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UNITED NATIONS
ECONOMIC COMMISSION FOR AFRICA

UNCTAD

INTERGOVERNMENTAL GROUP OF EXPERTS ON IRON ORE

(THIRD SESSION; GENEVA, 24-26 OCTOBER 1994)

MISSION REPORT

Introduction

1. The third session of the UNCTAD Intergovernmental Group of Experts on Iron Ore took place at the Palais des Nations, Geneva, from 24 to 26 October 1994.

2. The session was opened by Mr. John Cuddy, Officer-in-Charge of the UNCTAD Commodities Division, and was attended by representatives of iron ore producing and iron ore consuming countries. Three International Organizations also participated in the meeting.

3. In his introductory statement, Mr. Cuddy welcomed the Experts and mentioned that thanks to their participation, the annual sessions of the Group had become a reference -point for iron ore circles. He also pointed out that in these times of increasing competition, market information is more crucial than ever. Thus, the network established by UNCTAD on iron ore is more than ever a useful instrument contributing to greater market transparency and closer cooperation in the field of iron ore.

4. As to the situation of the iron ore market, Mr Cuddy informed participants that the year 1993 had marked a revival in the volumes of iron ore traded (but not in prices) despite the slow-down of the Japanese and European economies. The world market of iron ore had experienced a strong growth of nearly 8% in trade volumes: the world exports had reached 398 million tons thanks to the growing demand for imported iron ore in China, and in most developing regions, particularly in Asia. However, the financial transactions amounted only to US $ 47.55 billion, the lowest value since 1989, because of falls in world iron ore prices. A similar situation was occurring in 1994, because the boost in demand and the tighter supply situation had not prevented another collapse in iron ore prices. Today, prices are around 25-30% below the 1991 level, leaving iron ore a major exception not benefitting from the recent rise in commodity prices.

5. Regarding iron ore production at the world level, output had grown by 2.5% to 942 million tons in 1993, despite the sharp drop in mining and steel activities in the CIS states. Although the prices of iron ore are not been conducive to new greenfield projects, major iron ore companies had continued to invest in replacements and capacity expansions, to assure long-term supply. Four main projects had started operations in 1993, in Australia, Brazil, Mauritania, and Venezuela.

6. Recent iron developments had also shown more clearly the impact of environmental constraints, technological advances and cost considerations on the demand for different types of

ores. The expansion of the direct reduction market is already influencing the demand for lumps and pellets. But there are also emerging smelting reduction technologies which might revive the interest in fines and concentrates.

Agenda

7. The Group adopted the following agenda:

a. Election of officers

b. Adoption of agenda and organization of work

c. Review of iron ore statistics and other institutions activities and publications on iron ore

d. Review of the current situation and outlook for iron ore

e. Provisional agenda for the fourth session of the Intergovernmental Group of Experts on Iron ore

f. Other business

g. Adoption of the report to the standing Committee on Commodities

Election of Officers

8. The Group elected Mr. Jacques. E. Astier, Ingénieur Conseil, of France, as Chairman of the session, and Mrs. Zonia Osorio de Fernández of Venezuela as Vice chairman- cum-rapporteur.

Review of iron ore statistics and other institutions activities and publications on iron ore.

9. Based on replies to its questionnaire from 38 countries and the European Commission (acting on behalf of its twelve members), the UNCTAD secretariat had prepared a document containing 27 tables on updated statistics on iron ore. For the first time, the secretariat has devoted a table to China, because of her growing importance on the world market of iron ore.

10. Before reviewing these statistics, the UNCTAD secretariat reminded the Group to use, in the course of compilation of statistics, agreed definitions. Then some modifications were proposed to the table on iron ore production and production capacity. Besides, some participants provided revised figures which were included in the final version of the document.

11. As to the review of activities and publications on iron ore carried out by other institutions and individual countries, the Group examined a document prepared by the UNCTAD secretariat, containing brief summaries of studies and worldwide activities in the field of iron ore and related issues. It should be noted that the ECA Natural resources Division had not carried any activity on iron ore in 1993.

Review of the current situation and outlook for iron ore

12. Despite the sharp drop in iron ore consumption in the CIS states, and the slow-down of the European and Japanese economies, global iron ore demand increased slightly in 1993, thanks to China, Latin America, the Middle East and Asia (Consumption of iron ore has decreased in Africa, Europe and Noth America).

13. As to the products, supply for pellets and lumps have been particularly tight because of the ever-growing demand from direct reduction plants. Moreover, soaring prices for prime grade ferrous scrap in 1993 had led to greater interest in primary iron products.

14. The world production of iron ore had risen by 2.5% in 1993 to 942 million tons. The strongest increase in iron output had taken place in China(+15%), while the sharpest drop had been in the CIS states(-12%). Production had also increased in Australia, Brazil, India and South Africa.

15. World iron trade had also risen in 1993, with total exports nearly 8% higher than in 1992, reaching 398 million tons, thanks to the strong demand for imported iron ore in China and fast developing regions such as Asia . Australia had been the leading world supplier followed by Brazil. Together, these two countries accounted 57% of world supply of iron ore. Among the ten tops, South Africa had recorded a remarkable export growth (+30%) but recoveries in export volumes had also occurred in Chile, Mauritania and Sweden, and for the first time, the declining trend has been reversed in the CIS states.

16. The leading importer of iron ore by far was Japan, with a share of nearly 30% of world imports. Growing importance of China as iron ore importer should be noted: she has moved up very fast, from the tenth place in 1990 to the fourth place in 1993.

17. Iron prices had fallen for the third consecutive year. In 1993, world reference prices had been cut by 10 to 12 on average. In 1994, despite the strong demand for iron ore, prices of these commodities had dropped further by 9.5% for fines, and by 6% for lumps. Even for pellets which had been in short supply, prices had not increased.

18. Africa contributed for 4.8% to the world production of iron ore: the iron ore production of the Continent (South Africa included) was less than 45 million tons in 1993, compared to 60 million tons five years before. During that period, the world produced 932 million tons of iron ore. South Africa is the major iron ore producer of Africa. In 1993 its output was 4% higher than in 1992, exceeding 29 million tons. The exports of iron ore of that country in 1993 rose to 19.5 million tons, more than 30% higher than in 1992, thanks to the strong world demand for lumps ore. Against this background, the country has expanded the capacity of Sishen mines and started new operations at Thabayimbi.

19. Mauritania is the second iron more producer of Africa. The SNIM's operations recovered from the sharp decline of 1992. The M'haoudat project was inaugurated in April 1994, ensuring the continued supply of high grade direct shipping ores which was nearly jeopardized with the nearly exhaustion of the Kedia and Tazadit deposits. M'haoudat will produce 6 million tons per year of iron ore for the next 20 years of which 40 to 50% will be lumps. Mauritania is planning to build a pellet plant to produce 5 million tons of DR-pellets for the arab market.
Finally, in 1993, Mauritania sold 9.7 million tons of iron ore to the world .

20. Liberia did not produce iron ore in 1993, because of the war which is still going on in that country. But it is believed that Liberia had shipped a small amount of iron ore from its stocks. Mining activities ceased in November 1992.

21. In Guinea, negotiations to raise funds for the MIFERGUI project continue. Apparently the major obstacle to the development of the project, the environmental aspect has been surmounted: world experts have agreed that the project area is located outside the Nimba world heritage. Very recently, a new equity holding multinational joint venture involving French, Japanese and South Africa, has been established to define the best way to implement the project.

22. Senegal is also seeking for concrete financial commitments from potential users/ multilateral institutions to launch the MIFERSO project.

Presentations on the Ownership structure of the iron ore industry in the 1990S and on Fine ore reduction: raw materials, energies and other criteria for process selection.

23. In line with the analysis of the international market of iron ore, two guest speakers made presentations on the above mentioned subjects.

The ownership structure of the iron ore industry in the 1990s

24. **Mr. Magnus Ericsson of Raw Material Group, Sweden**, mentioned that in 1975, the three leading iron ore companies, CVRD, USX and LKAB, controlled 19 % of total world production. By 1993, this figure had increased to 34% and CVRD was still at the top, followed by BHP and RTZ. He added that this was a unique trend of increasing corporate concentration, since in most major non-ferrous minerals and metals, a deconcentration had taken place during the same period.

25. The ten largest companies controlled almost 30% of western production. Mr. Ericsson said this concentration could be explained by :

- The size of the industry output both in volume and value
- The extreme economies of scale
- The use of giant intercontinental freight vessels that decreases the transport costs
- The geological situation with huge deposits of higher grade ores

He also indicated that some of the world's most successful iron ore companies were still state-controlled, citing as examples, the Brazilian CVRD and Swedish LKAB.

26. Regarding the steel companies control, Mr. Ericsson indicated that among the ten top iron ore mining companies, in 1975, five were steel companies with captive mines. Today four companies, Iscor of South Africa, USX, Bethlem steel, and Australian BHP control around 11% of the world production of iron ore. It seems that the domination of steel companies over the iron ore industry had weakened and that a new type of iron ore company focusing primarily on the mining stage has developed.

27. Mr. Ericsson also mentioned that while in 1975 the most important owners of iron mines were North American based(they controlled 7% of the world iron ore industry) today the North American interests in that in iron ore industry has dwindled to just 1% while European companies control abroad has increased to 9% and Japanese/Chinese to 4%. In Africa iron ore mining had became completely locally controlled since the closing down of mining activities in Liberia.

28. Mr. Ericsson concluded by stating that it was possible that most difficult years of contradictions between Governments of developing countries and transnational firms as experienced in the mid and late 1970s were over. But there will be always a source of tension between transnational and Governments of developing countries because "the production of minerals in the developing countries is continuously growing, but control over these minerals to a large extent remains in the industrialized countries".

Fine ore Reduction: Raw Materials, Energies and Other Criteria For Process Selection

29. Mr. Detlev Schelebusch, Manager of Technology, Lurgi Metallurgie GMBH, Germany, first recalled that hot metal production via the coke oven and blast furnace route was highly capital-intensive and had continuing environmental problems. Given the growing importance of direct reduction(DR) he added, iron ore suppliers should consider the prerequisites for a DR feedstock and adapt to the market, as should plant designers and suppliers of technology.

30. He also indicated that DR processes operated with all the three types of iron ore :pellets, lumps and fines. However the use of fines would depend on the type of the reactor.

31. For more details on the two presentations, papers of Mr. Ericsson and Dr. Detlev are attached to the present report. Also annexed to the report is the revised document on statistics on iron ore production.

Development of Congo iron ore deposits

32. In July 1994, the Government of Congo informed ECA that among its priorities was the development of iron ores of the country and asked ECA to assist it in exploring all the possibilities for the exploitation of the deposits located in Zanaga, in the south-west of the country.

33. The ECA representative at the third session of the Intergovernmental Group of Experts on Iron Ore seized the opportunity offered by this forum to exchange views with some experts and the UNCTAD secretariat on this matter.

34. During the exchange of views, Mr Jacques Astier, current Chairman of the Group and an Ingenieur-Conseil of France, indicated that he was ready to visit Congo in connection with the request of the Government of Congo.

Conclusion

35. As stated by the UNCTAD Officer-in-Charge, the annual session of the Intergovernmental Group of Experts has become a reference-point for everyone interested in iron ore industry. Although the ECA Natural Resources Division did not carried out any activity on iron ore in 1993, its participation in the 1994 session which reviewed the development of iron ore industry in 1993, and in the meetings of the Group in general, has been very much appreciated by the UNCTAD Secretariat and particularly by the representatives of iron ore producing countries and iron ore consuming countries of the other parts of the world, especially because African countries usually don't attend these meetings. Over the last three years, ECA has for this reason, unofficially acted on behalf of its member States. On 26 October 1994, the UNCTAD Secretariat indicated that it would officially request the ECA to act on behalf of its member States like the European Commission: ECA will every year report to the Group on the development of the African iron ore industry. **This would affect the MRU programme of work, since the assessment of the African iron ore industry would be included in that programme every year.**

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(Albert Yama Nkounga)

Annexes

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INTERGOVERNMENTAL GROUP OF EXPERTS ON IRON ORE

Geneva, 24 - 26 October 1994

" The ownership structure of the iron ore industry in the 1990s ".

Presentation by :

Mr. Magnus ERICSSON

Raw Materials Group

Sweden

THE OWNERSHIP STRUCTURE OF THE IRON ORE INDUSTRY IN THE 1990s

Magnus Ericsson, Kristina Rosén, Andreas Tegen
Raw Materials Group, Stockholm

Introduction

In 1975 the three leading iron ore companies, CVRD, USX and LKAB controlled 19 per cent of total world production. In 1993 this figure had increased to 34 per cent and CVRD was still to find at the top followed by BHP and RTZ. This is a unique trend of increasing corporate concentration. In most major non-ferrous minerals and metals a deconcentration has taken place during the same period.

This paper surveys the corporate structure of the iron ore industry during the last 20 years. Present changes in ownership and control are discussed and possible future trends are identified.

Ownership and control

Two concepts are of basic importance when discussing structural changes, *ownership* and *control*. Ownership refers to the holding of shares in a company and is easy to define and to measure. In principle the ownership figures are to be found in the share register. Control is more difficult to define and to measure accurately. The following definition will be used:

"To be in control is to have the possibility to act decisively on strategically important issues rather than to have day-to-day influence over a company. Such issues include the broad policies of a company, decisions on large investments, buying or selling of subsidiaries and authority to appoint or dismiss top management."

Control can be exercised through many means, of which ownership is the most common and important one. Other ways are for example through administrative and technical management, long term contracts, market knowledge, proprietary technology, financing, personal links and vertical integration.

In this study ownership and management is used to measure control. Further details on the methodology used are given in Appendix.

All figures on corporate ownership and production presented in this paper are obtained from *Raw Materials Data* [1].

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1. *Raw Materials Data*, the database on ownership and production in the world's mineral industries compiled and updated by Raw Materials Group, Stockholm 1994.

Historical trends

Trends of development over the last 20 years for five aspects of the corporate structure of the industry are highlighted:

* Corporate concentration
* State control
* Steel company control
* Locus of control
* Foreign control

Corporate concentration

Corporate concentration is a measure of the strength of the largest companies in a market. High corporate concentration means that the major producers can have a significant market impact. The level of corporate concentration in the iron ore industry is given in Tables 1 and 2.

The three largest companies control over 30 per cent of Western world iron ore production. The ten largest together reach almost 60 per cent. Compared to other minerals industries concentration in the iron ore industry is at a medium level, similar to for example copper and bauxite. The concentration is lower than in nickel and tin which are the most concentrated of the major metals.

The wind of change since 1975 is however unique in the iron ore industry: A continuous and steady increase in corporate concentration. The pace of concentration has also increased considerably over the last decade. The share of Western world iron ore production controlled by the ten largest companies grew with a meager 4 per cent between 1975 and 1984 but sky rocketed with 30 per cent from 1984 to 1993. Other major metals such as bauxite, copper and gold exhibit a clear declining trend over the last decade.

Several factors each give a part of the explanation for this:

* The size of industry out put, total production of iron ore is approximately 900 Mt/year which is roughly ten times higher than the next metal, bauxite. The total value of the iron ore production in the Western world almost equals that of gold and and is six times higher that of bauxite.

* Extreme economies of scale, which are more important in iron ore production than in most other minerals.

* The introduction of giant intercontinental freight vessels, that decreases transport costs and makes it possible to export iron ore all over the world.

* A geological situation where there is a shift towards higher grade, huge deposits as opposed to the reversed trend in many non-ferrous metals.

* Low grade, smaller deposits that have been mined over a long period have been gradually closing down as in France and the US.

* High financial barriers to entry due to the large scale of an iron ore project.

* High concentration on the consumer side with the Japanese buyers' group as a prime example.

However even with these factors in mind it is difficult to satisfactorily explain the high and increasing concentration in the iron ore industry.

State control

State control is in this study defined in the same way as corporate control ie only the influence of the state through share holdings in iron ore producing companies is measured. Actual state control might be larger when considering that a government also has power over legislation, taxation etc, but this has not been taken into account.

In 1993 total state control amounted to 33 per cent of Western world iron ore production. This is the highest level among all major non-fuel minerals, in no other metal is state control over 30 per cent. See Table 3. Since 1984 there has been a slow decline from 35 per cent. This is in line with the trend for most other metals. The decrease is lower than in copper but on the same level as in for example bauxite and nickel.

During the last few years privatisations have been in focus in both market economies and the former centrally planned economies. Against this background it is surprising how small changes have actually taken place in the iron ore industries of the Western world. South African Iscor (1989), Brazilian Cia Siderurgica Nacional (1993) and Peruvian Empresa Minera del Hierro del Peru (1992) are the major privatisations that have taken place. Together these three producers control 6.3 per cent of Western world production in 1993. Ironically however the Peruvian company was bought by the Chinese state owned Shougang and is thus still under state control. The shut down of state controlled iron ore mines as in France is another reason for diminishing state control during the same period.

Some of the world's most successful iron ore mining companies are still state controlled such as Brazilian CVRD and Swedish LKAB. CVRD seems to be firmly under Brazilian state control in spite of permanent rumours and discussion about privatisation during the last 20 years. In recent privatisations of the Brazilian steel industry CVRD has even been bidding for steel producers that are being privatised. LKAB has been on the privatisation list but the new Swedish government, elected in September 1994, will most likely not pursue these plans both of ideological reasons and of the simple reason that it is difficult to find a buyer willing to pay an acceptable price for the company. In India and Venezuela discussions about privatisations are active but so far no actual changes have taken place.

It is probable that plans like these, which are also supported by international financing agencies including the World Bank, will decrease government or state control further in the mid 1990s. Some financially ailing state controlled iron ore producers might also be shut down further decreasing state controlled share of total production. However the speed of privatisation will probably tail off and the state sector will undoubtedly continue to play an important role in the international iron ore industry also in the long term perspective. The nationalisations of the late 1960s and the early 1970s will not be completely reversed.

Steel company control - vertical integration

Mining companies integrating into metal refining is an important feature of several mineral industries. In for example the aluminium industry bauxite mining companies take control over alumina plants and also aluminium smelters. This phenomena is known as vertical integration. In the iron and steel industries it includes the control of iron ore mines by steel companies and vice versa. A high level of vertical integration indicates stronger corporate control than if there were different actors in mining and metal refining (iron- and steel production). Among the top ten iron ore mining companies in 1975 were five steel companies with captive mines. US Steel (presently USX) and Kaiser Steel from the USA, European Arbed and Sacilor and Australian BHP. Further the nationalisation in Venezuela was quite recent and there are reasons to believe that Ferrominera Orinoco to a large extent was still operating as a captive US Steel mine. Together these six companies controlled around 16 per cent of the Western world production of iron ore. In 1993 the importance of steel companies had diminished and there were only 4 steel companies among the top ten. Iscor from South Africa, USX and Bethlehem Steel from the US and Australian BHP together controlling 11 per cent of total world production. It seems as if earlier stronger domination by the steel companies over the iron ore industry has gradually weakened and that a new type of iron ore company focusing primarily on the mining stage has developed.

Geographical shifts in locus of control

The geographical locus of control over iron ore mining has shifted considerably during the last 20 years. In Table 4 controlling companies are grouped according to region of incorporation of the controlling company. As an example Brazilian Caemi's 25 per cent share of Canadian producer Quebéc Cartier is considered to be under Latin American control since Caemi is based in Brazil. North American company control has been cut into half from 17 per cent in 1975 to 8 per cent of total world production in 1993. A similar decrease is found for the European controlling companies but not quite as steep. It is the Australian controlled producers and the Latin American ones that have increased their control over the last two decades from 5 to 7 per cent and from 13 to 17 respectively. These trends of increasing importance of Latin American companies and a decrease for the North American, mainly US ones, are not unique to the iron ore industry but constitutes a general trend which can be found also in other minerals and metals industries. The North American influence over the primary industries is clearly declining.

To some extent these shifts in locus of control reflect the geographical shifts in production of iron ore that have taken place during the last two decades. However it is important to underline that the relocation of control over production does not automatically follow relocation of physical production. In Europe the imbalance between control and production is most obvious, 12 per cent of the total world iron ore production is controlled by West European companies but only 4 per cent of the iron ore is actually produced in Europe. In Australia the situation is the opposite, only roughly half of the iron ore production is controlled by Australian companies.

Foreign control

The total foreign control in the iron ore industry is summarised in Table 5. The level of foreign control has been fairly constant over the last two decades around 15 per cent of total world production. In 1975 the most important owners internationally were North American based, together they controlled 7 per cent. European companies were at almost the same level while international control by companies from other regions was of little importance. In 1993 the North American interests had dwindled to just above 1 per cent. European companies control abroad had increased to around 9 per cent and Japanese/Chinese control had increased to 4 per cent. African iron ore mining had became completely locally controlled in the period with the closing down of Liberian mining. Foreign control over North American and European producing companies have also declined. Instead foreign interests have been concentrated to Australian and South American iron ore producers.

Third world developments

The developments in locus and nationality of control are complex to disentangle. In brief it is obvious that the expectations and hopes of the developing countries in the early 1970s for a resource based economic and social development have not been met with. However in the iron ore industry the success of the developing countries in taking over control of the industry and harvesting a larger share of the benefits has been more obvious than in other minerals industries such as copper and bauxite.

Given the present privatization trend and the lack of national capital in most developing countries, the share of foreign controlled iron ore production is set to increase in the next few years. It is possible that the most difficult years of contradictions between developing country governments and transnational mining industry as experienced in the mid and late 1970 are over. There will, however always be a source of tension in the fact that production of minerals in the developing countries is continuously growing but control over these minerals to a large extent remains in the industrialised countries.

Recent changes and future developments

Western world

Apart from the privatisations discussed earlier only a few minor ownership changes have taken place in the iron ore industry during the early 1990s. This is perhaps a bit unexpected considering the difficult years in terms of low prices and profits that the industry has been going through. It seems as if the present structure which developed after the profound changes taking place in the early 1970 is relatively stable.

Among the most active players during the early 1990s are the Chinese taking a direct owner's role in the Australian iron ore industry. There are signs that this expansion will continue and that the Chinese will become even more important internationally. Anshan, the largest iron ore producer in China and one of the leading steel mills, has formed a 60:40 joint venture with Portming mining of Perth to open the Koolyanobbing deposit.

Most of the production increases that have taken place in the two last decades and planned future expansions take place within the existing corporate structures. There are no completely new mega projects in the iron ore industry as is for example the case in copper mining.

Traditionally Japanese iron and steel companies have secured their iron input by long term contracts through the trading houses. Iron ore is one of the few metal industries where Japanese companies have for a long time had a fairly strong direct ownership in mining operations. Mitsui, Nippon Steel and NKK (previously Nippon Kokan) and other Japanese companies together control more than 4 per cent of total Western world production of iron ore. This might not seem to be an important holding but compared to Japanese direct investment in other mineral and metals it is considerable. At present the Japanese are reconsidering their strategy to secure a stable supply of non-ferrous metals and are opting for a more active role not only as buyers but also as owners of non-ferrous mining companies. Against this background it would not be surprising if the direct investments into iron ore mining would also increase.

The former centrally planned economies

The member states of the CIS were still in 1991 the world's largest iron ore producers. Russian, Kazakh and Ukrainian iron ore producers are however quickly being integrated into the world market and their production levels have been cut down from a total of 200 kt in 1991 to 150 kt two years later. But there are no signs of a quick integration of the iron ore industries of these countries into the network of the dominating international mining groups. There are several complex reasons for this. Firstly it will be very difficult to find buyers to the often inefficient and polluting mines, sometimes based on low grade deposits. Secondly there are important benefits for the new governments in retaining state control.

In the former centrally planned economies there is pressure on the present governments to keep at least a majority of the ownership and hence control of the most important mining companies:

* State control over minerals was one of the foundations of the centrally planned economical system. In spite of recent market reforms there is still support for these ideas. There are strong conservative/nationalist groups in most of the former centrally planned countries that also oppose privatisations. The management of the mining companies also fight hard to stay in power.

