metric to | ons)          | (thousands) |           |  |
|                                  | K2O       |            |               |             |           |  |
|                                  | content   | Product    | K2O           | Customs     | C.i.f.    |  |
|                                  | (percent) |            | equivalent e/ |             |           |  |
| 1993:                            |           |            |               |             |           |  |
| Potassium chloride               | 61        | 7,050,000  | 4,300,000     | \$548,600   | \$649,000 |  |
| Potassium sulfate                | 51        | 87,300     | 44,500        | 15,400      | 17,300    |  |
| Potassium nitrate                | 45        | 28,100     | 12,700        | 7,830       | 8,750     |  |
| Potassium sodium nitrate mixture | 14        | 38,900     | 5,450         | 5,970       | 6,570     |  |
| Total                            | XX        | 7,200,000  | 4,360,000     | 578,000     | 682,000   |  |
| 1994:                            |           |            |               |             |           |  |
| Potassium chloride               | 61        | 7,790,000  | 4,740,000     | 614,000     | 716,000   |  |
| Potassium sulfate                | 51        | 70,900     | 36,200        | 17,300      | 19,000    |  |
| Potassium nitrate                | 45        | 16,400     | 7,360         | 4,280       | 5,240     |  |
| Potassium sodium nitrate mixture | 14        | 45,700     | 6,400         | 6,180       | 6,810     |  |
| Total                            | XX        | 7,920,000  | 4,790,000     | 642,000     | 747,000   |  |

## TABLE 10 U.S IMPORTS FOR CONSUMPTION OF POTASH, BY TYPE 1/

e/Estimated. XX Not applicable. 1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

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 1/

|                    |                   |           |        |               | Metric tons | of product                              |        |                              |           |           |          | Total<br>(thou | value    |          |  |
|--------------------|-------------------|-----------|--------|---------------|-------------|---|--------|------------------------------|-----------|-----------|----------|----------------|----------|----------|--|
| Country            | Potassi<br>chlori | Potassium |        | Potassium Pot |             | Potassium Potassiu<br>nitrate sodium ni |        | otassium<br>um nitrate Total |           |           | Customs  |                | C.i.f    | C.i.f.   |  |
|                    | 1993              | 1994      | 1993   | 1994          | 1993        | 1994                                    | 1993   | 1994                         | 1993      | 1994      | 1993     | 1994           | 1993     | 1994     |  |
| Belarus            | 198,000           | 302,000   |        |               |             |   |        |                              | 198,000   | 302,000   | \$16,300 | \$24,000       | \$18,600 | \$28,600 |  |
| Belgium            | 3,000             | 2,500     | 15,800 | 8,720         |             |   |        |                              | 18,800    | 11,200    | 2,920    | 1,960          | 3,460    | 2,280    |  |
| Canada             | 6,400,000         | 7,230,000 | 2,770  | 11,100        | 14          | 1                                       | 12,300 | 20,300                       | 6,420,000 | 7,260,000 | 497,000  | 577,000        | 590,000  | 671,000  |  |
| Chile              |                   |           |        |               | 13,800      | 10,200                                  | 26,590 | 25,300                       | 40,400    | 35,500    | 7,760    | 5,530          | 8,630    | 6,330    |  |
| Denmark            |                   |           |        |               | 1,220       | 2,070                                   |        |                              | 1,220     | 2,070     | 458      | 651            | 557      | 867      |  |
| Dominican Republic |                   |           |        |               | 169         | 226                                     |        |                              | 169       | 226       | 61       | 88             | 67       | 97       |  |
| France             |                   |           |        | 6,760         |             |   |        |                              |           | 6,760     |          | 3,000          |          | 3,060    |  |
| Germany            | 64,400            | 49,000    | 67,100 | 42,800        | 247         | 19                                      |        |                              | 132,000   | 91,800    | 15,800   | 10,800         | 18,200   | 12,700   |  |
| Israel             | 232,000           | 61,100    |        |               | 12,600      | 3,610                                   |        |                              | 245,000   | 64,700    | 25,700   | 6,930          | 28,600   | 7,990    |  |
| Japan              | 6                 |           | 407    | 307           | 25          | 45                                      | 56     | 118                          | 494       | 470       | 309      | 129            | 347      | 177      |  |
| Jordan             | 7,300             | 5,000     |        |               |             |   |        |                              | 7,300     | 5,000     | 647      | 425            | 788      | 521      |  |
| Latvia             | 34,500            | 33,000    |        |               |             |   |        |                              | 34,500    | 33,000    | 2,300    | 2,480          | 2,820    | 3,050    |  |
| Mexico             |                   |           |        | 73            | 6           |   |        |                              | 6         | 73        | 6        | 24             | 6        | 25       |  |
| Netherlands        | 28                |           | 1,200  | 1,150         |             |   |        | 46                           | 1,230     | 1,200     | 262      | 219            | 264      | 257      |  |
| Nigeria            |                   | 29        |        |               |             |   |        |                              |           | 29        |          | 6              |          | 7        |  |
| Poland             |                   |           |        |               | 36          | 91                                      |        |                              | 36        | 91        | 19       | 49             | 24       | 58       |  |
| Russia             | 109,000           | 109,000   |        |               | 43          | 51                                      |        |                              | 109,120   | 109,000   | 7,911    | 8,290          | 9,510    | 9,780    |  |
| Sweden             | 21                | 2         |        |               |             |   |        |                              | 21        | 2         | 20       | 3              | 22       | 3        |  |
| United Kingdom     |                   | 428       | 7      |               |             |   |        | 11                           | 326       | 439       | 156      | 137            | 193      | 165      |  |
| Other              |                   |           |        |               | (2/)        | 10                                      |        |                              |           | 10        |          | 9              |          | 11       |  |
| Total              | 7,050,000         | 7,790,000 | 87,300 | 70,900        | 28,100      | 16,400                                  | 38,900 | 45,700                       | 7,200,000 | 7,920,000 | 578,000  | 642,000        | 682,000  | 747,000  |  |

