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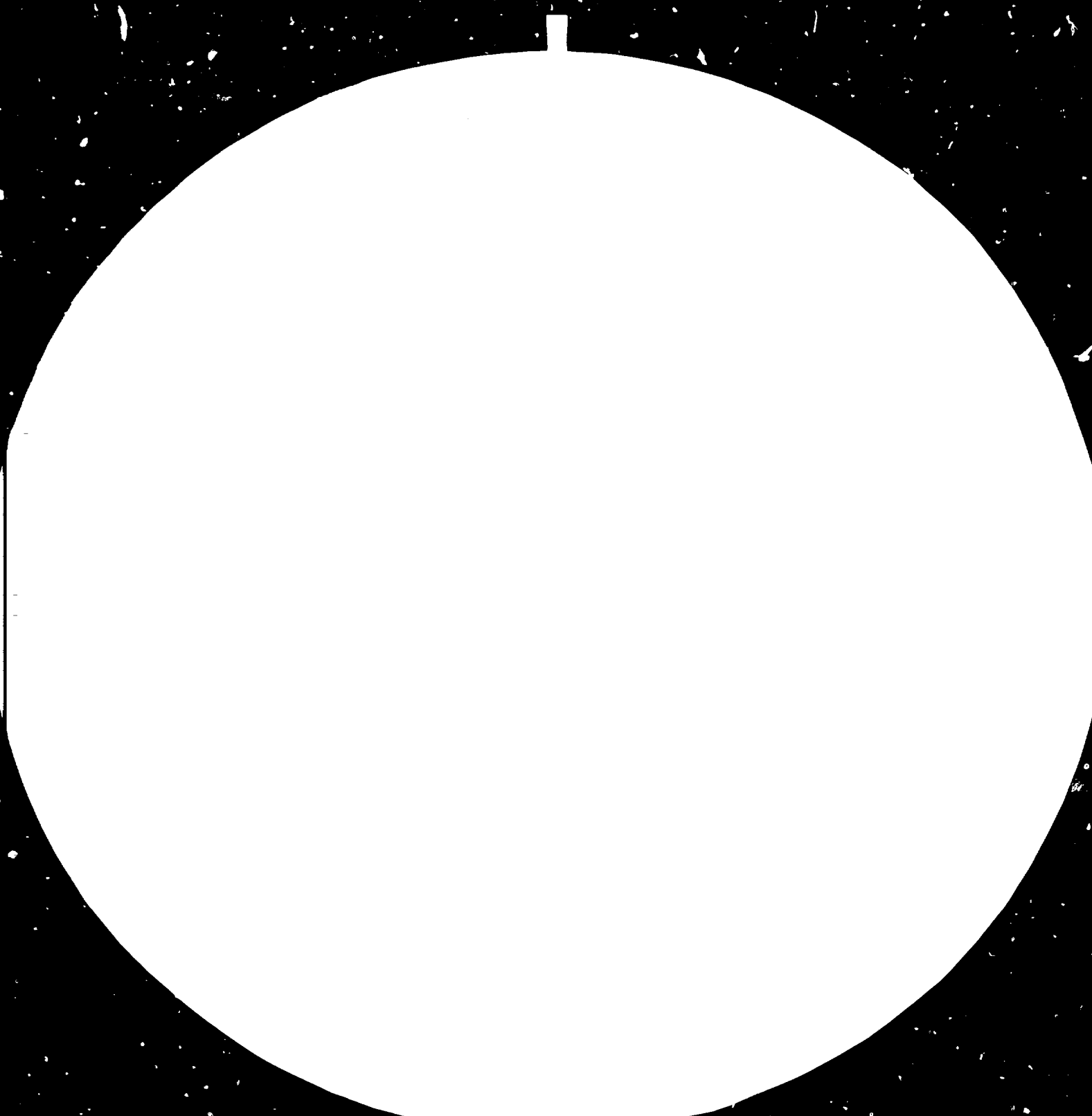

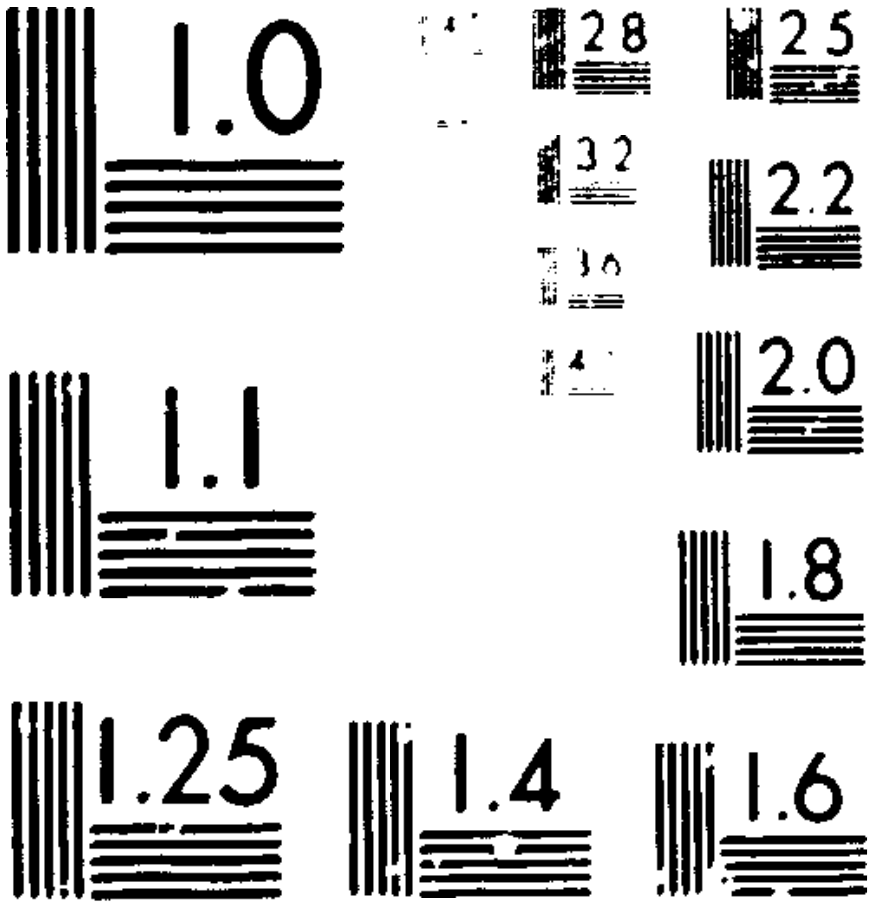
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IRON ORE - ITS SUPPLY, MARKET STRUCTURE

CONTRACTUAL NTS *

by

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C O N T E N T S

IRON ORE - ITS SUPPLY, MARKET STRUCTURE AND CONTRACTUAL ARRANGEMENTS

CHAPTER I

1.0 Introduction

The present report has been prepared in response to the interest expressed by the participants in the Second Consultation on the Iron and Steel Industry convened in New Delhi, India in January 1979. This Consultation recommended, inter alia, a study of iron ore supply with a view to:

- understanding the market structure, and the nature and content of long-term contracts for sale of the ore;
- identifying areas of co-operation between neighbouring countries for exploitation of shared iron ore deposits;
- considering the experience of co-operative buying of iron ore - nationally and internationally - and the action needed by the developing countries;
- ascertaining the likely investment on new iron ore mines, its linkage with future price levels, the development of the steel industry, and growth in economy.

CHAPTER II

2.0 Overall perspective

The world demand for iron ore is necessarily derived from the steel demand. It is so because 95 per cent of the production of iron ore is consumed in steel making. Consequently, the influence of steel production levels on iron ore demand is tremendous and any fluctuation in the steel production has an immediate impact on the demand for the ore.

Factors affecting demand

2.1 Another factor exerting influence over the demand for ore is the technological change taking place in the production processes of steel making. These affect both the quantity as well as the quality of the ore required.

2.2 The economic recession and inflation in the economy also affect the steel demand and consequently, the requirement for the iron ore. It is, however, extremely difficult to assess its impact on the future demand for ore.

2.3 Estimates of world iron ore resources have indicated that there is hardly any danger of the supply source for this mineral drying up in the near future. Presently, the reserves are said to be about 251 bn. tons while the resources are about 782 bn. tons. At current level of iron ore consumption, this would last for over 200 years. Even if demand for steel goes up exponentially, the ore resources would last for more than 100 years.

2.4 Based on the present state of development of technology, there is an approximate relationship between crude steel production and iron ore requirement involving use of about 1.2 tons of iron ore for production of one ton of crude steel.

2.5 An analysis of the resource position reveals the position to be as follows:

Resource position

- Japan is about the only major consumer of iron ore which has very little reserve of the ore. Even Western Europe does not have sufficient reserves to meet all its requirements. Bulk of reserves of Eastern Europe are concentrated in the USSR;

- North America has almost one-third of total world resources;
- Latin America has over 10 per cent while Asia contains about 10 per cent (mainly in China and India);
- Australia's resources are considered to be vast;
- Africa is the only region where substantial resources of the ore have not yet been confirmed. However, this is also the region where geological exploration work is yet to be carried out in sufficient detail.