* Many of the major mining companies have formed huge conglomerates that are virtually hub of the whole society in that area. The mining company operates the farms providing food for the local community, it operates the school system from nurseries up to university level and it is often also responsible for hospitals and old age homes. No private owners could take over these responsibilities in a market economy. To privatise these conglomerates means that these functions have to be cut off and at present or in the near future there are no state funds to support these functions vital for the survival of the local communities.

In the medium term perspective it does not seem likely that any of the CIS iron ore companies will be sold to foreign investors. The necessity to increase productivity and to import new technology as well as to stop the serious environmental damages caused by some of the present mining and metallurgical plants however is a strong counterforce and acts in favour of increased foreign ownership and control.

Gradually company based information is becoming available from the former Soviet Union and also from China. A preliminary list of the major iron ore producing companies in the world in 1992 incorporating also CIS and the PRC is shown in Table 6.

Among the top twenty companies three are Chinese, three Russian, two Ukrainian and one Kazakh. Corporate concentration decreases when the producers in the former Soviet Union and China are included. To make a comparison possible the figures before including these new producers are related to Western world production and the figures after to total world production. At the top 5 level from 43 per cent of Western world production to 25 per cent of total world production and at the top 10 level from 59 per cent of Western world production to 36 per cent of total world production. This decline is a reflection of the relatively small size of iron ore mining companies in both the CIS member states and in China as compared to the large iron ore mining companies in the Western world. These companies will become even more important on the world market when loss making producers in the market economic sense in the CIS and perhaps in the longer run also in China are gradually closed down.

The integration of the mining and metallurgical industries of the formerly centrally planned economies into the world market will initially further increase the state controlled sector of the international iron ore mining industry. Of total production

controlled by the global top twenty companies a little less than 60 per cent is state controlled. The same figure for the top twenty companies in the Western world is 40 per cent. Over the next few years this figure is however likely to decrease when more production capacity is closed down in the CIS countries.

Conclusions

The largest iron ore companies are likely to become more important and powerful in the mid and late 1990s. The general trend over the last 15-20 years seems to be continuing.

Apart from corporate strategies and micro economics a number of external factors exert major influence on the pattern of ownership and corporate control in the iron ore industry. The average grade of iron ore mined around the world is gradually increasing. Low grade mines are being shut down and by using modern bulk transport technologies ores from high grade deposits are transported over longer and longer distances. These factors support the long term trend towards an increasing corporate concentration. In general production technologies under development and the present state of the art technology are large scale technologies demanding large amounts of capital for investment and often also a highly skilled work force. These technological changes in general favour higher concentration and larger companies.

It is difficult to determine whether this corporate concentration process will reach a stage where it could in any decisive way impact price formation or other market conditions. However in an industry with high barriers to entry, where the ten largest companies control almost 60 per cent per cent of Western world production it is obvious that in a future market situation with higher demand than today this could easily be the case. Future structural changes in the iron ore industry clearly merit continuous attention.

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Table 1

Corporate control in metal mining in 1993.
IRON ORE MINING

	Controlling company/state, (% control) controlled producers	Country of incorp. or production	Producer's total prod. Mt	Controlled share Mt	Share of to world prod %
1	State of Brazil	Brazil	-	87.38	9.3
	100% Cia Vale do Rio Doce	Brazil	74.40	74.40	8.0
	51% Minas da Serra Geral SA	Brazil	9.90	5.01	0.5
	67% NIBRASCO	Brazil	7.20	4.81	0.5
	51% Cia Italo-Brasileira de Pelot	Brazil	3.10	1.58	0.2
	51% Cia Hispano-Brasileira Peloti	Brazil	3.10	1.58	0.2
2	Broken Hill Pty Co Ltd	Australia	-	53.74	5.7
	100% Mount Newman Mining Co Pty Lt	Australia	31.32e	31.32e	3.3
	100% Yandi Iron Ore Mine	Australia	7.77e	7.77e	0.8
	100% Goldsworthy Mining Ltd	Australia	5.35e	5.35e	0.6
	49% Samarco Mineracao SA	Brazil	7.30	3.58	0.4
	100% Whyalla Iron Ore Mine	Australia	2.89e	2.89e	0.3
	100% Koolan Island (Yampi Sound) I	Australia	2.80e	2.80e	0.3
3	RTZ Corporation PLC	UK	-	48.35	5.2
	100% Hamersley Holdings Ltd	Australia	44.14	44.14	4.7
	60% Channar Iron Ore Mine	Australia	6.13	3.68	0.4
	100% Mineracao Corumbaense Reunida	Brazil	0.44	0.44	0.0
	58% Palabora Mining Co Ltd	South Africa	0.15	0.09	0.0
4	Caemi	Brazil	-	26.98	2.9
	100% Mineracoes Brasileiras Reunid	Brazil	23.30e	23.30e	2.5
	25% Quebec Cartier Mining Co	Canada	14.70	3.68	0.4
5	Iscor Ltd	South Africa	-	23.47e	2.5
6	State of Sweden	Sweden	-	18.73	2.0
	100% Luossavaara Kirunavaara AB	Sweden	18.73	18.73	2.0
7	State of Venezuela (CVG and FIV)	Venezuela	-	17.48	1.9
	100% CVG Ferrominera Orinoco CA	Venezuela	17.48	17.48	1.9
8	State of India (federal and regional)	India	-	16.29e	1.7
	100% National Mineral Development	India	10.00e	10.00e	1.1
	100% Kudremukh Iron Ore Co Ltd	India	6.29e	6.29e	0.7
9	USX Corp	USA	-	14.40	1.5
	100% Minntac Iron Ore Mine	USA	14.40e	14.40e	1.5

Corporate control in metal mining in 1993. continued...

IRON ORE MINING (continued)

	Controlling company/state, (% control) controlled producers	Country of incorp. or production	Producer's total prod. Mt	Controlled share Mt	Share of tot world prod %
10	Bethlehem Steel Corp	USA	-	12.85	1.4
	100% Hibbing Taconite Co	USA	8.16e	8.16e	0.9
	35% Iron Ore Co of Canada	Canada	13.60e	4.69e	0.5
11	North Broken Hill Peko Ltd	Australia	-	10.99	1.2
	53% Robe River Iron Associates	Australia	20.73	10.99	1.2
12	LTV Corp	USA	-	10.58	1.1
	100% LTV Steel Mining Co	USA	7.87e	7.87e	0.8
	25% Empire Iron Mining Partnershi	USA	7.41e	1.85e	0.2
	17% Wabush Iron Ore Mines	Canada	4.94	0.86	0.1
13	Mitsui & Co Ltd	Japan	-	10.31	1.1
	32% Robe River Iron Associates	Australia	20.73	6.63	0.7
	25% Quebec Cartier Mining Co	Canada	14.70	3.68	0.4
14	Dofasco Inc	Canada	-	10.28	1.1
	50% Quebec Cartier Mining Co	Canada	14.70	7.35	0.8
	100% Algoma Steel Inc	Canada	1.16	1.16	0.1
	18% Wabush Iron Ore Mines	Canada	4.94	0.90	0.1
	6% Iron Ore Co of Canada	Canada	13.60e	0.87e	0.1
15	State of Mauritania	Mauritania	-	9.19	1.0
	100% Sté Nationale Industr. et Min	Mauritania	9.20	9.20	1.0
16	State of Luxemburg	Luxembourg	-	8.51	0.9
	63% SA Mineracao de Trindade	Brazil	6.25	3.94	0.4
	32% Samarco Mineracao SA	Brazil	7.30	2.35	0.3
	63% Arbed France	France	3.50	2.21	0.2
17	State of China	China	-	7.97	0.9
	100% Empresa Minera del Hierro del	Peru	5.52	5.52	0.6
	40% Channar Iron Ore Mine	Australia	6.13	2.45	0.3
18	State of Iran	Iran	-	7.20e	0.8
	100% National Iranian Steel Co	Iran	7.20e	7.20e	0.8
19	Cyprus Amax Minerals Co	USA	-	6.17	0.7
	100% Babbit/Silver Bay Iron Ore Mi	USA	3.32e	3.32e	0.4
	50% Tilden Iron Ore Partnership	USA	5.67e	2.84e	0.3
20	Inland Steel Industries Inc	USA	-	6.14	0.7
	40% Empire Iron Mining Partnershi	USA	7.41e	2.96e	0.3
	100% Inland Steel Co	USA	2.61	2.61	0.3
	11% Wabush Iron Ore Mines	Canada	4.94	0.56	0.1

Table 2

CORPORATE CONCENTRATION IN IRON ORE MINING
(% of Western world production)

Year / Rank	Top 3	Top 5	Top 10
1975	19.2	27.0	42.7
1984	24.2	31.6	44.2
1993	34.2	43.3	57.7

Source: Raw Materials Data 1994.

Table 3

STATE CONTROL IN IRON ORE MINING
(% of Western world production)

Country	1975	1984	1993
Brazil Mainly CVRD	10.0	13.3	15.8
Sweden LKAB	4.5	3.5	3.4
Venezuela Ferrominera Orinoco	4.1	2.6	3.2
India NMD, Kudremukh	1.1	2.3	2.9
Mauretania SNIM	1.5	1.9	1.7
Luxemburg Arbed, Samarco,	-	1.7	1.5
China Hierro del Peru, Channar	-	-	0.9
Iran Nisco	0.1	0.3	1.3
Italy Mainly Sesa Goa, Itabrasco	0.1	0.2	1.0
Turkey Mainly Turk Demir	0.1	0.3	0.8
South Africa Iscor	1.1	3.7	-
Liberia Lamco, NIOC, Bong	1.7	1.9	0
France Mainly Sacilor	-	1.7	0
Chile CAP	1.9	1.5	-
Angola	0.9	0	0
Yugoslavia	0.9	0.6	0
Total state control	**25.8**	**35.1**	**33.0**

Source: Raw Materials Data 1994.

Table 4

LOCUS OF CONTROL AND PRODUCTION OF IRON ORE MINING
(% total world production)

Year / Area	1975 Contr	1975 Prod	1984 Contr	1984 Prod	1993 Contr	1993 Prod
Africa	5.5	7.1	5.5	6.3	4.3	4.6
Asia	9.2	11.7	19.6	20.6	33.3	32.0
Australia & New Zealand	4.5	11.2	4.2	10.4	7.3	13.1
CIS & Eastern Europe	27.7	27.7	29.3	29.3	17.1	17.1
Europe	17.5	12.8	13.2	6.3	12.0	3.6
North America	17.4	14.2	11.0	10.5	8.4	9.3
Latin America	12.9	15.4	13.3	16.6	16.7	21.1

Source: Raw Materials Data 1994.

Table 5

FOREIGN CONTROL OF IRON ORE MINING
(% of total world production)

Area	1975	1984	1993
Africa in Australia	0.5	0.2	-
Asia in Australia	0.7	1.1	1.4
North America	-	0.8	1.0
Latin America	-	-	1.6
Australia in Europe	-	-	0.1
Latin America	-	0.4	0.4
Europe in Africa	0.9	0.7	-
Asia	0.1	0.1	0.4
Australia	2.7	4.1	5.1
Europe	1.1	0.5	0.3
North America	0.2	0.1	-
Latin America	1.2	3.6	3.0
North America in Africa	0.3	0.1	-
Australia	2.8	1.4	0.2
North America	3.3	2.6	1.2
Latin America	0.7	0.6	-
Latin America in North America	-	-	0.4
TOTAL:	14.5	16.3	15.1

Source: Raw Materials Data 1994.

Table 6

CORPORATE CONTROL IN IRON ORE MINING 1992
(Mt)

1.	CVRD	Brazil	80.9
2.	RTZ	UK	48.3
3.	BHP	Australia	45.7
4.	Anshan	China	26.3
5.	Caemi	Brazil	25.8
6.	Iscor	South Africa	22.5
7.	Shougang (1)	China	22.3
8.	LKAB	Sweden	19.0
9.	Ferrominera Orinoco	Venezuela	18.1
10.	Yuzhny	Ukraine	18.0 e
11.	Severny	Ukraine	16.0 e
12.	Lebedinsky	Russia	15.6
13.	USX	USA	13.3
14.	Bethlehem Steel	USA	12.8
15.	Uralruda	Russia	12.8
16.	Benxi Iron and Steel	China	12.6
17.	North Broken Hill	Australien	11.9
18.	Mikhailovsky	Russia	11.7
19.	Sokolovo-Sarbaysky	Kazakhstan	10.8
20.	Mitsui	Japan	10.7
TOTAL			455.1

Note: Including Hierro del Peru.

Source: Raw Materials Data 1994.

APPENDIX

Ownership and control

There are different ways of interpreting ownership information and translating it into control information. The two most common methods are:

* **Management** method, which claims that management is of crucial importance for control.
* **Equity** method, which relates control to mathematical equity share.

Between these two extremes exist several methods which combine elements from both methods. Which method is most frequently used varies from time to time and also from one part of the world to another. For example is the view that an equity stake and management of a company is enough for control widely held in South Africa where the mining houses have built their control over publicly traded gold mines in this way.

The corporate control model developed and computerised by the Raw Materials Group is based on two variables: Level of ownership, or strictly level of votes, and the existence of a management or administrative contract. The RMG method emphasises the importance of strong shareholding more than the "equity method". The RMG method also takes into account the presence of other large shareholders than the managing company unlike the "management method".

The RMG model operates in three steps. First all minerals producing companies are divided into three groups:

* Independent and controlling companies
* Fully controlled companies
* Partially controlled companies.

The model takes into account the dispersion of shareholding and identifies, if there are two or more major owners, if they are "rivals" or belong to the same corporate group. See enclosed matrix.

The most common example of full control is when company A holds all or a majority of the shares in company B and there is no other large owner of company B.

An example of partial control is when company B has two or more owners whose holding are substantial, more than around 20 per cent, and are approximately of the same size. However, if one of the owners of company B, company C, controls another owner of B, company D, their holdings should be added and attributed to company C, possibly making the total, direct and indirect, holding by C large enough for full control.

The second step of the model is to attribute the operating mining company's production to the company/ies which control it. All of its production is attributed to the controlling company if it has full control. Also in the case of partial control, and unlike the "equity method", all of the producer's production is attributed to the controlling companies, in this case however, in proportion to their shareholding, direct or indirect via subsidiaries. It is important to note that all of the producers' production is allocated to controlling companies at the top of the ownership hierarchies. This is done in such a way that all double accounting is eliminated. To give one example: if a mine is owned by two mining houses each with a 25 per cent stake and the remaining 50 per cent is held by 2000 small shareholders, the two major shareholders are considered to be in control of 50 per cent each of the total production of the mine.

Table for control assessment

Data on A's relation to B		Summarized data on total ownership of B						Control level
Holding (%)	Manag/ admin.	Total no of owners	Number of owners in ownership interval (% of B:s voting shares) 1-5	5-20	20-50	50-100	5-10 35-50	
12.5-100.0	M	1						full
50.1-100.0		≥ 1		0-3	0	1		full
50.1-100.0		≥ 2			1-2	1		part
20.1- 50.0		≥ 1		0	1	0		full
20.1- 50.0	M	≥ 1	0-1	0-1	1	0	0-1	full
35.1- 50.0	M	≥ 1	0-1	0-1	1	0	1	full
20.1- 50.0		≥ 2			2-4	0		part
20.1- 50.0		≥ 2			1-2	1		part
5.1- 50.0		≥ 2		1-9	1-4			part
5.1- 20.0	A	≥ 2		2-9	0	0		part
5.1- 20.0	A	≥ 1		1	0	0		part

UNCTAD

INTERGOVERNMENTAL GROUP OF EXPERTS ON IRON ORE

Geneva, 24 - 26 October 1994

" Fine Ore Reduction : Raw Materials, Energies and other Criteria for Process Selection ".

Presentation by :

Mr. Detlev SCHLEBUSH
Lurgi Metallurgie GmbH
Germany

LURGI

Dr. Detlev Schlebusch, Dr. Peter Weber

'Fine Ore Reduction: Raw Materials, Energies and other Criteria for Process Selection'

Introduction

1. General Technology Selection Criteria
2. Raw Material Criteria
3. Representative DR Technology Survey
4. References

Lurgi Metallurgie GmbH, Lurgiallee 5, 60295 Frankfurt, Germany, Phone (0 69) 5808-36 06, Fax (069) 5808-27 43

1. General Technology Selection Criteria

Many DR processes have been developed and proposed to the industry in the past 30 years. The cemetery of these ideas is full of famous head stones; **PUROFER, STORA, CODIR,COIN, H-IRON, NOVALFER, NUFER, HIB, HÖGANÄS, WIBERG, INRED, ELRED, PLASMARED, SOREL**. We estimate that approximately **US $1 BILLION** of R+D funds are buried there as well.

Lurgi pioneered the development of direct reduction facilities with its coal based SL/RN technology in the 1960´s at great expense and technical commitment. This technology became the process of choice in countries such as India and South Africa which are blessed with vast quantities of coal and indigenous supplies of iron ore pellets or lump ore.

As less industrialized countries with abundant supplies of natural gas began to develop their own steel industries in the 70´s and 80´s, numerous gas based DR plants were built that were captive to their associated EAF steelmills with Midrex being the most accepted process. Today, Lurgi has installed more Midrex DR capacity than any other Midrex licensee. This technology is still the process of choice for many DR plant owners based on pellets and lump ores as feedmaterial.

Merchant plant owners will demand the lowest cost plant using the lowest cost raw materials, as they vie for the opportunities to sell products on the open market and to satisfy their contractual partners who always have the option of purchasing scrap. Political risk concerns will influence the decision, where to build merchant DR plants, which in turn, will dictate the use of energy sources available to operate such plants.

The general criteria for process selection and investment can be formulated as follows;

Introduction

The productivity of the blast furnace and its energy efficiency have improved significantly over the past 20 years. Nevertheless, hot metal production via the coke oven/blast furnace route is highly capital intensive and has continuing environmental problems. Consequently, there is a world-wide trend towards use of high quality DRI products which are subsequently processed in EAFs for steelmaking in minimills. The long products thus obtained today allow highly competitive and economic production. On this basis they are also starting to occupy large shares of the flat product market. DRI will therefore play an increasingly important role as an EAF feedstock with growth rates of more than 10 % being predicted for the next decade from today's 20 million tpy production. With the increasing significance of direct reduction processes raw material suppliers have to consider the prerequisites for a DR feedstock. Not only do ore suppliers have to adapt to the market, but also plant designers and suppliers, those responsible for the development of processes, have to adapt their portfolios accordingly.

Lurgi Metallurgie as a leading engineering company in the field of direct reduction has defined and evaluated the various criteria which determine the process selection.

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The general criteria for process selection and investment can be formulated as follows;

General Commercial Criteria

from today's DR Plant Builder's Perspective

- Captive DR production is a must for EAF based steelmills located in regions without sufficient local scrap resources.

- Plant builder's must be able to offer DR technology that is adaptable to the lowest cost local energy source, either natural gas or coal.

- Private investment in merchant plants dedicated to supplying DR to scrap-rich markets will continue to be financially risky, as scrap with a low intrinsic value, will always be the first choice of steelmakers.

- Competitive pressures will force DR plant builders to offer technologies that use low cost, widely available iron ores fines instead of costly pellets and lump ore.

- Direct steelmaking technologies have not as of yet achieved the technological breakthroughs necessary to challenge conventional EAF steelmaking, therefore, solid forms of metallic iron units will remain the material of choice for the growing demand in nonintegrated steelmaking for the foreseeable future.

- In spite of strict environmental regulations and burdensome permitting requirements, private investors will prefer to build DR plants in those countries, where political risk is minimized. Therefore, DR plants must be able to meet such restrictive limits while remaining economically competitive.

- Integrated steelmakers will expand their use of DR as a means of balancing their metallics usage either as a sweetener for their blast furnaces or as a scrap substitute or trim material for their BOF´s.

The terminology 'Direct reduction' describes the method of reducing iron ores directly to metallic iron at solid state through the use of either a gaseous or solid reductant. The resulting product, the direct reduced iron (DRI), is then processed to steel in a subsequent melting shop.

The selection of raw materials for direct reduction processes is determined by the chemical and physical characteristics, as well as factors relating to the reduction behaviour such as oxide reducibility, fusion temperature and fragmentation tendencies.

However, beside the above mentioned criteria, the specification of the raw material is primarily dictated by the overall economics of both the direct reduction and the subsequent steel making process. Since the removal of oxygen when reducing Fe_2O_3 to Fe_{met} increases the concentration of gangue material and impurities by about 50 percent in the product, it is necessary to select raw materials with a high Fe content and low concentration of impurities and gangue material. Excessive gangue material or incidental tramp elements can have a major negative effect on the economics of DRI based steelmaking.

Both, the energy needed for DRI melting as well as the refractory consumption are basically influenced by the gangue content, in particular its acid constituents. The next figure[2] shows the effect of gangue content on energy consumption as well as on metallic loss in subsequent steelmaking processes. It becomes evident that the extra energy when melting 100 percent DRI product with 7 percent gangue compared to DRI with 3 percent can be as high as 130 KWH per ton of liquid steel further ensuing an additional metallic loss of 1.8 percent. This leads to additional steelmaking costs of approximately US $15 per ton of liquid steel[3] not including the additional costs for transport, material handling, maintenance and investment costs in the upstream DR and agglomeration plant.

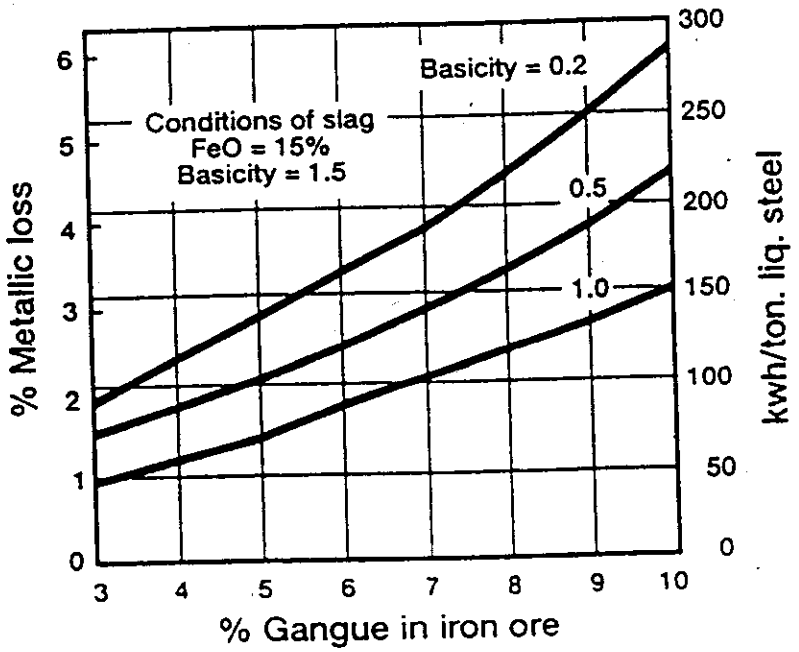


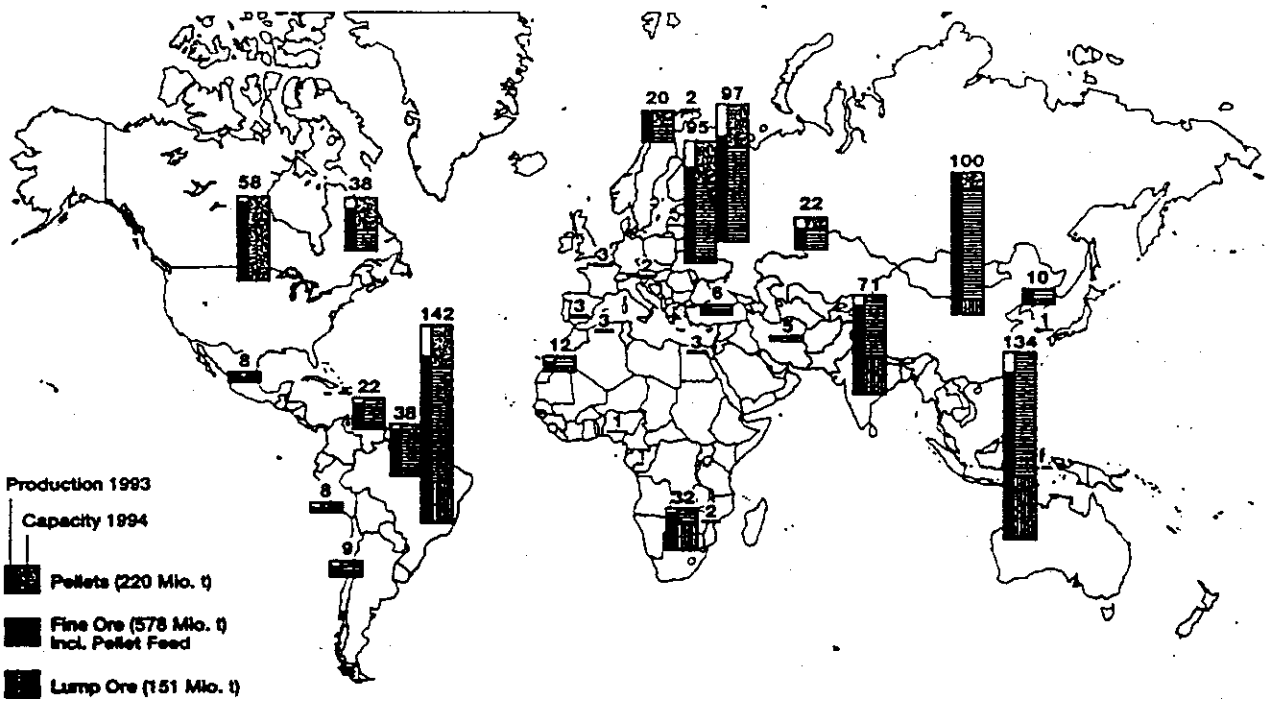
Figure 2: Metallic Loss and Energy Consumption as a Function of Iron Ore Gangue and Basicity when melting DRI [2]

2. Raw Material Criteria

2.1. Iron Ores - General

The world-wide iron ore production in 1993 amounted to 802 million tons[1] (traded grades) while the present capacity is estimated to be 949 million tons. Thereof Brazil has produced 180 million tons followed by Australia with 132 million and China with approximately 100 million tons.

