AUTHENTICATED

(DINESH GOSWAMI)

THE MINISTER OF STEEL & MINES

AND THE MINISTER OF LAW & JUSTICE

REPORT OF THE

COMPTROLLER AND AUDITOR GENERAL

OF INDIA

UNION GOVERNMENT

No. 5 (COMMERCIAL) OF 1989

NATIONAL MINERAL DEVELOPMENT CORPORATION LIMITED

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PREFACE

This report on National Mineral Development Corporation Limited was prepared by an Audit Board consisting of the following members:

Shri K. Ranganadham (upto 30th June 1987) Shri C.P. Mittal (1st July 1987 to 31st March 1988) Shri K. Tyagarajan (1st AprIL 1988 onwards)	Chairman, Audit Board and Ex-officio Additional Deputy Comptroller and Auditor General (Commercial)
Shri U.N. Ananthan (upto 24th July 1987) Shri B.L. Boipai (25th July 1987 to 31st January 1989) Shri N. Bhimarao (1st February 1989 onwards)	Member, Audit Board and Ex-officio Director of Commercial Audit, Hyderabad.
Shri R. Kumar (upto 30th July 1987) Shri K. Krishnan (31st July 1987 onwards)	Member, Audit Board and Ex-offico Director of Commercial Audit II, Calcutta.
Sh. Ashok N. Banerjee	Ex-Chairman-cum-Managing Director, Kudremukh Iron Ore Company Ltd. - Non-official Member.
Sh. H.V. Mirchandani	Ex-Chairman-cum-Managing Director, Hindustan Zinc Ltd - Non-Official Member.

2. The report was finalised by the Audit Board after taking into account the results of discussions held with the representatives of the Ministry of Steel and Mines (Department of Steel) and the Company at its meeting held on 4th January 1989 and the comments furnished by the Ministry on 23rd January, 1989.

3. The Comptroller & Auditor General of India wishes to place on record his appreciation of the work done by the Audit Board and the contribution in particular, made by the two non-official members.

OVERVIEW

I The National Mineral Development Corporation Limited (NMDC), registered in November 1958, has not formulated its long term and micro objectives as yet. An appraisal on the working of the Company on a review by the Audit Board was presented in 1970 and Committee on Public Undertakings (COPU) made their recommendations in their thirty seventh Report to Lok Sabha in 1973.

II The Company had developed and commissioned the following iron ore projects:

(a) Bailadila Iron Ore Project No. 14 and 11c

(b) Bailadila Iron Ore Project No.5

(c) Donimalai Iron Ore Project

III Bailadila Iron Ore Project 14 was provided with two lines of crusher. COPU, in 1974-75, held the view that a single line of crusher could handle the entire production and recommended a probe into the matter. The Detailed Project Report (DPR) of Bailadila Iron Ore Project 11c, accordingly, contained the provision to transfer the spare line of crusher from Bailadila 14. Contrary to this, a new line of crusher was assembled by utilising spares from Bailadila-14 by additional procurement worth Rs.389.51 lakhs which was charged to Bailadila-14. (Para 5.1)

IV The Bailadila Iron Ore Project-5, scheduled to be completed in January 1974 was commissioned in January, 1977. It was observed that

(i) Against the original estimate of Rs.36.53 crores, an expenditure of Rs.67.49 crores had been incurred on the project.

(ii) The project never achieved the designed capacity since inception.

(iii) The performance guarantee tests conducted in February 1979 revealed certain defects. The reclaimer and wagon loader supplied by Heavy Engineering Corporation Limited (HEC) were based on the design supplied by a West German firm. As the defects could not be rectified by HEC, NMDC called the German experts. The Company had not taken any action against the supplier. Certain inherent design deficiencies like inability of primary crusher to start under chokefeed condition; inability of Primary Crusher Crane to handle assemblies; inferior quality of Apron feeders; low capacity of primary and secondary stockpiles etc. were also noticed (Para 5.2)

V The Donimalai Iron Ore Project sanctioned in 1971 at estimated cost of Rs.19.46 crores was commissioned in 1977 at a cost of Rs.41.18 crores.

(Para 5.3)

VI (i) The actual production of lump ore and the production envisaged in DPR at the two Bailadila projects was as follows:

Project	Production as envisaged in DPR	Actual Production
Bailadila-14	75%	58 to 69%
Bailadila-5	66.7%	48 to 64%

The management stated that due to limited drilling tests conducted at the time of DPR, it could

not assess the exact recovery rate of lump ore.

(ii) The Donimalai Iron Ore Project was never operated at its rated capacity due to absence of marketing tie up for sale and the matching infrastructure facilities. As a result, the huge investment made in the project could not be economically made use of. (Para 6.3)

VII The percentage of utilisation of equipments was less than the norms fixed by Bureau of Industrial costs and prices for assessing the standard cost price at Bailadila Iron Ore Project-14, Bailadila-Iron Ore Project 5 as well as Donimalai Iron Ore Project. (Para 7.2.1)

VIII (i) Different sections of the projects had different capacities. It was noticed that there were imbalances in the capacities of different sections. As a result, there was no possibility of full utilisation of section with higher capacity. The actual production from the mines was still lower in various mining sections of the projects.

(ii) The actual production of fines ranged between 3.58 - 15.81 lakh tonnes per annum whereas the sales ranged between 1.41-11.02 lakh tonnes during 1978-79 to 1987-88. The quantity of fines not sold due to inadequate market was dumped into a valley. The quantity so dumped upto 31st March 1988 was 10.81 lakh tonnes.

(Para 8)

IX The production of lump ore was only about 2 Million tonnes per year against the capacity of 4 million tonnes at Bailadila Iron Ore Project-14. However, the actual manpower employed was 1918 in March 1988 against the staff strength of 1000 envisaged in DPR.

(Para 9)

X NMDC has also taken up Diamond mining project, Panna since 1959. These Diamond mines included Ramkheria Mine and Majhgawan Mines. It was observed that:-

(i) The COPU had recommended (1972-73) a thorough investigation regarding taking up of exploitation of Ramkheria Diamond mines without a thorough and careful techno-economic study of the project. The Company closed the mine only in June 1980. The loss suffered during 1973-74 to 1980-81 amounted to Rs.158.87 lakhs.

(ii) An expansion scheme taken up at Majhgawan Mines with a view to increase the income by Rs.14.80 lakhs per annum was completed in November 1982 at a total cost of Rs.55 lakhs. The Diamond Mining Project has, however, been incurring a loss of more than Rs. 1 crore every year even after completion of expansion scheme.

(Para 10)

XI The Iron ore produced in Bailadila Mines is exported through Minerals and Metals Trading Corporation of India Ltd. (MMTC), the canalising agent. The sale price demanded and received by NMDC in respect of these exports has been a subject matter of dispute and dialogues over a number of years between MMTC and NMDC.

(Para 11.1)

XII As the Bailadila Iron Ore Deposit-14 was depleting, a scheme was prepared in May 1978 for developing an adjoining deposit 11-C at an estimated cost of Rs.9.90 crores. The actual expenditure incurred upto March 1988 however, amounted to Rs.30.89 crores in addition to Rs.4.04 crores being spent on installation of a second crusher line

(Para 12.1.1.)

XIII Financial position of the company on 31st March 1988 reflected a capital of Rs.11,534.72 lakhs and a loss of Rs.1527.85 lakhs after wiping off the cumulative profit of Rs.255.73 lakhs at the beginning of the year.

(Para 17)

1. INTRODUCTION

1.1 The National Mineral Development Corporation Limited was registered on November 15, 1958.

1.2 An Appraisal on the working of the Company on a review by the Audit Board was presented in Part-IV of the Report of the Comptroller and Auditor General of India (Commercial), 1970. On this report, the Committee on Public Undertakings (COPU), after an indepth study of the activities of the Company upto the year ended 31st March, 1972 made their recommendations in Thirty Seventh Report to the Fifth Lok Sabha in April, 1973. In their Sixtieth Report to the Fifth Lok Sabha (April 1975) the action taken by the Government on the above recommendations was considered. The results of the study of the activities of the Company subsequent to the period 1971-72 in general and during the years 1983-84 to 1987-88 in particular are brought out in the present report.

2. OBJECTIVES

The main objectives of the Company were incorporated in its Memorandum of Association.

The Company had sent in August, 1979 the long-term corporate objectives (Annexure-I) to the Government. No approval was received (December, 1988). The Ministry stated even in January, 1989 that the long-term corporate objectives were under discussion within the Company only.

Based on the recommendations of the Parliamentary Committee on Public Undertakings and guidelines issued thereon by the Bureau of Public Enterprises (BPE) the Government directed (May, 1979/ February, 1984) the Public Sector Undertakings to frame their micro objectives and get them approved by their Administrative Ministries to facilitate meaningful evaluation by Government. The Ministry stated (January, 1989) that the Company prepares annual corporate plans which also include micro objectives for the relevant year and get them approved by Board of Directors. This is contrary to instructions issued by the Ministry of Finance, Department of Expenditure which requires that the micro objectives should be laid down and got approved from the Administrative Ministry.

3. ORGANISATIONAL SET-UP

The Company is headed by a Chairman-cum-Managing Director who is assisted by three functional directors, in-charge of production, planning and finance and the General Managers/Project Managers in-charge of projects and various divisions.

4. CAPITAL STRUCTURE

The Company was registered with an authorised capital of Rs.15 crores which was increased from time to time. The authorised and paid-up capital as on 31st March, 1988 was Rs.150 crores and Rs.115.35 crores respectively. In addition, Government had from time to time granted loans aggregating Rs.142.87 crores. The amount of loans outstanding as on 31st March, 1988 was Rs.72.23 crores (inclusive of interest accrued and due Rs.7.66 crores).

5. PROJECTS AND THEIR PERFORMANCE

The Company had developed and commissioned the following projects for production of iron ore:-

1. Bailadila Iron Ore Project - Deposit - 14 and 11 - C

2. Bailadila Iron Ore Project - Deposit - 5

3. Donimalai Iron Ore Project

5.1 BAILADILA IRON ORE PROJECT-14

5.1.1 The project was commissioned in April, 1968 to raise iron ore by open cast mining. The setting up of the project and its performance was discussed in Audit Report (Commercial), 1970 Part-IV. One of the observations made in the Audit Report was that a Committee appointed by the Management to look into the designing of the mine, held in May 1968 that there were 2 lines of crushers while even a single line of crusher was in a position to treat enough ore to produce 4 million tonnes of sized ore per -annum. According to the Committee the second line of crusher was an expensive stand-by. While giving evidence before the COPU, the Chairman of the Company accepted that there was over designing in the crusher capacity.

5.1.2 The COPU observed in para 20 of their Sixtieth Report (1974-75 Fifth Lok Sabha) as follows:

"The Committee are still of the view that a single line of crusher could have handled the entire production of the mine and, therefore, reiterate that the matter should be probed into and responsibility for the lapse fixed".

Accordingly, Government asked (March, 1976) the Steel Authority of India Limited (the then holding Company) to probe into the matter and submit a report to the Government. The Company requested (April, 1976) the SAIL to indicate the action to be initiated in the matter.

There is no evidence whether SAIL has conducted any probe except for a decision (May, 1978) for shifting of one Line of crusher from Bailadila Iron Ore Project-14 to Bailadila-11/C.

5.1.3 The Ministry, however, stated (January, 1989) that a spare crushing line was essential as this was an export oriented project and the investment on spare crushing line was insignificant as compared to the loss of foreign exchange in case spare line was not installed. It was further added that it might be possible, however, to provide 150% capacity instead of 200%. This, however, would depend upon individual situation and importance of the project to National Economy. In case of Bailadila-14, the Crusher had to be of a minimum size of 54" x 74" on technical grounds. This corresponded to the designed capacity of Bailadila-14. The spare crusher had also to be minimum 54" x 74" size. This turned out to be 100% spare capacity. Company could not have designed an arrangement with a total 150% capacity in such situations.

However, the above is to be weighed against the background of:-

1) The planned production capacity of the mine is 5.5 million tonnes of ROM Ore per year.

2) To calculate the hourly crushing capacity, adopting an annual base of 3000 hrs. (300 days of 10 hrs. each) or 2500 hrs. (on 250 days of 10 hrs. each), it works out to a minimum of 1833 tonnes (3000 hrs. basis), and maximum of 2200 tonnes (2500 hrs. basis).

3) The Crusher installed is a 54" x 74" Allis Chalmer (or Kobe) unit and since the required output size of Crushed material is reported to be 8 inches the capacity of the Crusher, according to manufacturer's recommendation, is 3000 tonnes per hour in friable Lime stone & 3600-4000 tonnes per hour for Iron Ore (which is heavier by 50%) after allowing for moisture, bulking etc.

Prima-facie, even the single Crusher had an extra capacity of more than 50% of the maximum requirement and, therefore, need for a standby second Crusher still would remain unanswered. It is evident that there is a certain change in the present stand taken by the Company with regard to the second line of crusher at Bailadila-14. The main goal in the exploration of iron ore in the entire Bailadila Sector is to earn foreign exchange, but the installation of second line of crusher to achieve the said goal need not be over emphasized.

5.1.4 The detailed project report of Bailadila-11(C) (DPR) contained provision to transfer the spare line of crusher from Bailadila-14 at a cost of Rs.92.43 lakhs. Contrary to this a new line of crusher was assembled by utilising spares from Bailadila-14 by additional procurement worth Rs.389.51 lakhs which was charged to Bailadila-14. The project cost of 11(C) (Rs.3089 lakhs) did not include this expenditure. The reply from the company is silent as to why this expenditure was not debited to the project cost of 11C.

5.2 BAILADILA IRON ORE PROJECT-5

5.2.1 To meet the export commitment the company under took the development of Bailadila deposit-5 and commissioned the mine in January 1977. It was pointed out in para 5.3 of the Report of the CAG - 1970 Part IV that in August, 1968 the company examined in detail the profitability of the mine with reference to the proposed phasing. It was found by the company that the mine would remain a losing venture for all times to come and the loss per tonne at 2 million and 4 million tonnes capacity was estimated at Rs.10.50 and Rs.6.80 per tonne respectively.

5.2.2 The COPU in para 6.32 of their 37th Report (Fifth Lok Sabha - 1972-73) observed:-

> "The Committee are at a loss to understand as to how an investment decision on a project with a capital outlay of more than Rs. 38 crores had been taken even with the full knowledge of the fact that it would be a losing venture for all times.
>
> The Committee would like that Government should carefully analyse the various components of cost and take concerted measures to ensure that the cost of production and transport charges do not exceed the sale price which is fixed with reference to the international conditions".

5.2.3 Even at the time of submission of revised project estimates

(August, 1977) to the Public Investment Board, the Government anticipated that with the construction of the Vizag Outer Harbour, which will result in increase in FOB price, the loss would be reduced to about Rs.2.55 per tonne; at 100 percent capacity utilisation as against the loss of Rs.6.80 per tonne estimated at the time of original approval.

5.2.4 Since inception, the project never achieved the designed capacity and due to increase in cost of production, the project incurred losses upto 1980-81. Profits were made upto 1985-86 mainly due to accretion of dollar vis-a-vis the rupee. The project again incurred loss of Rs.531.70 lakhs and Rs. 1120.24 lakhs in 1986-87 and 1987-88 respectively bringing the accumulated loss to Rs.1863.66 lakhs at the end of March, 1988.