2.6 The position of reserves is rather sensitive to exploration, to new discoveries and to the changes in the economic, technological and political environment. Instances are there when some countries that were earlier insignificant producers of the ore have now become major producers through discoveries of mammoth ore bodies in the country. A clear example is that of Australia which has emerged today as the largest iron ore exporting country in the world.

2.7 In 1979, world iron ore production had risen to an estimated 888.8 million tons.[1/] This was to match the production of steel of 748 million tons. The production of ore showed an improvement of 6.8 per cent over the 1978 level - an improvement achieved despite major interruptions in supply from two of the leading producers, i.e. Brazil and Australia.

2.8 In considering the supply and demand position, the following factors are important:

(a) The developing countries, which today supply nearly 50 per cent of the total world availability of ore for export to the developed countries, are themselves launching ambitious steel development programmes. (In 1980 the supply was 241 million tons out of world availability of 491 tons for export). This would affect the supplies of iron ore to the developed countries and necessitate expanding the mining capacity in the developing countries.

(b) The depletion in supplies from some of the existing iron ore mines would necessitate opening up of new mines. Investment costs on such projects will be considerable. Hence, the pricing question in such ores will assume great importance as it would have a vital bearing on the investment decision on the new projects.

1/ Mining Annual Review 1980

CHAPTER III

3.0 Future supply and demand

No analysis of iron ore demand can be carried out without a study of the steel demand. A large number of such studies on future requirements of steel have been carried out by various organizations. These have revealed the demand for steel in 1985 as being likely as follows:

- 896 million tons (Wharton, October 1977);
- 919 million tons (Amax, March 1978);
- 1,015 million tons (Metal Society, May 1978);
- 890 million tons (Citybank, June 1978);
- 920 million tons (Cleveland Cliffs, July 1978);
- 970 million tons (SRI, April 1979);
- 880 to 920 million tons (S.F. Hogan, 1979);
- 884 million tons (Ditzel, November 1979).[1/]

3.1 The analysis of UNIDO indicates the total crude steel capacity available in 1985 as:

- Industrialized countries: 920 to 930 million tons
- Developing countries: 187 million tons

Total: 1107 to 1117 million tons.

For the year 2,000, this may range from 1550 million tons to 1750 million tons.

Corresponding requirement of iron ore in 1985 should, therefore, be around 1320 million tons and the year 2,000 about 1800 million tons to 2100 million tons.

3.2 One important feature of the future demand is that "fines" will be the dominant form of ore requirement for the western world. In 1985 it is likely to amount to more than 55 per cent of total supplies.[2/]

1/ Document UNIDO/ICIS.161, 12 June 1980.

2/ Report of IISI, "Iron and Steelmaking Raw Materials: the outlook for Iron ore, Coking Coal and Scrap".

Pellets are expected to increase their share from 20 per cent in 1973 to more than 30 per cent in 1985, while lumps will decrease from 21 per cent in 1973 to less than 15 per cent in 1985.

Supply

3.3 A normal assumption could be that world iron ore production would keep pace with the demand for the commodity. In fact, it ought to be in excess of the demand - unless some serious constraints arise on account of pricing disputes or financial constraints or labour problems.

3.4 World production of the ore was close to full capacity at 900 million tons in 1974-1975. Since then it has been fluctuating downwards so as to match the requirement of steel industry.

3.5 While considering the supply position, one also has to keep in mind the stocks that are built up during the years when offtake from steel industry is less than the ore output; [1/] one assessment is that the current excess ore stocks total an estimated 50 million tons at the mines alone.

3.6 UNCTAD's assessment is that an additional 200 million tons of capacity of iron ore production is believed to be under construction which may help to increase the total capacity to about 1150 million tons by early 1980's. For subsequent years, another 300 million tons capacity is said to be under consideration[2/].

3.7 Based on published plans for explansion, the production trends in iron ore mining are indicated in the Table below:

Table I Projected world iron ore production
(millions of tonnes)

Production trends	Country	1985	1990	2000
	USSR	330	385	500
	USA	115	135	175
	Australia	140	170	240
	France	54	56	60
	China (People's Rep.)	80	110	180
	Canada	80	100	150
	Brazil	155	195	290
	Sweden	41	45	55
	India	45	50	60
	Others	135	150	300
	Total	1175	1396	2010

Source: UNIDO survey

1/ Metal Bulletin, January 1979

2/ This assessment is subject to variation depending on closure of existing uneconomic mines and advancing or retarding of the new projects.

3.8 The above figures present a rather disquieting picture and indicate that if the steel demand rises at the expected rate, ore supply could lag behind by 100–150 million tons in 1985.

3.9 A study of a limited nature relating to western world iron ore requirements was carried out by the International Iron and Steel Institute recently. This was based on answers to questionnaires and use of 'Standard Reference Projections'. According to this study, the demand for ore from the western world in 1985 is shown to be 827 million tons. Annexure I will be of interest.

These trends are indicative of the general shift towards more prepared burdens in line with modern blast furnace technology.

3.10 This study forecasts a deficit of iron ore in 1985 of 24 million tons, as indicated below:

Likely future deficit

Table II Regional surplus/deficit (-) of iron ore grades, 1985 (based on SRP)

Country or region	Classified lumps	Pellets	Run of mine	Fines	Total
North America	- 7	15	1	11	20
Latin America	14	38	12	85	149
Oceanea	45	11	2	63	121
EEC	-18	-18	- 1	-129	-166
Other Western Europe	- 2	5	8	- 15	- 4
Japan	-39	-20	0	-119	-178
Asia, including India	7	0	- 2	13	18
South Africa	8	0	0	7	15
Other Africa	5	6	4	20	35
Middle East	- 2	- 5	0	- 8	- 15
Eastern Bloc	-11	- 1	0	- 7	- 19
Total world	0	31	24	-79	- 24

Source: Report of IISI

3.11 The forecast of the IISI shows that Japan and the EEC are likely to have the biggest regional deficit of 178 million tons and 166 million tons respectively.

The eastern bloc deficit with the western world may be about 19 million tons.

The middle east deficit will be about 15 million tons which would reflect its likely rapid growth in steel production.

"Other Africa" will be having a continued surplus - though a declining one - from 1973 to 1985. This decline is more due to a fall in production capacity of ore rather than an increase in steel production capacity.

India, South Korea and Taiwan all have a rapidly growing steel industry and consequently this region will be showing a falling surplus in iron ore.

3.12 An interesting light on the production trends was thrown in the second international iron ore symposium that was organized by Metal Bulletin in Frankfurt in March 1981. It was reported that the exporting countries had increased their domestic consumption but not increased their overall production of the ore. It was apprehended that by 1985 there may be a potential shortage of 141 million tons and that even if all the planned investments go ahead, there would still be a shortage of 42 million tonnes. Iron ore exports by 1988 might fall short of world import requirements by about 250 million tons.

3.13 The above signifies the need for better producer-consumer relationship and also the need to concentrate on development of new mine capacity, and expansion of existing facilities. It also calls for expeditious decisions on proposals involving investigations, economic appraisal, installation of appropriate infrastructure and construction of mines.

3.14 With Japan emerging as a major steel producer and demand from Western Europe outstepping the traditional sources of supply of ore, an impetus has been given to a rapid expansion and exploitation of reserves in countries like Brazil, India and West Africa. There has been thus a substantial internationalization of production of iron ore.

Role of developing countries

3.15 The number of developing countries which are producing in excess of 2 million tons of iron ore (actual weight) per annum has increased from four to thirteen over the period 1955 to 1975. The number of countries producing over 25 million tons of ore each went up from three in 1955 to eleven in 1975. Of the latter, four were developing countries.

3.16 A comparison between the forecast of world availability of iron ore for export and the contribution of the developing countries towards the total availability is shown in the following table:

Table III Contribution of the developing countries to the exports and world resources of iron ore
(thousands metric tonnes)

Total availability		1980	1985	1990
I.	For iron ore exports including contribution	497,000	595,000	656,000
II.	by developing countries	241,000	301,000	344,000
II/I	Percentage	48.4	50.6	52.4
	Share of the developing countries in world resources	About 30 per cent		

Source: Iron ore supply/demand 1980-1990 CAEMI/International BU The Hague, December 1976
UNIDO/ICIS.89, 20 November 1978

3.17 The share of developing countries has increased from about 10 per cent of world production (actual weight) in 1955 to nearly 30 per cent by 1980.

3.18 A note of caution should be added to the future projections of supply and demand for the ore. There is a major factor of uncertainty in these projections because of large gaps in information and inadequate knowledge of future behaviour of world economy Accordingly there are obvious pitfalls in a blind acceptance of these figures and planning future development programmes based on them. While the producer countries, particularly the developing ones, are understandably keen to increase their ore production so as to earn more foreign exchange, they need to also ensure that their actions do not radically upset the supply and demand balance with disastrous effect on the prices.