World wide iron ore trade is made up of 22 percent lump ores, 22 percent pellets, 53 percent fine ores as sinter feed and approximately 3 percent pellet feed only.



World Iron Ore Capacity in 1994 (949 Mio. t)
against Iron Ore Production in 1993 (802 Mio. t)

Figure 1: Capacity and Production of Ore Products in the World [1]

The success of any direct reduction process is based on the flexibility in the selection of the feedstock. Direct reduction processes are operated with all three types of ores, 100 percent pellets, lump ores and fine ores.

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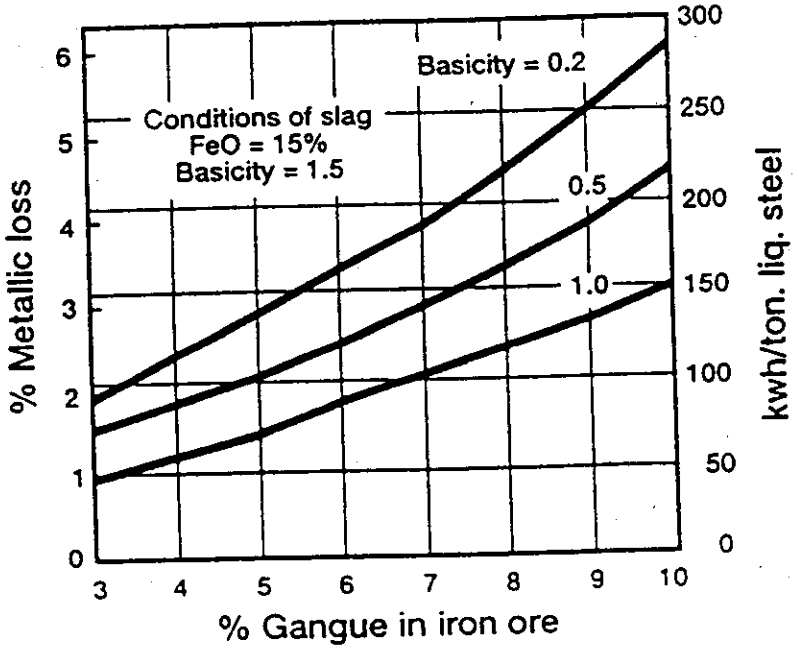


Figure 2: Metallic Loss and Energy Consumption as a Function of Iron Ore Gangue and Basicity when melting DRI [2]

It is therefore a must to decrease the detrimental elements in iron oxides, such as the gangue content, in the first processing step near the mine to the economically lowest possible degree.

With the depletion of reserves of naturally rich iron ores, and because of increasing stringent quality demands the beneficiation of iron ore products has become a necessity. Against this background and in view of the overall worldwide economics over 50 percent of iron ore products are not only sized by crushing and classification, but are also upgraded in their chemical composition.

2.2. Lump Ore and Pellets

Pellets and Lump ore constitute the bulk of feedmaterial for both gas based and coal based DR technologies. The SL/RN and Midrex process with their characteristic flexibility in respect to raw material requirements have a 79 percent share of all coal based DR plants and an over 64 percent share of all gas based DR plants operating in the world. Based on its experience in having designed and built a major portion of this capacity Lurgi has established the following comments on the effect of raw material criteria on the design and operation of DR plants :

Raw Material Criteria for DR Processes

While the chemical composition of the pellets and lump ores is of primary interest to the steelmaker, the DR plant operator is mostly interested in their physical and reduction characteristics. As far as the physical characteristics are concerned, the following criteria are important: **Size, Mechanical Strength and Bulk density.**

With regard to reduction characteristics all oxide pellets and most lump ores have an adequate reducibility at reduction temperatures below the fusion temperature, however, unlike oxide pellets, most lump ores are subjected to thermal degradation. Thermal degradation describes the generation of fines during the conversion of hematite to magnetite (Fe_2O_3-> Fe_3O_4) with its rearrangement of the crystal structure. Lump ores, which inherently are not very elastic, have the tendency to shed chips because of the internal physical stresses resulting from the progressive dimensional expansion. Therefore lump ores with high reduction degradation may generate 10 to 15 percent of fines -4 mm which effect the operation of the shaft furnace as well as the rotary kiln.

The raw material criteria for the SL/RN and the Midrex direct reduction process are outlined in table 1 and 2.

2.2. Fine Ores

As already pointed out fine ores represent the major portion of iron ore products with a share of over 75 percent. In general the bulk of fine ores have to be subjected to an upgrading process in order to produce a high grade concentrate with a Fe content of 65 - 67 percent. Low grade fine ores are usually only fed into the sinter plant. Fine ores can be sorted according to their particle size as follows:

Sinter feed:	- 6.0 mm
Spiral concentrates:	0.1 - 1.5 mm
Pellet feed:	- 6.0 mm
Pellet fines:	70 - 90 % - 0.045 mm

The possibility of directly feeding fine ores into the process routes of steelmaking is of particular interest for steel production, as it improves the overall economics, resulting in savings when avoiding additional agglomeration costs. However, from the operating point of view the quantity of fine ores to be used in conventional DR processes, such as the rotary kiln and the shaft furnace, is confined to a minimum. The bulk of fine ores present are therefore subjected to subsequent treatment in order to produce high quality sinter or pellets which can be fed to subsequent processes .

The use of fine ores and the effect on the operating conditions of the different DR processes has to be distinguished according to the reactor type.

In the rotary kiln fine ores tend to form accretions and disturb the operation. A recent patent (pending) developed by Lurgi allows the controlled injection of up to 10 percent fines into the reduction zone hence improving the overall economics of the feedstock.

In the Midrex shaft furnace the effect of fine ore addition is different. Increasing amounts of fines lead to a poor gas distribution within the shaft furnace, so called 'channelling' can occur, which consequently results in operating problems and/or a decreased product quality. The maximal acceptable content of additional fines in the burden amounts to about 6 percent, taking into account the fines generation from thermal degradation of lump ores.

The only plant commercially operating with a feedstock consisting of 100 percent fine ores is the Sivensa plant in Venezuela which operates according to the FIOR process. The process concept is based on a multiple stationary fluid bed system which uses gas as the reductant. The FIOR process operates at temperatures over 700 C and 10 bar pressure. The major draw-backs of this process are its frequent shut downs due to sticking problems as well as high energy consumption making this concept interesting only in countries with very low gas prices and low labour costs.

In view of the persistent demand for lower operation costs and considering the enormous cost advantage of fine ores as a feedstock, Lurgi has put more than 20 years of R+D effort into the development of fine ore reduction processes. Based on inhouse experience with Circulating Fluidized Beds and from experience with DR processes, the Circofer® and Circored® processes have been developed, producing DRI or HBI with either coal or gas as a reductant.

Effect of feedstock on plant operation

The type of feedstock affects the operation of the DR processes and is an important criteria in particular with respect to its effect on the capacity of the various Direct Reduction Processes.

Using a 100 percent pellet feed the capacity of a rotary kiln can be increased by about 5 to 10 percent compared to a 100 percent lump ore operation. Because of safety of operation, however, larger DR plant unit capacities can be safely implemented. This increase results from the better reducibility of pellets due to their porous structure so that the same metallization can be achieved in shorter retention times. A blend of pellets and lump ores would only result in a marginal increase in capacity with a respective low decrease in operating costs but would require an increase in investment cost for a more comprehensive material handling system. Therefore in each case the overall economics dictates the mode of operation and has to be analysed individually.

A different behaviour can be observed in the Midrex shaft furnace reduction process [4]. A 70/30 oxide mix (70 percent pellets / 30 percent lump ore) increases the relative reduction capacity and reformer capacity while reducing fuel consumption. This occurs because the use of 30 percent lump ore allows operation at a higher reduction temperature without sticking; above 30 percent lump ore typically causes less than optimal gas distribution, which decreases production capacity. The effect of feedstock selection is shown in table 3 assuming that the 3 mm to 6 mm fines fraction are metered into the oxide (partial fines utilization).

	100 % Pellets	70 % Pellets/ 30 % Lump Ores	100 % Lump Ores
Relative Reduction Furnace Capacity	0.99	1.04	0.71
Relative Reformer Capacity	1.00	1.08	1.08
Relative Fuel Consumption	1.01	0.95	0.97
Relative Electrical Consumption	1.01	1.09	1.16
Percentages of fines discarded	0.99	2.0 - 3.0	5.0 - 6.0

Table 3: Operating Parameters for various oxide feed mixes [3]

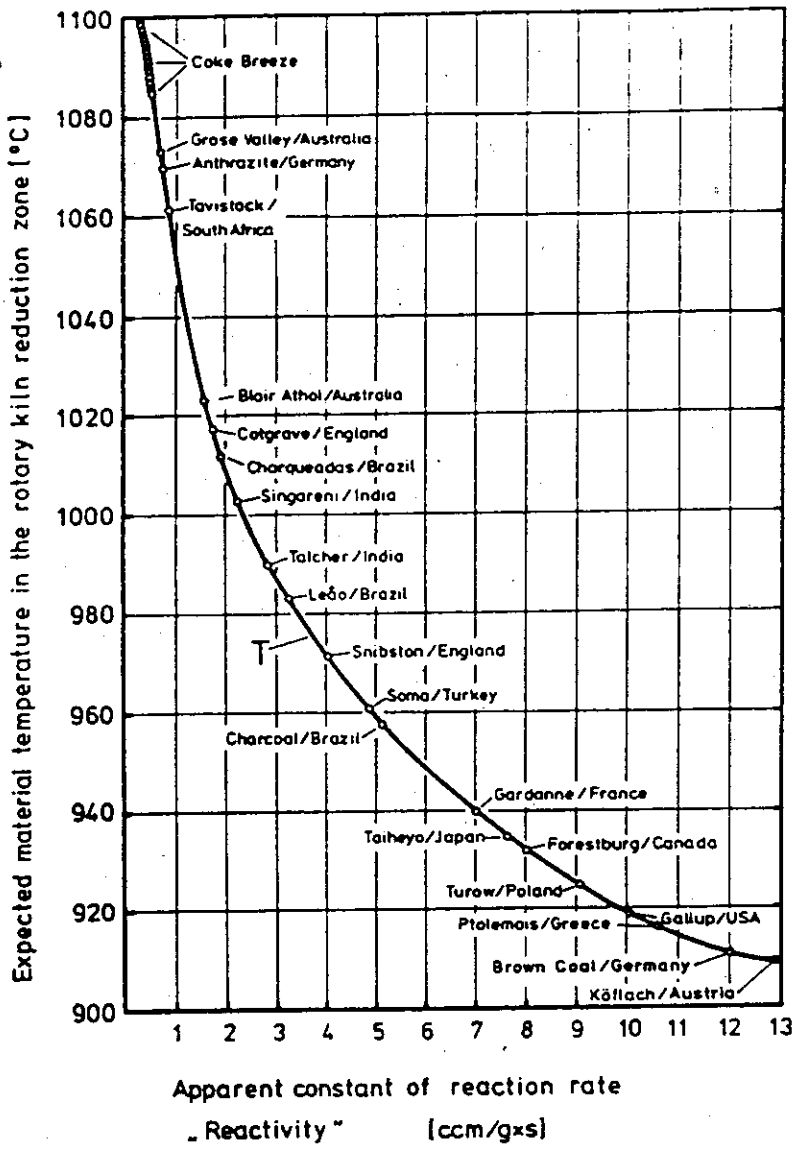


Figure 3: Correlation between CO content, reactivity and material temperature

The ash content of the coal does not affect the operation but limits the effectiveness of the process. In conventional processes increasing amounts of ash not only need extra energy but reduce the effective charge volume, hence decreasing capacity of the furnace. Figure 4 shows the effect of the volatile, moisture and ash content of the coal on the available capacity of the SL/RN kiln. The same detrimental affect applies to new smelting reduction processes, such as Corex, HIsmelt or DIOS with coal quality also being a major concern.

In the Circofer process the effect of an increasing volatile content on the available capacity is rather small (Figure 5), whereas an increasing ash content also leads to an increase in the specific coal consumption, mainly as a result of the necessary bleed of recycle char to avoid a build up of ash in the reactor system.

The requirements to be met by the raw materials for use in these CFB processes are confined to the question of particle size. The ore for the Circofer® process should be in the particle size range of 1-0.03 mm and for the Circored® process in the range of 1-0.1 mm. In order to also be able to process the very fine fraction below 50 µm Lurgi has developed a low cost micropelletizing process in which the fine particles are granulated to a processable particle size. In this way two new flexible processes are available which can directly use the bulk of fine ores without any cost intensive upstream material preparation.

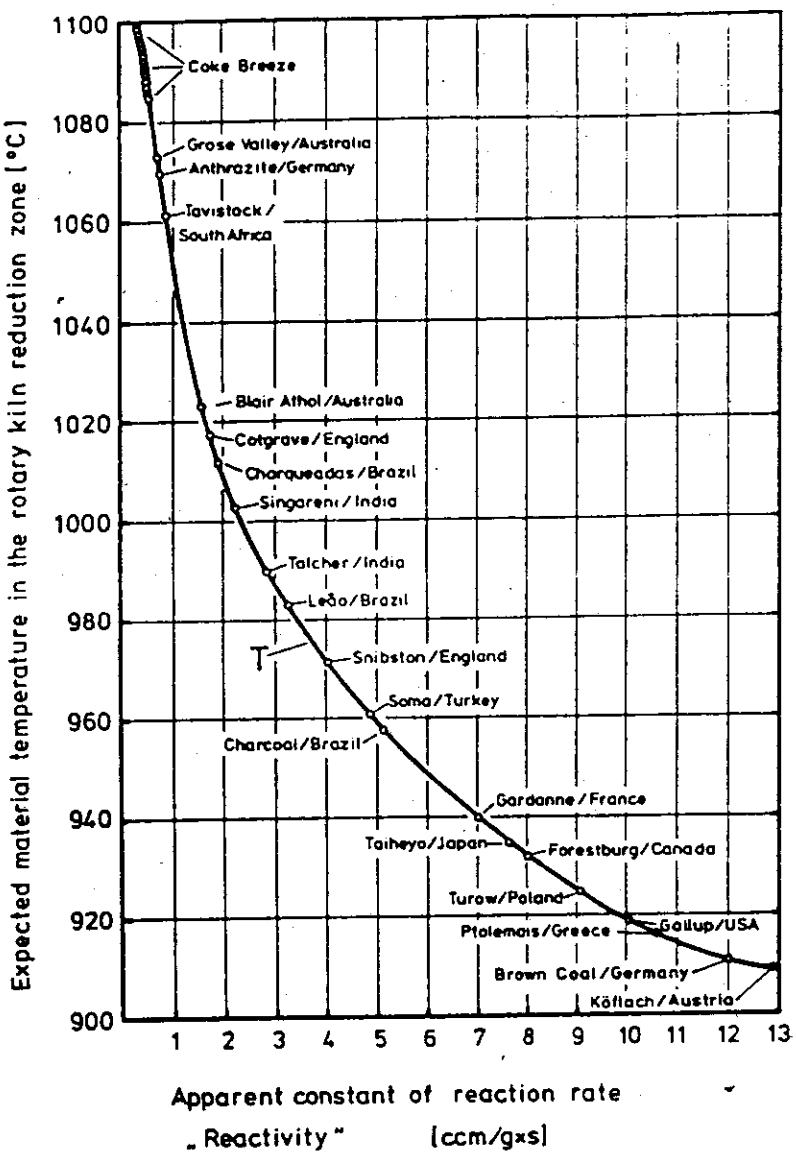
2.3. Energy

Beside flexibility in the selection of feedmaterials, adaptability to the various energy criteria is a major feature which has to be fulfilled by direct reduction processes. The bulk of DRI production is based on gas and hence of interest for countries with low gas prices such as Venezuela, Mexico and in the Gulf states. Whereby coal based DRI production is mainly confined to countries where coal is available at low cost i.e. India, New Zealand and South Africa. However, with the increasing need for virgin iron units and the need to compensate for high scrap prices, DRI production becomes economic even in countries with higher primary energy costs.

- Coal

Of primary importance in DRI production is the requirements of the coal. In general, DR processes can operate with a wide variety of coals, from coals characterized by a very low volatile content to coals with a very high volatile content of approximately 45 percent. While the Circofer® process requires a minimum volatile content of approximately 8 percent for example, the SL/RN process can substitute the missing volatility through extra combustion of gas or oil.

Coals with higher reactivity are preferred as they allow lower operating temperatures which is not only advantageous with respect to sticking tendencies but also allows higher throughputs. Figure 3 shows the reactivity of the various coals and the operating temperature for the SL/RN coal based DR process example. However, in general, higher reactivities correspond to higher volatile contents which ensue higher coal consumption to compensate for the loss in C_{fix} .



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In the Circofer process the effect of an increasing volatile content on the available capacity is rather small (Figure 5), whereas an increasing ash content also leads to an increase in the specific coal consumption, mainly as a result of the necessary bleed of recycle char to avoid a build up of ash in the reactor system.

In the selection of the coal it is therefore important to consider the overall economics and not only the specific costs of the coal as otherwise the above described economic death spiral situation can occur.

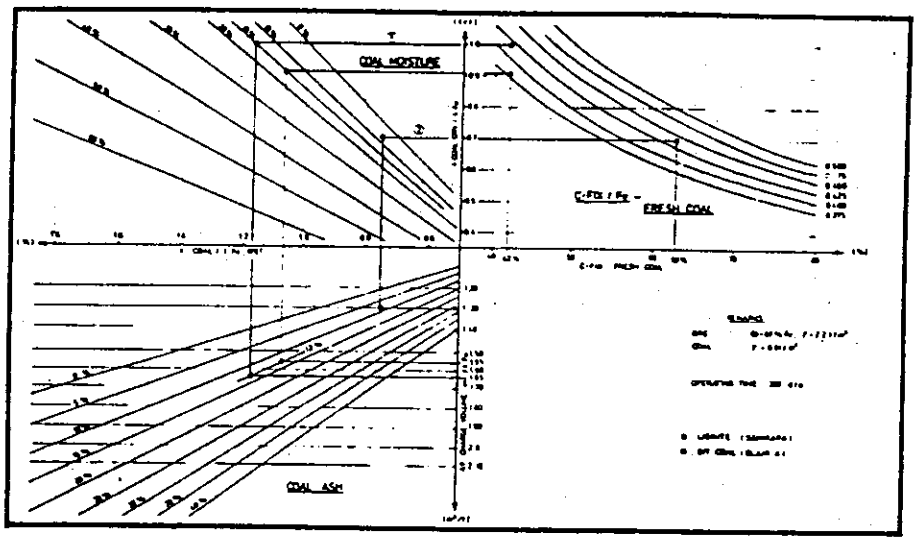


Figure 4: SL/RN Capacity Diagram

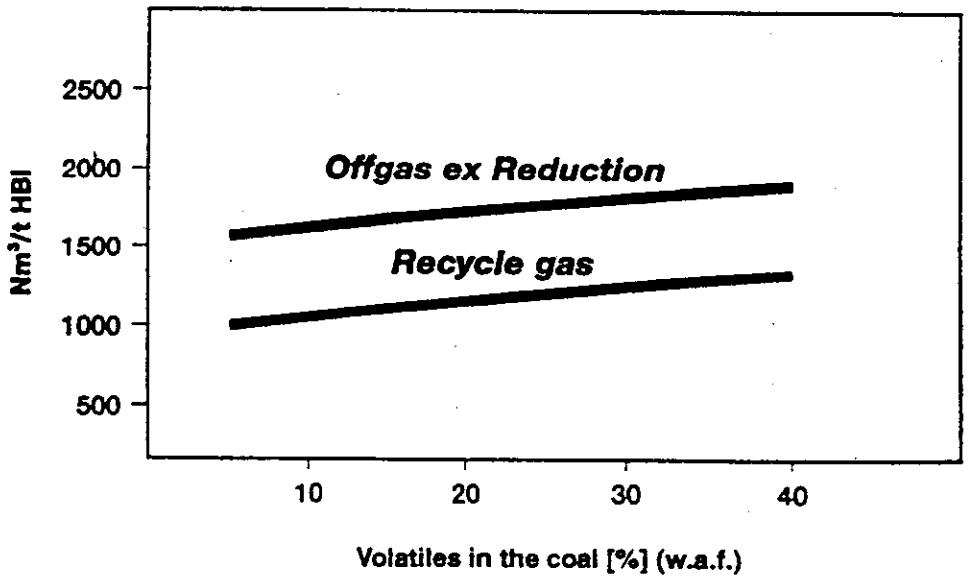


Figure 5: The Effect of the Volatile Contents of processable Coals in the Circofer Concept

3. Representative DR technology Survey

As described Lurgi covers both the gas based and the coal based reduction technology with the conventional SL/RN and Midrex processes as well as the innovative Circofer® and Circored® processes. Figure 7 gives an overview of Lurgi' s activities in the DR-related technologies.