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown. 2/ Revised to zero.

Source: Bureau of the Census.

# TABLE 12 MARKETABLE POTASH: WORLD PRODUCTION, BY COUNTRY 1/ 2/

### (Thousand metric tons of K2O equivalent)

| Country        | 1990   | 1991     | 1992        | 1993      | 1994 e/  |
|----------------|--------|----------|-------------|-----------|----------|
| Belarus        | XX     | XX       | 3,310       | 1,950     | 2,510    |
| Brazil         | 66     | 101      | 85          | 173       | 240      |
| Canada         | 6,990  | 7,410    | 7,270       | 6,840     | 8,040 3/ |
| Chile e/ 4/    | 45 r/  | 55       | 55          | 55        | 70       |
| China e/       | 29     | 32       | 21          | 25        | 25       |
| France         | 1,290  | 1,130    | 1,140       | 890 r/ e/ | 870      |
| Germany:       |        |          |             |           |          |
| Eastern states | 2,650  | XX       | XX          | XX        | XX       |
| Western states | 2,310  | XX       | XX          | XX        | XX       |
| Total          | 4,960  | 3,860    | 3,460 r/    | 2,860 r/  | 3,290    |
| Israel         | 1,310  | 1,320    | 1,300 r/ e/ | 1,310 r/  | 1,260    |
| Italy          | 68     | 31       | 86          | r/ e/     |          |
| Jordan         | 841    | 818      | 808         | 822 r/    | 930      |
| Russia         | XX     | XX       | 3,450       | 2,600     | 2,480    |
| Spain          | 686    | 585      | 594         | 661 r/    | 684      |
| Ukraine        | XX     | XX       | 98 r/       | 88 r/e/   | 78       |
| U.S.S.R. 5/    | 9,000  | 8,560 e/ | XX          | XX        | XX       |
| United Kingdom | 488    | 495      | 529 r/      | 550 r/    | 580      |
| United States  | 1,710  | 1,750    | 1,710       | 1,510     | 1,400 3/ |
| Total          | 27,500 | 26,100   | 23,900 r/   | 20,300 r/ | 22,500   |
|                |        |          |             |           |          |

e/Estimated. r/ Revised. XX Not applicable.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

2/ Table includes data available through Apr. 25, 1995.

3/ Reported figure.

4/ Data from Comisión Chilena del Cobre. This is the sum of potassium chloride production and exports of mixed sodium-potassium nitrates.

5/ Dissolved in Dec. 1991.