CHAPTER IV

4.0 Structure of market

4.1 Iron ore is seldom sold in the form in which it is extracted from the ground. It is further processed to improve its characteristics and its Fe content. For this purpose various processes like washing, grinding, screening and agglomeration (sintering) and pelletising, etc. are used.

4.2 Consumers of iron ore look for the most economic source of supply of iron ore and they take into consideration factors like cost of ore, Fe content, ratio of acid to basic gangue constituent and presence or absence of other impurities, size, consistency and the ease with which the ore can be reduced.

4.3 Some steel makers have found it more economical to use higher quality ore even though it may cost more. Use of such ore results in better productivity which often compensates for the higher prices that they have to pay for the ore.

4.4 This demand for high quality ore has had two important effects:

1. The iron ore exporting countries have been encouraged to upgrade their poorer quality ores through use of various processes, including pelletisation. Export of such higher value added product has brought them larger foreign exchange earnings, besides encouraging investments within the country with beneficial effects on employment and economy;
2. The second effect has been in the form of social and economic benefits through development of infrastructure facilities such as roads, railways, ports, and sometimes shipyards for the construction of large-size ocean-going ore carriers.

4.5 The average metal content of the ore has gradually risen from 51.6 per cent in 1955 to 61.1 per cent in 1975. In the case of the exporting developing countries, the average Fe content of iron ore exported rose to 63.4 per cent in 1968. The demand for higher quality ores has also given an impetus to the world trade.

4.6 Countries with steel industry have been meeting their consumption requirements of iron ore through increasing imports. In recent years, Japan has emerged as the major steel producer, a result achieved by using entirely imported raw materials including iron ore. This has been

a major factor in the restructuring of international trade in iron ore.

Pattern of international trade

4.7 An interesting feature of international trade in iron ore is the continuing concentration of exports from a small number of countries. There has been a gradual increase in the number of such countries which are significant exporters. But the number is still rather limited. Earlier, Canada, Sweden and the USSR were among the largest exporters of iron ore. But by 1975 Australia and Brazil had emerged as the two largest exporters accounting for 21.5 per cent and 18.6 per cent respectively, of world exports.

4.8 Similarly, there has been a concentration among the buyers of iron ore. In 1975 the largest importers of ore were Japan, the USA and the Federal Republic of Germany. They were importing nearly 60 per cent of their iron ore needs in terms of volume and value. If one includes the United Kingdom and the BENELUX countries, the percentage figure goes up to 70. Japan alone had imported over 33 per cent of world imports in 1975.

4.9 In some countries the lower cost of transporting ore through ocean-going vessels as compared to the domestic rail costs has encouraged import of ore from other countries. Typical example is that of the USA which despite having ample resources of iron ore, has been importing nearly 35 per cent of its requirements.

4.10 Limits of geography have also continued to play an important role in shaping the pattern of international trade:

Geographical distribution

- West Africa supplies primarily to the European market;
- Australia and India export mainly to Japan;
- Latin America concentrates on the USA and Japan.

4.11 In 1975 the developed market economy-countries relied on the developing countries for nearly half of their total imports of iron ore. In the case of the developing countries, 95 per cent of their exports were to the developed market-economy countries.

A simplified market pattern by area of origin is indicated in the statement in Annexure II.

It would be evident from this statement that Japan and the EEC are by far the largest importing regions, importing a total of 243 million tons. They are followed by Eastern Europe (13 million tons per year, excluding the USSR), and the USA (45 million tons per year). Western European countries other than the EEC countries are also net

importers of about 14 million tons per year. Some of the developing countries like Republic of Korea, Argentina, etc. also import the ore, but the quantity at present is only 3 million tons per year.

The iron ore industry is thus almost totally affected by the consumption levels of the ore in the steel industry in Japan, the EEC and the USA.

4.12 A study of the structure of the future market of iron ore shows the picture by 1985 to be as follows:

For the iron ore exporting countries

Future market pattern

- North America will increase its production to 188 million tons, with the region exporting 26 million tons. Bulk of it will be through ocean-going movements from Canada to Western Europe;
- Latin America will be exporting nearly 70 per cent of its production. Both Brazil and Venezuela will continue to be the big exporters to the USA, Western Europe and Japan;
- Oceania (Australia) will export 87 per cent to 89 per cent of its production - mainly to Japan. [1] (Of its production of 97 million tons in 1980, it exported 82 million tons to Japan). Only a small percentage is expected to be in the form of pellets. This shows preference of Japan for sinter;
- The EEC (7) and other Western European countries - its importance as iron ore exporting region will continue to decline;
- Asia - as a source of supply will continue to be dominated by India. Despite its own increasing steel production, it is likely to export at least 35 million tons in 1985, with the highest quantity going to Japan;
- Africa is responsible for more than 11 per cent of western world total imports. Excluding South Africa, the exports total more than 95 per cent of Africa's production. Liberia and Mauritania are the largest exporters - mainly to western Europe. South Africa is expected to be the biggest producer by 1985 and will be exporting nearly one-third of total African exports.

4.13 In 1980 the developing countries exported 48.4 per cent of the total world exports of iron ore. In 1985 it is expected to rise to 50.6 per cent and increase further in 1990 to 52.4 per cent.

1/ Mining Journal, April 10, 1981

4.14 This increasing trend in exports appears quite logical. For the developing countries such increases in the export of ore, preferably processed, helps to bring in much needed foreign exchange. Thus, despite their wanting to develop their own steel industry, their exports of ore will continue to grow.

4.15 For the steel-producing countries, the trade pattern is likely to present the following picture:

Japan. Imports will be around 200 million tons, 45 per cent from Australia, 15 per cent from the east coast of South America, 12 per cent from India. Substantial quantities will continue to be shipped from West Africa and South Africa. Trade with Brazil will expand.

Europe. Requirements will be covered mainly by South America, West Africa and North America. Australia and Canada will account for 15 per cent each while South America will be the largest exporter, supplying about 60 million tons.

South Africa will become an important supplier and will export about 15 million tons by 1985.

Western and Eastern Europe trade with India will also increase to about 16-17 million tons by 1985.

USA. Imports may reach about 45 million tons by 1985 via the Great Lakes.

Over 50 per cent of imports may be from Brazil. There will be an increase in imports from Australia and South Africa.

4.16 In this connection, the following Table will be of interest:

Table IV Inter-area seaborne iron ore trade, 1985
(millions of tonnes)

Country	Europe	USA	Japan	Others	Total
Scandinavia	27.0	-	-	-	27.0
Mediterranean	2.5	-	-	0.5	3.0
West Africa	56.0	3.0	13.5	3.0	75.5
South Africa	16.5	4.0	16.0	2.0	38.5
India	16.5	1.0	23.5	9.5	59.5
Far East	-	-	4.0	0.5	4.5
North America	28.5	6.0	7.0	-	41.5
South America	61.5	25.0	42.5	8.0	137.0
Oceania	33.0	5.5	94.5	4.5	137.5
Others	4.0	0.5	3.0	1.0	8.5
Total	245.5	45.0	204.0	29.0	523.5

Source: UNIDO Survey on Iron Ore Resources

4.17 The growth of iron ore exports is influenced not only by the long-term growth in demand but also by the extent to which major consumers of the ore take recourse to the international market. It is possible that the future demand for the ore may increase less rapidly than in the past. This could be offset by a further decline in the self-sufficiency ratios of the major ore importers. Hence, growth of iron ore imports in the future could still be at rates similar to those experienced in the past and may continue to be greater than the growth of iron ore production.

4.18 UNCTAD has assessed that possible world exports of ore may be about 760 million tonnes by 1985 and more than one billion tonnes by 1990.

CHAPTER V

5.0 Marketing arrangements[1/]

There is a mutual interest in the production and supply of iron ore between the producer and the consumer. The consumer wants to be assured of a regular supply of ore of a specified quality and quantity over a long period of time. The producer similarly would like to have the benefit of a secure long-term outlet for the ore and at prices which would be reasonable and would guarantee an adequate return on the investment that is being made in the mining projects.

5.1 No single system of marketing of iron ore exists today. Instead there are a number of interrelated systems with most buyers making purchases under several of these systems. Some examples are as follows:

- yearly or short-term contract;
- contract linked to ownership, with quantities in proportion to shareholdings;
- long-term contract for fixed quantities, with or without price clause;
- long-term contract with quantity linked to buyer's ore requirements, either as base quantity or as a certain percentage of ore consumption;
- barter deal transaction.

5.2 Each form of contract has its own advantages and disadvantages, which have to be weighed against each other. A common feature of these arrangements is the existence of the buyer's willingness to sign the contract and his good faith in fulfilling his commitments to buy which is closely linked to whatever concessions the seller is prepared to make, especially with regard to price.

In actual practice it is not possible to conclude a contract that will guarantee the producer full delivery even under the most unfavourable trade conditions, unless the price or other terms of sale are attractive enough to the buyer.