5.2.5 Certain significant aspects noticed in implementation of the project are mentioned in the succeeding paragraphs.

A. PROJECT ESTIMATES

5.2.6 The project report approved in April 1970 for Rs.3,653 lakhs (inclusive of foreign exchange component of Rs.218 lakhs), was revised to Rs.6,749 lakhs (inclusive of foreign exchange of Rs.775.5 lakhs) in February, 1978. The project scheduled to be completed by January, 1974 was actually commissioned in January, 1977.

The principal factors that contributed to the increase of Rs.3,096 lakhs over the estimates of April, 1970 were escalation in prices of plant and equipment (Rs.1,553 lakhs), increase in costs consequent on increase in period of construction (Rs.808 lakhs), increasing in scope of work (Rs.384 lakhs), increase in quantities (Rs.332 lakhs) and fresh items included in revision (Rs. 52 lakhs). Savings of Rs.33 lakhs was estimated on some items. While the increase in the total cost of the project was about 85 per cent, the establishment charges and head office expenses alone increased by 419 per cent as compared to the original estimates.

5.2.7 Regarding increase in project cost the BPE observed (November 1982)

"The establishment and interest accounted for about 25 per cent quantity variation about 19 per cent and the rest of the increase being explained by price escalation, etc. It is felt that if the project had been completed by scheduled date of January, 1974 almost half of the total cost over-run of Rs.31 crores could have been avoided".

The Bureau of Public Enterprises further pointed out (November, 1982) as follows:

"NMDC submitted the DPR much too early before the final concept of the project had been evolved after detailed investigations had been completed. NMDC had neither enough field data nor conceptual plan to estimate correctly the cost of the project and time of completion of various activities".

5.2.8 (i) Civil and structural works:- The entire civil and structural works pertaining to the plant were categorised into two groups - one group pertaining to crushing plant and other group comprising screening plant.

Structural works of both the plants were divided into two parts i.e. Part A and Part B. Part A was awarded to Hindustan Steel Works Construction Limited (HSCL) and Part B to Triveni

Structurals Limited (TSL) - both Public Sector Undertakings. There were abnormal delays in completion of work as given below:-

	Part A (HSCL)	Part B (TSL)
Date of award of work	30.11.1971	04.01.1971
Stipulated date of completion as per the contract	31.07.1974	13.09.1973
Actual date of completion	31.12.1976	31.12.1976

The increase in cost attributable to the delay on the part of these two firms could not be assessed by the Company. The Company could not levy any penalty/liquidated damages on these firms though delay was abnormal and increased the Project cost by Rs.8.08 crores on account of overall increase in the period of construction. The Ministry stated (December, 1988) that there were delays in other related activities like supply of engineering drawings by consultants and completion of tunnel and supply of equipment, etc., and it had not been possible to fix responsibility for the delay on the above two firms and hence the Company could not levy any penalty/liquidated damages.

(ii) Conveyor tunnel : Construction of a tunnel for a length of 2.135 Kms for the conveyor belt to pass through was a critical activity in the project. The Government of India, therefore, gave advance clearance in December, 1968. The tunnel work was entrusted to National Projects Construction Corporation (NPCC), a public sector undertaking in December, 1969, even though the Company had reservation initially about the capability of this Company to undertake the work. The work on open cut excavation was completed by NPCC in November, 1970 after which there was total stoppage of work for over one year due to encountering highly water laden strata. The termination of contract of NPCC was under correspondence between Ministry of Steel and Mines and Ministry of Irrigation and Power. As it was ultimately felt that the NPCC was not having the technical capability required for chemical grouting etc., the work was split up in January, 1975 between NPCC and R.J. Shah Limited and the tunnel was made through by end of March, 1976 and the balance work of lining, flooring etc., was completed in September, 1976.

As against the scheduled date of April, 1973 the work was completed by September, 1976 i.e. after a delay of nearly $3\frac{1}{2}$ years resulting in throwing the project schedule out of gear and increase in the cost of tunnel from Rs.85.10 lakhs to Rs.165.60 lakhs. The Management/Ministry stated (December, 1988) that "the execution of the tunnel work was delayed due to encountering of very bad and flowing strata and due to inadequate expertise of NPCC to whom the work was initially awarded.... it was in keeping with the policy to encourage public sector undertakings the work was entrusted to them."

(iii) Equipments: With a view to develop indigenous sources of supply, the project was constructed with about 80 per cent of indigenous equipment and machinery.

The agencies, however, belied the expectations. Almost all the suppliers, particularly HEC had inordinately delayed the supplies. It was stated that the delay on the part of HEC ranged from 46 months to 75 months.

Though the equipments were ordered on indigenous sources viz. HEC and Tata Robins Frasers, Jamshedpur, (TRF), it was observed that HEC had to make foreign collaboration with USSR for manufacturing crushers (April, 1970) and with DEMAG of West Germany for manufacturing the reclaimer and the wagon loader (May, 1971) and TRF, Jamshedpur had foreign collaboration with Robins Engineers and Constructions Limited, USA for manufacturing the downhill conveyor system. While the total cost of plant and machinery was increased by about 76.5 per cent of the original sanction, the foreign exchange component was increased by 255 per cent and total foreign exchange incurred amounted to 46.84 per cent of the total cost of plant and machinery against 23.25 per cent envisaged in the original estimate.

Thus, the purpose of placing the orders on indigenous firms to minimise the outflow of foreign exchange had not been achieved with the increase of foreign exchange component by 255 per cent over the original sanction. The Ministry stated (December, 1988) that such situations were unavoidable in the process of developing indigenous capabilities.

B. DESIGN DEFICIENCIES/DEFECTS IN PLANT AND EQUIPMENTS

5.2.9 The performance guarantee tests of individual sections and the integrated plant as a whole, except the reclaimer and wagon loader sections conducted in February, 1979 revealed that:

- the lump recovery was reduced from 66.68% to 59.16% due to working in the extended reserves area and increase in generation of fines;

- the effective operating hours per shift was lower than the required 6 operating hours out of the 8 hours shift;

- constraints in plant equipments, namely inability to start primary crusher on chokefeed conditions and poor performance of the equipments supplied like apron feeders by Mining and Allied Machineries Corporation, Durgapur, classifiers by Hindustan Dorr Oliver Limited, pulleys by TRF/MAMC/EPI existed.

5.2.10 The reclaimer and wagon loader supplied by HEC were based on the design supplied by DEMAG, West Germany. As the defects could not be rectified by HEC, NMDC had to call the German experts in April-June, 1980 and the performance tests for accepting them as satisfactory could be carried out only in June, 1980.

The Company had not taken any action against the suppliers for the inordinate delay and/or inferior/defective supply of plant equipments.

5.2.11 Certain inherent design deficiencies/defects in the plant and equipments were also stated to have come up as under:-

(i) Primary crushers : These crushers manufactured in the country for the first time by HEC, Ranchi

and supplied to the project were not able to start under chokefeed conditions. Whenever there was any stoppage due to power failure etc. the crusher got jammed and would not restart until it was cleaned out manually. HEC expressed (December, 1979) their inability to rectify this defect in the equipment.

(ii) Primary crusher crane facility: The crane was not capable of handling assemblies, sub-assemblies etc. easily for replacement/repair and maintenance.

(iii) Apron feeders: The detailed project report provided for 23 feeders, 4 being apron feeders and the rest vibrating feeders in the crushing and screening plant. The Consultants subsequently decided that all the feeders should be apron feeders. Though the company decided (November, 1971) to import these equipments from Japan, at the instance (July, 1972) of the Government, these equipments were ordered (September, 1972) and procured from MAMC, Durgapur, (a public sector undertaking) at a total cost of Rs.115 lakhs against the original estimate of Rs.26 lakhs. These equipments manufactured for the first time in the country without any collaboration from reputed manufacturers proved to be of inferior quality resulting in frequent breakdown of apron links/pans. MAMC could not supply spares of superior quality for replacement.

(iv) Downhill conveyor - 29 : This conveyor supplied by TRF was designed to handle 2500 tonnes per hour. Due to design deficiency in hydraulic breaking system resulting in over-speeding, burning of motors and frequent failures of pulleys, the feed to the conveyor had to be restricted to 1700 tonnes per hour.

(v) Capacity of primary and secondary stockpiles: The designed capacity of the stock piles was about 15,000 tonnes each. As this capacity was deemed small, whenever breakdowns (which were frequent) in downhill conveyor system occurred, the crushing and screening plants remained idle till the downhill conveyor system was restored.

(vi) Scalper discharge chute assembly: Due to design deficiency in scalper discharge chute connecting the dust collector to the chute, the dismantling and overhauling works consumed more time and involved heavy expenditure on maintenance of the chutes.

(vii) Reclaimer : Due to poor performance of the reclaimer, the Company placed indent (September, 1980) on German collaborators for two items of spares and also called German experts for carrying out necessary repairs. For rectification, Company incurred Rs.2.30 lakhs on the visit of German experts in January/February, 1981. The spare items costing Rs.1.84 lakhs received in August, 1981 have been lying unused. The Company stated (June, 1987) that the bearings were ordered to avoid holding up, if required to be changed by the experts and are now classified as insurance items.

C. SURPLUS CAPACITY IN CRUSHING PLANT

5.2.12 The plant at Bailadila Deposit-5 was also provided with two lines of primary crushers each with a capacity of handling 60 lakh tonnes of ROM with a view to keep one line as standby. The Planning Commission in their meeting held on 4th December, 1976 questioned whether the second primary crusher at Bailadila-5 was surplus and could be instal-

led elsewhere. The Company had stated (January, 1977) that based on experience in Kiriburu and Bailadila-14 mines, two lines of crusher were provided in Bailadila-5 and conceded that in course of time if rated capacity could be achieved with only one crushing line, not only second primary crusher but also its associated equipments could be declared as surplus and considered for use in any future mine units. The Company stated (June, 1987) that due to inherent weakness in the crushers supplied by HEC and the likely production losses during repair periods, provision of 2nd crusher line at Bailadila-5 had been helpful.

The Ministry further stated (January, 1989) that provision for spare crushing line was essential as it was an export oriented project and investment on spare crushing line was insignificant as compared to the loss of foreign exchange in case spare line was not installed.

5.3 DONIMALAI IRON ORE PROJECT

5.3.1 The project was orginally sanctioned in 1971 at an estimate of Rs.1945.56 lakhs. The construction was commenced in May-August 1972 and the project was commissioned in 1977. The estimates were revised to Rs. 4118.47 lakhs in 1978.

5.3.2 The principal factors that contributed to the increase in the estimates were - change in scope of work (Rs.339.15 lakhs), increase in quantities and prices (Rs.679.20 lakhs), increase in establishment expenses and interest on capital consequent on extension of time schedule (Rs.531.63 lakhs), items not provided for in DPR including Fine Ore Handling Plant (Rs.603.44 lakhs)and others (Rs. 74.49 lakhs). Savings of Rs.55.0 lakhs was estimated on some items. While the increase in the total cost of the project was about 112 per cent, increase in respect of establishment charges Head Office expenses, interest on capital was about 288 per cent which was due to delay in completion of the project.

6. PRODUCTION PERFORMANCE OF IRON ORE PROJECTS

6.1 Bailadila Iron Ore Project 14

A reference is invited to para 5.21 and 5.22 of Audit Report (Commercial) 1970 Part IV wherein it was pointed out that during the Ist year of production, the production was much below the rated capacity of 4 million tonnes of lump ore and the percentage of fines was of the order of 35.1 of the production of Run of Mine as compared to 25 per cent envisaged in the detailed project report.

While considering the above Report, Committee on Public Undertakings had also observed in their 37th Report Fifth Lok Sabha (1972-73) that the production in Bailadila even after four years (upto 1971-72) of commissioning of the plant had been below the original target of 4 million tonnes and the percentage of lump ore recovered did not exceed 65 per cent as compared 75 per cent envisaged in the Project Report. In view of above the committee had recommended that the Management should spare no pains to increase recovery of lump ore and enhance efficiency in production in order to improve the economics of the project.

It was, however, seen that the production in Bailadila Iron Ore Project 14 did not improve in the subsequent years also as the actual production of lump ore was 58 to 69 per cent (Annexure 3) during 1972-73 to 1987-88 as compared to 75 per cent envisaged in the detailed project report.

The Company had, however, constituted different committees in June 1970, 1975 and May 1977 to study the achievable rated capacity and to suggest methods for achieving the rated capacity. On the recommendation of first committee, certain mining equipments were purchased and dumper platform was strengthened at a cost of Rs. 171.48 lakhs but there was no improvement in the production performance as indicated below:-

	Production before implementation 1970-71	Production after implementation 1974-75
	(In lakh tonnes)	
Excavation	36.63	36.82
ROM	35.47	33.55
Lump ore	22.20	19.96

The recommendation of Second Committee were considered by Board of Directors in April 1976 and it was decided that further study should be made on the neighbouring ore bodies to optimise the utilisation of Bailadila 14 plant.

The Third Committee constituted in May 1977 observed (April 1978) that taking into consideration both geological and geometrical factors the maximum achievable capacity of the mine would be 2.00 to 2.3 million tonnes of lump ore annually during the year 1978-79 to 1982-83.

The Bureau of Industrial Costs and Prices (BICP) which also conducted the detailed studies on payment of prices of Iron ore to NMDC determined (December 1981 and August 1984) the achievable capacity of mine as 23.70 lakh tonnes of lump ore annually during 1981-82 to 1983-84 and

19.0 lakh tonnes of lump ore annually during 1984-85 to 1986-87.

Thus the project commissioned to produce 4 million tonnes of lump ore with a capital investment of Rs.27.95 crores had never attained the rated capacity. The reinforcement of the mining equipment with an investment of Rs.171.48 lakhs did not also improve the productivity of mine.

Moreover, as the maximum feed (i.e., ROM) to crushing plant since inception was recorded @ 75 per cent of the designed capacity in 1975-76 and 1980-81, the facilities created in crushing, screening and ore handling/loading sections of the plant remained unutilised by 25 per cent in addition to the over-designing of crushing section with the second line of crusher as standby at a cost of Rs.170 lakhs.

The Management/Ministry stated (December, 1988) that the DPR projections based on limited tests/drillings were not sufficient for assessing the actual production in future years.

6.2 Bailadila Iron Ore Project-5

6.2.1 Bailadila-5 Iron Ore Mine was designed to produce annually 6 million tonnes of run of mine (ROM) ore yielding 4 million tonnes of lump ore (at 66.7 per cent recovery), 1.4 million tonnes of fines and the balance as slime waste. But the BICP taking into account the operating efficiency of plant and equipments and the manpower, determined (December 1981 and August 1984) the annual achievable capacity of lump ore as 35 lakh tonnes (62.5 per cent of ROM of 56 lakh tonnes) for three years from 1981-82 to 1983-84 and 36 lakh tonnes (60 per cent of ROM of 60 lakh tonnes) of lump ore for 1985-86 to 1986-87.

6.2.2 In actual operation the lump ore recovery ranged between 48 to 64 per cent since inception except in the year 1981-82 when it was 70 per cent. The low recovery was stated (April 1983) to be due to increase in generation of more fines which ranged between 26-38 per cent (Annexure 4) on account of ore body and the long conveying system existed in the project.

6.2.3 A technical Committee appointed (June 1984) by the Company to assess the realistic achievable capacity of the mine under existing conditions, also reported that at higher through put and selective mining, lump ore production could be maintained around 30 lakh tonnes at recovery rate of 60 per cent of ROM for a few years although for smooth throughput the lumpore production could be around 28 lakh tonnes only at the recovery rate of 55 per cent of ROM.