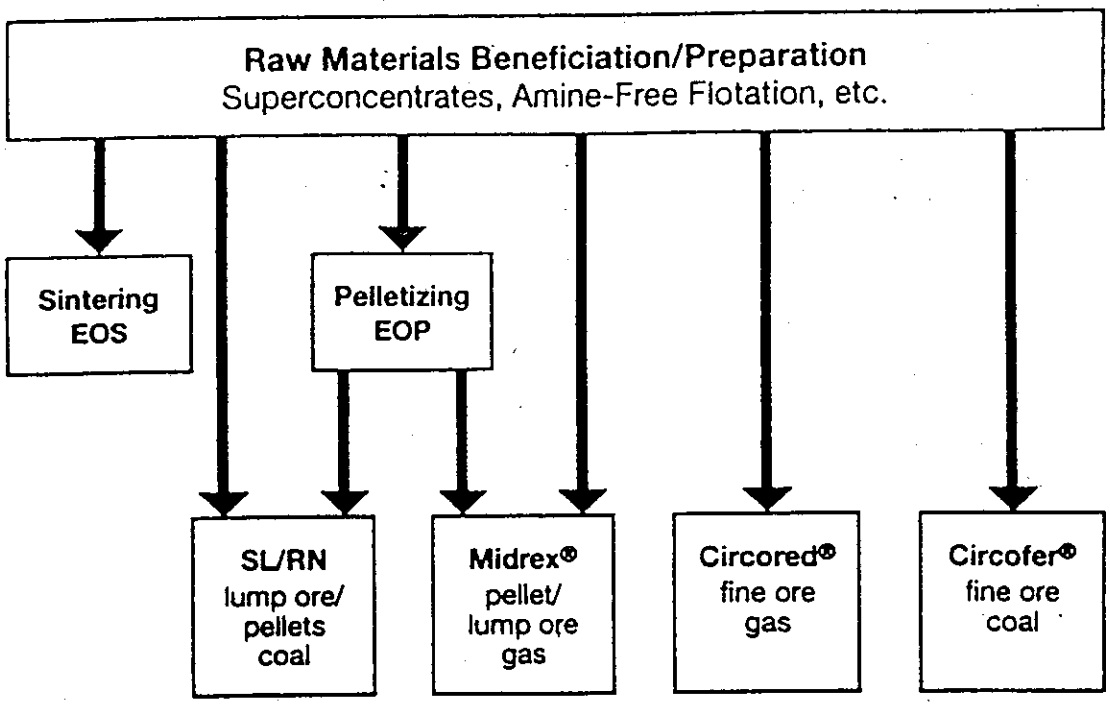


Figure 7: Lurgi's Portfolio of DR-related Technologies

	percent vol.	Effects
CH4	75 - 100	
C2H6	0-25	
C3H8	0 - 4	above 4 %, water vapour content in the feed gas must be increased
C4H10	0 - 2	
+ CH_4 hydrocarbons	0 - 0.5	
CO2	max. 20	above 20 % export fuel is produced
N2	max 20.	each 10 % increases fuel consumption by app. 2 %
S	max. 20 ppm wt	above 20 ppm wt.=14 ppm vol. carbon deposition on catalyst

Table 4: Recommended Natural Gas Composition for the Midrex process

Gas Treatment:

The above gas specification only refers to natural gases which are directly used in the respective gas based DR processes. If necessary the raw natural gas can be treated in order to suit the process requirements. Gas with a too high higher-hydrocarbon content can be treated for example in a turboexpander to separate the unwanted higher hydrocarbons out. Gases with an excessive sulphur content can be treated for example with a commonly used ZnO desulphurization unit or an other desulphurization process to generate a process gas with a tolerable sulphur content. Using available gas treatment systems, most gases can be adjusted to meet the requirements for their use in gas based DR processes, taking into account the economics of the gas pretreatment.

3. Representative DR technology Survey

As described Lurgi covers both the gas based and the coal based reduction technology with the conventional SL/RN and Midrex processes as well as the innovative Circofer® and Circored® processes. Figure 7 gives an overview of Lurgi' s activities in the DR-related technologies.

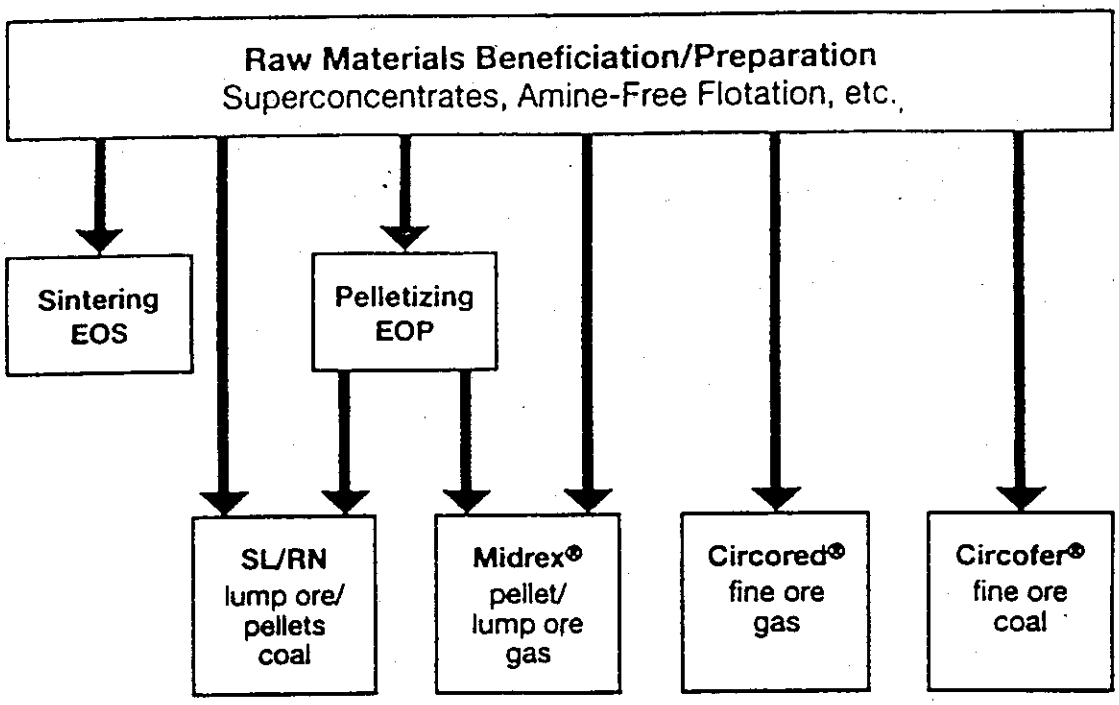
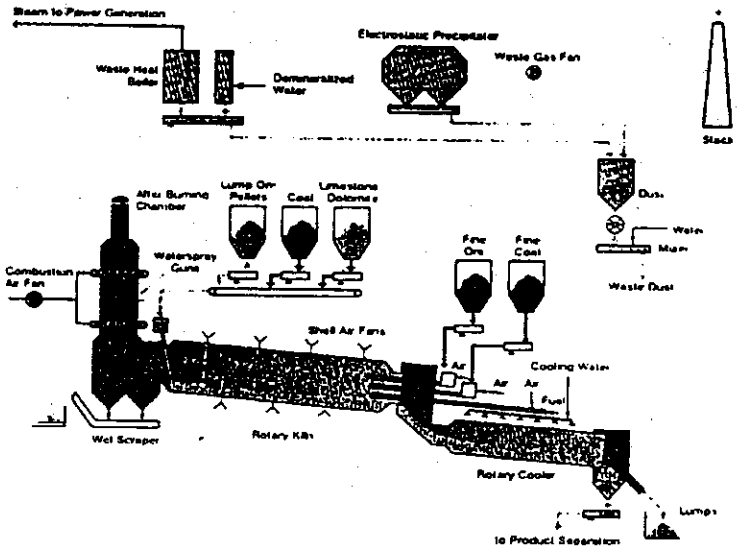


Figure 7: Lurgi's Portfolio of DR-related Technologies

SL/RN

Coal-based Direct Reduction

LURGI



		Unit/t DRI	Cost/t DRI
Iron Feed:	Pellets/(Lump Ore)	1.45 t	49.4 USD
Energy:	Coal	0.82 t	27.8 USD
	Electrical Power	60 kWh	2.4 USD
Others:	Desulphurizer	0.04 t	0.5 USD
	Manpower	0.25 h	5.2 USD
	Spares and consumables		2.5 USD
			87.8 USD

Product:	DRI lumps +3 mm (80%) + 90% metallization DRI fines - briquettes (20%) Electrical Power (converted from steam) 0,4 MW
Capacity/unit:	150,000 tpa to 250,000 t/year
Specific Investment:	200 - 220 USD/t installed capacity including Waste Heat Recovery and Briquetting of DRI-Fines
References:	31 Kilns/4,600,000* t/year installed capacity

* including prereduction and ilmenite reduction

Gas-Based Reduction Processes

- The Midrex Process

The Midrex Direct Reduction process converts oxides such a slump ores and pellets to high purity direct reduced iron DRI or hot briquetted iron HBI.

The major components of a Lurgi-Midrex Direct Reduction plant include the shaft furnace, reformer and heat recuperator. These components are supported by ancillary systems for handling iron ore, gas, water and DRI or HBI.

The direct reduction of oxides proceeds on a continuous basis with the iron oxide being fed to the top of the shaft furnace, flowing downward by gravity and then being discharged from the bottom of the shaft furnace in the form of DRI or HBI.

The reducing gas is generated in the reformer by catalytically reforming a mixture of fresh natural gas and recycled top gas from the shaft furnace at approximately 920 °C. As the reducing gas leaves the reformer at near equilibrium conditions, containing 90 to 92 percent hydrogen plus carbon monoxide the gas can be used directly in the shaft furnace where reduction takes place at about 850 °C.

- Thermal efficiency of the reformer is greatly enhanced by a comprehensive heat recuperation system. The heat exchangers recover the sensible heat from the reformer flue gas to preheat combustion air (used in the reformer burners) up to 650 °C and to preheat the process gas (mixture of top gas and natural gas) fed to the reformer up to 540 °C

- A major feature of the Midrex Process is its product quality. The uniform gas distribution in the shaft furnace ensures uniform product metallization even when the ore supplies change.

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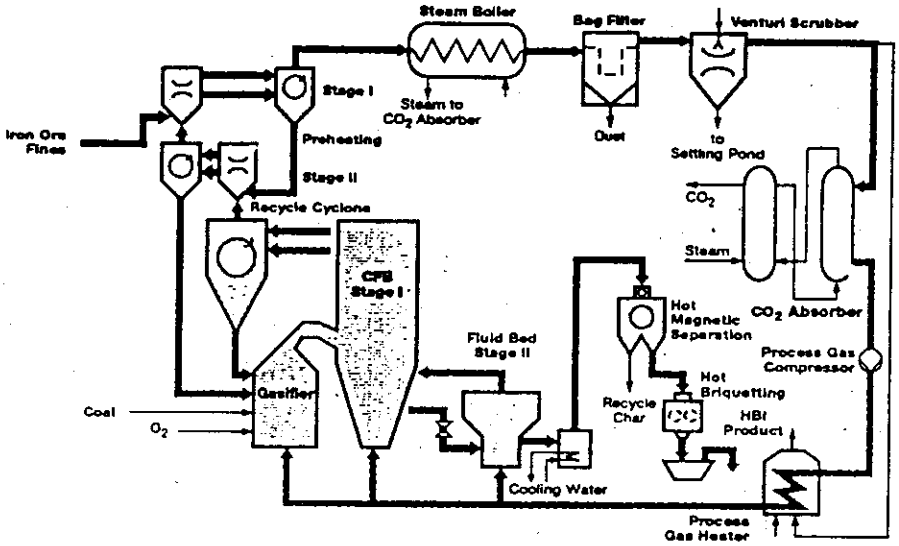
Coal-based Fine Ore Reduction



		Unit/t Product	Cost/t Product
Iron Feed:	High grade fine ores 0.03 - 1 mm	1.37 t	20.6 USD
Energy:	Coal	10 GJ	15.0 USD
	Electrical Power *	70 kWh	2.1 USD
	Oxygen	180 Nm^3	9.0 USD
Others:	Manpower		2.0 USD
	Spares and consumables *		4.5 USD
			53.2 USD

Product: DRI (hot charging) or HBI, 93% metallization, 1-2% C

Capacity/unit: 450,000 t/year
1,000,000 t/year (next generation)

Specific Investment: 120 - 200 USD/t installed capacity depending on capacity, hot briquetting etc.

* excluding hot briquetting

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Midrex ®

LURGI

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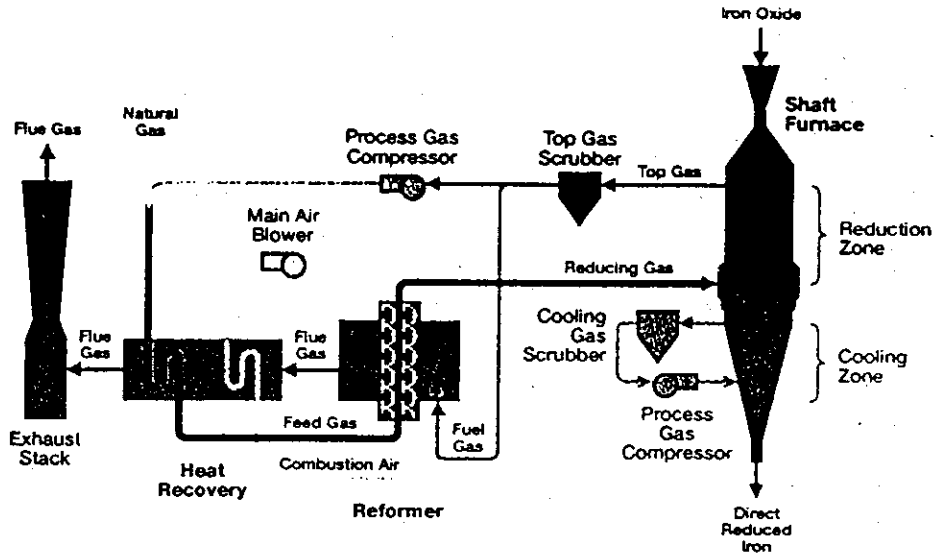
Gas-based Direct Reduction



		Unit/t Product	Cost/t Product
Iron Feed:	Pellets and Lump ores	1.45 t	46.7 USD
Energy:	Natural gas	11 GJ	11.0 USD
	Electrical Power *	90 kWh	2.7 USD
Others:	Manpower		2.5 USD
	Spares and consumables *		5.0 USD
			67.9 USD

Product:	DRI (cold or hot charging) or HBI, 93% metallization, 1-2% C
Capacity/unit:	450,000 / 650,000 / 1,000,000 t/year
Specific Investment:	150 - 210 USD/t installed capacity depending on capacity, hot briquetting etc.
References:	13 plants / 6,125,000 t/year installed capacity

* excluding hot briquetting

4. References

1. K.O.Weil; 'Gegenwärtige Kapazität and künftige Entwicklung im Eisenerzbergbau der westlichen Welt'; presented at the VDEh- Rohstoffausschuß, 14.7.1994
2. 'Metallurgical Aspects of DRI Melting in the Electric Furnace'; HYL Report April 1988
3. G.G. Carinci, J.A. Lepinski; 'Raw Materials Considerations for DR/EAF Steelmaking'
4. 'Lump Ore Use Criteria'; Midrex Corporation Charlotte Plaza, Charlotte, N.C. 28244 USA

Circored ®

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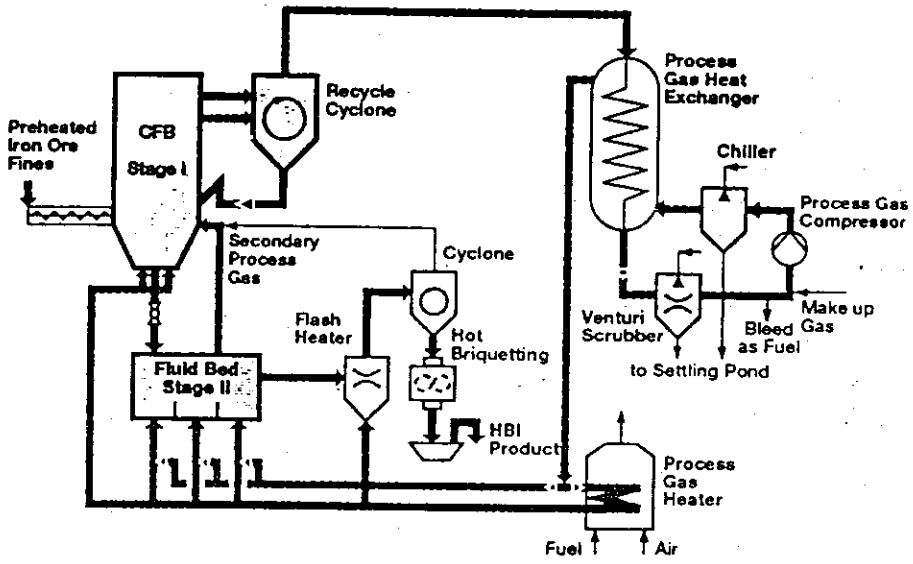
24

Gas-based Fine Ore Reduction



		Unit/t Product	Cost/t Product
Iron Feed:	High grade fine ores 0.1 - 1 mm	1.47 t	22.0 USD
Energy:	Natural gas	11.5 GJ	11.5 USD
	Electrical Power	100 kWh	3.0 USD
Others:	Manpower		2.0 USD
	Spares and consumables *		4.5 USD
			43.0 USD

Product:	DRI (hot charging) or HBI, 93% metallization
Capacity/unit:	500,000 t/year 1,000,000 t/year (next generation)
Specific Investment:	120 - 180 USD/t installed capacity depending on capacity, hot briquetting etc.

* excluding hot briquetting

4. References

1. K.O.Weil; 'Gegenwärtige Kapazität and künftige Entwicklung im Eisenerzbergbau der westlichen Welt'; presented at the VDEh- Rohstoffausschuß, 14.7.1994
2. 'Metallurgical Aspects of DRI Melting in the Electric Furnace'; HYL Report April 1988
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4. 'Lump Ore Use Criteria'; Midrex Corporation Charlotte Plaza, Charlotte, N.C. 28244 USA

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INTERGOVERNMENTAL GROUP OF EXPERTS ON IRON ORE

Geneva, 24 - 26 October 1994

25 OCTOBER 1994

INFORMAL ATTENDANCE OF EXPERTS

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Mr. Gordon CAW, Representative, ISCOR Europe
Mr. Jens TRIEBEL, First Secretary (Economic), Permanent Mission, Geneva

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Mr. Richard VALTON, Senior Analyst, Market Planning, BHP, Perth
Mr. David TUCKER, Manager Sales, Hamersley Iron, London

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Mr. Ricardo ANTUNES, Director, Companhia Vale do Rio Doce S.A. (CVRD)
Mrs. Solange WUCHERER, Companhia Vale do Rio Doce S.A. (CVRD)
Mr. Albert EHRENBURG, Managing Director, CAEMI International B.V.
Mr. Luiz Vicente AGUILAR, Market Coordinator, CAEMI International B.V.

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Sr. Arturo WENZEL, Vice Presidente, Pacific Ores & Trading B.V. Filial de Empresas CAP

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Mrs. Emma JOHNSEN, United Kingdom Mission, Geneva
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SUEDE

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SUDAN

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Mr. Mahmoud Alamin ABDULHAMID, Director, Administration of Geological Survey.

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Mr. Zater BALTACIOGLU, Economic Counsellor, Permanent Mission, Geneva

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Sra. Zonia Osorio de Fernandez, Directora General Sectorial, SERVIGEOMIN, Ministerio de Energia y Minas, Caracas.
Sr. Freddy CASTELLANOS, Gerente de Comercializacion, C.V.G. Ferrominera Orinoco C.A., Caracas.
Sr. Gerardo THIELEN, Primer Secretario, Mision Permanente, Ginebra

GUEST SPEAKERS

- Mr. M. ERICSSON, Raw Materials Group, Stockholm, Sweden
- Mr. Detlev SCHLEBUSH, Lurgi Metallurgie GmbH, Frankfurt, Germany
- Mr. Anthony B. HINDER, Batelle Europe, Geneva, Switzerland

UNITED NATIONS

COMMISSION ECONOMIQUE POUR L'AFRIQUE

Mr. Albert YAMA NKOUNGA, Gèologue, Addis Ababa

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Mr. A. APKA, Liaison Officer, UNIDO office at Geneva.

WORLD FEDERATION OF UNITED NATIONS ASSOCIATIONS

Mr. Marc WEYDERT, Permanent Representative at United Nations and other international organizations at Geneva.

SPECIALIZED AGENCIES

GATT

Ms. Sabrina SHAW, Economic Affairs Officer, Technical Barriers to Trade and Trade and Environment Division

17. IRON ORE: Apparent Consumption[1]

concluded

(thousand tonnes, natural weight)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993	% change 93/92
ASIA	**56433**	**61075**	**61139**	**68194**	**73205**	**83143**	**88277**	**94995**	**7.6**
India	23034	22354	17882	17955	22117	25345	26410	26000	-1.6
Indonesia	1400	1400	1400	2000	2000	2000	2100	2310	10.0
Iran,Islamic Rep.	2000	3000	4300	5630	5500	6184	7000	7200	2.9
Malaysia	1234	980	659	1103	1579	1542	1933	2050	6.1
Pakistan	1469	1105	1528	1393	1162	1605	1398	1982	41.7
Qatar	800	700	800	792	863	1000	1000	1000	-
Republic of Korea	12466	17117	17151	23134	22870	28730	32079	35793	11.6
Saudi Arabia	1385	1478	1245	1652	1468	1093	1450	2200	51.7
Singapore	7	1	10	1	5	2	6	7	16.7
Syrian Arab Republic	..	..	..	..	22	22	22	22	-
Taiwan Province of China	5358	6140	8477	8370	7760	8433	7251	9019	24.4
Thailand	37	97	99	160	132	228	459	208	-54.7
Turkey	7133	6745	7812	6334	8107	7394	6669	6894	3.4
United Arab Emirates	180	160	140	150	100	100	120	110	-8.3
Other Asia	-70	-202	-364	-480	-480	-535	380	200	-47.4
EUROPE	**7965**	**7064**	**7029**	**6735**	**5597**	**3672**	**2300**	**800**	**-65.2**
Yugoslavia	7965	7064	7029	6735	5597	3672	2300	800	-65.2
COUNTRIES IN EASTERN EUROPE	**267526**	**269324**	**265125**	**257143**	**248613**	**204114**	**174453**	**154210**	**-11.6**
Bulgaria	4427	4165	3938	3533	3043	1409	765	1300	70.0
Czechoslovakia (former	17193	16886	16491	15853	15883	13768	12490	13600	8.9
Germany (former (German Dem. Rep.)	4100	4300	4200	4000	2800	-	-	-	-
Hungary	3414	3403	2885	3263	3202	2700	2400	2800	16.7
Poland	16653	17122	16674	13448	12071	7424	8076	8100	0.3
Romania	17931	17981	16000	15626	11935	7339	2734	3710	35.7
USSR (former)	203808	205467	204937	201420	199679	171474	147988	124700	-15.7
of which									
Ukraine	..	..	..	..	105866	86813	..	..	-
Russia	..	..	..	..	95185	81064	72206	64845	-10.2
SOCIALIST COUNTRIES OF ASIA	**161176**	**164718**	**174021**	**184252**	**193893**	**203948**	**231309**	**268420**	**16.0**
China	152676	156118	165321	174552	183693	193748	221109	257720	16.6
Democratic People's Republic of Korea	8500	8600	8700	9700	10200	10200	10200	10700	4.9

[1] Apparent consumption: relates to production plus imports minus exports. Stocks not considered.