5.3 (a) Short-term purchases

This constitutes a traditional form of trading particularly in Western Europe and is used to meet the requirements which have

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1/ UNCTAD/TD/B/IPC/Iron Ore/2
TD/B/IPC/Iron Ore/3
UNIDO Survey on Iron Ore resources

not been covered through other forms of contract. The buyer negotiates with the seller the price for the purchase of a given quantity and quality of ore which is to be delivered to a given location. Usually the contractual arrangement is for a period of one year. Sometimes, however, it may range up to four years, subject to re-negotiation on an annual basis.

This form of contract acts only as a marginal source of supply for the consumer. The producer finds it profitable in times of high demand but it fails to offer adequate security in a fluctuating market conditions particularly when demand for ore gets depressed.

5.4 (b) Ownership ties

This form of arrangement has been encouraged by the desire of consumers to have a regular supply of ore for a long period and of the producers wanting to benefit from having a secure outlet for their product. Coupled to it is the fact that large amounts of capital are needed for mine development, ore processing and development of linked infrastructure.

There is a trend towards vertical integration of iron ore/steel industry. Establishment of such linkages is leading to a significant proportion of international trade in iron ore getting based on intra-firm transactions with consecuential effects on pricing of such transactions.

This form has been a traditional one in the case of supplies in the USA where the steel companies continue to be actively involved in investing in ore production facilities and where up to 80 per cent of the company's requirements are generally met through such transactions.

Western European and Japanese steel companies have also been active in financing ore production particularly in Africa and Australia though the proportion of requirement supplied under such arrangement remains lower as compared with the USA.

5.5 (c) Long-term arrangements

Development of iron ore mines requires enormous capital investment. Hence a pre-condition for any investor agreeing to deploy his resources for such projects is the existence of an assured market for the ore. His willingness to invest depends on the availability of a clear-cut guarantee of assured market linked to timely supply of iron ore at reasonable prices.

There is thus a complementarity between the producer of the iron ore and its consumer. Their complementary requirement has, therefore, to be matched through negotiations of a long-term contract which guarantees both supply to the consumer and offtake to the producer and which can also be used as collateral to secure project loan for financing investment on the mine and the infrastructure. Often, the finance is forthcoming from the consumer himself in the shape of equity participation and/or loan.

Trade among socialist countries of Europe continues to be conducted on the basis of such long-term supply arrangements. These generally cover the quantities to be traded for a period of five years or more with a small margin of flexibility. Prices are agreed annually in the light of average movement of world prices of ore over the last few years. In the case of West European companies, increasing recourse has been taken to such arrangements and 40 per cent of their imports are covered through this system.

Japanese steel industry is meeting 90 per cent of its import requirements under this type of arrangement.

Estimates of UNCTAD secretariat suggest that long-term arrangements now cover up to 60 per cent of international movement of iron ore. Such contracts usually run for a period of ten or twelve years. In its most common form it stipulates the annual quantities to be delivered, with a margin of 10 per cent flexibility.

The contract specified the quality of ores in terms of its Fe content and other minerals like phosphorus, sulphur, etc. and indicates the quantity to be traded.

The price commitment may be for a period of five years or more.

5.6 A copy of a proforma contract for this type of long-term arrangement is attached as Annexure III. Essentials of existing long-term contracts between Japanese companies with ore exporters are also contained in a compilation 'Iron ore manual' brought out by the TEX Report Co. Ltd. of Japan.

5.7 A logical extension of the contract work is the <u>service contract</u>. This is an agreement where in effect the Government hires a foreign company to develop a specific mineral deposit at a fixed price, with the Government supplying all the necessary capital and maintaining complete control over the mine rights. Only governments with

substantial revenues available to invest in mining enterprises are able to enter into such service contracts.

5.8 The stability that such long-term arrangements were expected to bring to the market has not always been realized. Sometimes the buyers have sought free negotiation of their minimum contractual obligation and have wanted a deferment of shipment of ore to a later date. In other cases, the producer of the ore has asked for similar free negotiations either for the quantity or the price.

The present situation appears to be that the long-term contracts have, in effect, become long-term quantitative arrangements with a two-year price element, although in some instances this period is as short as three months.

CHAPTER VI

6.0 Investment, pricing and inflationary impact

6.1 An economic size mining project requires not only large investments but its gestation period is also exceptionally long, extending to ten years or more. Often, the development involves opening up new mines and establishment of vast infrastructure.

6.2 The quantum of capital investment depends on several important factors like:

- geological and physical nature of deposits;
- engineering aspects of stripping of over burden and excavation of ores;
- establishment of facilities for beneficiation and agglomeration of ores;
- problem of logistics involving development of road, rail and other means of transport including port development, ship building, etc,
- setting up of various types of social infrastructure facilities.

6.3 Wide variations in the conditions from region to region make it impossible to assess with any certainty the magnitude of total future capital investment. In each case a proper feasibility study has to be carried out to determine the quantum of such investment.

Capital investment

However, based on a survey of the past development projects, an approximate assessment can be attempted taking the capital cost for a mine-pellet plant to range from $75 to $125 per ton at 1977 prices. An average cost of $100 per ton could then be considered for calculating the total investment needed so as to meet the requirement up to 1985 or so. If the additional production capacity to be planned is taken as 300 million tons, the funds required would be $30 billion, i.e. about $6 billion per annum.[1/]

6.4 A linkage of this investment cost with the selling price would suggest that after providing for depreciation and profit for operating costs, a new pellet mine should expect a price of $24 to $29 (at 1977 prices) per ton FOB.

1/ Best production so far was about 900 million tons in 1974. Total requirement in 1985 may be about 1320 million tons. Keeping in view slippages, a figure of 1300 million tons has been suggested.

6.5 In considering the investment cost, a point of interest would be that in most cases, the cost of mining and ore beneficiation may not be the final determining factor for the execution or non-execution of a project. Rather, the decisive factor could be the expenditure on transport, port and various infrastructure facilities which could account for more than 50 per cent of the total cost.

6.6 The very high cost of mine development, affected as it is by inflationary forces, makes it imperative that special attention is paid to tackling this problem. The iron ore industry, besides using the traditional methods of financing through equity, loans and depreciation, has also been supplementing it with suppliers'/ consumers' credits, world bank loans and loans from other lending agencies.

6.7 The steel producers, as consumers of the ore, are naturally vitally interested in the mines development programmes. They have therefore been extending their help and assistance, both financially and technically, to these projects. The long-term contracts entered into between the producer of iron ore and its consumer is invariably being used by the former as a collateral for securing required loans. Several countries such as Australia, South America and Africa, have been operating under this system.

6.8 Pricing

Iron ore not being a homogenous commodity, its pricing involves an exercise of considerable complexity. The producer of the ore is keen to obtain a price that ensures him adequate return on the investment made in the mine. In this context, he would prefer a linkage to the steel price, so that any increase benefits him in a corresponding increase in the price of ore.

6.9 The consumer, on the other hand, tries to work out the "relative" value or the "metallurgical" value of the ore and then use it for determining the commercial price.[1/] The "relative" value or "metallurgical" value indicates the maximum price that an iron and steel works can pay for the ore without increasing the cost price of the iron/steel. In its essentials, calculating the "relative value" of a given ore involves determining the total cost of smelting and then deducting this cost from the predetermined cost of the iron/

1/ United Nations "Economic Aspects of Iron-ore Preparation", 1966.

steel. The remainder is then divided by the figure for consumption of ore per ton of iron, or multiplied by the yield of iron per ton of ore. The result is the "relative value" of the ore free at the iron/steel works. This "relative value" is then used to determine the commercial price for the steel ore.

6.10 Each transaction of the ore involves the sale and purchase of specific quality of ore requiring a wide spectrum of prices so as to reflect adequately these qualitative differences. The pricing mechanism would appear to be strictly oligopolistic. The price is neither quoted on any commodity exchange nor is the material traded as a commodity. Instead the price is negotiated between large producers and large buyers taking into consideration world supply and demand, and contracts are drawn up specifying dates of delivery, quality of ore, etc. The contracts are both short and long-term, where short-term means one year and long-term can mean anything. There are also many "tied sales" whereby buyers of ore themselves own or have helped to develop a source, and, therefore, are able to buy at prices that may or may not be related to the prices that other buyers are paying for the same quality of ore.

6.11 Most non-ferrous metal ores are priced according to the metal content therein even though this may be even less than 10 per cent of the weight. In the case of ferrous metal, the position is quite different apparently because the relative cost of iron ore required for producing one ton of steel represents less than 10 per cent of the cost of standard steel. In the case of very special high grade steel it may be as low as 1 per cent of the cost.[1/] The value of iron ore in the steel it produces is very limited. One ton of ore may cost $17.50 f.o.b. (a price paid by West German companies for 52 to 53 per cent grade Brazilian ore). The most basic steel product however, is sold for about $280 per ton needing about 1.5 tons (US$26 worth) of ore to produce it. A typically high quality stainless steel sells for about $2,600 per ton and this might contain only 75 per cent iron derived not only from ore but from scrap. Agreed prices between the producers and consumers are generally linked to a market price which at present is 28.1 US cents for an iron (Fe) unit FOB Brazil.