6.2.4 In this connection, a reference is invited to para 5.2 wherein it was brought out that the project designed for annual rated capacity of 40 lakh tonnes of lump ore at a total estimated cost of Rs.67.49 crores had to settle down for a low capacity due to design deficiencies in mine, plant and equipments and inferior quality of plant equipments supplied by indigenous manufacturers/suppliers.

6.2.5 The Company decided (September, 1984) to engage Metchem, Canada, an expert consultant for examining and assessing the problems of the entire plant specially with reference to the problems faced in downhill conveyor system

and primary and secondary crusher in two phases. The Company appointed the consultant (July, 1985) to undertake the job under Phase-I at an estimated cost of Rs.11.62 lakhs (inclusive of foreign exchange component of Rs.8.17 lakhs) for (i) detailed investigation of downhill conveyor systems, conveyors 28 and 29 providing an appraisal estimate of the capital cost for an alternative solution, (ii) identification of problems in primary crushers and apron feeders and (iii) general advice on plant problems.

6.2.6 On receipt of the report of consultants (March 1986) it was found that they were not able to suggest a definite solution to the problems in the primary crushers and that the recommendations were in the nature of conceptual solutions which were required to be amplified in greater details for taking investment decision. The proposal to award the second stage of consultancy to Metchem at an estimated cost of Rs.143 lakhs (inclusive of foreign exchange component of Rs.79.57 lakhs) was approved by the Board in November, 1986 and by the Government in January, 1987. The Company entered into an agreement with the firm (31st January, 1987) to submit the report within 24 months. The same was awaited (December, 1988).

The Management/Ministry stated (December, 1988) that due to limited drilling conducted at the time of DPR it could not assess the exact recovery rate of lump ore. Actual lump recovery was low as a large number of transfer points were involved due to long conveyor system.

6.3 DONIMALAI IRON ORE PROJECT

6.3.1 The production pattern envisaged in the detailed project report (September 1968) of 17.5 lakh tonnes each for lump ore and fines was changed to 16 lakh tonnes of lump ore and 20 lakh tonnes of fines in 1975 to improve the economic viability of the project. The BICP in their reports (December, 1981 and August, 1984) taking into account the geological factors, plant equipment performance and infrastructure factilities, determined the achievable capacity as 15.58 lakh tonnes of lump ore and 15.95 lakh tonnes of fines for the years 1981-82 to 1983-84 and 18.80 lakh tonnes of lump ore and 16.20 lakh tonnes of fines for the years 1984-85 to 1986-87.The project was, however, never operated at rated capacity (see Annexure-2) due to following reasons:

- No firm long term contract for sale of iron ore were entered into before commissioning the mine.

- The ore produced was found to be containing higher percentage of alumina and phosphorous content compared to projections in DPR.

- Availability of rail movement to a capacity of 6 to 8 lakh tonnes only to this project from the Railways against rated capacity of 36 lakhs tonnes of lump ore and fines of the project upto 1983-84 and available capacity to the extent of 25 lakh tonnes only, there after against enhance capacity of 50 lakh tonnes provided by Railway authorities

6.3.2 The DPR envisaged the ratio of ROM and waste at 1:0.26 in the total excavation. However, in actual operation, the ratio was

1:0.44. The increase of waste mining necessitated acquistion of additional machinery/equipment.

6.3.3 Thus due to absence of marketing tie-up and the matching infrastructure facilities, huge investment made in the project could not be economically made use of.

The Ministry stated (December, 1988) that the international market position underwent a major change with a slump in the steel industry all over the world which was not anticipated. Production of ore in excess of or less would have not been feasible as there was no large stock piling capacity.

6.3.4 The BICP in their report (December 1981/1984) recommended the output per manshift for total excavation and ROM as 9.6 tonnes and 5.6 tonnes respectively for the years 1983-84 to 1986-87 against which the actual output per manshift in respect of excavation ranged between 7.3 and 9.68 tonnes and in respect of ROM between 4.19 - 6.73 tonnes during the period.

6.3.5 The low OMS in respect of ROM was due to huge quantity of waste mining done during these years. The DPR envisaged the waste mining at 35 per cent of ROM against which the actuals for the Six years ended 31st March 1988 ranged between 46-218 per cent. It was stated (March 1984) by the Company that huge quantity of waste mining was done in order to avoid the mining equipment remaining unutilised.

7. PLANT AND EQUIPMENT PERFORMANCE IN IRON ORE PROJECTS

7.1. The mining operations are done through heavy duty mining equipments namely, blast-hole drills, shovels and dumpers. The Company did not fix norms for operation of these equipments. For recommending the price to be charged to the operations on standard cost basis, the BICP had fixed (December, 1981 and August 1984) projectwise norms of operations of these equipments taking into account the norms of operation envisaged in DPRs, 'All India Average' norms observed in mechanised iron ore mines in the country, the 'Best' norms of operation and the norms recommended in 1973 by Uniform Cost Committee of the SAIL for all the opencast mines and the sectional mining constraints and existing conditions of mining equipments in the NMDC projects. In the absence of any alternative, the prices fixed by the BICP were accepted by the Company but the norms of operational efficiency of the mining equipments and plant etc. adopted in arriving at the recommended prices were contested by NMDC to be on the high side. The Ministry stated (January 1989) the Company felt norms to be stringent and the matter was discussed with BICP in August 1986, September 1986 and January 1987 ..... it was felt that instead of pursuing this matter with BICP in respect of stringency of norms, it could be more appropriate if the issue of standard price be finalised at the earliest and it was this matter which was pursued further.

7.2 The details of actual performance of equipments in the project vis-a-vis the norms during five years ended 31st March, 1988 are given in Annexure-5.

7.2.1 Bailadila Deposit - 14

The percentage of utilisation was less than the norms in respect of all the equipments. The under-utilisation was attributed by the Company (1982) to the restricted face length of mining benches, limited bench area and appearance of shale/waste band in the deposit due to topographical factors and gradual depletion of the mine. The Company stated (June 1987) that the norms recommended by BICP would have been achieved but for maintaining the quality of the ore for export purpose. It may, however, be pointed out that the BICP had considered the deposit limitations and the past performance of equipments to analyse the factors affecting the performance before fixing the norms.

7.2.2 Bailadila Deposit-5

7.2.2.1 The details (annexure-5) reveal that (i) the percentage of availability was less than the norms except dumpers in 1987-88 against 'All India Average' norms and (ii) the percentage of utilisation was also less than the norms in respect of all the equipments. The reasons for low availability and under utilisation were as follows:

- the low availability of blast hole drill was due to 'breakdown in certain parts of equipments.

- the low availability of dum-

pers was due to frequent failures of engines supplied by Cummins Columbus USA and also due to development of a rippled patch in the haul road which caused excessive damage to the dumper, differential housing, body/cabin suspension system and engine parts.

- the low utilisation of shovels was due to low availability of dumpers and abnormal plant stoppage.

7.2.2.2 In spite of the fact that the company had been replacing the outlived equipment and identifying the causes for low utilisation of capacities created, the low availability and under utilisation continued.

7.2.2.3 The company stated (June 1987) that in order to ensure high grade of ore, the project had been adopting selective mining which resulted in low utilisation of the equipments.

7.2.3 Donimalai Project

7.2.3.1 The details (Annexure 5) reveal that the percentage of utilisation was less than the norms in respect of blast-hole drills, diesel shovels and dumpers during all these years (except shovel 4.6 BKS and dumpers 35 T in 1986-87 and 1987-88 against all India Average' norms) and the availability was also less than norms during all the years. The low utilisation was mainly due to the operation of the mine at lower capacity in the absence of any sale-tie-up matching with the facilities created by the company. The BICP stated (December 1981 and August 1984) that the abnormal breakdown in dumpers was due to mechanical troubles and the same were controllable.

7.2.3.2 The Company/Ministry stated (June 1987/December 1988) that the BICP had assumed high norms compared to the norms achieved in similar mines in the country.

7.3 Plant Performance

7.3.1 The BICP in their reports also provided norms of operation for crushing and screening plants in the projects for the years 1981-82 to 1986-87. The details of actual performance vis-a-vis the norms in respect of the three iron ore projects during five years ended 31st March, 1988 are given in the annexure-6 (adopting BICP figures for 1986-87 and 1987-88 also). The reasons for low availability and under-utilisation of the plants are given below:

BIOP - 14 AND DIOP

7.3.2 Though availability compared favourably with the norms, the excess idleness was due to under-utilisation of the mining/haulage equipments namely, drills, shovels and dumpers used for feeding the ore to the ore dressing plants.

BIOP - 5

7.3.3 The low availability of plants in certain years and under utilisation of plants in all the years were due to design deficiencies in mine and plant equipments and inherent defects in plant equipments and under-utilisation of heavy mining equipments. The company stated (June 1987) that the assumptions of BICP were not correct.

8. IMBALANCE IN SECTIONAL CAPACITIES

8.1 The DPRs of the projects envisaged daily ROM production of the mines as 22000 tonnes and 24,000 tonnes in respect of BIOP-14 and BIOP-5 respectively and 14,200 tonnes in respect of DIOP which the projects were never able to achieve. For working out the standard costs in respect of NMDC mines, the BICP in their reports (December 1981 and August, 1984) assumed the norms of achievable capacity of various mining sections of the projects and based on the limiting sectional capacity and also the topographical factors in BIOP-14, fixed the over all daily achievable capacity of the respective mines for the years 1981-82 to 1986-87. The actual performance vis-a-vis the norm, the underutilisation of the capacities and percentages thereof are detailed in Annexure-7.

8.2 It will be seen therefrom that :-

(i) the capacity of ore dressing was more than what dumpers could transport (ii) while 18000 MT of ore could be drilled during the year, the loading capacity of shovels was only 17,200 MT and that of dumpers was still less. Due to such imbalance of capacity, there was no possibility of full utilisation of section with higher capacity. The actual production from mines was still lower in various mining sections of the projects.

Even though the existing capacity was not fully utilised, the Company purchased a shovel at a cost of Rs.69.84 lakhs (January 1985) and increased the daily loading capacity to 25,500 tonnes. The maximum loading achieved did not register significant increase after January 1985. This rendered the entire investment of Rs.69.84 lakhs as infructuous.

8.3.1 The revised production pattern envisaged the exploitation of 20 lakh tonnes of fines per annum (September, 1975) for which a fine ore handling system was constructed (December 1979) at a cost of Rs.206.69 lakhs to handle 1,000 tonnes of fine ore per hour. Taking into account the scheduled available hours for ore dressing plant during the year 1985-86 and the BICP norms of utilisation, the capacity of the fine ore handling system worked out to 36 lakh tonnes per year. The Company stated (December 1988) that the capacity of Fine Ore handling plant is decided by weight of ore per rake and permissible loading time and taking these factors the capacity of the system has to be taken as 20 lakh tonnes per annum.

8.3.2 Moreover, due to dropping of Donimalai Pelletis-ation plant and absence of sale contract, the actual production of fines ranged between 3.58-15.81 lakh tonnes per annum and sales ranged between 1.41-11.02 lakh tonnes during 1978-79 to 1987-88. Thus, the fine ore handling system could be utilised only upto 30.61 per cent of its capacity.

The Company stated (June 1987) that the fine ore handling system was designed taking into account the surge loads. In this connection it may be pointed out that the overall achievable capacity of the mine covered the surge loads capacity also.

8.3.3.In the absence of adequate

market, the quantity of fines not sold was dumped into a valley; the quantity dumped upto 31st March, 1988 was 10.81 lakh tonnes. As the present system of handling is not designed to reclaim the dumped fines, 4.41 lakh tonnes of fines were reclaimed manually during 1980-81 to 1987-88 and transported to the loading plant by incurring an expenditure of Rs.8.47 lakhs.

9. LABOUR UTILISATION

The labour utilisation in respect of three iron ore projects was observed as under:

9.1 Bailadila Iron Ore Project-14

Although the production of lump ore was only about 2 million tonnes per year against the capacity of 4 million tonnes per year, the actual man power employed was 1546 in April, 1970 and 1918 in March 1988 against the staff strength of 1000 envisaged in DPR.

9.1.2 The incidence of payment and benefit per tonne of production at Bailadila-14 during the period 1981-82 to 1987-88 increased from Rs.7.68 to Rs.20.38 against the BICP norm of Rs.5.18 (1981-82) to Rs. 12.37 (1987-88).

9.2 Bailadila Iron Ore Project-5

While the production of lump ore never exceeded 31.10 lakh tonnes per year (1981-82), the number of employees increased from 1702 in 1977-78 to 1950 in 1987-88 against a strength of 1400 envisaged in the DPR for production of 40 lakh tonnes per year of lump ore.

9.2.2 The incidence of payment of benefit per tonne of production increased from Rs.8.90 in 1980-81 to Rs.19.88 in 1987-88 against the BICP norm of Rs.5.62 in 1980-81 to Rs.7.64 in 1987-88.

9.3 Donimalai Iron Ore Project

The DPR indicated the manpower requirement of the project as 1200 persons at the production stage. Due to change in production pattern of the plant, the Company sanctioned (Janaury 1976) 1445 employees for attaining the rated capacity of the project. However, since inception, the project was operated on single shift upto 31st August, 1985, and started double shift operation from September, 1985. The actual strength of employees which was 1111 numbers at the end of 31st March, 1978, increased to 1511 employees at the end of 31st March, 1988.

The company stated (June, 1987) that the staff strength in mechanised mine could not come down with reduced production.

9.3.2 The incidence of payments and benefits per tonne of production (lump and fines) ranged from Rs.13.51 in 1981-82 to Rs.26.28 in 1987-88 against BICP norm of Rs.5.55 in 1981-82 to Rs. 7.91 in 1987-88.

The company had not analysed the man hour utilisation in the projects to control the excess man power and to improve the optimum economical utilisation of manpower deployed in the project.

10. DIAMOND MINING PROJECT, PANNA

10.1 Government assigned in December 1959 the Diamond Mining Project, Panna to NMDC for development with a tentative production target of 90,000 carats of diamond per annum during third Five Year Plan. The final revised scheme envisaging revival of diamond deposits at Ramkheria and Majhgawan for exploitation with production capacity of 11,250 carats and 12,000 carats at a capital investment of Rs.68.0 lakhs and Rs.105.0 lakhs respectively was approved by Government in December, 1967. The mines were commissioned in 1968-69 at a total capital cost of Rs.183.28 lakhs.

10.2 Ramkheria Mine

10.2.1 The COPU which examined the various aspects relating to the project on Ramkheria Mine observed in para 7.21 of its 37th Report (1972-73 - Fifth Lok Sabha) as follows:-

"The Committee takes a serious view of the undue haste with which the mine was taken up for exploitation without a thorough and careful techno-economic study of the project resulting in an infructuous expenditure .

The Committee strongly recommended that the entire matter should be thoroughly investigated by the Government as to the quantum of the loss and the responsibility for such costly lapses be also fixed".

As no action was taken by Government on the above lines, the COPU in para 38 of 60th Report (Fifth Lok Sabha April 1975) reiterated that the entire matter be thoroughly investigated and the responsibility for the loss fixed.

10.2.2 The company finally closed the mine from June 1980 and suffered loss of Rs.158.87 lakhs between 1973-74 to 1980-81 due to delay in taking decision to close mine.

During the above period the actual production was markedly poor as shown below against the designed capacity of 11,250 carats per year.

