Report of the Comptroller and Auditor General of India

for the year ended March 2005

Union Government (Commercial)

Public Sector Undertakings

Review of Activities of selected PSUs

(Performance Audit)

No. 8 of 2006

CONTENTS

PREFACE

A reference is invited to the prefatory remarks in Report No. 10 of 2006 – Union Government (Commercial) of the Comptroller and Auditor General of India where a mention was made that Report No.8 of Performance Audit contains reviews on some of the activities of the Companies and Corporations other than Companies under the Telecommunications Sector.

This Report contains reviews on the following activities of selected PSUs:

Name of the Ministry/Department	Title of the Review
Department of Atomic Energy	Computer Education Division - Electronics Corporation of India Limited
Ministry of Civil Aviation	Fleet Utilisation and Maintenance - Air India Limited
Department of Coal	a) Project Implementation, Performance of HEMM, Manpower Analysis, Fund Management and Environment Planning – Mahanadi Coalfields Limited b) Bucket Wheel Excavators – Neyveli Lignite Corporation Limited
Department of Heavy Industries	Marketing activities of Tractor Business Group-HMT Limited
Ministry of Petroleum and Natural Gas	a) Telecom Business-GAIL India Limited b) Availability and utilisation of critical equipment of offshore installations in Mumbai Region - Oil and Natural Gas Corporation Limited
Ministry of Power	a) Gas Based Power Stations-NTPC Limited b) Gas Based Power Stations – North Eastern Electric Power Corporation Limited
Ministry of Steel	a) Working of Bharat Refractories Limited b) High Seas Sale Activity-MSTC Limited c) Import of Coking Coal-Steel Authority of

	India Limited
Ministry of Textiles	Trading Activities - Cotton Corporation of India Limited

OVERVIEW

This volume of Audit Report represents reviews on 13 selected areas of operation involving 13 Public Sector Undertakings under eight Ministries. These areas were selected in audit for review on the basis of their relative importance in the functioning of the concerned organisation. The total financial implication of these reviews is Rs.2744.63 crore.

DEPARTMENT OF ATOMIC ENERGY

Electronics Corporation of India Limited

❖ **Computer Education Division**

- Electronics Corporation of India Limited started the business of computer education without conducting any objective and detailed assessment of the business potential or its own strengths and weaknesses. The Company did not formulate any policy with regard to appointment of franchisees and as a result faced problems in implementing the franchisee agreements. It had to cancel as many as 63 franchisee agreements during the first five years of operation ending March 2005. There was lack of effective internal control due to which the franchisees worked on their own and exploited the name and repute of the Company. In one agreement alone, the Company had to suffer a loss of Rs.67.13 lakh during 2001-02 and 2002-03. The Company also undertook school projects in different States wherein too, it worked through the franchisees. Due to problems in controlling the functioning of these franchisees, the Company had to take a decision to not undertake such projects in future. The Company failed to achieve the target turnover and also suffered losses during the years 2001-02, 2002-03 and 2004-05 in this business segment.

MINISTRY OF CIVIL AVIATION

Air India Limited

❖ **Fleet Utilisation and Maintenance**

- Air India Limited had a fleet of 36 aircraft as on 31 March 2005, out of which 18 were owned by the Company and remaining were on dry lease. No aircraft was purchased after 1996. The Company resorted to taking aircraft on dry lease for augmentation of fleet since the year 2000 due to absence of an effective fleet replacement policy.

- The Company cancelled/rescheduled the flights in 3.05 to 12.04 per cent cases and delayed it by more than 20 minutes in 17.35 to 21.87 per cent cases during the last three years ended 2004-05, but it did not maintain the industry data in regard to adherence to flight schedules for evaluation of its own performance *vis a vis* the other airlines. The utilisation of the available fleet, however, was more than the industry average as well as the planned hours in most cases.

- The Company incurred expenditure of only Rs.6.14 crore in creation of repair and maintenance facility as against the capital budget of Rs.99.98 crore for the last three years ended 2004-05. As a result of non-setting up facilities and non-procurement of equipment as per the capital plan, it had to incur avoidable expenditure of Rs.8.21 crore on outside repairs in three cases.
- The Company had prescribed norms for completing various checks prescribed by the Director General of Civil Aviation, but the actual time taken for completion of the checks far exceeded the norms. This resulted in excess grounding of aircraft and consequent loss of potential contribution amounting to Rs.93.04 crore based on the loss of flying hours.
- The Company sent 13 aircraft for overseas repairs and spent Rs.57.37 crore on major maintenance such as 'C' and 'D' checks during the last three years ended March 2005, on grounds of capacity constraints and lessor's requirement, despite having the in-house capability to carry out these checks. There was shortage of technical manpower but no comprehensive study was conducted to assess the long-term requirements of the technical manpower.
- No case of accident was noticed during the last three years but there was scope for reduction in number of incidents. The Company did not have industry data for benchmarking its performance on the air safety aspects.