6.12 An average iron ore may contain over 60 per cent of iron but there

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1/ UNIDO/IS.213 dated 9 March 1981

is no apparent relationship between the price of ore and that of iron/steel which ensures an automatic adjustment in price keeping pace with the price fluctuations of iron/steel. This issue has also been considered during discussions in UNCTAD meetings and the difficulties have been brought out in establishing such a relationship.

6.13 Despite the absence of a linkage with the price of steel, the constant efforts by producers and consumers of the ore is to try and ensure that the ore price covers at least the production costs and some element of profit.

6.14 What ails the iron ore market today is the fact that the real prices of ore have fallen. Even without a direct linkage with the steel prices, the consumers of the ore have been agreeing, periodically to ore price increases, but these increases have been insufficient to compensate for the effects of higher costs of production of ore, inflationary impact, etc.

6.15 In the Fourth Annual Conference of the IISI, the Secretary-General made an interesting observation: "There are no fewer than 22 countries producing iron ore today and selling it in international competition. This suggests that the availability of ore now, and in the near future at least is not a matter of concern for the world's steel producers. The very severe competition on the world market over the past ten years has driven the international price levels down".

6.16 Taking account of inflation and other factors, the nominal prices of ore have been periodically raised by the consumer. But the level of real prices have continued to be quite low.

6.17 The price negotiations for 1979 supplies in the Japanese and western European market took place against the background of depressed trading before the demand started increasing. Demands for an additional $3.00 per ton were put forward but the final conceding ranged from between $1.00 to $1.30 per ton. In recent discussions an increase of 7.5 per cent was agreed by the Japanese as against 15 per cent demanded by the producers.

6.18 Prices in the North American market also increased during the course of 1979 with less superior iron ore pellet rising by approximately 11 per cent compared with the prices ruling at the end of 1978.

6.19 The consensus view among producers has been that despite the surplus availability in the world market, which some source indicated as in excess of 50 million tons, appreciable f.o.b. price increases were necessary to meet higher operating costs.[1/]

6.20 An important feature of the pricing of ore is its f.o.b. or c+f nature.[2/] The latter is determined in each of the major consumption regions and then the f.o.b. price is derived by decuting the estimated sea transport cost from the c.i.f. or c+f price. Consequently, the f.o.b. price tends to become lower as the estimated freight costs increase. It is worth noting that the f.o.b. price per ton for iron ore concentrate imported from Sierra Leone into the FRG has been consistently lower than the corresponding price for the Norwegian concentrate, notwithstanding the relatively higher Fe content of the former.

6.21 The f.o.b. price for a stated quality or type of iron ore in a particular country tends to vary and, other factors being equal, is priced lower for exports to distant markets than for sale to nearby markets. For example, f.o.b. unit value for iron ore imported from Brazil to Japan (distance 11,412 miles) was lower than that for ore shipped to major destinations in Europe or the United States where the distances are realtively short. The unit value for exports from Australia to Japan have in most cases been higher than those obtained for exports to European destinations or the United States.

Impact of transport cost

6.22 According to the studies carried out by UNCTAD it appears that c.i.f. or c+f prices for fully comparable products tend to be equal in a given market. Thus normal freight cost differentials for iron ore shipped from different ports of loading to a given receiving port will have to be observed by the sellers in the form of a lower f.o.b. return that that received by a seller enjoying the most favourable transport costs. However, freight cost differentials caused by the inability of receiving port to accommodate large size vessels or by low unloading rates or slow vessel turn around due to any other reasons tend to be borne by the importers.

6.23 Once the f.o.b. prices are fixed, throughout the period for

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1/ Mining Annual Review 1980

2/ U.N. "The maritime transportation of iron ore"

which they are applicable any changes in transport costs are reflected in the c+f price. Increase in transport costs are borne entirely by the buyers and the benefit from reductions in these costs is correspondingly also enjoyed by them. In the past the actual transport costs have been lower than the estimated costs and the benefit from that difference has gone to the buyers.

6.24 The developed market economy countries argue that where differentials in freight costs are reduced, f.o.b. price for iron ore from the countries to which such lower freight costs apply will tend to rise. This is true so long as the level of c.i.f. price remains unaffected, which is not however, the case in the long run. During the decade 1960-1969, c.i.f. prices declined faster than f.o.b. prices. Consequently, at each new negotiation, the estimated transport costs were deducted from the reduced c.i.f. prices which in most cases resulted in lower f.o.b. prices also.

6.25 Fixation of prices on f.o.b. or c+f basis also has a bearing on the return obtained by the ore producers. C+f prices are generally about 20-50 per cent higher than the f.o.b. prices. However, the problem here is that while the developing countries would prefer the pricing to be on a c+f basis, it may not always be practicable or feasible. The c+f price makes the developing country as the ore producer, responsible for making the shipping arrangements, which is not an easy task. This is the reason that most of the contracts with the developing countries are on an f.o.b. basis.

6.26 A consumer prefers to pay the same price for similar grade ore no matter where it comes from. A Japanese company, for example, will make the same outlay on a certain grade or ore whether it comes from Australia or Chile. The extra distance means the Chilean miner might receive 20 per cent less for its ore than his Australian counterpart. As ore prices stagnate (in real terms iron ore prices have declined for the past 25 years) and shipping costs rise fast, the position of Third World producers deteriorates even further.

6.27 One of the aims of the Association of Iron Ore Exporting Countries is to obtain and achieve some rationalization in the iron ore prices, through standard ore specifications and perhaps through some indirect linkage with steel prices, which itself is less centralized than those of most commodities.

Rationalization of prices

6.28 The subject of iron ore has been engaging the attention of UNCTAD which after a series of meetings has decided on evolving a system of statistical information collection which would be of help in carrying out an analytical work on the commodity for work on "market transparancy" and "ongoing market situation". It has been accepted that there is a need to study the problem of iron ore export from a long-term perspective.

6.29 Any slowing down in the long-term increase in demand together with the possible increases in productive capacities of iron ore will also continue to put pressure on real prices that are already being affected continually through increases in cost of production, maritime transport, inflation, energy costs and changes in technology.

6.30 Effects of inflation

A word here on inflationary effects on iron ore pricing and its exports may not be out of place. Inflation is a major problem that has been affecting world economy. Its impact is, therefore, very much there on the iron ore market. Earlier when inflation was confined to manageable rates of about 4 per cent to 5 per cent per year, its impact on the iron ore pricing was only marginal. But in recent years, the inflation figures have jumped up mostly into the double digit range. Its impact, therefore, on the investment cost estimates on specific projects has been quite disastrous. In several cases, costs have risen by 50-100 per cent within 18 months to two years. Such an escalation in the cost of investment has consequently affected the price of the ore. Besides this, the increase has also thrown the planning of the projects out of gear, resulting in considerable delay in their implementation. In some cases, even cancellation of the project has had to be resorted to.

6.31 The stringent environmental laws that are being enforced particularly in some of the developed countries like North America, have also been adversely affecting the iron ore mining projects in those countries.

6.32 The overall result of all the above mentioned factors could be a severe temporary imbalance between ore supply and demand. This may even make it necessary to re-schedule the new capacities both in mining and steel making.

6.33 Differential inflation rates between various countries have also contributed to creation of some new problems in iron ore market. The reference is to the instability of currency exchange rates. Unexpected changes in the parity rates in the exchange market, which occur independent of the iron ore market pricing, have rather unpredictable effects on the cost prices and revenue. These create conditions of uncertainty and put up hazards which affect both the producers and consumers. They have, therefore, to counter this by either having contracts in relatively stable units of account or by including free negotiation clauses in the agreement.

In considering the pricing of the ore one may also mention the large influence wielded by major producers like CVRD of Brazil and Australian ore producers. On the side of the purchasers, the leaders are the European Steel producers (represented by EUROFER) dominated by West German Steel Industry, and the Japanese steel companies. The arrangements e normally finalised every year during negotiations held in Dusseldorf in West Germany and the prices determined (but seldom publicised!) for Brazilian ore delivered at Rotterdam (presently 38.6 U.S. cents per Fe unit) are taken as marker price by other ore exporters and consumers.

CHAPTER VII

7.0 Co-operation amongst developing countries

The share of developing countries in the total world iron ore trade being nearly 50%, a special emphasis needs to be placed on the aspect of co-operation amongst them in the field of iron ore development. Given adequate political goodwill and healthy relationship between the participating countries, such co-operation can be highly beneficial to both sides. Some examples of this are already existing in the area of steel production.

7.1 Co-operation can cover various aspects of the development like exploration, exploitation and processing, marketing, etc. Some developing countries like India and Brazil already have a well developed iron ore mining and steel industry. Their expertise is being utilized by other developing countries in Africa, Middle East and Africa in exploration work as well as training of local personnel and in strengthening of national geology and mining organizations.

7.2 Similar type of assistance and co-operation is extendable to the exploitation and processing of the ore reserves. One aspect of this could even be the sharing of deposits for production of steel. For example, one country may have the ore resources, while its neighbour may be surplus in natural gas. They could then consider a joint project for development of mine and natural gas deposits and establish direct reduction plants for producing sponge iron and steel. (e.g.: India, Bangladesh, Pakistan and Indonesia) .

