MANGANESE

(Data in thousand metric tons, gross weight, unless otherwise specified)

Domestic Production and Use: Manganese ore containing 35% or more manganese was not produced domestically in 1997. Manganese ore was consumed mainly by about 15 firms with plants principally in the Eastern and Midwestern United States. The majority of ore consumption was related to steel production, directly in pig iron manufacture and indirectly through upgrading ore to ferroalloys and metal. Ore was used otherwise for such nonmetallurgical purposes as producing dry cell batteries, as an ingredient in plant fertilizers and animal feed, and as a colorant for brick. Leading identifiable end uses of manganese were construction, machinery, and transportation, which were estimated to be 23%, 14%, and 11%, respectively, of total manganese demand. Most of the rest went to a variety of other iron and steel applications. Value of domestic consumption was estimated from foreign trade data as about $420 million.

Salient Statistics—United States:

<table>
<thead>
<tr>
<th>Year</th>
<th>Production, mine</th>
<th>Imports for consumption:</th>
<th>Exports:</th>
<th>Shipments from Government stockpile excesses:</th>
<th>Consumption, reported:</th>
<th>Price, average value, 46% to 48% Mn metallurgical ore, dollars per mtu cont. Mn, c.i.f. U.S. ports</th>
<th>Stocks, producer and consumer, yearend:</th>
<th>Net import reliance as a percent of apparent consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>254</td>
<td>389</td>
<td>696</td>
<td></td>
<td></td>
<td>2.60</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>134</td>
<td>449</td>
<td>694</td>
<td></td>
<td></td>
<td>2.40</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>1995</td>
<td>115</td>
<td>486</td>
<td>676</td>
<td></td>
<td></td>
<td>2.40</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>1996</td>
<td>128</td>
<td>478</td>
<td>776</td>
<td></td>
<td></td>
<td>2.55</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>123</td>
<td>485</td>
<td>715</td>
<td></td>
<td></td>
<td>2.44</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Recycling: Scrap recovery specifically for manganese was negligible, but a significant amount was recycled through processing operations as a minor component of ferrous and nonferrous scrap and steel slag.

Import Sources (1993-96): Manganese ore: Gabon, 58%; Australia, 18%; Mexico, 11%; South Africa, 7%; and other, 6%. Ferromanganese: South Africa, 38%; France, 26%; Brazil, 10%; Australia, 8%; and other, 18%. Manganese contained in all manganese imports: South Africa, 28%; Gabon, 16%; Australia, 13%; France, 12%; and other, 31%.

Tariff: Item | Number | Most favored nation (MFN) | Non-MFN
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ore and concentrate</td>
<td>2602.00.0040/60</td>
<td>Free</td>
<td>2.2¢/kg of contained Mn.</td>
</tr>
<tr>
<td>Manganese dioxide</td>
<td>2820.10.0000</td>
<td>4.7% ad val.</td>
<td>25% ad val.</td>
</tr>
<tr>
<td>High-carbon ferromanganese</td>
<td>7202.11.5000</td>
<td>1.5% ad val.</td>
<td>10.5% ad val.</td>
</tr>
<tr>
<td>Silicomanganese</td>
<td>7202.30.0000</td>
<td>3.9% ad val.</td>
<td>23% ad val.</td>
</tr>
<tr>
<td>Metal, unwrought</td>
<td>8111.00.4500</td>
<td>14% ad val.</td>
<td>20% ad val.</td>
</tr>
</tbody>
</table>

Depletion Allowance: 22% (Domestic), 14% (Foreign).

Government Stockpile: In addition to the data tabulated, the stockpile contained additional uncommitted inventories of nonstockpile-grade materials, as follows, in tons: natural battery ore, 16,800; chemical ore, 81; and metallurgical ore, 427,000.