Year	Actual Production (Carats)
1973-74	1613
1974-75	2032
1975-76	2344
1976-77	1762
1977-78	2230
1978-79	1894
1979-80	711
1980-81	38

Though the Ramkheria mine was closed in June 1980, the mine and its township were kept under care and maintenance upto July, 1985 incurring an expenditure of Rs. 41.23 lakhs from July 1980 to 31 March, 1985.

10.3 Majhgawan Mine

10.3.1 The Scheme approved in December 1967 envisaged production capcity of the mine at 12,000 carats of diamonds out of treatment of 1.2 lakh tonnes of tuff.

10.3.2 To increase the production capacity from 12,000 Carats to 15,000 carats of diamonds out

of treatment of 1.5 lakh tonnes of tuff, an expansion scheme was taken up in May 1981 with an estimate of capital investment of Rs.47.84 lakhs revised to Rs.58.34 lakhs in November 1983. The scheme expected to be completed by March 1982 was actually completed in November 1982 at a total capital cost of Rs.55 lakhs. Though the cost of expansion (47.84 lakhs) was anticipated to be recovered within 3 years and 3 months with anticipated increase in income of Rs.14.80 lakhs per annum, same could not be recovered as the Diamond Mining Project Panna incurred the loss as under:

Year	Rs. in Crores
1984-85	1.62
1985-86	1.91
1986-87	1.69
1987-88	1.35

10.4 Production capacity, Targets and Achievements

The installed capacity of mine was fixed based on the treatment capacity of the plant and assuming the average incidence of diamonds at 10 carats per 100 tonnes of tuff. The following table gives the details of installed capacity, original, revised targets and actuals in respect of diamonds produced during five years ended 31st March, 1988.

Year ended 31st March	Installed Capacity	Budgets		Actuals
		Original	Revised	
		(in carats)		
1984	15000	16500	16000	13416
1985	15000	16000	15000	14978
1986	15000	15000	15000	15919
1987	15000	15000	15000	15190
1988	15000	15000	15500	15824

10.5 Sales

10.5.1 The reserve prices for diamonds are fixed by Diamond Valuation Officer of the Project keeping in view the characteristics like colour, clarity, shape and weight etc. The diamonds are sold in uncut shape in public auctions (from March 1964) periodically at various centres in the country. The company also introduced in September 1976 sale by inviting sealed tenders in some cases. The pieces, which did not secure the reserve prices in auctions were sold by inviting sealed tenders.

10.5.2 The following table gives the details of diamonds available for sale and the quantity sold during the five years ended 31st March, 1988:

Year	Opening balance	Production for the year	Quantity available for sale	Quantity sold	Percentage of of quantity sold to quantity available
		(in carats)			
1983-84	5220	13416	18636	12618	68
1984-85	6018	14978	20996	14368	68
1985-86	6628	15819	22447	16006	71
1986-87	6441	15190	21631	15249	70
1987-88	6382	15824	22206	16966	76

10.5.3 The table below gives the details of actual sales vis-a-vis the budgets for the five years ended 31st March, 1988:-

Year ended	BUDGETS: Original Quantity (carats)	Original Value (Rs. in lakhs)	Original Realisation per carat (Rs.)	Revised Quantity (carats)	Revised Value (Rs. in lakhs)	Revised Realisation per carat (Ruppes)	Actuals Quantity (carats)	Actuals Value (Rs. in lakhs)	Actuals Realisation per carat (Rs.)
1984	15,000	185.00	1,233	15,000	180.00	1,200	12,618	146.27	1,159
1985	15,000	180.00	1,200	15,000	295.00	1,500	14,368	216.40	1,506
1986	15,000	225.00	1,500	16,000	200.00	1,250	16,006	211.61	1,322
1987	16,000	200.00	1,250	16,000	200.00	1,250	15,249	267.06	1,751
1988	16,000	200.00	1,250	16,000	200.00	1,250	16,966	310.23	1,828

10.5.4 The Company attributed the shortfall in quantity sold and the sale realisation during five years ending March 1988 to the sluggish market conditions and lack of demand for costlier and bigger diamonds.

10.5.5 To improve the sales realisation, the company decided (November 1983) to get some diamonds cut and polished through outside agency as necessary expertise was not available with the company and put the same to auction on trial basis. Accordingly four pieces of diamonds were cut and polished into eight pieces weighing 4.29 carats which were put to sale in March 1985 and the company could sell only one piece weighing 0.41 carat at a premium of about 50%. The balance seven pieces were also sold by December 1987 and the amount realised was less than the price of rough diamonds.

10.5.6The main conditions for the sale of diamonds as incorporated in the mining lease deed of the Company with the Government of Madhya Pradesh were that

the Company would arrange disposal of diamonds by public auction and/or invitation of tenders at suitable intervals at Panna, Bombay etc. The Company conceded (July, 1986) that in respect of sales through auction, the customers tend to form cartel and jeopardize the scope of getting higher prices through bidding. The Company has therefore, approached (June 1986) the State Government to modify the lease conditions to provide for "retail sale" directly by NMDC or through Hindustan Diamond Corporation/MMTC . State Government's approval was awaited (April 1988)

10.6 Plant and Equipment Utilisation

10.6.1 The Company had not fixed any norms of operation in respect of plant and heavy mining equipments of diamond mining project.

10.6.2 The details of performance of plant and mining equipments during the five years ended 31st March, 1988 are given in Annexure 8

10.6.3 In the absence of norms, the performance efficiency of plant and mining equipment could not however, be evaluated.

10.6.4 The Company stated (June 1987) that the low availability was due to equipments having outlived their normal life and the constraints in procuring the spares in time. The under-utilisation was stated to be due to grade/ quality aspects of the feed to the plant.

10.7 Labour Utilisation

10.7.1 The diamond mining revival scheme (December 1967) did not provide for the actual requirement of manpower in both the mines at Ramkheria and Majhgawan. Consequent upon the decision to close the Ramkheria Mine the study conducted (December 1978) by the Industrial Engineering Unit of the Company showed that Majhgawan Mine and Panna Office required only 607 employees against the actual strength of 780 employees. Accordingly the company introduced a voluntary retirement scheme with effect from 15th May, 1979 and kept it open upto 31st March, 1980, 327 daily workers opted for voluntary retirement.

10.7.2 Due to transfer of employees from Ramkheria Mine to Majhgawan Mine/Panna Office and the employees kept at Ramkheria Mine for care and maintenance, the actual men-in-position in the project were much more than the requirement of Majhgawan Mine and Panna Office.

10.7.3 The table below gives the details of actual men-in-position in the project vis-a-vis the requirements and incidence of payments and benefits to surplus staff during the five years ended 31st March, 1988:-

Details	1984	1985	1986	1987	1988
1	2	3	4	5	6
i) Total men-in position	787	759	756	753	735
ii) Actual requirements as per industrial engineering unit recommendations.	607	607	607	607	607

1		2	3	4	5	6
iii)	Surplus men-in-position (Col.(i)-(ii)	180	152	149	146	120
iv)	Total payments and benefits to employees (Rs. in lakhs) (Excluding over time)	130.99	147.05	165.30	179.79	210.19
v)	Incidence of payments per employee (Col.iv-i)	16644	19375	21843	23876	28597
vi)	Incidence of payments to surplus staff (Rs. in lakhs) Col. iii x v)	29.96	29.45	32.55	34.86	36.60

Total Rs. 163.42 lakhs

10.7.4 The Company stated (June 1987) that the Majhgawan Mine and Panna required additional manpower to the extent of 60 persons from 1983 for which no extra sanction was obtained and the requirement was met from the surplus staff.

10.7.5 In this connection, it is relevant to mention that the project did not expand its activities from 1983 onwards and the expansion scheme (completed in November 1982) contemplated procurement of one loader, two tippers and one water tanker and construction of water treatment plant. These facilities did not require additional manpower to the extent of 60 persons.

10.7.6 A revised voluntary retirement scheme providing for additional compensation over the earlier scheme to induce more number of employees to opt for voluntary retirement was introduced from 17th July, 1984 and was kept open upto 31st December, 1984. Only 25 employees opted for retirement and company paid compensation amounting to Rs. 5.59 lakhs. The Company introduced another voluntary retirement scheme for muster roll employees from 28th September, 1987 and kept it open upto 27th February, 1988.

10.7.7 The percentage of mandays lost to mandays available was ranging between 9.81 (1982-83) to 14.35 (1987-88) during last five years ended 31st March, 1988. The OMS in respect of tuff mined, tuff treated and the diamond production had been ranging between 0.505 to 0.621, 0.393 to 0.591 and 0.046 to 0.063 respectively during this period. The incidence of payments and benefits to employees per carat of diamond recovered increased from Rs.606.00 to Rs.1141.00 in the last four years ended 31st March, 1988.

The project had not been analysing the manpower utilisation.

11. PRICING POLICY AND SALES

11.1 The iron ore produced in Bailadila Mines is exported through MMTC, the canalising agent. The sale price demanded and received by NMDC in respect of these exports has been a subject matter of dispute and dialogues over a number of years between MMTC and NMDC.

The matter regarding payment of price by MMTC for NMDC's iron ore during the recent years was considered by committee of secretaries chaired by Cabinet Secretary in April, 1983. The committee inter-alia decided that MMTC would pay to NMDC, the cost of production as determined by BICP from 1983-84.

NMDC, however, continued to receive the residual price. The committee of secretaries in their meeting held in March 1986 re-iterated that NMDC should be paid by MMTC, for the iron ore supplies, at standard cost worked out by BICP. With effect from June 1986, MMTC started paying NMDC on basis of standard cost worked out by BICP for the year 1983-84. In March, 1987, BICP submitted a report indicating standard cost in respect of Bailadila for the years 1984-85, 1985-86 and 1986-87 and also the escalation for the year 1986-87 in respect of Donimalai taking the standard cost worked out by them for the year 1983-84 as the base. Based on the report submitted by BICP, Secretary (Expenditure) recommended (February, 1988) that (i) all agencies engaged in iron ore export should be given a fair price; (ii) all the agencies may be paid the standard cost without return on investment worked out by BICP for the year 1986-87, during the period April 1986 to March 1989.

The annual report of the company stated (September, 1988) that these recommendations were also not implemented by MMTC and NMDC continued receiving the standard cost fixed in 1983-84.

The Board of Directors was informed (December, 1988) that MMTC had started paying the price at the revised rates recommended by BICP with effect from 1.11.1988. For earlier period, the matter was stated to be under discussion.

11.2 The Bailadila mines were commissioned to exploit lump ores only. As there was no market for fines till 1980-81, Japanese Steel Mills Association (J.S.M) and South Korea started taking small quantities of fine ore from 1980-81 onwards and despatches were made from BIOP-14. The fines remaining unsold were dumped in a valley.

The table below indicates the quantity of fines produced, quantity sold and quantity dumped in a valley from 1968-69 to 1987-88

Year	Fines produced (Quantity in lakh tonnes)	Fines sold	Fines dumped
1	2	3	4
From 1968-69 to 1979-80	153.12	-	153.12
1980-81	20.50	7.83	12.67

1	2	3	4
1981-82	22.10	7.00	15.10
1982-83	23.02	3.19	19.83
1983-84	18.47	3.61	14.86
1984-85	22.24	5.55	16.69
1985-86	19.93	10.19	9.74
1986-87	25.85	18.67	7.18
1987-88	28.41	16.50	11.91
			261.10

11.3 Donimalai Project

The absence of long term sale contract upto 1983-84, the inadequate rail movement capacity in Bellary Hospet to Madras line and port handling capacity at Madras Outer Harbour have been dealt with under 'Production Performance' of DIOP

11.3.2 Targets and Achievements

The following table gives the targets and actuals of sales for the project during five years ended 31st March, 1988:

	Designed Capacity	BUDGET Original Qty.	Original Value	Revised Qty.	Revised Value	Actual Qty.	Actual Value
		(Qty. in lakh tonnes and value in Rs. in lakhs)					
DIOP Lump Ore and Fines							
1983-84	36.00	15.00	732.86	8.80	764.72	10.75	556.42
1984-85	36.00	15.00	632.52	16.00	581.00	19.68	935.53
1985-86	36.00	15.00	613.00	18.00	858.00	24.41	1304.63
1986-87	36.00	18.00	858.00	20.00	933.00	26.51	1857.39
1987-88	36.00	20.00	933.00	25.00	1567.00	23.05	1646.67

11.3.3 MMTC entered into a long term ten years contract with JSM on 9th December, 1983 for export of 34.6 million tonnes of lump ore and fines from the year 1984-85, which included 20.8 million tonnes

of Donimalai Ore. Besides the export against this long term contract, MMTC had been taking additional quantities on adhoc basis on occasions when there was short supply of ore from private miners.

11.3.4 While the prices in respect of lump ore were paid at par with the rates paid to private miners, the prices in respect of fines were paid on 'residual' basis i.e., after setting off all the selling expenses from the FOB sale realisation from foreign buyers.

11.3.5 The following points were noticed:

Lump Ore : The price in respect of lump ore was paid on FOR project railway siding. From the year 1980-81, MMTC started charging for 'clearing the ore handling system' at Madras Port and these charges were increased from Rs.0.55 per MT to Rs.1.00 per MT from 5th December, 1983 as fixed by Madras Port Trust. The total recovery from 1980-81 to 1983-84 worked out to Rs.7.42 lakhs.

Company disputed the recovery on the grounds that:

- No such recovery was effected from the private miners;
- the lump ore prices were fixed on FOR project Railway Siding: and
- the clearing charges were not on actual basis and the amount recovered was exhorbitant compared to the actual expenditure.

MMTC had not refunded the amount (April 1988). The Ministry stated (December 1988) that the Ministry of Commerce would be requested to urge MMTC for early settlement of this dispute.

12. EXPANSION AND MODIFICATION SCHEMES

12.1 Bailadila-14 (Expansion and Modification)

12.1.1 As the Bailadila Iron Ore Deposit-14 was depleting, in May, 1978 a scheme was prepared at an estimated cost of Rs.9.90 crores to develop an adjoining Deposit-11/C with an initial production of 3.3 million tonnes of ROM to be stepped up to about 5 million tonnes in the second phase as a supplementary/replacement of Deposit-14.

12.1.2 The justification for this scheme was that with out development of the supplementary deposit-11/C the cost of production of Bailadila-14 would be very high and the men and equipment would remain unutilised. Further, the combined cost of production of Deposits-11/C and 14 was expected to be Rs.30.85 per tonne against Rs. 74.44 per tonne for the existing Bailadila deposit-14. The estimated cost of the project finally revised to Rs.29.52 crores was approved by the Government in October, 1986 against which an expenditure of Rs.30.89 crores was incurred upto March 1988. This did not include Rs. 403.64 lakhs being the expenditure incurred on installing second crusher line.

12.1.3 The increase in the estimates was mainly attributed to upward revision on account of increase in prices of Steel and Cement, labour charges payable to Hindustan Steel Construction Limited contractors for civil and structural works, ALIND contractors for mechanical works, wage revision, upward revisions for reimbursement of POL charges, revision of establishment charges, Head Office expenses and interest on capital during construction period due to time over-run.