7.3 In the African region, Mali, with more than 100 million tons of ore reserve and which has problems of access to sea, could consider a co-operation venture with Senegal (1,400 million tons reserve) and/or Mauritania (2,000 million tons reserve). The latter two countries are already major producers of iron ore.

7.4 Liberia which is the largest producer of iron ore in Africa could perhaps consider joining up with its neighbour Sierra Leone (290 million tons reserve) in the exploitation of its resources and they could together help Guinea to develop its rich deposits.

7.5 Gabon (1,200 million tons of reserves) could consider co-operation with the adjoining Republic of Congo (500 million tons reserves).

7.6 Kenya and Uganda have ore deposits near their borders and one could perhaps consider the feasibility of joint development. Similar in the case with Ghana and Togo; and Upper Volta and Niger.

7.7 In the Latin American region, co-operative ventures may be possible between Argentina and neighbouring countries like Bolivia or Chile. Venezuela may be able to help Surinam. Brazil might find it possible to co-operate with Paraguay.

7.8 The above examples are only of an indicative nature. In each case feasibility will have to be worked out, keeping in view the political and economic relationship between the countries and the logistics involved in movement of ore to consumption centres.

7.9 Since the exploitation of deposits has to be closely tied up with development of common infrastructure facilities, such co-operation venture could encompass all such facilities like construction of roads, rail links, port development etc.

7.10 A detailed study on this could be carried out by UNIDO in close co-operation with regional organizations like the (ECA) Economic Commission for Latin America (ECLA) etc. so as to determine the likely areas of co-operation. Based on such a study, action could be initiated with the interested countries on bilateral or multilateral basis for formulation of the projects.

CHAPTER VIII

8.0 Issues for International Action

The indispensability of iron ore as an important industrial raw material and its technical and economic characteristics as well as the feature of its market make it necessary for these problems to be considered in an international forum so as to devise measures which would ensure continuous supply of the material to the industry. Some of the important aspects of the problem are outlined below:

8.1 (a) Finance for investment

A serious constraint which the developing countries, in particular, are facing in their mine development programme in the scarcity of capital required for mining, processing and marketing of ore, and development of infrastructure. What they need is not only adequacy of capital but also that the funds provided by various agencies are at low enough costs which would ensure the economic viability of the venture.

An iron ore producer may have ambitious plans for developing new mines. But lack of finance could completely thwart these plans. A good example is that of Carajas mines in Brazil where development has been considerably delayed owing to difficulties in procuring capital funds.

No doubt, the iron ore consumer often provides assistance so as to ensure regular supplies to their plants. But such help invariably gets reflected adversely for the ore producer in the pricing and other conditions of the contract. Such constraints would have been avoidable if the financing had been from other sources like World Bank or Commercial financing agencies.

Would it therefore not be better to consider this problem in its Macro aspect and study the financial requirements for the industry as a whole - both for mining and steel production? Such a study could involve not only the producers of ore and its consumers, but also the major financing agencies like the World Bank, International Financial Corporations etc. Perhaps UNIDO could organise a Working group for this purpose.

8.2 (b) Supplies

There is also need to have an effective management of supplies with a direct regulation of the prices of the commodity. Such international management of supply would entail control of production or exports of iron ore from the major iron ore exporting countries at times of undue

pressures on prices with a view to maintaining prices at agreed levels or within agreed limits. In other words, at times there may have to be certain amount of restraint on exports or expansion in total supplies which would have a proportionate response to the prices.

The notion of supply management is not a new one to the iron and steel industry. Steel producers have resorted to this in the past so as to counteract the adverse effects of unfavourable conditions in steel market. This has been done through a joint harmonization of their production and/or marketing programmes rather than through reductions in the prices of iron ore steel products. The feasibility of extending this concept to iron ore deserves consideration in an international forum.

8.3 (c) Pricing

This is another problem that requires special attention of international community. The issue is, whether the trend in real prices - "persistent price decline" - calls for adoption of specific price objectives and supporting measures. Despite a shortlived improvement in early 1970's, decline in the price has continued. The basic cause of the prolonged decline in the real price of iron ore has been the persistent pressure of supplies upon markets accentuated by the exploitation on a large scale of newly discovered rich iron ore deposits.

The international community is faced with problems of maintaining the prices at levels which could be considered as reasonably remunerative and just both to the producers and to the consumers. The price objective, therefore, has to be specified clearly. One could consider a broad correspondence between the price of iron ore and movements in the prices of manufactured goods imported by the developing countries or movements in the price of steel, or even movements in the price of an associated raw material (e.g.: coking coal) used in the manufacture of steel. In the alternative one has to consider devising a system which would help to maintain the price of ore at desired levels, without linking it to any other price series.

Deliberate stocking of iron ore could also play a role - though a small one - in attaining the objectives of a pricing policy. The concept of the common fun set up by UNCTAD could perhaps be extended to cover such "stocking". This has been considered earlier in the deliberations of UNCTAD meetings but the practical problems involved

in such a scheme have tended to dampen the enthusiasm for the proposal. A further study in detail may be desirable.

Although iron ore is one of the non-core commodities in the UNCTAD programme, it still deserves full coverage by the objectives of UNCTAD IV aiming, inter-alia, - "at achieving stable conditions in commodity trade, including avoidance of excessive price fluctuations and to improve and sustain the real income of individual developing countries through increased export earnings".

Another approach could be for exporting countries to maintain agreed minimum and maximum selling prices for a standard grade of iron ore. The prices of other grades could be derived from that of the standard grade.

The concept of "compensatory financing" is also an interesting one. This does not involve any direct intervention of market forces. Under this arrangement, a "reference" price and trading quantity is established by agreement between the producers and consuming countries and, compensation by one party to the other is awarded for any deviations of the actual trade volume and value from the agreed "norms".

8.4 Training and infrastructure development

Lack of trained manpower is a major factor responsible for the slow pace of mining development in developing countries, especially in the African Region. Programmes can be drawn up for manpower development in such areas and assistance secured from the international community for their fulfilment. Local availability of trained geologists, mining experts, engineers, etc. would also help to reduce the dependence on other countries - a dependence that invariably adds to the cost of production.

A special emphasis on infrastructure development, particularly for ports and ship building can have a direct bearing on the price of the ore. Availability of such facilities can help the exporting developing country to negotiate the contract on C and F basis instead of F.O.B., thereby ensuring higher prices for the commodity. Perhaps the developing countries could also take up such programmes on a regional basis.

8.5 Need for Coordinated Approach

The world market for iron ore is an extremely complex one and major gaps in information relating to supply and demand picture, and figures pertaining to investment costs, market conditions and prices, make it very difficult to plan properly future development of this commodity. The producer countries need to have a close coordination among themselves in

their mining development activities so as to avoid a situation of over supply of the ore with consecuential adverse effect on the prices. Without such an international demand assessment and supply management, the marketing of iron ore will continue to suffer from present afflictions.

Such coordinated approach, - maybe bilaterally or through organisations like the Association of Iron Ore Exporting Countries - can help to increase their negotiating power vis-a-vis the steel makers who invariably negotiate the purchase by adopting coordinated policies on a national basis.

Annexure I

DEMAND FOR IRON ORE, ESTIMATED REQUIREMENTS IN ACCORDANCE WITH THE SRP
(all figures in mmt)

COUNTRY/REGION	YEAR	Estimates Based on SRP			
		SRP	Iron Requirement		
		Crude Steel	Total Weight	Fe from Iron Ore	Iron Ore Requirement
(1)	(2)	(3)	(4)	(5)	(6)
North America	1973	-	103.7	93.3	149.5
	1985	177.3	113.6	104.7	168.0
Latin America	1973	-	11.9	10.7	17.7
	1985	46.4	46.2	42.8	69.0
Oceania, Australia	1973	-	7.3	6.6	11.5
	1985	12.1	10.5	9.7	15.0
EEC (6) + United Kingdom	1973	-	107.9	97.1	187.9
	1985	172.9	124.8	115.1	213.0
Other Western Europe	1973	-	18.1	116.3	33.9
	1985	60.0	41.9	38.7	74.0
Japan	1973	-	92.0	82.8	129.0
	1985	140.3	122.1	112.5	179.0
Other Asia	1973	-	7.9	7.1	15.9
	1985	37.1	25.0	23.2	39.0
South Africa	1973	-	4.9	4.4	6.2
	1985	11.6	10.7	9.9	16.0
Other Africa	1973	-	0.5	0.5	1.2
	1985	6.4	4.9	4.5	8.0
Middle East	1973	-	0.3	0.3	0.6
	1985	15.0	12.6	11.8	21.0
Western World Total	1973	-	354.5	319.1	553.4
	1985	682.0	512.3	472.9	802.0
Eastern Countries' Demand from Western World (1)	1973	-	-	-	8.5
	1985	-	-	-	25.0
TOTAL DEMAND	1973	-	-	-	561.9
	1985	-	-	-	827.0

(1) IISI Estimate.