17. IRON ORE: Apparent Consumption[1]

(thousand tonnes, natural weight)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993	% change 93/92
WORLD	**917390**	**932667**	**955123**	**974116**	**979549**	**941254**	**922883**	**918429**	**-0.5**
DEVELOPED MARKET ECONOMY COUNTRIES	**357631**	**365692**	**381032**	**389974**	**391279**	**380008**	**356216**	**334063**	**-6.2**
AMERICA	**62961**	**71489**	**87033**	**79381**	**83417**	**76848**	**76956**	**76151**	**-1.0**
Canada	11051	12071	14677	16268	13105	12043	14597	11588	-20.6
United States	51910	59418	72356	63113	70312	64805	62359	64563	3.5
EUROPE	**148423**	**144853**	**154128**	**163059**	**150176**	**147938**	**139292**	**126547**	**-9.1**
European Union	*134888*	*131912*	*140546*	*148891*	*137064*	*134441*	*126291*	*114986*	*-9.0*
Belgium-Luxembourg	18055	18382	20788	19776	20262	19473	17975	12709	-29.3
Denmark	-2	5	-1	4	-1	1	1	7	600
France	24582	22882	24874	25812	24247	22545	20051	17336	-13.5
Germany	42344	39824	45219	47265	43810	43325	41350	35264	-14.7
Greece	1302	-	-	-24	..	-	-	-	-
Italy	17601	16523	16200	18201	17203	17855	15064	16741	11.1
Netherlands	7017	6944	7339	8026	8221	7827	7495	8532	13.8
Portugal	593	794	502	709	469	466	565	589	4.2
Spain	8549	8268	7536	9913	8102	9354	7965	7887	-1.0
United Kingdom	14846	18290	18089	19209	14751	13595	15825	15921	0.6
EFTA	*13535*	*12941*	*13582*	*14168*	*13112*	*13497*	*13001*	*11561*	*-11.1*
Austria	6316	6360	6464	6602	6192	6088	5542	5018	-9.5
Finland	2630	2909	2957	2600	3158	3070	3308	3361	1.6
Iceland	25	17	23	17	18	17	17	22	29.4
Norway	1146	631	1080	394	-20	138	-21	280	-
Sweden	3407	3015	3046	4555	3764	4184	4155	2880	-30.7
Switzerland	11	9	12	-	-	-	-	-	
SOUTH AFRICA	**15633**	**13206**	**13744**	**15392**	**13262**	**13484**	**13358**	**9831**	**-26.4**
ASIA	**115525**	**112329**	**123655**	**127960**	**125498**	**127226**	**113743**	**114484**	**0.7**
Japan	115525	112329	123655	127960	125498	127226	113743	114484	0.7
OCEANIA	**15089**	**23815**	**2472**	**4182**	**18926**	**14512**	**12867**	**7050**	**-45.2**
Australia	14396	23196	1584	3182	17644	13488	12115	5979	-50.6
New Zealand	693	619	888	1000	1282	1024	752	1071	42.4
DEVELOPING COUNTRIES AND TERRITORIES	**131057**	**132934**	**134945**	**142747**	**145764**	**153184**	**160906**	**161736**	**0.5**
AFRICA	**9301**	**8365**	**6311**	**8210**	**7606**	**6866**	**8012**	**5966**	**-25.5**
Algeria	3312	3562	3400	2728	2912	2680	2522	2261	-10.3
Egypt	1999	2112	2400	2400	2420	2371	3242	3709	14.4
Liberia	1660	296	-971	-447	94	185	432	-800	-
Mauritania	333	118	-223	976	60	-275	168	-90	-
Morocco	200	204	37	39	-13	-12	13	113	776
Nigeria	-	-	152	770	300	150	150	100	-33.3
Tunisia	378	353	267	273	253	269	277	290	4.7
Zimbabwe	1419	1720	1249	1471	1580	1498	1208	383	-68.3
AMERICA	**57358**	**56430**	**60466**	**59608**	**59357**	**59503**	**62317**	**59975**	**-3.8**
Argentina	3893	4142	4293	4493	3592	2399	3577	3207	-10.3
Bolivia	-	-	-	-11	-100	0	50	56	12.7
Brazil	36766	36817	40697	42102	38007	37440	39829	38112	-4.3
Chile	1480	802	898	690	1265	1285	1920	739	-61.5
Colombia	523	615	615	600	628	607	713	600	-15.8
Mexico	7681	7419	8289	8198	8477	9288	7573	7940	4.8
Peru	335	1137	-510	-79	1	1011	-120	1076	-
Trinidad and Tobago	..	..	..	..	988	900	950	1219	28.3
Venezuela	6180	5498	6184	3615	6499	6573	7825	7026	-10.2

19. IRON ORE: Reported consumption by product, 1993

(thousand tonnes)

Country or area	Non-agglomerated ores							Agglomerated		TOTAL
	Run of mine[1]	Lumps[2]	Fines[3]	Concentrates[4]	Pellet-feed[5]	Others	Total	Pellets[6]	Sinter[7]	
Australia	2,029	..	..	..	..	..	2,029	2,765	6,155	10,949
European Union										
Belgium	..	..	..	..	..	..	1,338	1,794	10,048	13,180
France	..	..	..	..	..	..	2,757	541	17,470	20,768
Germany	..	..	..	..	..	..	3,984	12,822	25,418	42,224
Greece	..	..	..	..	..	..	3,484	3,007	12,834	19,325
Italy	..	..	..	..	..	..	-	16	-	16
Luxembourg	..	..	..	..	..	..	81	-	4,382	4,463
Netherlands	..	..	..	..	..	..	19	4,394	4,032	8,445
Portugal	..	..	..	..	..	..	5	246	411	662
Spain	..	..	..	..	..	..	278	2,273	6,202	8,753
United Kingdom	..	..	..	..	..	..	4,424	934	13,602	18,960
Japan	..	..	..	..	..	..	20,550	9,243	91,544	121,337
Peru	..	..	..	..	..	..	-	312	-	312
Romania	53	135	-	-	-	-	188	760	5,076	6,024
South Africa	10,579	-	-	-	-	-	10,579	-	-	10,579
Sweden	-	-	1,100	147	-	-	1,247	3,032	-	4,079
Turkey	-	1,272	3,679	443	-	-	5,394	1,774	-	7,171
Venezuela	-	1,454	1,167	6,918	-	-	8,085	4,365	-	12,450
Zimbabwe	-	286	128	-	-	-	413	-	112	525

1 Marketable unprepared iron ore with more than 20 per cent fines.

2 Marketable iron ore between 10 and 30mm with usually less than 20 per cent fines.

3 Marketable fine ore, usually below 10mm (or similar size).

4 Marketable product from a concentrate plant.

5 Fine ore or concentrate very fine, usually below 0.1mm.

6 Iron ore fines agglomerated into a rough ball shape typically 10mm.

7 Agglomerated fines or concentrates and other iron-bearing materials.

22. PIG IRON[1]: Production

(thousand tonnes)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
COUNTRIES IN EASTERN EUROPE	**149340**	**149850**	**149312**	**148538**	**139568**	**112583**	**104937**	**90759**
Bulgaria	1605	1657	1484	1484	1143	960	848	900E
Czechoslovakia (former)	9573	9788	9706	9911#	9667	8479	8034#	7855
Germany (former (German Dem. Rep.)	2738	2755	2786	2732	2159	-	-	-
Hungary	2061	2109	2000#	1951	1708	1311	1176	1408
Poland	10194	10121	9837#	9488	8352	6355	6348	6175
Romania	9329	9500E	8941#	9051#	6355#	4525#	3111	3191#
USSR (former)	113840	113920	114556#	113921#	110184#	90953	85420	71230
of which								
Ukraine	..	..	..	..	..	..	34663	26999
Russian Fed.	..	..	..	..	59200#	48900#	45824	40599
SOCIALIST COUNTRIES OF ASIA	**56440**	**60930**	**62940**	**64100**	**68506**	**73164**	**79438**	**92332**
China	50640	55030	57040	58200	62606	67164	73438	86332
Democratic People s Republic of Korea	5800	5900E	5900E	5900E	5900E	6000E	6000E	6000E

1 Pig iron: primary iron produced from iron ore mainly in blast furnaces.

20. IRON ORE: Reported stocks[1]

(concluded)

(thousand tonnes)

Country or area	1986	1987	1988	1989	1990	1991	1992	1993
Morocco (producers)	..	..	68#	..	67#	6#	..	..
Norway (producers)	..	..	..	751#	..	..	..	..
Peru *(Total)*	..	..	..	..	..	*1238*	..	..
(producers)	1280#	..	781#	..	502#	1189#	..	*892#*
(consumers)	..	..	..	..	..	49#	..	68#
Philippines (consumers)	..	..	4#	..	277#	..	..	..
Poland (consumers)	4432#	..	9365#	..	..	..	..	..
Republic of Korea *(Total)*	..	..	..	*1410*	*1455*	*2200*	..	..
(producers)	111	..	..	10#	..	-#	..	..
(consumers)	..	..	..	1400#	..	2200#	..	..
Romania *(Total)*	..	..	..	..	*243*	..	..	..
(producers)	..	..	..	..	174#	..	..	..
(consumers)	..	..	..	..	69#	..	..	..
Saudi Arabia (consumers)	..	..	..	..	..	..	..	..
Sweden *(Total)*	..	..	..	..	..	..	..	..
(consumers)	1960#	..	..	..	..	..	..	..
(producers)	..	..	..	1752#	2002#	1879#	2224#	898#
Trinidad and Tobago (consumers)	..	..	..	..	..	..	..	149#
Turkey *(Total)*	..	..	*3091*	*3926*	..	*2734*	*2480#*	*3059#*
(producers)	..	..	1793#	2310#	..	1329#	1273#	1452#
(consumers)	..	..	1298#	1616#	2326#	1405#	1207#	1607#
United States *(Total)*	*22551*	*22877*	*20182*	*25900*	*22977*	*28400*	*22857*	*20000E*
(producers)	5113	6312	3296	4575	4795#	4853#	3783#	..
(consumers)	17438	16565	16886	15730#	15911#	17612#	19074#	..
Venezuela (producers)	..	2033#	2845#	1184#	1969#	1670#	2477#	
Yugoslavia (former) (former) *(Total)*	..	..	*542*	*1917#*	..	..	..	..
(producers)	..	..	259#	79#	..	..	..	..
(consumers)	..	..	283#	1838#	..	..	..	..
Zimbabwe *(Total)*	*5327*	..	*4782*	*5848*	*6045*	*7124*	*6833*	*6809*
(producers)	3854#	..	4130#	4789#	5091#	5614#	5743#	5768#
(consumers)	1473#	..	652#	1059#	954#	1510#	1090#	1041#

1 Reported stocks: inventories at the end of calendar year (31 December) held by producers at mines, plants or loading docks; or by consumers at iron, steel or sinter plants, as well as in receiving docks.

2 Dry weight.

22. PIG IRON[1]: Production

(thousand tonnes)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
COUNTRIES IN EASTERN EUROPE	**149340**	**149850**	**149312**	**148538**	**139568**	**112583**	**104937**	**90759**
Bulgaria	1605	1657	1484	1484	1143	960	848	900E
Czechoslovakia (former)	9573	9788	9706	9911#	9667	8479	8034#	7855
Germany (former (German Dem. Rep.)	2738	2755	2786	2732	2159	-	-	-
Hungary	2061	2109	2000#	1951	1708	1311	1176	1408
Poland	10194	10121	9837#	9488	8352	6355	6348	6175
Romania	9329	9500E	8941#	9051#	6355#	4525#	3111	3191#
USSR (former)	113840	113920	114558#	113921#	110184#	90953	85420	71230
of which								
Ukraine	..	..	..	..	..	..	34663	26999
Russian Fed.	..	..	..	..	59200#	48900#	45824	40599
SOCIALIST COUNTRIES OF ASIA	**56440**	**60930**	**62940**	**64100**	**68506**	**73164**	**79438**	**92332**
China	50640	55030	57040	58200	62606	67164	73438	86332
Democratic People's Republic of Korea	5800	5900E	5900E	5900E	5900E	6000E	6000E	6000E

1 Pig iron: primary iron produced from iron ore mainly in blast furnaces.

22. PIG IRON[1]: Production

(thousand tonnes)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
WORLD	**496065**	**508160**	**537544**	**545015**	**532123**	**507027**	**499018**	**502022**
DEVELOPED MARKET ECONOMY COUNTRIES	**228447**	**231930**	**253547**	**257635**	**249980**	**243048**	**234705**	**235955**
AMERICA	**49121**	**53636**	**60059**	**60816**	**57173**	**52391**	**55998**	**56788**
Canada	9249	9719	9498#	10139#	7346	8268	8621	8633
United States	39872	43917	50561	50677	49827#	44123#	47377#	48155#
EUROPE	**93012**	**92989**	**102386**	**104135**	**100302**	**98147**	**92739**	**92461**
European Union	*84601*	*84752*	*93681*	*95134*	*91777*	*89564*	*84517*	*84011*
Belgium-Luxembourg	10724	10559	11701#	11607#	12082	11839	10779	10593
France	13714	13236	14786#	15071#	14414	13646	13051	12624
Germany	28592	28119	32453#	32777#	30098	30989	28548	26970
Italy	11898	11372	11376#	11788#	11882	10856	10461	11066
Netherlands	4628	4574	4994#	5163#	4960	4696	4849	5411
Portugal	422	430	445#	377#	340	251	402	397
Spain	4811	4804	4691#	5535#	5682	5404	5076	5394
United Kingdom	9812	11658	13235#	12816#	12319	11883	11351	11556
EFTA	*8411*	*8237*	*8705*	*9001*	*8525*	*8583*	*8222*	*8450*
Austria	3349	3417	3664	3823#	3452#	3441#	3074#	3070#
Finland	1978	2064	2180#	2300#	2283	2330#	2413#	2535
Norway	570	371	367#	240#	54	-	-	-
Sweden	2435	2315	2494	2638#	2736#	2812#	2735#	2845
Switzerland	79	70	-	-	-	-	-	-
SOUTH AFRICA	**5774**	**6317**	**6171**	**6513**	**6234**	**6968**	**6498**	**6121**
ASIA	**74651**	**73419**	**79221**	**80121**	**80144**	**79909**	**73086**	**73738**
Japan	74651	73419	79221#	80121	80144#	79909#	73086#	73738
OCEANIA	**5889**	**5569**	**5710**	**6050**	**6127**	**5633**	**6384**	**6847**
Australia	5889#	5569#	5710#	6050#	6127	5633	6384	6847#
DEVELOPING COUNTRIES AND TERRITORIES	**61838**	**65450**	**71745**	**74741**	**74069**	**78232**	**79939**	**82976**
AFRICA	**3259**	**3293**	**3099**	**3080**	**3055**	**3010**	**2738**	**2552**
Algeria	1400	1499	1500	1300#	1300E	1200E	930#	1000E
Egypt	1066	1071#	1112	1100E	1068#	1149#	1103#	1185#
Tunisia	149	163	128	155	148	172	158	165
Zimbabwe	644	560	359#	525#	539	489#	547#	202#
AMERICA	**27151**	**28199**	**30294**	**31453**	**28153**	**28243**	**28688**	**29565**
Argentina	1639	1775	1596#	2169#	1918	1437	971	990
Brazil	20163	21121#	23222#	24380	21141	22530#	22982#	23795#
Chile	592	613	778	679	675	726	873	917
Colombia	319	326	370#	297	323	304	298	235
Mexico	3728	3712#	3678#	3230#	3665#	3039	3404#	3423
Peru	216#	178#	165#	209	117	207#	158	205#
Venezuela	494	474	485#	489#	314#	-	-	-
ASIA	**28365**	**31091**	**35436**	**37306**	**40548**	**45713**	**47609**	**50757**
India	10514	10923	11724#	12080#	12644	14176	15126	15674
Iran,Islamic Rep.	250E	250E	250E	250E	1267	1952#	2053	1961
Malaysia	200E	200E	- #	-	-	-	95#	100E
Pakistan	895	905	905	910E	920E	910E	800E	800E
Republic of Korea	9003	11057	12578	14840#	15390#	18510#	19323	21776
Taiwan Province of	3740	3658	5487#	5708#	5491	5561	5292	6096
Thailand	10E	10E	10E	10E	10E	10	-	-
Turkey	3733#	4068#	4462#	3508#	4826#	4594#	4920#	4350#
Other Asia	20E	20E	20E	-	-	-	-	-
EUROPE	**3063**	**2867**	**2916**	**2902**	**2313**	**1266**	**906**	**102**
Yugoslavia (former)	3063	2867	2916#	2902#	2313#	1266	906	102

27. CRUDE STEEL[1]: Production

(thousand tonnes)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
WORLD	**713310**	**735098**	**778345**	**784908**	**768619**	**733581**	**718068**	**725335**
DEVELOPED MARKET ECONOMY COUNTRIES	**341762**	**348851**	**378425**	**383019**	**377412**	**368686**	**357560**	**365707**
AMERICA	**88113**	**95613**	**105515**	**104310**	**101199**	**92725**	**98255**	**103180**
Canada	14081	14737	14866#	15458#	12281	12987	13933	14387#
United States	74032#	80876#	90649#	88852#	88918#	79738#	84322#	88793#
EUROPE	**139219**	**139239**	**151461**	**153651**	**149660**	**149917**	**144934**	**145830**
European Union	*125714*	*125958*	*137426*	*139578*	*136572*	*137490*	*132379*	*132168*
Belgium-Luxembourg	13420	13085	14883#	14687#	14953	14710	13398	13464
Denmark	632	605	650#	624#	609	632	591	603
France	17670	17432	18598#	18692#	19021	18401	17961	17109
Germany	37134	36248	41023#	41073#	38434	42169	39711	37625
Greece	1010	908	959#	956#	999	980	924	1023
Ireland	208	220	271#	324#	326	293	257	326
Italy	22985	22819	23762#	25216#	25472	25110	24842	25691
Netherlands	5283	5082	5518#	5681#	5412	5171	5439	5983
Portugal	721	732	811#	761#	746	541	749	745
Spain	11882	11691	11886#	12765#	12705	12932#	12295	12974
United Kingdom	14769	17136	19065#	18799#	17895	16551	16212	16625
EFTA	*13505*	*13281*	*14035*	*14073*	*13088*	*12427*	*12555*	*13762*
Austria	4292	4301	4560#	4718#	4291#	4186	3953	4149#
Finland	2586	2668	2798#	2921#	2861	2600#	2748#	3256
Norway	836	851	910#	678#	376#	438#	446#	506
Sweden	4716	4595	4779	4692#	4455#	4248#	4358#	4591#
Switzerland	1075	866	988	1064	1105	955	1050	1260
SOUTH AFRICA	**9055**	**8836**	**8709**	**9567**	**8738**	**9358**	**8496#**	**8726**
ASIA	**98385**	**98629**	**105780**	**108009**	**110466**	**109739**	**98240**	**99723**
Israel	110	116	99	100	135	90	109	100E
Japan	98275	98513	105681#	107909#	110331	109649#	98131#	99623
OCEANIA	**6990**	**6534**	**6960**	**7482**	**7349**	**6947**	**7635**	**8148**
Australia	6703#	6125#	6400#	6800#	6630#	6141	6877	7298#
New Zealand	287	409	560	682	719	806	758	850
DEVELOPING COUNTRIES AND TERRITORIES	**91007**	**98769**	**109337**	**114425**	**114601**	**121495**	**126909**	**137369**
AFRICA	**3512**	**3961**	**4410E**	**4233**	**4623**	**5003**	**5116**	**5194**
Algeria	1450	1533	1412	1042	836	840#	820#	865
Egypt	1013	1433	2025	2114	2247	2557	2524	2772
Morocco	6E	5E	5E	5E	5E	5E	5	5
Nigeria	134#	137#	139#	213#	220	114	200E	150E
Tunisia	181	188	162	197	184	193	181	182
Zimbabwe	674	597	602	592#	579	526#	547#	220#
Other Africa	54	68	65E	70	552	768	839	1000
AMERICA	**37671**	**39518**	**42194**	**42547**	**38372**	**38699**	**40557**	**42452**
Argentina	3242#	3603#	3624#	3893#	3657	2972	2661	2862
Bolivia	5E	- E	- #	-	-	-	-	-
Brazil	21228#	22228#	24657#	25017	20582	22617#	23934#	25207#
Chile	706	720	899	813	773	805	994	1064
Colombia	632	690	712	706	710	664	689	685
Cuba	411	402	363	432#	340#	300E	200E	90
Mexico	7225#	7642#	7779#	7851#	8726#	7964#	8435#	9126
Peru	358#	400#	463#	397	284	235#	300	225#
Trinidad and Tobago	331	388	363	347	380#	444	532	492
Uruguay	31	30	30	37	38	44	53	60
Venezuela	3402	3297#	3165#	2942#	2787	2558	2668#	2565#
Other America	100	118	139	112	95	96	91	76

23. SPONGE IRON (DRI)[1]: Production

(thousand tonnes)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
WORLD	**12654**	**13630**	**13872**	**15501**	**17258**	**19199**	**21172**	**24392**
DEVELOPED MARKET ECONOMY COUNTRIES	**2070**	**1980**	**2060**	**2189**	**2292**	**2232**	**2725**	**2971**
AMERICA	**850**	**940**	**1060**	**996**	**1122**	**970**	**1028**	**1184**
Canada	690	730	770	705	732	560	639	744#
United States	160	210	290	291	390	410	389#	440#
EUROPE	**170**	**200**	**270**	**353**	**310**	**362**	**403**	**275**
European Union	*170*	*200*	*270*	*353*	*310*	*260*	*300*	*180*
Germany	170	200	270	353	310	260	300	180
EFTA	-	-	-	-	-	*102*	*103*	95
Sweden	-	-	-	-	-	102	103#	95#
SOUTH AFRICA	**790**	**840**	**730**	**840**	**860**	**900**	**910**	**870**
OCEANIA	**260**	-	-	-	-	-	**384**	**642**
New Zealand	260	-	-	-	-	-	384	642
DEVELOPING COUNTRIES AND TERRITORIES	**9834**	**10390**	**10132**	**11612**	**13276**	**15267**	**16861**	**19986**
AFRICA	**140**	**610**	**902**	**1040**	**1331**	**1517**	**1723**	**1821**
Egypt	30	470	770	817	710	617	826#	837
Libyan Arab Jamahiriya	-	-	-	90	500	790	847	944
Nigeria	110	140	132	133	121	110	50	40
AMERICA	**5976**	**6453**	**5938**	**6357**	**7016**	**8226**	**8646**	**9367**
Argentina	950	1040	1067	1166	1035	960	1017	1156
Brazil	300	200	195	239	280	226	230#	250#
Mexico	1370	1551	1686	2163	2525	2490	2394#	2737
Peru	56	52	49	50	30	24	30	-
Trinidad and Tobago	380	490	593	695	800	710	675	734#
Venezuela	2920	3120	2348	2044	2346	3816	4300	4490
ASIA	**3718**	**3327**	**3292**	**4215**	**4929**	**5524**	**6247**	**8798**
India	148	177	195	360	750	1180	1440	2210
Indonesia	1300	1030	980	1210	1410	1430	1370	1395#
Iran,Islamic Rep.of	-	-	-	40	300	584	960	1770
Iraq	-	-	100	200	170	-	-	-
Malaysia	580	590	427	644	620	620	480#	710
Myanmar(Union of)	30	20	20	20	20	20	20	20
Qatar	490	470	495	534	574	570	617	573
Saudi Arabia	1170	1040	1075	1207	1085	1120	1611	2015
COUNTRIES OF EASTERN EUROPE	**750**	**1260**	**1680**	**1700**	**1690**	**1700**	**1580**	**1540**
USSR (former)	750	1260	1680	1700	1690	1700	1580	1540

1 Sponge iron or DRI: primary iron produced through direct reduction, without exceeding the melting temperature.

Annex. Iron-ore questionnaire

Replies

Country or area	Date of reply	A		B				C	D			E	
		A.1	A.2	B.1	B.2	B.3	B.4		D.1	D.2	D.3	E.1	E.2
Argentina	9 May 94	#	-	-	-	-	-	-	-	-	-	-	-
Australia	22 April 94	#	#	-	-	#	#	#	#	#	#	#	#
Austria	19 July 94	#	#	#	#	#	-	#	-	#	-	-	-
Brazil	30 August 94	#	#	#	#	#	#	-	#	-	#	#	-
Canada	3 June 94	#	-	-	#	-	-	#	#	#	#	-	-
Chile	5 July 94	#	-	-	-	-	-	#	#	-	-	-	-
Czech Rep.	21 June 94	-	#	#	-	#	-	-	-	#	-	-	-
European Union	29 June 94	#	#	#	#	#	#	#	#	#	#	-	-
Egypt (92/93)	3 March 94	#	#	#	#	#	#	#	-	-	-	-	-
Greece	29 June 94	-	-	-	-	#	-	-	-	-	-	-	-
India (92/93)	22 March 94	#	-	-	-	-	-	#	-	-	-	-	-
Indonesia	1 March 94	-	-	#	#	#	#	#	-	-	-	-	-
Japan	4 April 94	-	#	#	#	#	-	#	-	#	-	-	-
Kazakhstan	30 June 94	#	#	-	-	#	-	-	#	-	-	-	#
Korea Rep.	23 February 94	#	-	-	-	-	-	-	-	#	-	-	-
Latvia	22 March 94	-	-	#	#	#	-	#	#	#	#	-	-
Mauritania	15 Sept. 94	#	-	-	-	-	-	#	#	-	-	#	-
Morocco	14 April 94	#	-	-	-	-	-	-	#	-	#	-	-
Norway	23 February 94	#	-	-	-	-	-	-	#	#	#	-	-
Peru	15 Sept. 94	#	-	#	#	#	-	#	#	-	#	-	-
Phillppines	26 June 94	#	-	-	-	-	-	-	-	-	-	-	-
Romania	1 April 94	#	#	#	#	#	#	-	-	#	-	-	-
Slovenia	18 April 94	-	-	#	#	-	-	-	#	-	-	-	-
South Africa	2 June 94	#	-	#	-	-	-	-	#	-	-	-	-
Spain	18 April 94	#	-	#	#	-	-	-	#	#	-	-	-
Sweden	28 March 94	#	#	#	#	#	#	#	#	#	#	#	-
Thailand	24 March 94	#	-	#	-	-	-	-	-	-	-	-	-
Trinidad & Tobago	30 March 94	-	-	#	#	#	-	#	-	#	#	-	-
Tunisia	4 February 94	#	-	-	-	-	-	-	#	-	-	-	-
Turkey	11 April 94	#	#	#	#	#	#	#	-	#	#	#	-
United States	6 June 94	#	-	#	-	-	-	#	#	#	#	-	#
Uruguay	6 June 94	#	-	-	-	-	-	-	-	-	-	-	-
Venezuela	12 May 94	#	#	#	#	#	#	#	#	-	-	#	-
Zimbabwe	17 February 94	#	#	#	#	#	-	#	-	-	-	-	#

CONTENTS: Iron ore

Note:

Afghanistan, Botswana, Central African Rep., Cote d'Ivoire, Oman replied to the questionnaire but have no iron ore or steel industry.