12.1.4 There were delays in execution of different item of works, ranging from 12 months to 45 months.

12.1.5 The lump ore and fines produced are to be exported or in the alternative sold/transferred to the Vizag Steel plant/ proposed pellet plant of the Company at Bailadila. Originally an average loss of Rs.13.20 per tonne (as against Rs.7.99 per tonne expected during first revision) in case of exports and an average profit of Rs.4.21 per tonne (as against Rs.3.75 expected during I revision) in case of sale/transfer of fines at cost to Vizag Steel Plant and/or the pellet plant at Bailadila was anticipated. However, the average loss per tonne during 1987-88 was Rs.20.30 per tonne. The Ministry stated (December, 1988) that the time and cost over-run of Bailadila was unavoidable and had already been gone into by the Government.

12.1.6 Tenders invited in January 1981 and March, 1981 for i) civil and structural works for primary crushing, building and dumper platform in Bailadila expansion and modification and ii) design, engineering, supply, erection and commissioning of conveyors system etc., were opened on 18th March 1981 and 31st August, 1981 respectively. The tender scrutiny committee constituted on 8th September 1981 recommended the acceptance of the lowest offer of Aluminium Industries (Private) Limited, Hyderabad (ALIND) for Rs.714.61 lakhs for mechanical and electrical portions. In regard to civil and structural works, the committee suggested delinking of civil works from their quotation. The Chairman suggested negotiations with Hindustan Steel Construction Limited

(HSCL), a Government of India Undertaking, who evinced interest in this work although they did not submit any tender. Accordingly, a committee negotiated (February, 1982) with HSCL and recommended entrusting of the civil works portion of both the works at cost of Rs.5.11 crores subject to the price payable to them being restricted to 10 per cent above the lowest acceptable quotations i.e. Rs.5.11 crores excluding the proposed escalations on POL and Minimum wages. Since the award of work at this cost was expected to result in the total cost of the project exceeding the overall cost of the project sanctioned by the Government of India, it was decided (March, 1982) to refer the matter to the Government for approval. The Government asked (March, 1983) the Company to examine the proposal afresh. In pursuance of the directives of the Government, negotiations were held with HSCL who finally confirmed (April 1983) their acceptance of work at Rs.5.11 crores plus escalations for POL and labour from Ist January, 1982 onwards. Thus (i) delinking the civil works with mechanical works in two tenders and inducting HSCL in February, 1982, and (ii) obtaining the Government's approval in March, 1983 for increase in project cost due to award of work to HSCL resulted not only in delay in execution of the project, but also in increase in project cost by Rs.93 lakhs in addition to the escalations on account of POL & Labour to an extent of Rs.43.66 lakhs.

12.1.7 The Company stated (June, 1987) that preference was given to HSCL on account of their technical competence. If that was the case when the company invited quotations for works in March, 1981 and HSCL had also purchased the tender documents, NMDC could have persuaded HSCL in 1981 itself after evaluating the tenders for taking up the job, which would have saved the escalation in cost of construction, POL, Labour, etc.

12.1.8 HSCL was also given a mobilisation advance of Rs.102.20 lakhs being 20 per cent of the value of the contract in equal instalments on 30th June, 1983 and 29th August, 1983. The impact of this on the cost of the works could not be ascertained as it was adjustable from the running bills.

The progress of work done by HSCL upto the end of November, 1988 was as follows:

Items	Total Quantity	Quantity actually completed
Concreting (M^3)	28445	29,092
Structural fabrication (T)	3,370-	3,249
Structural erection (T)	3,370	2,687

12.1.9 The total quantity of earthwork and concreting have been revised on receipt of construction drawings from HSCL . The poor progress was stated to be mainly due to shortage of manpower employed and inadequate construction equipment. The matter had been taken up (March, 1986) with HSCL and a joint programme was drawn up for completion of civil/structural works by July, 1986. Inspite of this, in view of lack of progress on the erection front, discussions were held with HSCL who agreed to give up the erection work in certain sectors

so as to complete the work in time (June, 1986). Even upto June 1986, the work was delayed by 24 months out of which 12 months delay was attributed to inadequate arrangements of HSCL and the Company did not impose any penalties/liquidated damages.

The Ministry stated (December, 1988) that the whole question of proper execution of Bailadila 11-c was enquired into by the Department of Steel. During the Audit Board Meeting it was explained that delays were noted by the Government.

12.1.10 In respect of tenders for the work of downhill conveyor system (electrical) and mechanical system the work was entrusted (April 1983) to ALIND at Rs.729.93 lakhs. It was agreed that:

(a) ALIND would be given 10 per cent interest free advance on the total value of the contract.

(b) another 10 per cent advance at 12½ per cent; and

(c) interest bearing advance will be adjusted first followed by the interest free advance.

The additional facilities were to compensate the delay in awarding the contract, the offer having expired on 31st January 1983. On the interest free advance of Rs.71.45 lakhs interest per annum works out to Rs.8.93 lakhs till the same is adjusted. The Ministry stated (December , 1988) that since escalation would have cost much more the Company agreeing to a 10 per cent interest free advance was less expensive alternative.

12.1.11 There were delays in obtaining import licence by ALIND. As against the original expected date of receipt of licence in January, 1984, the licence was received in June, 1985 resulting in a delay of 18 months. Due to financial problems, the firm was not able to speed up the supplies. A revised schedule of supplies of equipment was drawn up according to which ALIND was expected to complete the supplies by December, 1986 failing which penalty was to be levied. The supplies were, however, completed by February, 1988 and erection by March, 1988. No Penalties were levied by the Company.

12.1.12 The overall delay in completion of works is expected to be 41 months out of which 15 months was due to delay in award of work order and 26 months due to delay in supply of equipment by the contractor.

12.1.13 The electrical system required for the project consisting of two sub-stations and HT lines were completed in April, 1984. As the user areas viz., crushing, screening, downhill conveyor system and loading plant were ready to make use of the facilities only from November, 1987 the electrical system built up at a cost of Rs.57.31 lakhs (March 1986) remained mainly unutilised till the user facilities came up.

12.1.14. The Bailadila 11/C project was commissioned in October, 1987. The following points would be of interest

- Against the designed production capacity of 33 lakh tonnes of ROM per annum, the project could produce only 3.79 lakh tonnes of ROM from October, 1987 to March 1988 and 11.95 lakh tonnes of ROM upto January,

1989 during 1988-89. There was no sale of fines to VSP/nor transfer to pellet plant as anticipated due to proposed pellet plant at Bailadila not coming up.

- Though the company expected the combined cost of production of both the mines to be Rs.30.85 per tonne, the actual cost of production after commissioning the 11/C project in 1987-88 was Rs.91.82 per tonne.

- Against the envisaged loss of Rs.13.20 per tonne the actual loss during 1987-88 of the combined project was Rs.20.30 per tonne and the company estimated a loss of Rs.64.98 per tonne during 1988-89 as per the revised budget estimates.

12.2 Fine Ore Handling Scheme (FOH) at Bailadila Deposit 5

12.2.1 Anticipating high demand for iron ore fines in the wake of new trends in the steel manufacturing technology, the Company formulated (July, 1980) a scheme for handling the fines at Bailadila Deposit-5 at an estimated cost of Rs.13.86 crores (revised to Rs.25.94 crores in January, 1982), which was approved by the Government in September, 1982. These were further revised to Rs.30.77 crores and approved by Government in March, 1987. It was anticipated that the Japanese Steel Mills would take 6.0 million tonnes of Iron Ore per annum and the Visakhapatnam Steel Plant will take 0.11 million tonnes of lump and 0.28 million tonnes of fine ore during 1984-85 and it would increase to 1.90 million tonnes of lump ore and 3.39 million tonnes of fines by 1989.

12.2.2 The scheme was expected to improve the profitability of the BIOP-5 over a period of 10 years. The estimated loss of Rs.3,400.80 lakhs considering lump ore only as saleable was expected to be reduced to Rs.202.20 lakhs which has been revised to Rs.322.60 lakhs as per the latest revised estimates.

Metallurgical and Engineering Consultants Limited (MECON) another Government of India Undertaking was nominated as consultants in January, 1982 for a fee of Rs.72.00 lakhs for the work of detailed engineering, preparation of tender documents, supervision of erection construction, commissioning and inspection of equipment.

12.2.3 The work on the project started in September, 1982 which was originally expected to be completed by September, 1985 but was actually completed in December 1986 The delay in completion of different items of work ranged from 4 months to 27 months.

12.2.4 As against the sanctioned estimated cost of Rs.30.77 crores, an amount of Rs.23.65 crores only was booked upto March 1988 and the accounts are yet to be closed.

12.2.5 The scheme was commissioned in July, 1987. Against the designed handling capacity of 28 lakh tonnes of fine ore (i.e. 18 lakh tonnes from regular production, and 10 lakh tonnes by reclamation from dumped fines) the system could be made use of for handling only 4.76 lakh tonnes and 5.98 lakh tonnes of fine ore during 1987-88 and upto January, 1989 during 1988-89. Though a substantial reduction in the loss of the project was envisaged on commissioning the scheme as stated in para 12.2.2

the actual loss during 1987-88 had gone up to Rs.1120.24 lakhs compared to 1986-87 registering an increase of 110.68%. Further the loss of the project during 1988-89 is estimated at Rs.1341 lakhs as per the revised budget estimates.

Thus the projections made in the Fine Ore Handling scheme had not materialised.

13. OTHER ACTIVITIES

13.1 Research and Development

13.1.1 A Research and Development cell was set up in 1970. A scheme to increase the facilities of R&D Laboratories at an estimated cost of Rs.98.01 lakhs proposed (September, 1975) by the Company was approved by the Government in November, 1976. The main objectives of R&D were stated to be to evaluate the problem in the existing mines, to derive requisite data and to evaluate the performance of mines to achieve improved plant performance and to use the feed-back information for the benefit of new ore bodies. The estimates were again revised to Rs. 150.82 lakhs (July, 1978) and the scheme was completed by March, 1981.

13.2 Infructuous expenditure on Machkot Dolomite Project

The Company obtained (January 1979) prospecting licence from Madhya Pradesh Government for investigation of dolomite and limestone deposits near Jagadalpur Town in Bastar District to explore prospects for utilisation in their proposed Bailadila pelletisation plant. When the Company noticed that in the DPR of Visakhapatnam Steel Plant (VSP), the Jagadalpur Dolomite was one of the source of supply, it proposed to Government of India in July 1979 to enlarge its scope of investigation and to develop mines for supplying blast furnace grade limestone and dolomite to the Plant. The Company incurred an expenditure of Rs.48.04 lakhs on the detailed exploration of dolomite deposits upto March 1985.

13.2.2 The Company applied (June 1980) for grant of mining lease from Madhya Pradesh Government which was not sanctioned within the stipulated period of one year and it being deemed rejected a revision application was filed on 22nd October 1981. Government of India also passed an order under section 30 of the Mine and Minerals (Regulation and Development) Act 1957 on 18th March 1982 directing the Government of Madhya Pradesh to pass final orders on merits within a period not exceeding 200 days from the date of the order. The Government of India meanwhile assigned the project to the company on 25th May 1982 for development on the consideration that it was a specialised mining organisation and for a steel plant (Visakhapatnam Steel Plant) mining was only a supporting activity. The company proceeded with the execution of the project pending sanction of the mining lease and a sum of Rs. 1 crore was deposited in August 1982 with the Railways towards the cost of the railway siding and placed orders for major equipments like graders and dumpers and paid (31st March 1983) Rs.6.00 lakhs as advance for the orders placed (31st March 1983) for shovels (value Rs.143.50 lakhs)

The Government of Madhya Pradesh refused (22nd March 1983) to grant mining lease on the consideration that the mining area falls under reserve forest. Even after refusal by the Government of Madhya Pradesh to grant mining lease to the company, the company placed orders for shovels, bulldozers and paid an amount of Rs.6 lakhs as advance

towards the supply order for shovels. A revision application was however filed with the Government of India on 11th April 1983 against the rejection order of Madhya Pradesh Government.

As the mining lease was not forthcoming, orders issued for procurement of equipment were cancelled (January 1984) and refund of Rs.6 lakhs paid as advance was obtained. The Railway was also requested (December 1983) to refund the sum of Rs.1 crore paid as deposit in August 1982. Railways finally appropriated an amount of Rs.7.05 lakhs towards the expenditure incurred by them for preparation of estimates etc. and adjusted the balance amount of Rs.92.95 lakhs towards the cost of railway siding of other projects.

13.2.3 Besides the above, the company also incurred expenditure of Rs.44.55 lakhs on design, engineering and establishment upto March 1987 on Machkot Project.

13.2.4 Thus the total expenditure of Rs.53.30 lakhs on the project plus Rs.48.04 lakhs expenditure on investigation proved to be infructuous in addition to loss of interest of Rs.41.63 lakhs on the deposit made to Railways and Rs.1.62 lakhs on the advance paid to supplier. The Company's request for conversion of expenditure of Rs.53.30 lakhs on this project as grant for feasibilities studies was agreed to (August 1988) by Government of India.

13.2.5 The Company was aware of the rejection of the Mining Lease by Madhya Pradesh Government even before the project was assigned to them and proceeded with the execution of the project without taking into account the seriousness of the rejection assuming the release of mining lease as a mere formality.

In this connection the Ministry stated (December 1988) that 'preliminary investigations were an essential feature of any mining project. The fact that Government would not agree to allow the project to come up at Machkot on environmental grounds could not be foreseen at the time preliminary work was under taken".

13.3 Consultancy Services.

In 1977-78 the Company established a consultancy wing as an expansion of the inhouse activities of planning, engineering, investigation and research and development wings. The work of the wing includes receiving enquiries, preparation of estimates of costs and co-ordinating the execution of work by the various agencies.

Since inception, the wing had taken up 53 works upto 1987-88 on which it spent Rs.545.97 lakhs and realised Rs.458.29 lakhs only in executing these works resulting in a loss of Rs.87.68 lakhs. An analysis of the 49 works completed during these years indicated that in respect of 34 works (value Rs.83.80 lakhs), the company earned a profit of Rs.31.34 lakhs and incurred a loss of Rs.78.61 lakhs in 11 works (value Rs.187.54 lakhs). The Ministry stated (December, 1988) that was the best course open to the Company to utilise its surplus staff as well as valuable expertise. The major works in which the company suffered huge losses are detailed below:-

13.3.1 Gurda Core Drilling Work

With a view to keep the muster

roll employees (106) engaged (rendered idle on account of completion of the iron ore investigation), the Company took (August, 1978) core drilling work in Gurda area near Malangtoli on contract basis from Geological Survey of India. No estimates were prepared. The work was completed in August, 1980 and the company incurred a loss of Rs.11.02 lakhs. The Company stated (June, 1987) that on actual drilling the rock was found to be of hard and fractured category, against the original understanding that rock to be drilled was soft, medium and hard category and the increase in cost of drilling on this account was not reimbursed by the Geological Survey of India and hence the loss.

13.3.2 Bodhghat Hydel Project

The drilling work of 300 meters @ Rs.1000 per meter was taken up in February 1982 stipulating that additional drilling work would be undertaken after revision of rates and terms and conditions. However, the company had taken up the additional work of drilling at the same rate in May 1982 and February 1983 even though the actual cost of drilling was around Rs.1200 per metre at that time. Subsequently in January 1984 and September 1985 the additional drilling work of 1350 metres and of 200 metres (later increased to 250 metres) was also taken up at lower rates of Rs.1200 per metre and Rs.1500 per metre respectively though the actual cost of drilling at that time was much higher than these rates.

Upto March 1986, the company had executed the drilling work at a total cost of Rs. 56.66 lakhs against which a sum of Rs.39.53 lakhs could be realised from Bodhghat Hydel Project authorities according to the rates settled resulting in a loss of Rs.17.13 lakhs due to accepting the works at lower rates.