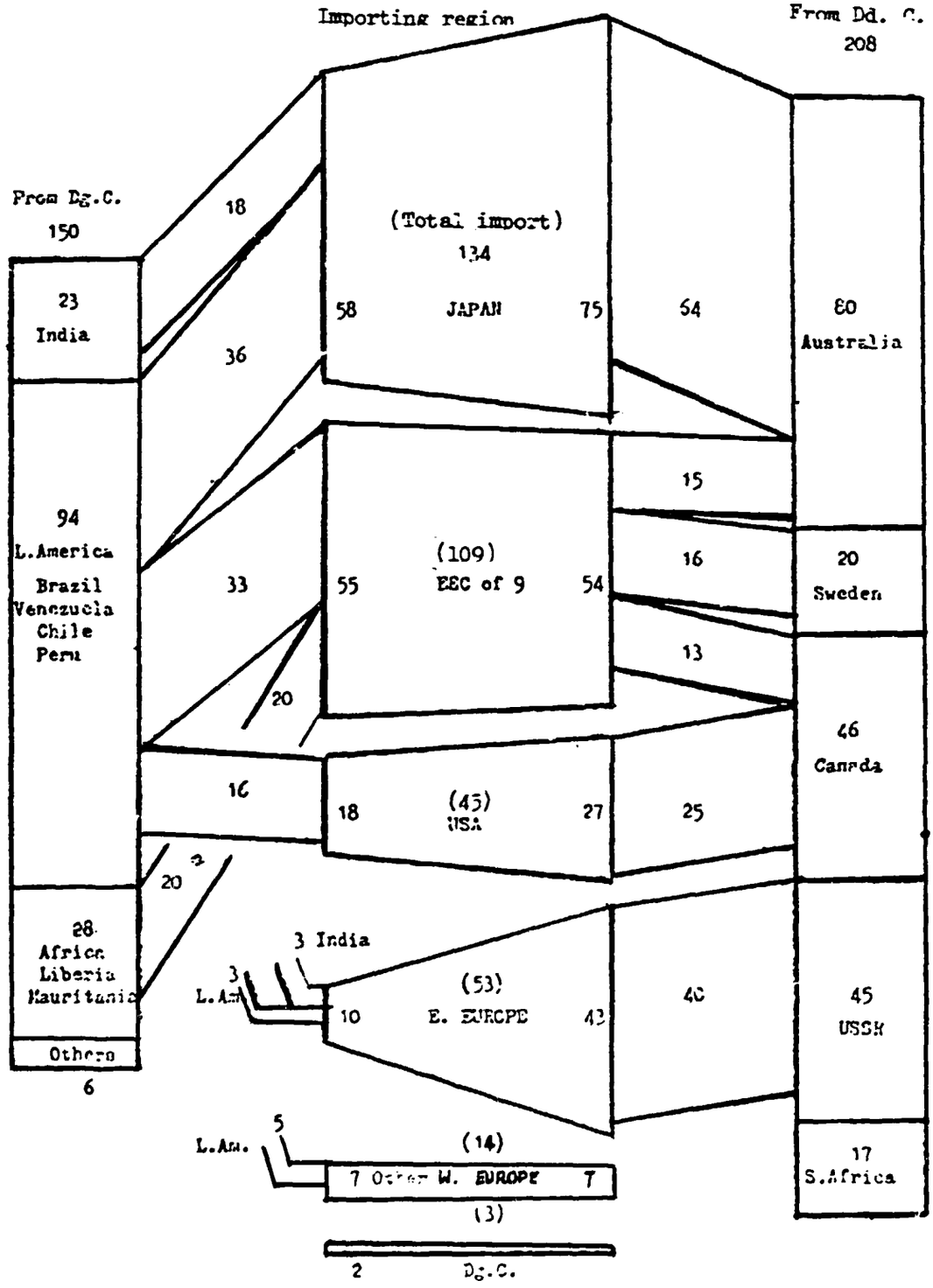
Notes

1. The iron ore requirement on the basis of the SRP includes that needed for pig iron, foundry iron, sponge iron production and use in steel vessels. The Fe from iron ore needed for calculated requirement is estimated from historical data to be around 90 per cent of the total weight. The rest is made up from scale, slag, dusts, scrap and other recirculated materials, less an inevitable loss. The expected trend is to move towards more Fe from iron

ore and less from other iron bearing materials and so a ratio of 92 per cent (95 per cent in the case of sponge iron) is used for 1985. This assumption appears valid even in the light of today's low scrap prices. Of course, the percentage figures vary from region to region, which was neglected here for the sake of simplicity.

2. As this study focuses on the Western World these demand requirements are shown in Table 10. In addition the iron ore demand of COMECON countries, mainland China and North Korea to be covered from sources in Western Europe has been added at the bottom of the table. There is no assessment based on the SRP for these countries.

Simplified world import pattern of iron ore by area of origin in Mt of actual weight (1976) (Intra EEC Trade ommitted, based on TD/B/IPC/IRON ORE/AC/4)



Source: UNIDO/IOD.236, - 13 December 1978

ANNEXURE III

PROFORMA CONTRACT FOR SALE OF IRON ORE

This contract is made by and between _____ _____ having their registered office in _____ at _____ _____(hereinafter referred to as "Seller" which expression shall be deemed to include their successors or assigns) of the one part and M/s. _____ having their registered office in _____ at _____ _____ (hereinafter referred to as "Buyer" which expression shall deem to include their successors or assigns) of the other part.

2. Now the parties hereto agree that Seller shall sell and the Buyer shall buy a quantity of _____ dry M/T of iron ore as mentioned below on the terms and conditions as laid down hereunder.

CLAUSE (1) - COMMODITY:

_____iron ore as per specifications given in clause (3).

CLAUSE (2) - QUANTITY:

_____ dry metric tonnes with a tolerance of 10% more or less.

CLAUSE (3) - SPECIFICATIONS:

(a) Chemical Composition

Iron (Fe)
SiO2
Al203
Sulphur
Phos.
Lead.
Zinc
Total of other metals (except Mg, Mn and Cao)
Moisture

(b) Physical Composition

_____ mm to _____ mm with a tolerance of _____% below and _____% above.

CLAUSE (4) - PRICE

(i) US$ _____ (US Dollars _____) per dry metric tonne FOBT basis _____ Fe. This price would be increased by US¢ _____ for every 1% above _____% and decreased by US¢ for every 1% below _____ fractions prorate.

(ii) The price would remain valid for shipments made up to _____. Vessels which arrive at the loading port(s) and serve Notice of Readiness before 24:00 hrs. on _____ would be loaded at this price. The price for shipments beyond _____ would be settled by mutual negotiations. The price stipulated above includes all local taxes, export duty, loading and trimming charges. For any special trimming required by the Master of the vessel the charges (for such trimming) will be payable by the Buyers/Owners.

CLAUSE (5) - SCALES AND PENALTIES

(a) For excess under-sized or over-sized material

If in any shipment of iron ore, percentage of undersized material exceeds the guaranteed percentage as mentioned in Clause 3, penalty at the rate of _____ per Dry Metric Tonne shall be applied to the quantity of undersized material in excess of the permissible tolerance limit. Similarly, if in any shipment the percentage of oversized material exceeds the stipulated guaranteed percentage, penalty at the rate of _____ shall be applied to the quantity of oversized material in excess of the permissible tolerance limit.

(b) For Fe contents

For Fe contents below the rejection limit stipulated in Article 3, the following penalties are to be applied:

(i) For 1st unit of Fe below the rejection limit penalty shall be applied at two times the scale stipulated in the contract, fractions pro-rata.

(ii) For 2nd unit of Fe below the rejection limit, the penalty shall be applied at three times the scale stipulated in the contract, fractions pro-rata.

(iii) In case the Fe falls more than 2 units below the rejection limit, the buyers have the option to reject the consignment or accept it at a negotiated price.

(c) Penalty for Silica, Alumina and Phos. contents

Penalty at the rate of _____ shall be applied for each 1% of Silica/Alumina in excess of the guaranteed permissible limit, fractions pro-rata.

(d) Phos

Penalty at the rate of _____ per DMT shall be applied for each 0.1% of phos in excess of the guaranteed limit, pro-rata.

CLAUSE (6) - DELIVERY PERIOD: SHIPPING SCHEDULE AND PORT OF SHIPMENT

(i) From Jan.to Dec. _____ or April_____ to March _____.

(ii) Monthly shipping schedule will be mutually discussed and agreed upon.

(iii) Shipments under this contract will be made from the port of _____.

CLAUSE (7) - ASCERTAINMENT OF WEIGHT, MOISTURE, SAMPLING AND ANALYSIS

(A) WEIGHT

1. The weight shall be ascertained at the loading port by draft survey by a qualified marine surveyor appointed by the Seller and approved by the Buyer.

2. The weight thus ascertained at the Loading Port shall be treated as provisional.

3. The weight shall similarly be ascertained at the discharging port by draft survey by a qualified marine surveyor appointed by the Buyer and approved by the Seller.