Annex. Iron-ore questionnaire

Replies

Country or area	Date of reply	A		B				C	D			E	
		A.1	A.2	B.1	B.2	B.3	B.4		D.1	D.2	D.3	E.1	E.2
Argentina	9 May 94	#	-	-	-	-	-	-	-	-	-	-	-
Australia	22 April 94	#	#	-	-	#	#	#	#	#	#	#	#
Austria	19 July 94	#	#	#	#	#	-	#	-	#	-	-	-
Brazil	30 August 94	#	#	#	#	#	#	-	#	-	#	#	-
Canada	3 June 94	#	-	-	#	-	-	#	#	#	#	-	-
Chile	5 July 94	#	-	-	-	-	-	#	#	-	-	-	-
Czech Rep.	21 June 94	-	#	#	-	#	-	-	-	#	-	-	-
European Union	29 June 94	#	#	#	#	#	#	#	#	#	#	-	-
Egypt (92/93)	3 March 94	#	#	#	#	#	#	#	-	-	-	-	-
Greece	29 June 94	-	-	-	-	#	-	-	-	-	-	-	-
India (92/93)	22 March 94	#	-	-	-	-	-	#	-	-	-	-	-
Indonesia	1 March 94	-	-	#	#	#	#	#	-	-	-	-	-
Japan	4 April 94	-	#	#	#	#	-	#	-	#	-	-	-
Kazakhstan	30 June 94	#	#	-	-	#	-	-	#	-	-	-	#
Korea Rep.	23 February 94	#	-	-	-	-	-	-	-	#	-	-	-
Latvia	22 March 94	-	-	#	#	#	-	#	#	#	#	-	-
Mauritania	15 Sept. 94	#	-	-	-	-	-	#	#	-	-	#	-
Morocco	14 April 94	#	-	-	-	-	-	-	#	-	#	-	-
Norway	23 February 94	#	-	-	-	-	-	-	#	#	#	-	-
Peru	15 Sept. 94	#	-	#	#	#	-	#	#	-	#	-	-
Philippines	26 June 94	#	-	-	-	-	-	-	-	-	-	-	-
Romania	1 April 94	#	#	#	#	#	#	-	-	#	-	-	-
Slovenia	18 April 94	-	-	#	#	-	-	-	#	-	-	-	-
South Africa	2 June 94	#	-	#	-	-	-	-	#	-	-	-	-
Spain	18 April 94	#	-	#	#	-	-	-	#	#	-	-	-
Sweden	28 March 94	#	#	#	#	#	#	#	#	#	#	#	-
Thailand	24 March 94	#	-	#	-	-	-	-	-	-	-	-	-
Trinidad & Tobago	30 March 94	-	-	#	#	#	-	#	-	#	#	-	-
Tunisia	4 February 94	#	-	-	-	-	-	-	#	-	-	-	-
Turkey	11 April 94	#	#	#	#	#	#	#	-	#	#	#	-
United States	6 June 94	#	-	#	-	-	-	#	#	#	#	-	#
Uruguay	6 June 94	#	-	-	-	-	-	-	-	-	-	-	-
Venezuela	12 May 94	#	#	#	#	#	#	#	#	-	-	#	-
Zimbabwe	17 February 94	#	#	#	#	#	-	#	-	-	-	-	#

CONTENTS: Iron ore

Note:

Afghanistan, Botswana, Central African Rep., Cote d'Ivoire, Oman replied to the questionnaire but have no iron ore or steel industry.

25. METALLICS: Reported exports, 1991-1993

(thousand tonnes)

Country or area	Pig iron			Sponge iron			Ferrous scrap[2]		
	1991	1992	1993	1991	1992	1993	1991	1992	1993
Australia	52	37	..	-	-	-	..	..	..
Brazil	2,560	2,415	1,860	-	-	-	..	..	15
Bulgaria	..	5.7	-	-	-	-	-	-	-
Canada	84	85	61	-	-	76	1,334	820	125
China	668	1,007	..	-	-	-	71	..	..
C.I.S.	3,449	1,931	..	-	-	-	..	..	..
Czechoslovakia	55	-	79	-	60	..	..	..	..
France	..	-	-	..	..	..	3,442	..	..
Germany	..	-	-	..	..	..	7,251	..	..
India	1	..	..	-	-	-	87	..	..
Japan	22	284	..	-	-	-	362	1,722	1,568
Korea Rep.	-	65	..	-	-	-	20	..	..
Moldova Rep.	..	..	31	-	-	-	..	..	2
New Zealand	..	..	..	..	..	..	78	38	..
Norway	58	..	..	-	0	..	4	3	2
Romania	..	..	5	-	-	-	..	..	17
South Africa	750	750	..	..	..	..	..	..	..
Spain	0	..	..	..	..	..	25	..	..
Sweden	9	32	45	5	9	9	237	66	231
Thailand	-	-	-	-	-	-	10	..	
Turkey	193	39	-	-	-	-	10	11	-
Trinidad and Tobago	..	..	-	..	..	224	..	..	26
United Kingdom	..	..	..	..	..	..	3,215	..	..
United States	16	33	26	5	0	17	9,345	9,203	9,869
Latvia	..	-	..	..	..	-	60	1	..
Venezuela	-	-	-	678	667	440	15	55	41
Zimbabwe	..	..	4	..	..	-	..	..	-

26. METALLICS : Reported imports, 1991-1993

(thousand tonnes)

Country or area	Pig iron			Sponge iron			Ferrous scrap[2]		
	1991	1992	1993	1991	1992	1993	1991	1992	1993
Bulgaria	35	9.4	..	-	-	-	-	-	-
Canada	23	27	29	-	-	..	789	871	..
China	385	385	..	-	-	-	..	..	..
Colombia	..	..	..	-	..	16	100	..	316
Czech Rep.	..	..	91	..	..	..	2	..	..
Egypt	..	75	..	..	..	-	35	200	..
Estonia	..	..	1	..	..	4	..	..	..
France	..	..	..	1	22	..	1,115	..	..
Germany	..	..	..	10	16	..	..	..	..
India	245	..	..	-	-	..	3,152	..	..
Indonesia	..	..	262	-	-	239	1,187	..	1,763
Japan	3,375	1,477	1,636	103	135	..	821	328	913
Latvia	88	12	14	-	-	-	98	4	0
Malaysia	..	25	-	-	-	-	734	274	..
Mexico	..	15	..	..	106	..	700	544	..
Moldova Rep.	..	..	5	..	..	..	..	..	0.7
New Zealand	..	-	..	..	5	..	..	..	0
Norway	5	3	5	19	25	30	0	0	1
Philippines	..	..	..		152	..			
Republic of Korea	787	1,069	1,482	-	..	..	690	..	..
Romania	..	3	19	..	-	-	..	-	1
Slovenia	..	13	12	..	-	0	..	1	2
Spain	212	..	..	105	..	..	4,259	..	..
Sweden	29	16	25	-	-	-	165	281	468
Thailand	82	159	..	..	..	..	501	816	..
Trinidad and Tobago	..	..	..	..	..	..	..	..	5
Turkey	240	396	698	38	33	-	4,443	4,434	6,373
United States	435	496	827	380	542	1,015	1,073	1,305	1,545
Venezuela	-	304	-	216	131	-	46	23	21

27. CRUDE STEEL[1]: Production

(concluded)

(thousand tonnes)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
ASIA	**45325**	**50953**	**58286**	**63163**	**68018**	**75518**	**79623**	**89017**
Bangladesh	116	120	120	120E	120E	120E	100E	100E
Hong Kong	120E	120E	120E	150E	150E	150	150	150
India	12197	13121	14309	14608	14963	17100	18117	18155
Indonesia	1729	2059	1850	2303#	2892	3089	2949	3442#
Iran,Islamic Rep.of	838	839	978	1081	1425	2203#	2937	3672
Malaysia	450	600	700	800	900	900E	872#	900E
Pakistan	900	1000	1200	1200E	1200E	1200E	1000E	1000E
Philippines	209#	261#	252#	400E	400E	605	497	500
Qatar	507	492	527	585	571	564	575	620
Republic of Korea	14555	16782	19118	21873	23126	26001	28054	33027
Saudi Arabia	1100	1365	1614	1810	1833	1783	1823	2357
Singapore	390	441	432	495	489	510	482	520
Syrian Arab Rep.	70E	60E	60E	30#	70#	70#	70E	70E
Taiwan Province of	5545	5915	8288	9047	9747	10973	10705	11970
Thailand	450	534	535	550E	600E	715#	810#	900E
Turkey	5927#	7044#	7983#	7901#	9322#	9335#	10252#	11414#
United Arab Emirates	50E	40E	40E	40E	40E	30E	40E	40E
Other Asia	172	160	160	170	170	170	190	180
EUROPE	**4519**	**4367**	**4487**	**4502**	**3608**	**2295**	**1633**	**726**
Yugoslavia (former)	4519#	4367#	4487#	4502#	3608#	2295	1633	726
COUNTRIES OF EASTERN EUROPE	**221649**	**224368**	**224208**	**219099**	**203135**	**165761**	**146324**	**125536**
Bulgaria	2898	3044	2880	2899	2180#	1615#	1552#	1941
Czechoslovakia (former)	15112	15416	15379#	15465#	14813	12071	11144#	10739
of which								
Czech Rep.	..	..	..	..	..	..	7282	6776#
Slovak Rep.	..	..	..	..	..	..	3858	3970
Germany (former G.D.R.)	7967	8243	8133	7829	5587	-	-	-
Hungary	3715	3622	3580#	3305	2962	1862	1559	1736
Poland	17144	17146	16885#	15094	13553	10432	9867	9936
Romania	14276	14962	14314#	14415#	9754#	7115#	5372	5446#
USSR	160537	161935	163037#	160092#	154286#	132666	116830	95738
of which								
Kajakstan	..	..	..	..	..	5940	5675	4279
Latvia	..	..	..	..	..	373#	246#	300#
Russian Fed.	..	..	..	..	89600	77076	67003	58236
Ukraine	..	..	..	..	52646#	44995#	41759	30357
SOCIALIST COUNTRIES OF ASIA	**58872**	**63080**	**66335**	**68345**	**73451**	**77619**	**87256**	**96703**
China	52208	56280	59431	61430	66349	70436	80037	89453
Democratic People's Republic of Korea	6600	6730	6830	6830	7000	7000	7000	7000
Viet Nam	64	70	74	85	102	183	219	250E

1 Crude steel: raw form of steel measured at the first stage of solidification, except for liquid steel casting.

2 The statistical series for the former German Democratic Republic stops in 1990. This should be taken into account for the comparison of the total of countries in eastern Europe which will be lower and the total in the European Union which will be higher.

Annex. Iron-ore questionnaire

Replies (*concluded*)

Country or area	Date of reply	F.1			F.2	F.3			G.1			G.2	H		
		F.1.1	F.1.2	F1.3		F3.1	F3.2	F3.3	G1.1	G1.2	G1.3		H.1	H.2	H.3
Australia	22 April 94	#	-	#	-	#	#	#	#	-	#	#	-	-	-
Austria	25 March 94	#	-	-	-	#	#	#	-	-	-	-	-	-	-
Brazil	30 August 94	#	#	#	#	#	#	#	#	#	#	#	#	-	#
Canada	3 June 94	#	#	#	-	#	#	#	#	#	#	-	#	#	#
Czech Rep.	21 June 94	-	-	-	-	#	#	#	-	-	-	-	#	#	-
Egypt (92/93)	8 March 94	#	-	#	-	#	#	#	#	#	#	#	-	-	-
Estonia	22 March 94	-	-	-	-	-	-	-	-	-	-	-	#	#	#
Greece	29 June 94	-	-	-	-	#	#	#	#	-	#	#	-	-	-
India (92/93)	22 March 94	#	-	-	-	#	#	-	-	-	-	-	-	-	-
Indonesia	1 March 94	-	#	#	#	#	#	#	#	#	#	#	-	#	-
Japan	4 April 94	#	-	#	-	#	#	-	-	-	#	-	#	#	-
Latvia	22 March 94	-	-	-	-	#	#	#	#	#	#	#	-	#	#
Moldova Rep.	13 June 94	-	-	-	-	#	-	-	#	-	-	-	#	#	#
Norway	23 February 94	-	-	-	-	-	-	-	-	-	-	-	#	#	#
Peru	15 Sept. 94	#	-	-	-	#	-	-	-	-	-	-	-	-	-
Romania	1 April 94	#	#	#	#	#	#	#	#	#	#	#	#	#	#
Slovenia	18 April 94	-	-	#	#	#	#	-	-	-	-	-	#	#	#
Spain	18 April 94	-	-	-	-	#	#	#	-	-	-	-	-	-	-
Sri Lanka	31 January 94	-	-	-	-	#	#	-	-	-	#	#	-	-	-
Sweden	28 March 94	#	#	#	#	#	#	#	#	-	-	#	#	#	#
Turkey	11 April 94	#	-	#	#	#	#	#	#	#	#	#	-	#	#
United States	6 June 94	#	#	#	#	#	-	#	#	-	#	-	#	#	#
Venezuela	12 May 94	#	#	#	#	#	#	#	#	#	#	#	#	#	#
Zimbabwe	17 February 94	#	-	#	-	#	#	#	#	-	#	#	#	-	-

CONTENTS : Iron and Crude steel

UNITED
NATIONS

TD

United Nations Conference
on Trade and Development

Distr.
RESTRICTED

25 October 1994

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TRADE AND DEVELOPMENT BOARD
Standing Committee on Commodities
Intergovernmental Group of Experts
on Iron Ore
Third session
Geneva, 25 October 1994

REVIEW OF IRON ORE STATISTICS

Revised version of the iron ore statistics - 1986-1993

This statistical information contains some revised figures provided by delegates during the session.

Prepared by the UNCTAD secretariat

CONTENTS

EXPLANATORY NOTES

1. The following symbols are applicable to all tables:

   (a) The symbol "#" indicates that the data concerned have been supplied by Governments in response to the questionnaire.

   (b) The symbol "-" indicates that the amount is nil or negligible.

   (c) The symbol ".." indicates that information is not available.

   (d) The letter "E" indicates that data have been estimated by the UNCTAD secretariat in the absence of data supplied by Governments and when data are not available from official national publications.

   (e) The term "tonnes" refers to metric tons.

   (f) The term "dollars" refers to United States dollars.

2. German reunification on 3 October 1990 increased the territory within the European Economic Community rendering statistical comparison with previous years difficult. In this report, statistics for Germany for 1991-1993 represent the enlarged territory. As a result of this situation, the interpretation of figures after 1990 should take into account that ***totals for developed market-economy countries, as well as for the European Union are higher***;in contrast, ***totals for the countries in Eastern Europe are lower*** since figures for the former German Democratic Republic are excluded.

3. In order to facilitating statistical analysis, this report shows for the period 1991-1993 figures for the former USSR; however, since 26 December 1991 the name Russian Federation in place of the name Union of Soviet Socialist Republics is to be used in the United Nations. While the Unctad secretariat received some statistics from Estonia, Kazakhstan, Latvia, Moldova, Russian Federation and Ukraine, these data are presented for information only and do not figure in the totals.

1. IRON ORE : Production[1]

(concluded)

(thousand tonnes, natural weight)[2]

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993	% change 93/92
COUNTRIES IN EASTERN EUROPE	**256379**	**256842**	**253605**	**246700**	**239373**	**201942**	**176483**	**155444**	**-11.9**
Bulgaria	2179	1857	1826	1613	1079#	858#	349#	500E	43.3
Czechoslovakia (former)	1784	1798	1773	1780#	1710	1740	726#	600E	-17.4
Poland	9	6	6	7	6E	5E	-	-	-
Romania	2431	2281	2000#	2000#	578#	477E	388#	344#	-11.3
USSR (former)	249976	250900	248000#	241300#	236000#	198862#	175000	154000	-12.0
of which									
Kazakhstan	..	..	..	..	..	..	..	12634	-
Ukraine	..	..	..	..	105866#	86813#	..	..	-
Russian Fed.	..	..	..	..	106800	90900	82100	76000	-7.4
SOCIALIST COUNTRIES OF ASIA	**148630**	**152020**	**162780**	**171100E**	**178850**	**184790**	**205438**	**234700**	**14.2**
China 5	140630	144020	154780	162100	169350	175290	195938	224700	14.7
Democratic People's Republic of Korea	8000	8000	8000	9000E	9500E	9500E	9500E	10000E	5.3

1 Production:includes ores, concentrates and iron ore agglomerated. Marketable products only.

2 Natural weight: natural state of extraction, normally wet.

3 Dry weight.

4 Pellets not included.

5 Figures subject to revision.

1. IRON ORE : Production[1]

(thousand tonnes, natural weight)[2]

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993	% change 93/92
WORLD	**914707**	**931714**	**960428**	**986156**	**976452**	**951409**	**918384**	**932591**	**1.5**
DEVELOPED MARKET ECONOMY COUNTRIES	**246690**	**253938**	**262286**	**278047**	**272451**	**281122**	**268536**	**269127**	**0.2**
AMERICA	**76125**	**84164**	**97924**	**99014**	**91491**	**92626**	**89362**	**87953**	**-1.6**
Canada	36679#	36520#	40409#	41142#	36033#	37111#	34449#	32292#	-6.3
United States	39446	47644	57515	57872	55458	55515#	54913#	55661#	1.4
EUROPE	**48866**	**43143**	**40401**	**40614**	**36165**	**35239**	**31633**	**28060**	**-11.3**
European Union	*20970*	*16598*	*14453#*	*14083#*	*11907*	*11582*	*8577*	*5723*	*-33.3*
France	12560	11566	9872#	9319#	8720#	7492#	5694#	3543#	-37.8
Germany	717	247	70#	102#	84#	118#	109#	100	-8.3
Greece	1300E	..	..	..	..	..	..	..	-
Portugal	50	30	25	20	20E	-	-	-	-
Spain	6054#	4492#	4262#	4610#	3030#	3915#	2746#	2080#	-24.3
United Kingdom	289	263	224#	32#	53#	57#	28#	0	-
EFTA	*27896*	*26545*	*25948*	*26531*	*24258*	*23657*	*23056*	*22337*	*-3.1*
Austria	3120#	3050#	2300#	2410#	2300#	2120#	1627#	1427#	-12.3
Finland	543#	648	557#	-	-	-	-	-	-
Norway	3660	3140	2644#	2358#	2081#	2209#	2152#	2182#	1.4
Sweden	20473#	19707	20447	21763#	19877#	19328#	19277#	18728#	-2.8
SOUTH AFRICA	**24483**	**22008#**	**25247#**	**29958#**	**30291#**	**28952**	**28226#**	**29385#**	**4.1**
ASIA	**291**	**295**	**278**	**251**	**208**	**40**	-	-	-
Japan	291#	295	278	251	208	40	-	-	-
OCEANIA	**96925**	**104328**	**98436**	**108210**	**114296**	**124265**	**119315**	**123729**	**3.7**
Australia	94015#	101748#	96084#	105810#	112000#	122000	117215#	121429#	3.6
New Zealand	2910	2580	2352#	2400E	2296#	2265#	2100E	2300E	9.5
DEVELOPING COUNTRIES AND TERRITORIES	**263008**	**268914**	**281757**	**290309**	**285778**	**283555**	**267947**	**273320**	**2.0**
AFRICA	**32150**	**30827**	**29982**	**31349**	**22568**	**18208**	**15976**	**15036**	**-5.9**
Algeria	3360#	3575#	3400E	2748#	2930#	2700#	2563#	2311	-9.8
Egypt	1999	2112#	2400#	2400E	2420#	2371#	1978#	2409	21.8
Liberia	15600	13806#	12808#	12300	3981	1200	1705	-	-
Mauritania	9262#	9120#	9782#	12114#	11416#	10194#	8262#	9565#	15.8
Morocco	200	204	117#	126#	50#	54#	71#	168#	137.0
Tunisia	310	290	226#	190#	191#	191#	189#	200#	5.8
Zimbabwe	1419#	1720#	1249#	1471#	1580#	1498#	1208#	383#	-68.3
AMERICA	**165596**	**171788**	**185548**	**192671**	**192851**	**194300**	**182875**	**188876**	**3.3**
Argentina	710	800	1162#	677#	444#	89#	3#	2#	-33.3
Bolivia 3	-	-	15#	14#	125#	102#	100E	95E	-5.0
Brazil 4	129054	134105#	146000#	153743#	152303#	152121#	145864#	149973#	2.8
Chile	6326#	6131#	7295#	8112#	7811#	8691#	7643	7005#	-8.3
Colombia	523#	615	615#	600	628#	607#	713	600	-15.8
Mexico	7581	7374	7830#	7538#	8114#	9138E	7763#	8000E	4.7
Peru 3	5195#	5567#	4158#	3935	3307#	3593#	2855	5722#	100.4
Venezuela	15207#	17196	18473#	18052#	20119#	19959#	18054#	17479#	-3.2
ASIA	**58644**	**60316**	**60684**	**61852**	**66227**	**68875**	**67796**	**69108**	**1.9**
India	51169#	51335#	49961#	51434#	53702#	56884#	54872#	56000E	2.1
Iran,Islamic Rep.&5]	2000[0]00E	4300	5630	5500E	6184#	7000E	7200E	2.9	
Malaysia	208	161	209#	193#	348	384	320#	350E	9.4
Republic of Korea	525	510	672	344#	370#	290#	300E	260#	-13.3
Syrian Arab Republic	..	..	..	..	20#	20E	20E	20E	-
Thailand	37#	97	99	160	132	228	459#	208#	-54.7
Turkey	4705#	5213#	5443#	4091#	6155#	4885#	4825#	5070#	5.1
EUROPE	**6618**	**5983**	**5543**	**4438**	**4132**	**2172**	**1300**	**300**	**-76.9**
Yugoslavia (former)	6618	5983	5543#	4438#	4132#	2172	1300E	300E	-76.9

3. IRON ORE: Production by products, 1993

(thousand tonnes, natural weight)