13.3.3 Drilling Works at Bhandaritola & Ghatshila

The Atomic Energy Department (AED) entrusted drilling works from time to time to the Company. The details of works and the rates quoted by the Company are given below:-

	Proposal received from AED	Rate per Metre (Rs)	Date of quotation	Date of completion
1	2	3	4	5
Bhandaritola area				
1. 7,500 metres a) 3,750 metres b) 3,750 metres	January 1981	a)675 b)730	January 1981	August, 1984
2. 2,400 metres	March, 1984	950	June, 1984	August, 1985
3. 2,400 metres	May, 1985	950	June, 1985	March, 1986

1	2	3	4	5
4. a) 3,000 metres	-	950	July, 1986	
b) 2,000 metres	-	950	July, 1987	Progress
c) 3,000 metres	-	950	April, 1988	
5. 3 boreholes of 400 metres each	January 1986	950 upto 300M and @ Rs.1128 from 301 to 450 Mtrs.	March, 1986	Under progress (upto March, 1986)
Ghatshila Area				
5, 4,500 metres	September 1982	730	October, 1982	May, 1985

The details of estimates and the actuals revealed the following:-

(i) While quoting the rates for 7,500 metres (January, 1981) in Bhandaritola area and 4,500 metres (October, 1982) in Ghatshila area the company did not take into account the expected increase in salaries and wages of the manpower deployed on the works. Moreover, contrary to the provisions in the estimates for deployment of daily rated labour @ Rs.7 per day per labour to assist the drill operations, the company actually deployed regular Khalasis drawing pay @ Rs.800 per month and allowances. The cost of stores and incidence of contingencies were also underestimated.

(ii) While quoting the rates for 2,400 metres (June, 1984) the company worked out the estimates based on the average expenditure incurred during November, 1981 to March, 1984 instead of on the basis of actual expenditure incurred during January 1984 June, 1984 and the likely increase in cost during execution of works.

(iii) In respect of subsequent works quoted in June, 1985 and March, 1986 respectively, the company did not revise the estimates.

Thus the deficiencies pointed out above resulted in loss of Rs.78 lakhs to the company i.e. Rs.41.01 lakhs in respect of Ghatshila drilling work already completed and Rs.36.99 lakhs (upto March, 1988) in respect of Bhandaritola on-going drilling work.

13.4 Feasibility Studies

13.4.1 Feasibility studies are taken up by the company from out of the grants given by the Government of India. A total amount of Rs.1145.03 lakhs was received as grant on this account upto March, 1988 against which an expenditure of Rs.1197.11 lakhs was incurred. The Government of India does not give project-wise details on which the grants are to be spent. The Company makes allocation of funds to different studies. In regard to the feasibility studies

taken up by the company, the following points were noticed:-

13.4.2 The Company conducted feasibility studies on six projects relating to iron ore on which an amount Rs.856.98 lakhs was spent. In one case, i.e., the survey and investigation work of Deposit-11B the work was entrusted to Investigation Division at Bhansi, and the same was completed in June, 1984. However, the Division was continued even after June, 1984 without allotment of any regular work. The expenditure incurred on its establishment from July, 1984 to March 1988 was Rs. 53.74 lakhs approximately. The Company stated (June, 1987) that the establishment was being progressively wound up making suitable alternative arrangements which was taking time due to industrial relations problem in shifting the staff. The Company further stated (December, 1988) that a small unit wasbeing detained in Bailadila complex to carry out studies in connection with possible future projects.

13.4.3 The company undertook the preparation of feasibility studies for expansion of the two existing Iron Ore projects Bailadila Deposit -14 & 5 to increase their production capacity by 13 lakh tonnes of lump ore and 47 lakh tonnes of fines and spent an amount of Rs.54.54 crores.

Since the company was not having adequate demand for the additional quantity of ore the possibility of converting the feasibility studies into regular production projects in the near future was not bright.

13.5 Pelletisation Plant at Bailadila

13.5.1 The Government approved in November, 1976 in principle the construction of pellet plant at Bailadila along with construction of a similar plant in Donimalai.

13.5.2 Global tenders were invited by the Company in December, 1976 for providing process know-how and for supply and erection of the equipment required for the project. Based on two acceptable offers of Allice Chaimers of USA and Lurgi of West Germany, the capital cost of the project estimated (August, 1979) at Rs.75.58 crores was revised to Rs. 84.70 crores in June, 1980.In the second half of 1978, offer of pellets from the Bailadila Project was made to P.I. Karakatau Steel, Indonesia. Finding the specifications of Bailadila Pellets attractive, the Indonesians were willing to purchase these pellets and an understanding was reached for a long term sale tie up for about 10 years for Bailadila pellets in March, 1979 @ 1.75 million tonnes per annum from 1982. As the Indonesians later did not show interest, the Government directed the Company (February 1981) to conduct fresh market studies by an outside agency for sale of pellets and also to study the economics of use of non-coking coal in place of fuel oil in the operation of pellet plant. Though the study conducted by a British firm indicated encouraging results, the same was not submitted to the Government in view of the preference given by them to the establishment of pelletisation plant at Kudremukh. The Company spent an amount of Rs.58.84 lakhs (March, 1986) on the investigative studies, etc., and capitalised the amount for eventual amortisation as and when the project comes up. As the project was not likely to come up this expenditure proved infructuous.

14. COST OF PRODUCTION

14.1 Iron Ore Mines

14.1.1 The Company had not introduced the system of standard costing as suggested by Committee on Public Undertakings in their 15th Report. The various processes involved in production were categorised in main responsibility centres and sub-divided in detailed cost centres. The actuals were being compared with the budgetted targets.

14.1.2 The BICP which undertook a study of the operation of the three Iron Ore Projects determined the estimated cost per tonne for the years 1981-82 to 1986-87. The following are the comparative details of the BICP estimates and actuals for the years 1983-84 to 1987-88 for the three iron ore projects :

Project/ Year	As estimated by BICP without escalation December 1981/August 1984	As per revised report of BICP of March 1987	Actuals	Average sales realisation per MT.
		(Rs. per MT)		
BIOP - 14				
1983-84	38.35	-	63.29	86.83
1984-85	57.68	65.13	65.09	81.51
1985-86	57.68	68.70	65.42	86.76
1986-87	57.68	67.95	63.61	67.95
1987-88	-	67.95	91.82	69.57
BIOP - 5				
1983-84	59.46	-	87.72	90.75
1984-85	70.18	62.42	77.50	89.83
1985-86	70.18	65.42	91.45	102.33
1986-87	70.18	64.12	79.28	64.12
1987-88	-	64.12 (.)	101.13	65.95
DIOP				
1983-84	53.99	-	102.48	51.76
1984-85	62.66	62.66	74.14	47.54
1985-86	62.66	62.66	74.18	53.45
1986-87	62.66	70.06	65.93	70.06
1987-88	-	70.06 (.)	70.10	71.43

(.) In the absence of seperate figures, figures of 1986-87 were adopted.

14.1.3Compared to the costs estimated by BICP in 1981/1984 the actual cost of production in all the projects were high in all the years.

Even compared with the revised report of March 1987 the cost of production was high in BIOP-5 and BIOP-14 in all the years except in BIOP 14 in 1987-88. The average sales realisation in 1984-85 decreased in all the projects due to reduction in FOB prices by 11.4 per cent and 12.4 per cent on the prices of 1983-84 in respect of lump and fine ore respectively. However, despite increase in the railway freight in both Bailadila and Donimalai sectors, the average sales realisation per tonne improved in 1985-86 mainly due to slight increase in the price of lump and fines agreed to by Japanese Steel Mills over the previous year sale price, increase in the conversion rate per dollar and rebate in the railway freight in Bailadila sector as a result of achieving the despatch of 6 million tonnes of iron ore.

The Ministry stated (December, 1988) that the standard costs determined by BIOP were based on fairly stringent efficiency norms and the company had largely been able to perform satisfactorily in respect of the norms adopted and standard costs calculated by BICP.

14.2 Diamond Mining Project, Panna.

14.2.1 The details showing the average cost of production, realisation and the loss per carat for the five years ending with 31st March, 1988 are given below:-

	1983-84	1984-85	1985-86	1986-87	1987-88
1. Production (in carats)	13416	14978	15819	15190	15824
2. Cost per carat (Rupees)	2452.15	2615.82	2642.58	2919.06	3062.68
3. Average realisation* per carat (Rupees)	1159.22	1506.14	1322.05	1751.33	1828.54
4. Difference (Rupees)	1292.93	1109.68	1320.51	1167.73	1234.14

* Based on quantities auctioned but not delivered

14.2.2 A study made by the Company in November, 1984 and November, 1986 to ascertain the reasons for the steep increase in cost of production revealed that the same was due to increase in costs in respect of consumption of stores and spares, power and electricity, salary and wages, imposition of mineral area development cess by Madhya Pradesh Government, the lower production due to equipment/plant

deficiencies/breakdowns and increase in depreciation due to expansion, replacements and additions. As a result the project would continue to incur losses in future also.

The Ministry stated (January, 1989) that the Panna Diamond Project has not been viable in the normal financial terms because of surplus labour, low incidence of diamonds and heavy statutory levies. In addition to this it is worthwhile to add here that the Company is not in a position to minimise the cost of production per carat than the actual realisation of the price per carat. For instance the cost of production in the year 1987-88 per carat of diamond was Rs.3062.68 whereas the average sale price based on the auctions was only Rs.2078.00 (excluding sales tax). Thus there was loss of Rs.985 per carat. The Ministry, also stated that the sale price during the current year 1988-89 has been highly favourable because of the increase in demand for diamonds and the average sale price between April 1988 and December 1988 was around Rs.3000/- without sales tax. It may, however, be stated that this favourable price of Rs.3000/- per carat may not accrue in profit as the actual cost of production is more than Rs.4000/-. The Company's argument was that India earns foreign exchange by importing rough diamonds and exporting cut and polished diamonds and if the Panna mine has not been operated diamonds to the tune of 15800 carats per annum then it had to be imported into the country valuing foreign exchange to the tune of Rs.2 to 3 crores per annum. However, such argument is not tenable in financial and real terms as the sale of diamonds by Panna diamond project accounted for even less than one per cent of the value of the total diamonds imported into the country.

15. MATERIAL MANAGEMENT AND INVENTORY CONTROL

15.1.1 A purchase manual codifying the procedures for purchase of equipment and other materials was under compilation by the Company (December 1988).

15.1.2 The Company procures materials through its central purchase organisation except for emergency requirements which are procured by project officers as per delegation of powers.

15.1.3 The Committee on Public Undertakings in its 40th Report (Third Lok Sabha) recommended that in Public enterprises, there should be a system of 'automatic replenishment' based on maximum, minimum and reorder levels in regard to stock items of regular use and there should be periodical review say once in six months of all non-stock purchases.

15.1.4 Though the Company had been in existence since November, 1958, maximum, minimum and reserve stock limits were not prescribed for the items of stores and spares (June 1987). The company stated in June 1987 that in respect of general items automatic replenishment action is taken and in respect of spares periodical reviews are conducted for replenishment.

15.1.5 The following are the details of year-wise, category-wise holdings of inventory (inclusive of construction projects and feasibility studies) at the end of last five years ended March, 1988 :

Year ended March	Stores & Spares	Stores in transit	Loose Tools	Total
		(Rupees in lakhs)		
1984	2467.37	155.18	20.29	2642.84
1985	2342.51	175.61	22.32	2540.44
1986	2590.21	401.24	25.05	3016.50
1987	2652.34	161.55	29.63	2843.52
1988	2742.91	190.97	31.59	2965.47

As will be seen from above the inventroy was always more than Rs.25 crores and had been increasing year after year.

15.2 Non-Moving Stores

15.2.1 Details of items of non-moving stores and spares for

more than two years as at the end of each of the past five years ended March, 1988 are give below:-

(Value: Rs. in lakhs)

Year ended 31st March	BIOP-14		BIOP-5		DIOP		PANNA		TOTAL	
	Items	Value	Items	Value	Items	Value	Items	Value	Items	Value
1984	15528	380.86	12618	294.49	4174	72.15	3388	14.62	35708	762.12
1985	14544	395.81	19014	350.10	11578	164.60	5470	26.67	50606	937.18
1986	18688	445.66	16587	422.07	12272	149.90	4611	20.21	52158	1037.84
1987	16764	399.05	16266	450.92	12271	149.58	3766	17.14	49007	1016.69
1988	12675	303.04	16648	425.92	11090	146.09	3557	15.02	43770	890.07

15.2.2 The non-moving items as on 31st March, 1988 included 'insurance spares' valued at Rs.103.49 lakhs.

15.2.3 Based on the recommendation of the COPU, the BPE in their circular dated 16th October, 1967, had requested the Public Enterprises to carryout ABC analysis to minimise the risk of stockout and to reduce investment in inventories. The ABC analysis of 98 per cent items of stores and spares conducted by the Company for the year 1987-88 covering 103827 items (Value RS.2,643.80 lakhs) disclosed that 82915 items (value Rs.1485.30 lakhs) representing 79.96 per cent had no movement during the year. In respect of other items, the stock held at the end of the year represented 4 to 16 months' consumption as per the details given below:-

Category of items and percentage	No. of items	Value of annual consumption (Rs. in lakhs)	Percentage of total consumption	Balance as on 31.3.1988 (Rs. in lakhs)	Stock in months' consumption
A 1.63	340	1631.48	70	538.02	3.95
B 8.14	1702	468.21	20	305.13	10.82
C 90.23	18870	232.39	10	315.31	16.28

Note : A : Value of consumption : Rs.5,000 and above.
B : Value of consumption : between Rs.500 to Rs.4,999/-
C : Value of consumption : Upto Rs.499/-

15.2.4 The limited analysis so conducted has not been submitted to the Board of Directors so far, nor has it been put to use for inventory control and hence the purpose of carrying out the ABC analysis has not been achieved.

15.2.5 While on the one hand equipment was kept without repairs for considerable length of time, for want of spares as discussed in

the chapter on equipment performance, sizeable stock of spares lie without movement on the other hand. The Company has stated (June, 1987) that procurement is made on anticipated requirements for overhauling and repairing various machines and equipments and after machines are opened for repair variations in requirement are noticed due to various factors.

15.3 Physical Verification

15.3.1 As per instructions issued (June 1981) verification of inventory is to be done annually in respect of all items at Panna Project and feasibilities. In the case of other projects, the verification is to be done selectively as follows:

All Capital equipment and Category (A) items	.. Once in a year
Category 'B' items	.. once in two years
Category 'C' items	.. once in three years

The excesses (Rs.7.23 lakhs) and shortages (Rs.6.15 lakhs) of stores noticed during the physical verification in accordance with above were awaiting settlement as at the end of March, 1988.

16. INTERNAL AUDIT

16.1 The internal audit of the head office and projects is done by private firms of Chartered Accountants. Till 1984-85, the scope of work of internal audit extended to verification of financial and accounting transactions. In October 1985, the company revised the scope of internal audit to bring in uniformity and standardisation in reporting and to facilitate the internal audit to apprise the management about the observations, deviations in procedure, suggestions for improvement, etc. The internal audit was also to conduct audit 'in depth' to locate areas of weakness, wastage and loss and suggest measure for effecting economy, improving the systems and procedures to safeguard against wastage, fraud, avoidable loss, etc. However, reports submitted by the internal audit did not indicate whether the appraisals of systems procedures and operations of the company as a whole had been conducted.