4. The arithmetic mean of the loading and discharging port weight determined as above shall be treated as final.

5. If Buyer elects not to have a draft survey taken according to subsection (A) (3) above, the weight setforth in Seller's provisional invoice shall be used for determination of Seller's final invoice.

(B) MOISTURE

1. The ascertainment of free moisture content at 105°C shall be carried out immediately after sampling at the loading port by one of the analysts mentioned in Sub-clause 6(C)(1) below. The free moisture content shall similarly be determined immediately after completion of sampling at the discharge port by the Buyer under the joint supervision of representatives of the Buyer and the Seller. The arithmetic mean of the moisture determined at loading and discharge port shall be final.

2. The Seller and the Buyer shall have the option to be represented at the discharging and loading port respectively at the time of weight and moisture determination at their own cost.

3. The Buyer shall airmail to the Seller discharging port weight and moisture results along with supporting certificate within 10 (ten) days after completion of discharge of each shipment.

4. All expenses in connection with weight and moisture ascertainment at the loading port shall be to the account of the Seller.

5. All expenses in connection with weight and moisture ascertainment at the unloading port shall be to the account of the Buyer.

(C) SAMPLING AND ANALYSIS

1. At Loading Port. A sample shall be drawn according to the mutually agreed standard at the time of loading by one of the reputed and independent analysts.

2. The sample so drawn shall be divided into four parts and sealed conjointly with the Buyer's representatives, if appointed. The Buyer has the right to appoint its representative at its own expenses to supervise sampling.

3. One sample shall be used for analysis. The second sample shall be kept with the Seller. The third sample shall be given to the Buyer or its representative. The fourth sample shall be kept with the sampling firm for umpire analysis, if needed.

4. All expenses connected with the sampling and analysis at loading port shall be to the Seller's account. The certificate of analysis shall contain the percentage of Fe, Si02, Al203, Phos, Sulphur, Ti02, in figures and words with accuracy of two decimal points and for Cu, Pb, Zn, As, up to three decimal points. The certificate will also contain a report on the physical composition of the ore. The Seller shall airmail certificate analysis to the Buyer within 10 (ten) days of loading of each vessel.

(D) AT DISCHARGING PORT

1. Samples for determination of the quality of the ore shall be drawn at the time of discharge by the Buyer under the joint supervision of representatives of the Buyer and the Seller according to mutually agreed international standards at the cost of the Buyer. It shall be divided into three parts and sealed conjointly with the Seller's representative, if appointed.

2. One sample shall be used for analysis by the Buyer. The second sample shall be given to the Seller or its representatives. The sample shall be kept for the umpire analysis, if needed.

3. The Buyer shall airmail certificate of analysis to the Seller within 10 days of the discharge of each vessel.

4. In case the differences between the loading and discharging port analysis results does not exceed 1% of Fe contents, the arithmetic mean of the two results shall be final.

5. Should the difference exceed 1% of the Fe contents and the parties do not reach an agreement on the final results, samples taken at the loading and discharging ports shall be forwarded to any one of the following analysts who shall mix them in equal proportions and carry out umpire analysis in respect of Fe which shall be final and binding on both parties.

The cost of umpire analysis shall be borne by the losing party. In the event of the results being equidistance, the cost shall be shared equally by the Buyer and the Seller.

6. As regards elements other than Fe, the final results shall be the arithmetic mean of the loading and discharging ports results.

7. For physical composistion, the arithmetic mean of the two results determined at the loading and discharging ports shall be final.

CLAUSE (8) - PAYMENT

(A) LETTER OF CREDIT

A commercial letter of credit in US Currency will be opened by the Buyer in favour of the Seller with the Bank of _____ at least 30 days prior to the date of commencement of loading of each vessel. The letter of credit will be established covering 100% value (with a tolerance of 10% more or less) of the goods of each shipment with validity of 90 days (to be extended, if necessary) following the date of opening of the same. The letter of credit would be unrestricted, without recourse to drawer, confirmed, irrevocable, assignable and divisible. Charges attendant to the opening, amending and extending of letter of credit and any other charges levied by the Bank in _____ shall be to the account of the Buyer. All charges levied by the Bank excluding confirmation charges would be to Seller's account.

(B) PROVISIONAL PAYMENT

Payment of 95% of the FOB Value of the cargo shall be made against the following documents:

1. A full set of clean on board ocean bills of lading.

2. Certificate of Origin, in original and four (4) signed copies.

3. Seller's signed provisional Commercial Invoice, in original and four (4) signed copies.

4. Certificate of weight, moisture and analysis in original and four copies.

(C) FINAL PAYMENT

Payment for the balance amount due to the seller Calculated on the basis of final weight and analysis, established according to Clause 7 hereof shall be made under the Letter of Credit on presentation of the following documents:

1. Seller's final invoice, in original and four (4) signed copies.
2. Statement showing final weight and physical and chemical composition as determined under Clause 6 hereof supported by copies of relevant loading and discharging port certificates.

CLAUSE (9) - ARBITRATION

Should any dispute arise between the parties within the framework of this agreement, it is agreed that such dispute shall be finally settled through Arbitration, under the Rules of conciliation and Arbitration of the International Chamber of Commerce by one or more Arbitrators appointed in accordance with the aforementioned rules. The Arbitration shall be held in accordance with the Local Law and shall be binding on both parties who are obliged to execute such decision voluntarily.

CLAUSE (10) - TITLE AND RISK

(i) Title with respect to each shipment shall pass to the Buyer when the Seller has negotiated the relative shipping documents and received the sale proceeds from the ngeotiating bank after completion of loading on board the vessel at the loading ports.

(ii) Risk with respect to each shipment shall pass from the Seller to the Buyer when ore has been loaded on board the vessel.

CLAUSE (11) - FORCE MAJEURE

(i) In the event of delivery of all or any part of order under this contract being obstructed and delayed by refusal to issue export or import licences, arrests or restraints effected by Government or people, war, blockage, revolution, insurrection and mobilization, strikes, lockouts, civil commotion riots, acts of God, plague or other epidemics, destructions of goods by fire or flood, or any other cause or causes beyond the control of the Seller and the Buyer, the Seller or the Buyer shall be relieved of the responsibility for delay in performance of the contract and the

time of delivery shall be postponed by the time or times in which delivery is prevented by any such causes as hereinabove mentioned, provided that in the event of such delay exceeding three months, the other party shall have the option to cancel the contract in respect of the undelivered quantity.

(ii) In the event that such Force Majeure condition occurs prescribed in Paragraph (1) hereinabove, the party shall advise by cable the other party as soon as possible and then shall, within two (2) weeks after occurrence of such event furnish the other party in writing with the particulars of the relevant event and documents explaining that its performance is prevented or delayed due to cause or causes as set forth in paragraph (1) hereinabove and further shall furnish at the same time or at latest within three (3) weeks after occurrence of such event the documentary evidence duly providing such Force Majeure condition.

The party declaring a Force Majeure shall during the duration of such Force Majeure condition use its best effort to resume the performance of its obligations under this contract with the least possible delay and such party shall always advise the other party of detailed progress of the event of Force Majeure and the prospect of settlement of such event and of the resumption of the performance of its obligations under this Contract.

(iii) Seller or Buyer shall be relieved of the responsibility for performance of this contract to the extent to which such performance has been obstructed and if approved by the other party, the time of delivery may be postponed for the duration of time, but not longer, in which delivery is prevented by any such cause or causes hereinabove mentioned.

(iv) In the event that the duration of the postponement of this contract mentioned herein exceeds three (3) months, the other party shall have the option to cancel this contract in respect of the undelivered quantity or extend the period of delivery by mutual agreement.

CLAUSE (12) - CLAIMS

All claims of any kind should be made by either party within 90 days from the date of unloading of each shipment.

CLAUSE (13) - PARITY CLAUSE

(a) In case the partity of the currency of this contract in terms of S.D.Rs at the time of signing of this contract is afterwards changed, the price of the ore and the amount of Letters of Credit will be renegotiated between the Seller and the Buyer.

CLAUSE (14) - LOSS OF CARGO

In the event of a total or partial loss of cargo after completion of loading on board the vessel and before completion of discharging at the discharging port(s), Buyer shall make final payment to Seller on the basis of the analysis at the loading port as set forth in Paragraph (1) of Article (16) and quantity as manifested on the Bill(s) of Lading.

CLAUSE (15) - VALIDATION AND ALTERATION

This contract shall become effective when the duly authorized representatives of Seller and Buyer sign thereon. Any change, modification in or addition to the terms and conditions of this contract shall become effective when confirmed by both Seller and Buyer in writing.

CLAUSE (16) - RIGHTS AND OBLIGATIONS OF EACH BUYER

The rights and obligations of Seller and Buyer shall be several and limited within the respective quantities as set forth in Article (3).

CLAUSE (17) - SPECIAL CLAUSE

The material sold/purchased under this contract shall be for consumption in _____ unless otherwise specifically agreed to between the parties.

In witness whereof this contract is made in duplicate at _____ and the duly authorized representative of the Seller and the Buyer having signed this contract on _____ have retained one copy each.

BUYERS SELLERS

[redacted]