Country or area	Non-agglomerated						Agglomerated	
	Run of mine [1]	Lumps [2]	Fines [3]	Concentrates [4]	Pellet-feed [5]	Others	Pellets [6]	Sinter [7]
Australia	2,949	44,958	70,605	85	1,300	-	1,533	-
Brazil	-	27,930	86,640	-	35,375	-	23,390	24,67
Chile	..	1,076	1,583	74	852	-	3,420	-
Canada	-	-	-	12,114	-	-	19,066	1,112
France	3,548	-	-	-	-	-	-	-
Mauritania	1,797	1,899	3,483	2,386	-	-	-	-
Morocco	120	40	-	8	-	-	-	-
Norway	-	-	-	2,182	-	-	-	-
Peru	-	-	115	1,501	839	-	2,667	-
Romania	-	-	-	344	-	-	-	-
South Africa	29,365	-	-	-	-	-	-	-
Spain	-	-	-	2,080	-	-	-	-
Sweden	-	547	7,744	86	-	-	10,350	-
Turkey	-	688	2,860	518	1,121	-	1,004	4,462
United Kingdom	..	-	-	-	-	-	-	-
Venezuela	-	3,328	7,154	-	6,997	-	5,863	-
Zimbabwe	-	329	112	-	-	-	-	

1 Marketable unprepared iron ore with more than 20 per cent fines.

2 Marketable iron ore between 10 and 30mm with usually less than 20 per cent fines.

3 Marketable fine ore, usually below 10mm (or similar size).

4 Marketable product from a concentrate plant.

5 Fine ore or concentrate very fine, usually below 0.1mm.

6 Iron ore fines agglomerated into a rough ball shape typically 10mm.

7 Agglomerated fines or concentrates and other iron-bearing materials

4. PELLETS [1]: Production

(thousand tonnes)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
WORLD	**196474**	**211500**	**229944**	**236789**	**226266**	**213323**	**203420**	**207435**
DEVELOPED MARKET ECONOMY COUNTRIES	**82042**	**90817**	**103772**	**107520**	**99578**	**96319**	**95672**	**96587**
AMERICA	**61656**	**70031**	**82248**	**84398**	**77331**	**75117**	**74585**	**74166**
Canada	23861#	24120#	26291#	27113#	22515#	20462	19625#	19066#
United States	37795#	45911#	55957#	57285#	54816#	54655#	54960#	55100#
EUROPE	**14542**	**14852**	**15015**	**16494**	**15869**	**15009**	**14800**	**17010**
European Union	*4000*	*4200*	*4506*	*4588*	*4507*	*4013*	*2971*	*5160*
Belgium-Luxembourg	500	500	710#	588#	663#	473#	292#	300E
Italy	-	-	-	-	-	-	507#	550E
Netherlands	3500	3700	3796#	4000#	3844#	3540#	2172#	4310#
EFTA	*10542*	*10652*	*10509*	*11906*	*11362*	*10996*	*11829*	*11850*
Finland	-	-	-	480#	-	-	-	-
Norway	1700	1500	1400#	1400	1397	1211	1513	1500#
Sweden	8842#	9152	9109#	10026#	9965#	9785#	10316#	10350#
ASIA	**2506**	**2625**	**3109**	**3128**	**3378**	**3393**	**3487**	**3811**
Japan	2506	2625	3109#	3128#	3378#	3393#	3487#	3811#
OCEANIA	**3338**	**3309**	**3400**	**3500**	**3000**	**2800**	**2800**	**1600**
Australia	3338#	3309#	3400E	3500E	3000E	2800#	2800#	1600#
DEVELOPING COUNTRIES AND TERRITORIES	**44082**	**47333**	**52137#**	**52519**	**49888**	**46804**	**44925**	**48548**
AFRICA	**2700**	**3060**	**3390#**	**3178#**	**1675E**	**170E**	**160E**	**160E**
Liberia	2700	3060#	3215#	3000	1500	-	-	-
Nigeria	..	..	175#	178#	175E	170E	160E	160E
AMERICA	**40103**	**42766**	**45273**	**45656**	**44162**	**43289**	**41241**	**43339**
Argentina	646	465	597	658#	612	101	10E	-
Brazil	24268	24852	26084#	26990#	24684#	24389#	22501#	23389#
Chile	3317	3694#	4073#	3924#	4015#	4154#	3921	3420#
Mexico	6663#	7400#	7937#	7582#	8298#	7634	8047#	8000e
Peru	1916	2011	1774#	1848	1304#	1360#	1460	2667#
Venezuela	3293#	4344#	4808#	4654	5249	5651	5302	5863#
ASIA	**1203**	**1451**	**3449**	**3624**	**4001**	**3315**	**3514**	**5049**
Bahrain	500	-	1000E	951	1049	396	1005	1864#
India	200	587#	1467#	1887	1920	1919	1546	2181
Turkey	503#	864#	982#	786#	1032#	1000#	963#	1004#
EUROPE	**76**	**56**	**25**	**61**	**50**	**30E**	**10E**	-
Yugoslavia	76	56	25#	61#	50E	30E	10E	-
COUNTRIES IN EASTERN EUROPE	**66730**	**69030**	**68235**	**68950**	**68300**	**59800**	**51323**	**50300**
Czechoslovakia (fo	230	230E	262#	250E	300	300	323#	300E
USSR (former)	66500	68800	67973#	68700#	68000#	59500	51000E	50000E
of which								
Ukraine	..	..	..	..	22000	22144#	..	..
SOCIALIST COUNTRIES OF ASIA	**3620**	**4320**	**5800**	**7800**	**8500**	**10400**	**11500**	**12000**
China	3620	4320	5800	7800	8500	10400	11500	12000E

1 Pellets: iron ore fines agglomerated into a rough ball shape typically 10mm diameter.

5. SINTER [1]: Production

(thousand tonnes)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
WORLD	**544996**	**538263**	**563613**	**563461**	**547318**	**515146**	**505306**	**486504**
DEVELOPED MARKET ECONOMY COUNTRIES	**218590**	**208920**	**228822**	**232647**	**226714**	**224396**	**207815**	**210236**
AMERICA	**15361**	**15854**	**16893**	**15570**	**14139**	**11727**	**12433**	**13567**
Canada	2114#	1392#	1396#	1906#	1900	1160	985#	1112
United States[2]	13247	14462	15497	13664#	12239#	10567#	11448#	12455
EUROPE	**109947**	**101346**	**110955**	**112787**	**110066**	**110426**	**100371**	**102036**
European Union	*100207*	*92012*	*101790*	*103131*	*101363*	*101416*	*92769*	*94399*
Belgium-Luxembourg	15513	15301	16556#	16116#	16306#	16436#	14827#	14430#
France	20873	15302	21477#	21378#	20517#	19499#	18526#	17470#
Germany	29311	26140	27833#	29753#	27230#	29064#	26582#	25418#
Italy	13478	13008	13071#	12311#	13114#	12113#	9183#	12834#
Netherlands	3706	3682	3901#	3668#	3945#	3797#	3795#	4032#
Portugal	492	429	452#	395#	344#	275#	428#	411#
Spain	6919	6600	5433#	6228#	6177#	6536#	5994#	6202#
United Kingdom	9915	11550	13067#	13282#	13730#	13696#	13434#	13602#
EFTA	*9740*	*9334*	*9165*	*9656*	*8703*	*9010*	*7602*	*7637*
Austria	5259#	4814	4431	4775#	4380#	4412#	3026#	2986#
Finland	2761#	2837	2970#	3060#	2800E	3040#	3170#	3300E
Norway	620	633	673#	680	400E	400E	300E	250E
Sweden	1100	1050E	1091#	1141#	1123#	1158#	1106#	1101#
ASIA	**87509**	**86447**	**94933#**	**98190#**	**96509**	**96143**	**88811**	**88232**
Japan	87509	86447	94933#	98190#	96509#	96143#	88811#	88232#
OCEANIA	**5773**	**5273**	**6041**	**6100**	**6000**	**6100**	**6200**	**6401**
Australia	5773	5273	6041	6100	6000	6100E	6200E	6401#
DEVELOPING COUNTRIES AND TERRITORIES	**45593**	**47985**	**54043**	**53372**	**51206**	**54662**	**54815**	**53895**
AFRICA	**2845**	**2680**	**4621**	**4639**	**4753**	**4236**	**3894**	**4126**
Algeria	2670#	2500	2600E	2600E	2500E	2000E	1910#	1900E
Egypt	-	-	1862#	1900E	2089#	2086#	1853#	2113#
Zimbabwe	175#	180E	159#	139#	164#	150#	131#	113#
AMERICA	**24019**	**24253**	**27095**	**26893**	**23565**	**25947**	**26878**	**26671**
Argentina	881	904	811	928#	838	743	592	600E
Brazil	21471	21871#	24952#	24703#	21395	23903#	24985#	24671
Colombia	390	405	396	379	414#	401#	385	400E
Mexico	1277	1073	936#	883#	918#	900E	916#	1000E
ASIA	**14824**	**17296**	**18550**	**18060**	**19588**	**21979**	**22843**	**22598**
India	8134	9021#	9686#	10189	10000E	12991	13500E	14000E
Turkey	2916#	3968#	4257#	3192#	4508#	4238#	4427#	4462#
Other Asia	3774	4307	4607	4679	5080	4750	4916#	4136
EUROPE	**3905#**	**3756#**	**3777#**	**3780**	**3300**	**2500**	**1200**	**500**
Yugoslavia	3905#	3756#	3777#	3780#	3300E	2500E	1200E	500E
COUNTRIES IN EASTERN EUROPE	**207893**	**201948**	**199248**	**194942**	**182398**	**147588**	**133776**	**112373**
Bulgaria	3000	2717	2287	2365	1650	1673	1535	1800
Czechoslovakia (to	14150	13000	12464	13076	12950	11700	10035	10000E
Germany (former (German Dem. Rep.)	3296	3207	3346	3199#	2500E	-	-	-
Hungary	3342	3023	2875	2900#	1773	1427	1490	1500E
Poland	15618#	15401	14054#	12993	11779	8613	8621	9000E
Romania	14021	14000E	13880#	13002#	8846	5575	5095	5073#
USSR (former)	154466	150600	150342#	147407#	142900#	118600	107000E	85000E
of which								
Ukraine	..	..	..	..	64094#	54088#	..	..
SOCIALIST COUNTRIES OF ASIA	**72920**	**79410**	**81500**	**82500**	**87000**	**88500**	**108900**	**110000**
China	72920	79410	81500	82500	87000	88500	108900	110000

1 Sinter: agglomeration of natural ore fines, ore concentrates, flue dust and other iron-bearing materials.

2 For 1993, Sinter consumption.

4. PELLETS [1]: Production

(thousand tonnes)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
WORLD	**196474**	**211500**	**229944**	**236789**	**226268**	**213323**	**203420**	**207435**
DEVELOPED MARKET ECONOMY COUNTRIES	**82042**	**90817**	**103772**	**107520**	**99578**	**96319**	**95672**	**98587**
AMERICA	**61656**	**70031**	**82248**	**84398**	**77331**	**75117**	**74585**	**74166**
Canada	23861#	24120#	26291#	27113#	22515#	20462	19625#	19066#
United States	37795#	45911#	55957#	57285#	54816#	54655#	54960#	55100#
EUROPE	**14542**	**14852**	**15015**	**16494**	**15869**	**15009**	**14800**	**17010**
European Union	*4000*	*4200*	*4506*	*4588*	*4507*	*4013*	*2971*	*5160*
Belgium-Luxembourg	500	500	710#	588#	663#	473#	292#	300E
Italy	-	-	-	-	-	-	507#	550E
Netherlands	3500	3700	3796#	4000#	3844#	3540#	2172#	4310#
EFTA	*10542*	*10652*	*10509*	*11906*	*11362*	*10996*	*11829*	*11850*
Finland	-	-	-	480#	-	-	-	-
Norway	1700	1500	1400#	1400	1397	1211	1513	1500#
Sweden	8842#	9152	9109#	10026#	9965#	9785#	10316#	10350#
ASIA	**2506**	**2625**	**3109**	**3128**	**3378**	**3393**	**3487**	**3811**
Japan	2506	2625	3109#	3128#	3378#	3393#	3487#	3811#
OCEANIA	**3338**	**3309**	**3400**	**3500**	**3000**	**2800**	**2800**	**1600**
Australia	3338#	3309#	3400E	3500E	3000E	2800#	2800#	1600#
DEVELOPING COUNTRIES AND TERRITORIES	**44082**	**47333**	**52137#**	**52519**	**49888**	**46804**	**44925**	**48548**
AFRICA	**2700**	**3060**	**3390#**	**3178#**	**1675E**	**170E**	**160E**	**160E**
Liberia	2700	3060#	3215#	3000	1500	-	-	-
Nigeria	..	..	175#	178#	175E	170E	160E	160E
AMERICA	**40103**	**42766**	**45273**	**45656**	**44162**	**43289**	**41241**	**43339**
Argentina	646	465	597	658#	612	101	10E	-
Brazil	24268	24852	26084#	26990#	24684#	24389#	22501#	23389#
Chile	3317	3694#	4073#	3924#	4015#	4154#	3921	3420#
Mexico	6663#	7400#	7937#	7582#	8298#	7634	8047#	8000e
Peru	1916	2011	1774#	1848	1304#	1360#	1460	2667#
Venezuela	3293#	4344#	4808#	4654	5249	5651	5302	5863#
ASIA	**1203**	**1451**	**3449**	**3624**	**4001**	**3315**	**3514**	**5049**
Bahrain	500	-	1000E	951	1049	396	1005	1864#
India	200	587#	1467#	1887	1920	1919	1546	2181
Turkey	503#	864#	982#	786#	1032#	1000#	963#	1004#
EUROPE	**76**	**56**	**25**	**61**	**50**	**30E**	**10E**	-
Yugoslavia	76	56	25#	61#	50E	30E	10E	-
COUNTRIES IN EASTERN EUROPE	**66730**	**69030**	**68235**	**68950**	**68300**	**59800**	**51323**	**50300**
Czechoslovakia (fo	230	230E	262#	250E	300	300	323#	300E
USSR (former)	66500	68800	67973#	68700#	68000#	59500	51000E	50000E
of which								
Ukraine	..	..	..	..	22000	22144#	..	..
SOCIALIST COUNTRIES OF ASIA	**3620**	**4320**	**5800**	**7800**	**8500**	**10400**	**11500**	**12000**
China	3620	4320	5800	7800	8500	10400	11500	12000E

1 Pellets: iron ore fines agglomerated into a rough ball shape typically 10mm diameter.

7. IRON ORE: Exports[1]

(thousand tonnes, Fe content)

Region country or area	% Fe	1986	1987	1988	1989	1990	1991	1992	1993
WORLD		**228932**	**230052**	**254408**	**266364**	**247969**	**251231**	**233335**	**252496**
DEVELOPED MARKET ECONOMY COUNTRIES		**93383**	**92981**	**105965**	**113333**	**105199**	**114643**	**106745**	**119155**
AMERICA		**22450**	**21957**	**22952**	**22799**	**19105**	**21325**	**19102**	**19744**
Canada	63.3	19527	18687	19596#	19403#	17101	18769	15908	16547
United States	63.2	2923#	3270#	3356#	3396#	2004#	2556	3194	3197
EUROPE		**14089**	**13914**	**14917**	**14508**	**13889**	**13496**	**13469**	**13761**
European Union		*2291*	*2297*	*2520*	*2030*	*1837*	*2038*	*1802*	*1308*
Belgium-Luxembourg	31.5	-	1	2	3	5	4	6	5
Denmark	-	2	1	1	-	-	-	-	-
France	31.5	1292	1159	1154	1073	1033	993	905	881
Germany	15.0	1	1	4	1	1	12	11	15
Netherlands	57.0	28	60	127	72	47	37	16	13
Spain	46.0	968	1075	1232	881	751	992	864	394
EFTA		*11798*	*11617*	*12397*	*12478*	*12052*	*11458*	*11667*	*12453*
Norway	65.0	1294	1392	967	1093	1373	1364	1483	1628
Sweden	65.8	10504	10225	11430	11385	10679#	10094#	10184#	10825#
SOUTH AFRICA	**65.0**	**5607**	**5544**	**7247**	**9176**	**11069**	**10035**	**9664**	**12710**
OCEANIA		**51237**	**51566**	**60849**	**66850**	**61136**	**69787**	**64510**	**72940**
Australia	62.0	50027#	50583	60115	66148	60578	69104	63742	72199
New Zealand	57.0	1210	983	734	702	558	683	768	741
DEVELOPING COUNTRIES AND TERRITORIES		**110667**	**112992**	**122605**	**129103**	**120997**	**120155**	**108033**	**115761**
AFRICA		**15527**	**14909**	**15782**	**15842**	**10035**	**7524**	**6169**	**6334**
Algeria	50.0	23	6	-	10#	9#	10	20	25
Liberia	67.0	9700	9052	9231	8540	2607	670	853	536
Mauritania	65.0	5804	5851	6503	7240	7381	6804	5261	6276
Morocco	60.0	-	-	48	52	38	40	35#	33
AMERICA		**72100**	**76846**	**83564**	**89174**	**87438**	**89426**	**81218#**	**87783#**
Bolivia	65.0	..	..	9	15	135	61	30	25
Brazil	65.0	59987	63237	68447	72547	72292#	74542	68923	73828
Chile	66.0	3179#	3553	4254	4935	4320#	4740#	3777	4135
Mexico	65.8	-	-	-	-	-	-	59	65
Peru	65.9	2817#	2920	3010	2589	2179#	1717#	1960	3103
Venezuela	63.4	6117#	7136	7844#	9088#	8512#	8366	6469#	6627#
ASIA		**23040**	**21237**	**23259**	**24087**	**23279**	**23067**	**20554**	**21644**
India	63.4	20624	18548	20210	21092	20028	19995	18045	19020
Philippines	64.0	2416	2689	3049	2995	3251	3072	2509	2624
EUROPE		-	-	-	-	**245**	**138**	**92**	-
Yugoslavia (former)	-	-	-	-	-	245#	138	92	-
COUNTRIES IN EASTERN EUROPE		**24882**	**24079**	**25838**	**23928**	**21793**	**16433**	**16207**	**17580**
USSR (former)	60.0	24882	24079	25838#	23928#	21793#	16433	16207	17580
of which									
Kazakhstan	61.5	..	..	..	..	..	..	..	4060
Russian Fed.	60.0	..	..	..	..	6969	5902	5936	6693

1 Exports: Quantities of iron ore units exported during the calendar year

2 European Union Total: excluding the European Union's internal trade.

8. IRON ORE: Network of exports by major region of destination, 1993

(million tonnes, natural weight)

Exports to / Exports from	World	Developed market economy countries					Developing countries	Eastern Europe	Socialist Asia [1]
		Total	United States	Japan	European Union	Others			
WORLD	**398.5**	**266.5**	**14.6**	**115.7**	**121.8**	**14.4**	**68.4**	**29.1**	**34.5**
DEVELOPED MARKET ECONOMY COUNTRIES	**191.2**	**133.2**	**7.8**	**59.7**	**55.9**	**9.8**	**32.1**	**3.0**	**22.9**
Australia	116.5	71.7	0.4	53.0	17.6	0.7	26.4	0.7	17.7
Canada	26.1	24.3	7.3	1.2	15.4	0.4	1.7	0.0	0.1
European Union	3.8	3.7	-	-	3.7	-	-	0.1	-
Sweden	16.4	13.7	0.1	0.0	11.7	1.9	2.7	0.0	0.0
South Africa	19.6	10.9	0.0	4.3	5.1	1.6	1.3	2.2	5.1
Others	8.8	8.8	-	1.2	2.4	5.2	0.0	-	-
DEVELOPING COUNTRIES AND TERRITORIES	**178.0**	**129.4**	**6.8**	**56.0**	**65.7**	**0.9**	**36.1**	**1.1**	**11.4**
Brazil	111.9	78.9	3.2	28.3	46.8	0.6	26.9	0.8	5.3
Chile	6.3	4.9	0.1	3.7	1.1	-	1.3	-	0.1
India	30.0	21.4	-	17.7	3.4	0.3	5.2	-	3.4
Mauritania	9.6	9.6	0.2	0.1	9.3	-	-	-	-
Peru	4.5	0.6	-	0.6	-	-	2.2	-	1.8
Venezuela	10.4	9.1	3.2	1.6	4.3	-	0.4	0.3	0.6
Others	5.2	4.8	-	4.0	0.8	-	0.1	-	0.3
COUNTRIES IN EASTERN EUROPE									
USSR (former)	29.3	3.9	-	-	0.2	3.7	0.2	25.0	0.2

Note: On the basis of information available to the secretariat as of 8 July 94.

[1] Socialist Asia: mainly to China (98%).

9. PELLETS: Exports

(thousand tonnes)

Country or area	1986	1987	1988	1989	1990	1991	1992	1993
Australia	1,706	2,111	2,011	1,624	1,668	692	600E	415
Brazil	22,254	19,962	23,765	23,335	20,040	23,975	21,259	23,045
Bahrain	-	-	-	839	903	479	875	2,137
Canada	17,488	13,078	17,569	17,325	12,751	14,374	13,298	12,860
Chile	3,013	3,284	3,549	3,587	3,423	3,809	2,752	3,563
India[1]	154	825	1,640	1,923	1,717	1,300	1,546	2,181
Liberia	3,188	3,227	3,201	3,320	1,455	0	0	0
Norway	..	..	1,060	1,052	1,247	1,337	773	1,135
Peru	1,499	1,752	1,515	1,503	1,153	844	1,147	2,339
Sweden	6,259	6,143	6,535	6,494	6,499	6,361	6,702	7,466
United States	4,551	5,049	5,232	2,874	3,018	4,016	4,653	5,030
USSR	10,927	10,866	10,892	11,507	12,316	10,043	9,772	11,169
Venezuela	22	434	849	1,159	1,184	922	1,123	1,242
TOTAL	**71,061**	**66,731**	**75,703**	**75,768**	**73,393**	**68,181**	**64,728**	**72,582**

[1] Fiscal year (April to March) until 1999.