Prepared by Thomas S. Jones, (703) 648-4973 [Fax: (703) 648-7757].
### MANGANESE

#### Stockpile Status—9-30-97

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery: Natural ore</td>
<td>107</td>
<td>0.7</td>
<td>107</td>
<td>54</td>
<td>8</td>
</tr>
<tr>
<td>Synthetic dioxide</td>
<td>3</td>
<td>—</td>
<td>3</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Chemical ore</td>
<td>148</td>
<td>—</td>
<td>148</td>
<td>36</td>
<td>2</td>
</tr>
<tr>
<td>Metallurgical ore</td>
<td>778</td>
<td>26</td>
<td>526</td>
<td>363</td>
<td>111</td>
</tr>
</tbody>
</table>

**Ferromanganese:**
- High-carbon: 940, 4, 695, 45, 27
- Medium-carbon: 13, 3, —, —, 5
- Silicomanganese: —, 0.005, —, —, 0.2
- Electrolytic metal: 9, 0.5, 9, 2, 1

**Events, Trends, and Issues:** Although raw steel production, a major determinant of manganese demand, was trending up slightly in the United States and firmly on a global basis, prices decreased to lower levels for manganese ore and the principal manganese ferroalloys. Impending production of refined manganese ferroalloys by joint ventures between Japanese and South African companies foreshadowed strong competition in that sector of the manganese industry. Manganese is an essential element for people, animals, and plants, but it can be harmful in excessive amounts. Thus, manganese can be an industrial poison, but generally is not a hazard.

#### World Mine Production, Reserves, and Reserve Base:

<table>
<thead>
<tr>
<th></th>
<th>Mine production 1996</th>
<th>Reserves¹</th>
<th>Reserve base¹¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1997</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Australia</td>
<td>1,020</td>
<td>1,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Brazil</td>
<td>858</td>
<td>860</td>
<td>21,000</td>
</tr>
<tr>
<td>China</td>
<td>1,200</td>
<td>1,200</td>
<td>40,000</td>
</tr>
<tr>
<td>Gabon</td>
<td>923</td>
<td>930</td>
<td>45,000</td>
</tr>
<tr>
<td>Georgia</td>
<td>29</td>
<td>30</td>
<td>7,000</td>
</tr>
<tr>
<td>India</td>
<td>659</td>
<td>630</td>
<td>24,000</td>
</tr>
<tr>
<td>Mexico</td>
<td>173</td>
<td>175</td>
<td>4,000</td>
</tr>
<tr>
<td>South Africa</td>
<td>1,380</td>
<td>1,320</td>
<td>370,000</td>
</tr>
<tr>
<td>Ukraine</td>
<td>1,020</td>
<td>930</td>
<td>135,000</td>
</tr>
<tr>
<td>Other countries</td>
<td>466</td>
<td>450</td>
<td>Small</td>
</tr>
<tr>
<td>World total (rounded)</td>
<td>7,730</td>
<td>7,500</td>
<td>680,000</td>
</tr>
</tbody>
</table>

**World Resources:** Land-based resources are large but irregularly distributed; those of the United States are very low grade and have potentially high extraction costs. South Africa and the Former Soviet Union (FSU) account for more than 80% of the world’s identified resources; South Africa accounts for more than 80% of the total exclusive of China and the FSU.

**Substitutes:** There is no satisfactory substitute for manganese in its major applications.

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¹Estimated. ²Revised
³Manganese content typically ranges from 35% to 54% for manganese ore and from 74% to 95% for ferromanganese.
⁴Excludes insignificant quantities of low-grade manganiferous ore.
⁵Imports more nearly represent amount consumed than does reported consumption; internal evaluation indicates that reported consumption of silicomanganese is considerably understated.
⁶Net quantity including effect of stockpile upgrading program. Data in parentheses denote increases in inventory.
⁷Total manganese consumption cannot be approximated from consumption of manganese ore and ferromanganese because of the use of ore in making manganese ferroalloys and metal.
⁸For 1996-97, exclusive of that at iron and steel plants.
⁹Thousand metric tons, manganese content. Based on estimates of average content for all significant components except imports, for which content is reported.
¹⁰Defined as imports - exports + adjustments for Government and industry stock changes.
¹¹See Appendix B.
¹²See Appendix C for definitions.
¹³Thousand metric tons, manganese content. See Appendix D for definitions.