16.2 The Company stated (July, 1984) that though a cell specially consisting of cost accountants and industrial engineers was not separately created, the desired results were achieved under the system developed by the company. However, the company could not fix the norms of performance in physical and monetary terms independently even after two decades of experience in the field.

16.3 The Management/Ministry stated (December 1988) that the Industrial Engineers Cell at Head Office is carrying out technical audit ..... the production cost is analysed and put up to Director (Production) and Director (Finance)

17. FINANCIAL POSITION AND WORKING RESULTS

17.1 Financial Position

17.1.1 The table below summarises the financial position of the Company under broad headings for five years ened 31st March, 1988

	1983-84	1984-85	1985-86	1986-87	1987-88
			(Rs in lakhs)		
LIABILITIES :					
a) Paid Up Capital (including share deposit)	9,232.72	10,138.72	11,081.72	11,306.72	11,534.72
b) Reserves and Surplus	87.83	162.10	520.96	587.03	331.39
c) Borrowings from Government of India	3,414.51	4,389.53	4,024.14	5,397.19	7,223.45
d) Trade dues and current liabilities	2,410.50	2,918.07	3,480.68	3,777.55	4,542.52
e) Receipt from Govt. of India for feasibility studies	862.52	887.52	940.42	1,022.33	1,022.12
	16,008.08	18,495.84	20,047.92	22,090.82	24,654.20
ASSETS :					
f) Fixed Assets	15,240.27	15,936.89	16,648.83	17,314.73	22,944.64
Less : depreciation	7,838.14	8,612.68	9,481.69	10,357.10	11,381.22
	7,402.13	7,324.21	7,167.14	6,957.63	11,563.42
g) Capital Work-in-Progress	1,473.24	2,277.96	3,198.23	4,985.06	645.34
h) Investments	256.77	256.77	256.77	256.77	256.77
i) Current Assets, loans and advances	5,113.53	7,075.53	7,925.22	8,297.68	8,976.78
j) Expenditure on feasibility studies awaiting set off.	919.46	869.87	926.29	1,024.81	1,074.20

	1983-84	1984-85	1985-86	1986-87	1987-88
k) Miscellaneous/ promotional expenditure	404.25	516.29	574.27	568.87	609.84
l) Accumulated losses	438.70	175.31	-	-	1,527.85
	16,008.08	18,495.94	20,047.92	22,090.82	24,654.20
Capital employed	10,105.11	11,481.67	11,611.68	11,477.76	15,997.68
Net worth	8,477.60	9,609.22	11,028.41	11,324.88	9,728.42
Working Capital	2,703.03	4,157.46	4,444.54	4,520.13	4,434.26
Debt equity ratio	0.37:1	0.43:1	0.36:1	0.48:1	0.63:1

Working Results:

17.2.1 The working results profit/ Loss of different projects for the last five years ending March, 1988 are given below:

(Rs. in lakhs)

Year ending 31st March	BIOP-14	BIOP-5	DIOP	Panna	Diamond exploration scheme	Head office (comml.)	Total
1984	678.11	142.72	(-) 549.64	(-)175.79	-	(-) 17.09	78.31
1985	464.60	339.48	(-) 489.28	(-)162.46	-	183.97	336.31
1986	819.34	351.25	(-) 428.78	(-)191.47	(+) 2.83	(-) 20.53	532.64
1987	551.22	(-) 531.70	(+) 211.37	(-)168.56	(+) 6.13	(-) 2.94	65.52
1988	(-)561.03	(-)1120.23	(+) 33.27	(-)134.67	(+) 1.41	(-) 2.33	(-)1783.58

17.2.2 As against the paid-up capital of Rs.11534.72 lakhs as on 31st March, 1988, the loss carried forward was Rs.1527.85 lakhs after wiping off the cumulative profit of Rs.255.73 lakhs as at the begining of the year.

17.2.3 While during the last six years ended 31st March, 1987, the Company earned profits of RS.2844.62 lakhs, it suffered a loss of Rs. 1783.58 lakhs in 1987-88. Due to difficult financial position, the Company requested the Government

for interest subsidy and moratorium on repayment of loan instalment. Government of India sanctioned interest subsidy (Rs. 2194.09 lakhs) during the four years ended 31st March, 1982 and waiver of penal interest chargeable at 2.5 per cent per annum on the defaulted loan instalments for the year 1983-84 to 1987-88 (Rs.173.17 lakhs) and on the interest defaulted during the years 1984-85 to 1987-88 (Rs. 26.26 lakhs). If the assistance from the Government by way of interest subsidy and waiver of penal interest are not taken into account, there would have been cumulative loss of Rs.3626.89 lakhs. Inspite of the favourable debt equity ratio ranging between 0.36:1 and 0.64:1 as against the BPE norm of 1:1, price cuts imposed by Japanese Steel Mills, low off-take from Donimalai project,

low capacity utilisation and consequent high cost of production affected the profitability of the Company in iron ore mining. The higher royalty levied by Madhya Pradesh Government and sluggish market affected the viability of the Diamond Mining Project, Panna.

The Ministry stated (December 1988) that necessary exercise and dialogue in regard to finding a permanent solution to the problem of payment of fair price to the Company having due regard to the interest of MMTC, Railways and Port, were continuing.

18. OTHER TOPICS OF INTEREST

CANNIBALISATION OF NEW DOZER PURCHASED AT A COST OF RS.10.59 LAKHS.

18.1 The Panna Diamond Mining Project procured (September, 1975) a D.120 Dozer from Bharat Earth Movers Limited, Bangalore (BEML), at a cost of Rs.10.59 lakhs. The dozer commissioned in October, 1975, went out of order in January, 1980, and was not in operation since then. Till the date of failure of engine the dozer had worked for 3,959 hours. During the years 1980-81 and 1981-82, certain components of the dozer were removed and were fitted to the other dozers. A Committee examined the condition of the dozer in February, 1982, and observed that the equipment had only worked continuously from October, 1975 to July, 1977 i.e., 1 year 9 months and by any standard the performance was very poor. It felt that the dozer could be repaired and suggested that spares to the extent available in other projects be obtained and balance items purchased from the supplier of the dozer. This was, however, not done.

18.2 Instead, as the other two dozers available at the project also suffered major breakdowns in 1980-81, 286 items of engine spares and 263 items of chassis spares required to recommission those dozers were removed from this dozer and fitted on them on the ground that the lead time for procurement would be long and otherwise the production of the project would suffer badly for want of dozers. It was, however, noticed that at the time of breakdown of the dozer in 1980-81, the other projects of the Company were having similar D.120 dozers as also maintenance spares which were, however, not utilised for repair of this dozer in Panna on the ground that they were maintenance spares, which were necesssary for the maintenance of their own dozers.

18.3 Had the Panna Project also procured the spares required for its dozers, extensive cannibalisation of a dozer could have been avoided.

18.4 The Company/Ministry stated (December, 1988) that but for cannibalisation both dozers would have been out of order and the dozer had since been commissioned after necessary spares were made available and was working. Thus, the dozers procured at a cost of Rs.10.59 lakhs in September, 1975 remained grossly under utilised for about six years.

K. Tyagarajan

(K. Tyagarajan)
Chairman, Audit Board and Ex-officio
Additional Deputy Comptroller and
Auditor General (Commercial)

New Delhi
The

Countersigned

New Delhi
The 23 DEC 1989

T N Chaturvedi

(T.N. Chaturvedi)
Comptroller and Auditor General of India

ANNEXURE - 1

(Refer para 2)

Long term Corporate Objectives framed by NMDC Limited

The objectives have been identified in four different sections:

Section 'A'

i) To function as the premier national enterprises for the exploration, development and optimum utilisation of Iron Ore resources of the country.

ii) To produce and supply the entire future needs of iron ore and other major requirements of minerals like limestone, Dolomite etc., for the Public Sector Steel Industry.

iii) To establish sound production basis for international trade in iron ore and other minerals consistent with Country's long term planned objective and

iv) To diversify the production in order to make best economic use of the total yield from the mine.

Section 'B'

To ensure reasonable return on the invested capital.

Section 'C'

i) To enhance its expertise and technical 'know how' to develop total technology of the open cast mining and mineral processing through investigation and Research and Development activities and to render mining consultancy services to other open cast mines in the country and also to other developing countries.

ii) To develop proper marketing intelligence and organisation for products and services.

iii) To develop personnel in all disciplines for bringing higher efficiency and productivity, and

iv) To improve further industrial relations, living and working conditions of the employees.

Section 'D'

To give special attention to minimise environmental damage and to reduce pollution hazards.

Annexure-2 (Para-6.3.1)

STATEMENT SHOWING THE PRODUCTION IN BIOP-5 DURING THE YEARS 1977-78 TO 1987-88

Year	Designed Capacity	Achievable Capacity as per BICP norms	Budgets		Actuals	Percentage of budgets to designed Capacity		Percentage of actuals to	
			Original	Revised		Original Budget	Revised Budget	Designed capacity	BICP Norms
	(Lump ore in lakh tonnes)								
1977-78	$\frac{40}{24}$ @	--	18.0	18.0	14.27	75*	75*	59*	--
1978-79	$\frac{40}{30}$@	--	30.0	25.0	24.03	100*	83*	80*	--
1979-80	40	--	30.0	22.50	22.53	75	56	56	--
1980-81	40	--	30.60	30.50	28.83	77	76	72	--
1981-82	40	35	30.0	30.50	31.10	75	76	78	89
1982-83	40	35	30.0	32.0	27.05	75	80	68	77
1983-84	40	35	32.0	30.0	25.02	80	75	63	71
1984-85	40	** 33	30.00	30.0	28.44	75	75	71	86
1985-86	40	** 36	30.0	30.0	28.28	75	75	71	79
1986-87	40	36	30.0	30.0	30.14	75	75	75	84
1987-88	40	@@ 36	30.0	30.0	26.17	75	75	65	73

@ Indicates achievable capacity @60% and 75% respectively during first two years.
* Percentage worked out with reference to achievable capacity of 60% and 75%
** The achievable capacities fixed by BICP in August, 1984/January, 1986
@@ The achievable capacity determined by BICP upto 1986-87 has been adopted for 1987-88 also.

ANNEXURE - 2 (Para 6.3.1)

STATEMENT SHOWING THE PRODUCTION IN BIOP-14 DURING THE YEARS 1977-78 TO 1987-88

Year	Designed capacity	Achievable Capacity fixed by Technical Committee/BICP (from 1981-82) (lump ore in lakh tonnes)	Budgets		Actuals	Percentage of Budgets to rated capacity		Percentage of actuals to	
			Original	Revised		Original Budget	Revised Budget	Designed capacity	Achievable capacity
1	2	3	4	5	6	7	8	9	10
1977-78	40.0	-	27.0	27.0	21.66	67	67	54	-
	-	-	31.0	28.0	32.12	-	-	-	-
1978-79	40.0	20.00	27.0	20.0	22.62	67	50	57	113
	-	-	17.6	15.0	13.41	-	-	-	-
1979-80	40.0	22.00	22.0	20.8	21.83	55	52	55	99
	-	-	2.0	1.6	2.83	-	-	-	-
1980-81	40.0	23.0	23.0	24.0	25.83	58	60	65	112
1981-82	40.0	23.70	23.0	25.0	25.66	58	63	64	108
1982-83	40.0	23.70	22.0	25.0	25.10	55	63	63	106
1983-84	40.0	23.70	19.0	19.0	20.09	48	48	50	85
1984-85	40.0	19.00	19.0	19.0	19.60	48	48	49	103
1985-86	40.0	19.0	19.0	19.0	20.68	48	48	52	109
1986-87	40.0	19.00	18.0	18.0	20.00	45	45	50	105
1987-88	40.0	19.00**	19.4*	18.0*	18.62*	49	45	47	98

* The targets and actuals included the production of Bailadila 11/C Project also commissioned in 1987-88.
** The achievable capacity determined by BICP upto 1986-87 has been adopted for 1987-88 also.

ANNEXURE-2 (Para:6.3.1)

STATEMENT SHOWING THE PRODUCTION IN DONIMALAI PROJECT DURING 1977-78 TO 1987-88

PRODUCTION PERFORMANCE OF DIOP

Year ended 31st March	Plant Capcity (in lakh tonnes)	BICP norms	Budgets		Actuals	Percentage of Budgets to rated capacity		Percentage of actuals of	
			Original	Revised		Original Budget	Revised Budget	Rated Capacity	BICP norms
1	2	3	4	5	6	7	8	9	10
1978	8.00(L)*	-	3.23	3.25	0.85	40	41	11	-
	10.00(F)*	-	4.28	4.69	0.68	43	47	7	-
1979	12.00(L)*	-	11.26	6.60	4.72	94	55	39	-
	15.00(F)*	-	10.69	6.05	3.74	71	40	25	-
1980	16.00(L)	-	6.00	4.50	5.70	38	28	36	-
	20.00(F)	-	7.20	1.30	4.15	36	7	21	-
1981	16.00(L)	-	6.00	5.84	6.30	38	37	39	-
	20.00(F)	-	6.00	5.97	5.70	30	30	29	-
1982	16.00(L)	15.58	6.00	8.00	5.57	38	50	35	36
	20.00(F)	15.95	6.00	8.00	4.92	30	40	25	31
1983	16.00(L)	15.58	8.00	5.30	4.23	63	33	26	27
	20.00(F)	15.95	10.00	4.70	3.58	50	24	18	22
1984	16.00(L)	15.58	8.00	4.46	7.49	50	28	47	48
	20.00(F)	15.95	7.00	3.90	6.50	85	20	33	41
1985	16.00(L)	18.80	8.00	9.50	11.27	50	59	70	60
	20.00(F)	16.20	7.00	8.50	8.87	35	43	44	55
1986	16.00(L)	18.80	9.50	9.50	14.45	59	59	90	77
	20.00(F)	16.20	8.50	8.50	10.73	43	43	54	66

1	2	3	4	5	6	7	8	9	10
1987	16.00(L)	18.80	9.50	11.00	15.02	59	69	96	80
	20.00(F)	16.20	8.50	9.00	11.28	43	45	56	70
1988	16.00(L)	18.80**	11.00	13.75	13.24	69	86	83	70
	20.00(F)	16.20	9.00	11.25	15.81	45	56	79	98

NOTE: * The capacities indicated for the years 1977-78 and 1978-79 are the achievable capacity as per DPR. The actual production of fines includes the quantity dumped into and reclaimed from the dump.