10. IRON ORE: Imports

(thousand tonnes, natural weight)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993	% change 93/92
WORLD	**367183**	**370093**	**396437**	**408313**	**397943**	**388553**	**374305**	**384318**	**2.1**
DEVELOPED MARKET ECONOMY COUNTRIES	**262928**	**261008**	**288040**	**292696**	**286831**	**283838**	**263322**	**256091**	**-2.7**
AMERICA	**22384**	**22080**	**24917**	**15954**	**22166**	**17955**	**17781**	**19397**	**9.1**
Canada	5367	5213	4791#	5348#	4113#	4620#	5280#	5436#	3.0
United States	17017	16867	20126	10606	18053	13335	12501#	13961#	11.7
EUROPE	**125251**	**126852**	**139277**	**147161**	**137575**	**135751**	**130298**	**121210**	**-7.0**
European Union[1]	*115543#*	*118507#*	*126564#*	*136079#*	*124286#*	*126675#*	*118222#*	*111311#*	*-5.8*
Belgium-Luxembourg	18056	18385	20795#	19787#	20278#	19486#	17995#	12724	-29.3
Denmark	3	8	3#	6#	3#	2#	2#	8#	300
France[2]	16191	15056	18727#	19955#	18807#	18206#	17232#	16585#	-3.8
Germany[3]	41632	39583	45169#	47170#	43730#	43288	41317#	35264	-14.7
Greece	2	-	-	-	-	-	-	-	-
Italy	17601	16523	16200#	18201#	17203#	17855#	15064#	16741#	11.1
Netherlands	7066	7049	7562	8153	8303	7892	7523	8555	13.7
Portugal	543#	764	477#	689#	449#	466#	565#	589#	4.2
Spain	4286	5767	5556#	6935#	6705#	7596#	7098#	6664#	-6.1
United Kingdom	14558	18028	17867#	19179#	14700#	13540#	15799#	15925#	0.8
EFTA	*5312*	*5689*	*6921*	*7086*	*7397*	*7420*	*7703*	*8155*	*5.9*
Austria	3204#	3311	4164	4192#	3892#	3968#	3915	3591#	-8.3
Finland	1987#	2261	2400#	2600#	3158	3070#	3308#	3361	1.6
Iceland	25	17	23	17	18	17	17	22	29.4
Norway	18	21	193#	23#	12#	27#	108	603#	458
Sweden	67#	70#	129	254#	317#	338#	355#	578#	62.8
Switzerland	11	9	12	-	-	-	-	-	-
ASIA	**115234**	**112034**	**123377**	**127709**	**125290**	**127186**	**113743**	**114484**	**0.7**
Japan	115234	112034	123377#	127709#	125290#	127186#	113743#	114484#	0.7
OCEANIA	**59#**	**42#**	**469#**	**1872#**	**1800**	**2946**	**1500**	**1000**	**-33.3**
Australia	59#	42#	469#	1872#	1800	2946#	1500E	1000E	-33.3
DEVELOPING COUNTRIES AND TERRITORIES	**34395**	**38473**	**42574**	**52142**	**50509**	**55997**	**60110**	**66441**	**10.5**
AFRICA	**71**	**63**	**198**	**858**	**367**	**228**	**1532**	**1490**	**-0.8**
Egypt	-	-	-	-	-	-	1294#	1300E	0.8
Nigeria	-	-	152#	770E	300E	150E	150E	100E	-33.3
Tunisia	71	63	46	88	67	78	88	90E	2.3
AMERICA	**3283**	**3387**	**3590**	**4476**	**4499**	**3360**	**4545**	**4464**	**-1.8**
Argentina	3183	3342	3131#	3816#	3148#	2310#	3574#	3205	-10.3
Mexico	100#	45	459#	660#	363#	150E	21#	40E	90.5
Trinidad and Tobago	..	..	..	..	988#	900E	950E	1219	28.3
ASIA	**29694**	**33942**	**37300**	**44503**	**43645**	**50609**	**52863**	**59987**	**13.5**
Indonesia	1400E	1400E	1400E	2000#	2000E	2000E	2100E	2310	10.0
Malaysia	1026	819	452#	912#	1233	1160	1613#	1700E	5.4
Pakistan	1469	1105	1528	1393	1162	1605	1398	1982	41.7
Philippines	3700E	4000E	4400E	4200E	4600#	4265	4300E	4300E	-
Qatar	800E	700E	800E	792	863	1000E	1000E	1000E	-
Republic of Korea	11941	16607	16479	22790#	22500#	28440#	31779	35533	11.8
Saudi Arabia	1385	1478	1245	1652	1468	1093	1450E	2200E	51.7
Taiwan Province of	5358	6140	8477	8370	7760	8433	7251	9019	24.4
Turkey	2428#	1532#	2369#	2243#	1952#	2509#	1844#	1824#	-1.1
United Arab Emirates	180	160	140E	150E	100E	100E	120E	110E	-8.3
Other Asia	7	1	10E	1	7	4	8	9	12.5
EUROPE	**1347**	**1081**	**1486**	**2305**	**1998**	**1800**	**1200**	**500**	**-58.3**
Yugoslavia (former)	1347	1081	1486#	2305#	1998#	1800E	1200E	500E	-58.3

1 European Union Total: excluding the European Union's internal trade.

2 For 1993, data subject to revision.

3 From 1991, unified territory of Germany.

8. IRON ORE: Network of exports by major region of destination, 1993

(million tonnes, natural weight)

Exports to / Exports from	World	Developed market economy countries					Developing countries	Eastern Europe	Socialist Asia [1]
		Total	United States	Japan	European Union	Others			
WORLD	**398.5**	**266.5**	**14.6**	**115.7**	**121.8**	**14.4**	**68.4**	**29.1**	**34.5**
DEVELOPED MARKET ECONOMY COUNTRIES	**191.2**	**133.2**	**7.8**	**59.7**	**55.9**	**9.8**	**32.1**	**3.0**	**22.9**
Australia	116.5	71.7	0.4	53.0	17.6	0.7	26.4	0.7	17.7
Canada	26.1	24.3	7.3	1.2	15.4	0.4	1.7	0.0	0.1
European Union	3.8	3.7	-	-	3.7	-	-	0.1	-
Sweden	16.4	13.7	0.1	0.0	11.7	1.9	2.7	0.0	0.0
South Africa	19.6	10.9	0.0	4.3	5.1	1.6	1.3	2.2	5.1
Others	8.8	8.8	-	1.2	2.4	5.2	0.0	-	-
DEVELOPING COUNTRIES AND TERRITORIES	**178.0**	**129.4**	**6.8**	**56.0**	**65.7**	**0.9**	**36.1**	**1.1**	**11.4**
Brazil	111.9	78.9	3.2	28.3	46.8	0.6	26.9	0.8	5.3
Chile	6.3	4.9	0.1	3.7	1.1	-	1.3	-	0.1
India	30.0	21.4	-	17.7	3.4	0.3	5.2	-	3.4
Mauritania	9.6	9.6	0.2	0.1	9.3	-	-	-	-
Peru	4.6	0.6	-	0.6	-	-	2.2	-	1.8
Venezuela	10.4	9.1	3.2	1.6	4.3	-	0.4	0.3	0.6
Others	5.2	4.8	-	4.0	0.8	-	0.1	-	0.3
COUNTRIES IN EASTERN EUROPE									
USSR (former)	29.3	3.9	-	-	0.2	3.7	0.2	25.0	0.2

Note: On the basis of information available to the secretariat as of 8 July 94.

[1] Socialist Asia: mainly to China (98%).

9. PELLETS: Exports

(thousand tonnes)

Country or area	1986	1987	1988	1989	1990	1991	1992	1993
Australia	1,706	2,111	2,011	1,624	1,668	692	600E	415
Brazil	22,254	19,962	23,765	23,335	20,040	23,975	21,259	23,045
Bahrain	-	-	-	839	903	479	875	2,137
Canada	17,488	13,078	17,569	17,325	12,751	14,374	13,298	12,860
Chile	3,013	3,284	3,549	3,587	3,423	3,809	2,752	3,563
India[1]	154	825	1,640	1,923	1,717	1,300	1,546	2,181
Liberia	3,188	3,227	3,201	3,320	1,455	0	0	0
Norway	..	..	1,060	1,052	1,247	1,337	773	1,135
Peru	1,499	1,752	1,515	1,503	1,153	844	1,147	2,339
Sweden	6,259	6,143	6,535	6,494	6,499	6,361	6,702	7,466
United States	4,551	5,049	5,232	2,874	3,018	4,016	4,653	5,030
USSR	10,927	10,866	10,892	11,507	12,316	10,043	9,772	11,169
Venezuela	22	434	849	1,159	1,184	922	1,123	1,242
TOTAL	**71,061**	**66,731**	**75,703**	**75,768**	**73,393**	**68,181**	**64,728**	**72,582**

[1] Fiscal year (April to March) until 1989.

11. European Union: Iron ore imports by origin/destination, 1993

(thousand tonnes, natural weight)

Origin \ Destination	Germany	France	Italy	Netherlnds	Belgium Luxembrg	United Kingdom	Denmark	Spain	Portugal	European Union
Non agglomerated ores[1]										
Total	*23,072*	*16,359*	*13,767*	*8,552*	*11,431*	*14,562*	*8*	*4,481*	*487*	*91,016 a*
of which:										
EU	46	462	4	731	-	489	-	0.8	-	-
Australia	3,234	3,146	1,781	978	917	5,665	-	810	-	16,531
Brazil	12,606	6,420	4,291	2,869	5,988	1,858	-	1,939	-	35,971
Canada	3,009	1,568	199	535	566	2,404	-	327	240	8,848
Liberia	36	110	-	73	-	-	-	-	-	210
Mauritania	250	2,569	2,442	37	1,024	947	-	731	124	8,124
Norway	531	582	-	-	407	121	-	-	-	3,797
South Africa	331	435	1,649		28	1,925	-	-	-	4,368
Sweden	2,583	527	-	2,156	1,527	143	8	-	-	4,888
Venezuela	73	394	1,054	581	704	939	-	637	57	4,439
India	-	176	2,257	444	164	-	-	36	66	3,143
Others	274	99	148	106	71	-	-	-	688	
Agglomerated ores[2]										
Total	*12,191*	*225*	*2,974*	-	*1,290*	*1,361*	-	*2,183*	*102*	*20,295 a*
of which:										
EU	-	10	-	-	-	-	-	-	22	-
Australia	-	-	-	-	-	79	-	-	-	79
Brazil	4,789	-	2,126	-	-	178	-	1,685	-	8,778
Canada	2,410	165	693	-	535	305	-	498	80	4,686
Norway	343	-	-	-	-	798	-	-	-	1,742
South Africa	-	2	155	-	0	-	-	-	-	157
Sweden	3,300	48	-	-	698	-	0	-	-	4,047
Venezuela	-	-	-	-	-	-	-	-	-	-
Others	749	-	-	-	57	-	-	-	-	806
Total	**35,264**	**16,585**	**16,741**	**8,555**	**12,721**	**15,923**	**8**	**6,664**	**589**	**111,311 a**

Notes: Greece and Ireland are not concerned.

1 Non-agglomerated ores: fines; lumps; pellet-feed and concentrates.

2 Agglomerated ores: pellets or sinter.

a Excluding European Union's internal trade.

12. CHINA: Iron ore imports by origin, 1988-1993

(thousand tonnes, natural weight)

Origin	1988	1989	1990	1991	1992	1993 (E)
Australia	6,622	8,854	10,168	12,073	13,757	17,500
Brazil	2,550	2,515	2,478	3,137	4,709	5,200
India	184	168	470	958	2,467	3,200
Korea DPR	1,088	519	599	790	724	700
Russian Fed.	-	-	-	23	181	200
South Africa	-	-	-	1,000	1,500	5,000
Venezuela	-	-	-	-	238	500
Others	97	396	628	477	1,203	1,170
Total	**10,541**	**12,452**	**14,343**	**18,458**	**25,171**	**33,020**

13. JAPAN: Iron ore imports by origin, 1993

(thousand tonnes, dry weight)

Origin	Non-agglomerated[1]	Agglomerated[2]	Total
Australia	53,126	347	53,473
Brazil	24,407	3,415	27,822
Canada	1,159	-	1,159
Chile	1,910	1,647	3,557
India	16,617	-	16,617
New Zealand[3]	1,232	-	1,232
Philippines[4]	-	4,131	4,131
Peru	572	2	574
South Africa	4,136	-	4,136
Others	1,783	-	1,783
Total	**104,942**	**9,542**	**114,484**

1 Non-agglomerated ores: fines; lumps; pellet-feed and concentrates.

2 Agglomerated ores: pellets or sinter.

3 Iron ore sands.

4 Sinter produced from fines imported via Japan.

14. REPUBLIC OF KOREA: Iron ore imports by origin, 1993

(thousand tonnes, natural weight)

Origin	Non-agglomerated[1]	Agglomerated[2]	Total
Austria	196	-	196
Australia	17,270	94	17,364
Brazil	9,431	-	9,431
Canada	917	-	917
Chile	537	166	703
India	4,799	-	4,799
Peru	1,173	371	1,544
South Africa	467	0	467
Liberia	112	-	112
Total	**34,903**	**630**	**35,533**

1 Non-agglomerated ores: fines; lumps; pellet-feed and concentrates.

2 Agglomerated ores: pellets or sinter.

15. IRON ORE: Value of Exports[1]

(million dollars)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
WORLD	**6909.2**	**6842.8**	**7397.6**	**8167.5**	**8595.9**	**8719.7**	**7901.8**	**7578.9**
DEVELOPED MARKET ECONOMY COUNTRIES	**2860.0**	**2698.7**	**3034.7**	**3369.9**	**3680.8**	**3933.8**	**3731.9**	**3552.9#**
AMERICA	**1001.9**	**928.9**	**1010.7**	**992.0**	**842.6**	**934.1**	**852.2**	**788.7#**
Canada	797.1	730.6	816.9#	799.3#	719.4#	777.7#	665.4	621.9#
United States	204.8	198.3	193.8	192.7	123.2#	156.4#	186.8#	166.8#
EUROPE	**404.0**	**441.1**	**474.8**	**536.0**	**568.7**	**520.2**	**585.4**	**532.9**
European Union[2]	*0.9#*	*1.0#*	*1.1#*	*2.2#*	*5.7#*	*3.7#*	*5.3#*	*2.2#*
Belgium-Luxembourg	0.1	0.2	0.7#	0.8#	1.4#	0.9#	1.2	1.1E
Denmark	0.1	0.1	-	-	-	-	-	-
France	26.2	28.7	29.6#	27.1#	31.1	29.6#	28.7#	26.7
Germany	0.5	0.7	1.1#	0.8#	0.6#	2.3#	2.5	1.9
Greece	-	-	-	24.0#	-	-	-	-
Italy	0.1	-	-	0.2#	0.1#	0.1#	0.1#	0.1#
Netherlands	1.2	5.3	7.7#	6.1	5.3	4.8#	3.0#	2.5E
Spain	16.3	17.5	19.5#	15.3#	17.7#	27.9#	23.7#	10.3
United Kingdom	0.2	0.2	0.3#	0.2#	0.5#	0.4#	0.5#	0.6
EFTA	*359.3*	*388.4*	*415.9*	*461.5*	*512.0*	*454.2*	*525.7*	*489.7*
Austria	0.3	-	-	-	-	-	-	-
Norway	55.3	53.4	42.5#	50.0#	61.5#	63.7#	66.3	67.7#
Sweden	303.7#	335.0	373.4	411.5#	450.5#	390.5	459.4#	422.0#
SOUTH AFRICA	**132.1**	**131.8**	**146.1#**	**209.2#**	**299.0#**	**285.2#**	**219.0#**	**275.0E**
OCEANIA	**1322.0**	**1196.9**	**1403.1**	**1632.7**	**1970.5**	**2194.3**	**2075.3**	**1956.3**
Australia	1300.9#	1181.6#	1390.8#	1620.0#	1960.0#	2183.0#	2060.0	1942.4#
New Zealand	21.1	15.3	12.3#	12.7#	10.5#	11.3#	15.3#	13.9
DEVELOPING COUNTRIES AND TERRITORIES	**2927.2**	**2928.7**	**3219.6**	**3750.0**	**3928.9**	**4040.9**	**3439.9**	**3326.0**
AFRICA	**384.6**	**352.1**	**365.0**	**473.2**	**315.1**	**219.5**	**196.8**	**195.7**
Algeria	0.5	0.2E	-	0.3#	0.3E	0.2E	0.7#	0.2
Liberia	241.0	217.9	220.0E	286.0E	93.0E	24.0E	29.0E	-
Mauritania	143.0#	134.0#	143.5#	185.1#	220.2#	192.0E	164.1#	193.0E
Morocco	-	-	1.3#	1.6	1.4	3.3	3.0	2.5E
Tunisia	0.1	-	0.2#	0.2E	0.2E	-	-	-
AMERICA	**2017.6**	**2052.0**	**2286.1**	**2632.2**	**2954.7**	**3157.1**	**2736.6**	**2624.7**
Bolivia	..	..	0.2	0.3	3.0E	0.1	0.6	0.6
Brazil	1624.0	1615.4#	1900.4#	2176.0#	2436.5#	2603.9#	2303.4#	2180.5
Chile	92.3#	95.7#	105.4	125.7	138.4	158.1	137.6	112.2
Peru	74.3#	70.9	61.0#	60.2E	51.8#	42.0E	45.0E	81.4
Venezuela	227.0E	270.0	219.1#	270.0E	325.0	353.0	250.0	250.0E
ASIA	**525.0**	**524.6**	**568.5**	**643.6**	**655.2**	**661.8**	**504.9**	**505.6**
India	435.0#	427.6	461.5	571.6	578.2	583.4	425.9	430.6
Other Asia	90.0E	97.0E	107.0E	72.0E	77.0E	78.4	79.0E	75.0
EUROPE	-	-	-	**1.0#**	**3.9#**	**2.5E**	**1.6E**	-
Yugoslavia (former)	-	-	-	1.0#	3.9#	2.5E	1.6E	-
COUNTRIES IN EASTERN EUROPE	**1122.0**	**1215.4**	**1143.3**	**1047.6**	**986.2**	**745.0**	**730.0**	**700.0**
USSR (former)	1122.0	1215.4	1143.3	1047.6	986.2#	745.0E	730.0E	700.0E

1 Value of exports: f.o.b. value of iron ore exported, converted to United States dollars using exchange rates indicated by governments, or converted on the basis of exchange rates supplied by I.M.F.

2 European Union Total: excluding the European Union's internal trade.

13. JAPAN: Iron ore imports by origin, 1993

(thousand tonnes, dry weight)

Origin	Non-agglomerated[1]	Agglomerated[2]	Total
Australia	53,126	347	53,473
Brazil	24,407	3,415	27,822
Canada	1,159	-	1,159
Chile	1,910	1,647	3,557
India	16,617	-	16,617
New Zealand[3]	1,232	-	1,232
Philippines[4]	-	4,131	4,131
Peru	572	2	574
South Africa	4,136	-	4,136
Others	1,783	-	1,783
Total	**104,942**	**9,542**	**114,484**

1 Non-agglomerated ores: fines; lumps; pellet-feed and concentrates.

2 Agglomerated ores: pellets or sinter.

3 Iron ore sands.

4 Sinter produced from fines imported via Japan.

14. REPUBLIC OF KOREA: Iron ore imports by origin, 1993

(thousand tonnes, natural weight)

Origin	Non-agglomerated[1]	Agglomerated[2]	Total
Austria	196	-	196
Australia	17,270	94	17,364
Brazil	9,431	-	9,431
Canada	917	-	917
Chile	537	166	703
India	4,799	-	4,799
Peru	1,173	371	1,544
South Africa	467	0	467
Liberia	112	-	112
Total	**34,903**	**630**	**35,533**

1 Non-agglomerated ores: fines; lumps; pellet-feed and concentrates.

2 Agglomerated ores: pellets or sinter.

16. IRON ORE: Value of Imports[1]

concluded

(million dollars)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993
COUNTRIES								
IN EASTERN EUROPE	**921.8**	**877.8**	**852.7**	**911.9**	**815.5**	**726.3**	**560.2**	**550.0**
Bulgaria	35.0E	51.7E	51.3E	50.5E	42.9#	15.0E	14.0E	12.0E
Czechoslovakia (former)	358.4	290.0	272.0E	280.0E	284.0E	273.0#	265.0E	252.0E
Germany (former (German Dem. Rep.)	66.0E	69.0E	62.0E	102.2#	75.0E	-	-	-
Hungary	46.6	51.2	47.0E	58.1#	51.5	53.5	45.0E	46.0E
Poland	167.8	163.9	157.4	236.0E	209.0E	196.3	188.2	170.0E
Romania	248.0E	252.0E	263.0E	185.1	153.1	188.5	48.0	70.0E
SOCIALIST COUNTRIES OF ASIA	**343.0**	**281.5**	**274.0**	**343.9**	**408.6**	**578.4**	**778.8**	**964.0**
China	335.4	269.5	260.0	329.9#	394.1	563.4	764.3	950.0E
Democratic People's Republic of Korea	7.6E	12.0E	14.0E	14.0E	14.5E	15.0E	14.5E	14.0E

1 Value of Imports: c.i.f. value of iron ore imported expressed in United States dollars converted using exchange rates indicated by governments or on the basis of rates supplied by I.M.F.

2 European Union Total: excluding the European Union's internal trade

17. IRON ORE: Apparent Consumption[1]

(thousand tonnes, natural weight)

Region country or area	1986	1987	1988	1989	1990	1991	1992	1993	% change 93/92
WORLD	**917390**	**932667**	**955123**	**974116**	**979549**	**941254**	**922883**	**918429**	**-0.5**
DEVELOPED MARKET ECONOMY COUNTRIES	**357631**	**365692**	**381032**	**389974**	**391279**	**380008**	**356216**	**334063**	**-6.2**
AMERICA	**62961**	**71489**	**87033**	**79381**	**83417**	**76848**	**76956**	**76151**	**-1.0**
Canada	11051	12071	14677	16268	13105	12043	14597	11588	-20.6
United States	51910	59418	72356	63113	70312	64805	62359	64563	3.5
EUROPE	**148423**	**144853**	**154128**	**163059**	**150176**	**147938**	**139292**	**126547**	**-9.1**
European Union	*134888*	*131912*	*140546*	*148891*	*137064*	*134441*	*126291*	*114986*	*-9.0*
Belgium-Luxembourg	18055	18382	20788	19776	20262	19473	17975	12709	-29.3
Denmark	-2	5	-1	4	-1	1	1	7	600
France	24582	22882	24874	25812	24247	22545	20051	17336	-13.5
Germany	42344	39824	45219	47265	43810	43325	41350	35264	-14.7
Greece	1302	-	-	-24	..	-	-	-	-
Italy	17601	16523	16200	18201	17203	17855	15064	16741	11.1
Netherlands	7017	6944	7339	8026	8221	7827	7495	8532	13.8
Portugal	593	794	502	709	469	466	565	589	4.2
Spain	8549	8268	7536	9913	8102	9354	7965	7887	-1.0
United Kingdom	14846	18290	18089	19209	14751	13595	15825	15921	0.6
EFTA	*13535*	*12941*	*13582*	*14168*	*13112*	*13497*	*13001*	*11561*	*-11.1*
Austria	6316	6360	6464	6602	6192	6088	5542	5018	-9.5
Finland	2630	2909	2957	2600	3158	3070	3308	3361	1.6
Iceland	25	17	23	17	18	17	17	22	29.4
Norway	1146	631	1080	394	-20	138	-21	280	-
Sweden	3407	3015	3046	4555	3764	4184	4155	2880	-30.7
Switzerland	11	9	12	-	-	-	-	-	
SOUTH AFRICA	**15633**	**13206**	**13744**	**16392**	**13262**	**13484**	**13358**	**9831**	**-26.4**
ASIA	**115525**	**112329**	**123655**	**127960**	**125498**	**127226**	**113743**	**114484**	**0.7**
Japan	115525	112329	123655	127960	125498	127226	113743	114484	0.7
OCEANIA	**15089**	**23815**	**2472**	**4182**	**18926**	**14512**	**12867**	**7050**	**-45.2**
Australia	14396	23196	1584	3182	17644	13488	12115	5979	-50.6
New Zealand	693	619	888	1000	1282	1024	752	1071	42.4
DEVELOPING COUNTRIES AND TERRITORIES	**131057**	**132934**	**134945**	**142747**	**145764**	**153184**	**160906**	**161736**	**0.5**
AFRICA	**9301**	**8365**	**6311**	**8210**	**7606**	**6866**	**8012**	**5966**	**-25.5**
Algeria	3312	3562	3400	2728	2912	2680	2522	2261	-10.3
Egypt	1999	2112	2400	2400	2420	2371	3242	3709	14.4
Liberia	1560	296	-971	-447	94	185	432	-800	-
Mauritania	333	118	-223	976	60	-275	168	-90	-
Morocco	200	204	37	39	-13	-12	13	113	776
Nigeria	-	-	152	770	300	150	150	100	-33.3
Tunisia	378	353	267	273	253	269	277	290	4.7
Zimbabwe	1419	1720	1249	1471	1580	1498	1208	383	-68.3
AMERICA	**57358**	**56430**	**60466**	**59608**	**59357**	**59503**	**62317**	**59975**	**-3.8**
Argentina	3893	4142	4293	4493	3592	2399	3577	3207	-10.3
Bolivia	-	-	-	-11	-100	0	50	56	12.7
Brazil	36766	36817	40697	42102	38007	37440	39829	38112	-4.3
Chile	1480	802	898	690	1265	1285	1920	739	-61.5
Colombia	523	615	615	600	628	607	713	600	-15.8
Mexico	7681	7419	8289	8198	8477	9288	7573	7940	4.8
Peru	835	1137	-510	-79	1	1011	-120	1076	-
Trinidad and Tobago	..	..	..	..	988	900	950	1219	28.3
Venezuela	5180	5498	6184	3615	6499	6573	7825	7026	-10.2