** The achievable capacity determined by BICP upto 1986-87 was adopted for 1987-88 also.

DETAILS OF PRODUCTION IN BIOP-14

ANNEXURE-3 (Para 6.1)

Year	ROM	Lump	Fines	Waste	% to ROM			Actual Lump recovery Percentage	Percentage of Achievements compared to DPR	
					Lump	Fines	Waste		ROM	Lump
	(In lakhs tonnes)									
1968-69	26.23	17.4	6.21	2.93	65	24	11	65	48	43
1969-70	33.97	21.85	8.64	3.47	63	25	12	63	62	56
1970-71	35.47	22.20	10.65	2.62	63	30	7	63	64	56
1971-72	36.63	23.74	10.57	2.32	65	29	6	65	67	59
1972-73	32.33	20.37	9.37	2.59	63	29	8	63	59	51
1973-74	37.40	24.69	10.41	2.30	66	28	6	66	68	62
1974-75	33.55	19.96	10.49	3.10	59	31	10	59	61	50
1975-76	40.85	24.38	12.65	3.82	60	31	9	60	75	61
1976-77	30.29	23.03	11.99	4.27	59	31	10	59	71	58
1977-78	37.56	21.66	11.87	4.03	58	32	10	58	68	54
1978-79	37.56	22.62	8.28	6.66	60	22	18	60	68	56
1979-80	36.19	21.83	8.90	5.46	60	25	15	60	66	54
1980-81	41.24	25.83	8.51	6.90	63	21	16	63	75	64
1981-82	39.93	25.66	8.75	5.52	64	22	14	64	73	64
1982-83	39.51	25.10	9.75	4.66	63	25	12	63	72	62
1983-84	31.83	20.09	6.40	5.39	63	20	17	63	58	50
1984-85	30.75	19.60	6.09	5.06	64	20	16	64	56	49
1985-86	30.07	20.68	6.99	2.40	69	23	14	69	55	52
1986-87	32.77	20.00	10.09	2.68	61	31	8	61	60	50
1987-88	30.99	18.62	10.82	1.55	60	35	5	60	56	47

ANNEXURE - 4

(Refer to Para No.6.2.2)

STATEMENT SHOWING DETAILS OF ORE HANDLED AND RECOVERIES MADE IN BIOP-5 DURING THE PERIOD 1977-78 TO 1987-88

Year	ROM handled	LUMP	FINES	% of lump recovery	Fine recovery
	(In lakh tonnes)				
1977-78	29.63	14.27	8.93	48	30
1978-79	43.08	24.03	13.03	56	30
1979-80	36.89	22.53	11.13	61	30
1980-81	45.96	28.83	11.99	63	26
1981-82	44.47	31.10	13.35	70	30
1982-83	43.55	27.05	13.27	62	30
1983-84	42.50	25.02	12.07	59	28
1984-85	44.24	28.44	16.15	62	36
1985-86	44.21	28.28	12.94	64	32
1986-87	46.88	30.14	15.76	64	34
1987-88	46.92	26.17	17.59	56	38

ANNEXURE - 5(Para 7.2)

EQUIPMENT PERFORMANCE IN BIOP - 5

Equipment	All India Average norms	Best norms achieved in any mine	Uniform Cost Committee norms	DPR norms	BICP norms 1981-82 to 1983-84	BICP norms 1984-85 to 1987-88	Actual performance for the year ended 31st March 1984	1985	1986	1987	1988
				(Percentage of Scheduled hours)							
Blast Hole Drills SBS 242 mm(9")											
Breakdown	37	34	30	-	30	30	50	57	56		
Availability	63	66	70	-	70	70	50	43	44		
(a) Idle	35	19	14	-	17.5	14	35	26	26		
(b) Utilisation	28	47	56	-	52.5	56	15	17	18		
	63	66	70		70.0	70	50	43	44		
Shovels 4.6 BKG											
Breakdown	20	18	25	34	25	25	40	40	37	43	40
Availability	80	82	75	66	75	75	60	60	63	57	60
(a) Idle	44	30	30	16.5	25	20	25	28	35	27	35
(b) Utilisation	36	52	45	49.5	50	55	35	32	28	30	25
	80	82	75	66.0	75	75	60	60	63	57	60
Dumpers 50 T											
Breakdown	33	36	35	25	33	40	60	50	46	39	32
Availability	67	64	65	75	67	60	40	50	54	61	68
(a) Idle	22	19	13	19	17	15	13	30	23	31	42
(b) Utilisation	45	45	52	56	50	45	27	20	31	30	26
	67	64	65	75	67	60	40	50	54	61	68

EQUIPMENT PERFORMANCE IN BIOP-14

ANNEXURE - 5 (Para 7.2)

Wing Equipment	All India average norms	Best norms achieved in any mine	Uniform Cost Committee norms	DPR norms	Norms recommended by BICP		Actual utilisation for the year ended 31st March				
					1981-82 to 1983-84	1984-85 to 1987-88	1984	1985	1986	1987	1988
					(Percentage of Scheduled hours)						
Blast Hole Drills (150 mm)											
Break down	32	30	40		37	25	25	31	34	32	25
Availability	68	70	60		63	75	75	69	66	68	75
(a) Idle	21	23	12		21	19	40	44	30	38	51
(b) Utilisation	47	47	48		42	56	35	25	36	30	24
	68	70	60		63	75	75	69	66	68	75
Blast Hole Drills (242 mm)											
Breakdown	37	34	30		37	30	41	43	54		
Availability	63	66	70		63	70	59	57	46		
(a) Idle	35	19	14		19	14	33	35	27		
(b) Utilisation	28	47	56		44	56	26	22	19		
	63	66	70		63	70	59	57	46		
Shovels (4.6 BKG)											
Breakdown	20	18	25		38	30	37	48	42	43	40
Availability	80	82	75		62	70	63	52	58	57	60
(a) Idle	44	30	30		25	20	33	24	29	27	35
(b) Utilisation	36	52	45		37	50	30	28	29	30	25
	80	82	75		62	70	63	52	58	57	60
Dumpers											
Breakdown	33	36	35		39	35	22	36	34	39	32
Availability	67	64	65		61	65	78	64	65	61	68
(a) Idle	22	19	13		25	16.25	43	30	39	31	42
(b) Utilisation	45	45	52		36	48.75	35	34	27	30	26
	67	64	65		61	65.00	78	64	66	61	68

EQUIPMENT PERFORMANCE IN DIOP

ANNEXURE - 5 (Para 7.2)

Equipment	All India average norms	Best norms achieved in any mine	Uniform Cost Committee norms	DPR norms	Norms adopted by BICP		Actual utilisation for the year ended 31st March				
					1981-82 to 1983-84	1984-85 to 1987-88	1984	1985	1986	1987	1988
Blast Hole drills (150 mm)											
Breakdown	32	30	40	25	30	25	24	26	27	37	35
Availability	68	70	60	75	70	75	76	74	73	63	65
(a) Idle	21	23	12	18.50	20	19	38	29	29	24	31
(b) Utilisation	47	47	48	56.50	50	56	38	45	44	39	34
	68	70	60	75.00	70	75	76	74	73	63	65
Shovels 1.89 Diesel											
Breakdown	35	26	40	- -	30	30	17	34	52	55	60
Availability	65	74	60	- -	70	70	83	66	48	45	40
(a) Idle	12	11	24	- -	17.5	20	70	50	33	23	24
(b) Utilisation	53	63	36		52.5	50	13	16	15	22	16
	65	74	60		70.0	70	83	66	48	45	40
Shovels 4.6 BKG											
Breakdown	20	18	25	28.4	25	25	19	27	31	41	24
Availability	80	82	75	71.6	75	75	81	73	69	59	76
(a) Idle	44	30	30	17.9	32	20	42	28	27	18	30
(b) Utilisation	36	52	45	53.7	43	55	39	45	42	41	46
	80	82	75	71.6	75	75	81	73	69	59	76
Dumpers 35 T											
Breakdown	35	35	35	31	35	40	51	61	48	44	40
Availability	65	65	65	69	65	60	49	39	52	56	60
(a) Idle	35	13	13	17.25	16.25	12	28	16	25	22	29
(b) Utilisation	30	52	52	51.75	48.75	48	21	23	27	34	31
	65	65	65	69.00	65.00	60	49	39	52	56	60
Dumpers 50 T											
Breakdown	33	36	35		29	30	41	44	50	42	34
Availability	67	64	65		71	70	59	56	50	58	66
(a) Idle	22	19	13		21	20	24	18	18	17	22
(b) Utilisation	45	45	52		50	50	35	38	32	41	44
	67	64	65		71	70	59	56	50	58	66

ANNEXURE - 6
(Refer Para 7.3.1)

STATEMENT SHOWING PLANT PROFORMANCE IN BIOP-5

Deatils	BICP Norms		Acutal performance for the year ended 31st March				
	1981-82 to 1983-84	1984-85 to 1986-87	1984	1985	1986	1987	1988
	(Percentage to schedule hours)		(Percentage to schedule hours)				
Crushing Plant							
Breakdown	10	9	12	13	8	4	6
Availability	90	91	88	87	92	96	94
(a) Idle	14	14	43	40	46	47	44
(b) Utilisation	76	77	45	47	46	49	50
	90	91	88	87	92	96	94
Screening Plant							
Break down	10	11	16	26	23	20	22
Availability	90	89	84	74	77	80	78
(a) Idle	14	14	34	19	22	18	15
(b) Utilisation	76	75	50	55	55	62	63
	90	89	84	74	77	80	78

Note : BICP did not provide for idle hours. However, 15% of availability as idle hours was suggested by Uniform Cost Committee of SAIL and also by BICP in their report (August, 1984)

ANNEXURE-6
(Refer Para 7.3.1)

STATEMENT SHOWING PLANT PERFORMANCE IN BIOP-14

Details	BICP norms		Actual performance for the year ended 31st March				
	1981-82 to 1983-84	1984-85 to 1986-87	1984	1985	1986	1987	1988
	(percentage to schedule hours)		(percentage to schedule hours)				
Crushing Plant							
Breakdown	6	9	5	7	4	4	6
Availability	94	91	95	93	96	96	94
(a) Idle	14	14	55	56	59	63	61
(b) Utilisation	80	77	40	37	37	33	33
	94	91	95	93	96	96	94
Screening Plant	6	7	7	8	8	11	10
Breakdown	94	93	93	92	92	89	90
Availability							
(a) Idle	14	14	38	34	30	27	30
(b) Utilisation	80	79	55	58	62	62	60
	94	93	93	92	92	89	90

Note : BICP did not provide for idle hours. However, 15% of availability as idle hours was suggested by Uniform Cost Committee of SAIL and also by BICP in their report (August, 1984)

ANNEXURE-6
(Refer Para 7.3..1)

STATEMENT SHOWING PLANT PERFORMANCE IN DIOP

Details	BICP Norms		Actual performance for the year ended 31st March				
	1981-82 to 1983-84	1984-85 to 1986-87	1984	1985	1986	1987	1988
	(Percentage to schedule hours)		(Percentage to schedule hours)				
Crushing Plant							
Break down	15	9	19	9	11	11	5
Availability	85	91	81	91	89	89	95
(a) Idle	13	14	50	49	50	50	56
(b) Utilisation	72	77	31	42	39	39	39
	85	91	81	91	89	89	95
Screen Plant							
Break down	15	7	13	16	18	25	22
Availability	85	93	87	84	82	75	78
(a) Idle	13	14	34	10	16	17	15
(b) Utilisation	72	79	53	74	66	58	63
	85	93	87	84	82	75	78

Note : BICP did not provide for idle hours. However, 15% of availability as idle hours was suggested by Uniform cost committee of SAIL and also by BICP in their report (August, 1984).

Annexure - 7
(Refer para 8.1)

STATEMENT SHOWING THE IMBALANCES AND THE UNDER UTILISATION OF VARIOUS MINING SECTIONAL CAPACITIES IN BAILADILA IRON ORE PROJECT 14.

Mining sections	Achievable capacity, BICP norms during		The maximum overall daily average production per year during		The extent to which the capacities remained unutilised during (percentage)	
	1981-82 to 1983-84	1984-85 to 1987-88	1981-82 to 1983-84	1984-85 to 1987-88	1981-82 to 1983-84	1984-85 to 1987-88
	(In MT)		(In MT)		(In MT)	
Blast Hole Drilling	18,000	22,600	15,972	11,916	2,028 (11%)	10,684 (47%)
Loading (shovels)	17,200	24,600	15,972	11,916	1,228 (7%)	12,684 (52%)
Transport (Dumpers)	16,500	16,750	15,972	11,916	528 (3%)	4,834 (29%)
Ore Dressing	20,440	21,600	15,972	11,916	4,468 (22%)	9,684 (45%)
Overall achievable capacity of the mine fixed by BICP.	16,500	11,630	-	-		

Annexure - 7
(Refer Para 8.1)

STATEMENT SHOWING THE IMBALANCES AND UNDERUTILISATION OF VARIOUS MINING SECTIONAL CAPACITIES AND UNDERUTILISATION IN BIOP-5.

Mining sections	Achievable capacity, BICP norms during		The maximum over all daily average production per year during		The extent to which the capacities remained unutilised during (percentage)	
	1981-82 to 1983-84	1984-85 to 1987-88	1981-82 to	1984-85 to 1987-88	1981-82 to 1983-84	1984-85 to 1987-88
	(in MT)		(in MT)		(in MT)	
Blast Hole Drilling	37,135	33,500	17,788	18,768	19,347 (52%)	14,732 (44%)
Loading (Shovels)	22,400	25,500	17,788	18,768	4,612 (21%)	6,732 (26%)
Transport (dumpers)	24,200	23,400	17,788	18,768	6,412 (27%)	4,632 (20%)
Ore dressing	25,600	28,500	17,788	18,768	7,812 (31%)	9,732 (34%)
Overall daily achievable capacity of mine fixed.	22,400	23,400	-	-	-	-

Annexure - 7 (Refer Para 8.1)

STATEMENT SHOWING THE IMBALANCES AND UNDERUTILIZATION OF VARIOUS MINING SECTIONAL CAPACITIES ON DONIMALAI PROJECT.

Details of mining sections	Achievable capacities fixed by BICP during				The extent to which the capacities remained underutilised with reference to actual average daily production during the year (percentage)			
	1981-82	1982-83	1983-84	1984-85 to 1987-88. (in MT)	1981-82	1982-83	1983-84	1984-85 to 1987-88.
Drilling	10,315	12,900	15,470	13,850	5,958 (58%)	9,920 (77%)	10,277 (66%)	3,497 (25%)
Loading (Shovels)	11,775	12,575	13,375	15,325	7,418 (63%)	9,595 (76%)	8,182 (61%)	4,972 (32%)
Transport (Dumpers)	12,000	13,280	14,550	13,440	7,643 (64%)	10,300 (78%)	9,357 (64%)	3,087 (23%)
Ore Dressing	14,400	14,400	14,400	14,400	10,043 (70%)	11,420 (79%)	9,207 (64%)	4,047 (28%)
Overall achievable capacity of the mine	10,315	12,575	13,375	13,440	-	-	-	-
Actual daily average production during the year.	(4,357)	(2,980)	(5,193)	(10,353)				

ANNEXURE 8

(Refer Para 10.6.2)

STATEMENT SHOWING PERFORMANCE OF PLANT AND EQUIPMENTS

	Plant		Equipments		
	Crushing Section	Grinding Section	Loaders	Dozers	Tippers& Dumpers
		(Percentage to schedule hours)			
1983-84					
Breakdown	19	11	58	78	50
Availability	81	89	42	22	50
Idle	14	5	22	11	24
Utilisation	67	84	20	11	26
1984-85					
Breakdown	17	14	61	82	52
Availability	83	86	39	18	48
Idle	19	2	19	8	22
Utilisation	64	84	20	10	26
1985-86					
Breakdown	11	9	57	61	45
Availability	89	91	43	39	55
Idle	13	3	17	14	27
Utilisation	76	88	26	25	28
1986-87					
Breakdown	9	6	62	56	48
Availability	91	94	38	44	52
Idle	10	2	14	15	25
Utilisation	81	92	24	29	27
1987-88					
Breakdown	7	4	62	75	46
Availability	93	96	38	25	54
Idle	14	2	16	10	30
Utilisation	79	94	22	15	24