DEPARTMENT OF COAL

Mahanadi Coalfields Limited

❖ **Project Implementation, Performance of HEMM, Manpower Analysis, Fund Management and Environmental Planning**

- The Company could not complete the implementation of advance action plan of seven projects even after time over run of one to 10 years leading to cost overrun of Rs.66.29 crore as on March 2005. Due to resistance from land oustees, the Company could not produce coal valued at Rs.118.25 crore during 2004-05 in six projects of Talcher Coalfields.
- The Company incurred avoidable extra expenditure of Rs.4.46 crore in 2002-03 by awarding the contract of hiring of surface miner at a higher rate.
- There was no scientific assessment of manpower requirement. The Company had a workforce of 21298 out of which 66 *per cent* was in unskilled category at the end of March 2005. The Company's control on overtime remained ineffective and despite the negative growth in OB removal, there was increase in overtime by Rs.8.73 crore and Rs.13.96 crore in 2003-04 and 2004-05 respectively.
- Despite holding huge surplus fund ranging between Rs. 29.37 crore and Rs.97.10 crore per month from April 2002 to February 2004, the Company did not invest the same with Coal India Limited (CIL) and lost an interest of Rs.4.04 crore.

- The Company could not recover loading charges of Rs.17.34 crore up to March 2005 in the absence of any agreement with the customers. Further, crushing charges of Rs.8.12 crore could not be recovered from customers in the absence of a notification for revision of prices of coal produced through surface miner for the period from June 2000 to January 2001.

Neyveli Lignite Corporation Limited

Neyveli Lignite Corporation Limited (Corporation) was incorporated in November 1956 with the main objective of excavating lignite in the Neyveli area and generating power therefrom. The Corporation has three mines with lignite excavating capacity of 24 million tonne per annum and three lignite based Thermal Power Stations (TPS) with generating capacity of 2490 MW. Each TPS has a dedicated mine to meet its fuel requirement.

❖ **Performance of Bucket Wheel Excavators**

- The Hanumantha Rao Committee appointed by the Government of India determined the norms in 1983 for operation of Bucket Wheel Excavators based on the data available for the period 1969 to 1982. The Company subsequently procured new Bucket Wheel Excavators with upgraded technology but adopted the norms already fixed for the old machines and thus ignored the technical superiority, which enhanced the designed capacities of the Bucket Wheel Excavators.
- Neither the Hanumantha Rao Committee nor the Corporation fixed achievable capacities for the Bucket Wheel Excavators (BWEs) deployed in the lignite bench/bottom bench.
- The BWEs worked for more hours than norms but the output rate was lower than the achievable capacity resulting in short removal of overburden of 21.55 million cubic metres and short extraction of 12.22 MT lignite in Mine I and II during the five-year period ending March 2005.
- There was excess consumption of power and teeth in operating the Bucket Wheel Excavators amounting to Rs.17.73 crore and Rs. 10.43 crore in Mine I and II respectively during the period under review.
- The stoppages under the planned and breakdown categories exceeded the norms and led to short extraction of 24.27 MT lignite during the five-year period ending March 2005.

DEPARTMENT OF HEAVY INDUSTRY

HMT Limited

❖ **Marketing activities of Tractor Business Group**

- The Tractor Business group (Group) comprises the tractor manufacturing division at Pinjore set up in 1971, (with a licensed capacity of 25,000 tractors and an installed capacity of 18,000 tractors per annum), marketing division at Chandigarh

and Area Offices. Marketing of tractors is done through a net work of dealers who are the only link with the customers.

- The Company's market share of tractors declined from 6.1 per cent (1999-00) to 2.9 per cent (2004-05) due to working capital constraints resulting from slow recovery of funds locked up in the market and production constraints.
- The Group resorted to aggressive marketing techniques through advance of tractors to dealers through Area offices. Dealers in turn advanced most of the tractors to customers to show higher sales. The unsold tractors with dealers were taken back irrespective of their physical condition and credit was given to the dealers accounting the same as sales return. The sales returns, thus, amounted to Rs.3.68 crore, Rs.17.25 crore, Rs.9.42 crore and Rs.1.18 crore representing 1.28 per cent, 6.66 per cent, 5.76 per cent and 0.58 per cent of sales in 2001-02, 2002-03, 2003-04 and 2004-05 respectively. Thus, the aggressive marketing practice of the Group ended up in huge sales returns.
- The mounting Sundry debtors to turnover of the Group (43.55 per cent in 1999-00 to 89.59 per cent in 2002-03) were due to the injudicious practice of dumping tractors on dealers resulting in cash crunch and subsequent low volume of production/sales.

MINISTRY OF PETROLEUM AND NATURAL GAS

GAIL (India) Limited

❖ **Telecom business**

- The Company started its GAIL-Tel project with an investment of Rs. 262.95 crore without preparing Detailed Project Report. It also implemented Phase IIB of the project without considering the actual unsatisfactory performance of the previous phases. The project could not achieve its targets in terms of capacity sales or sales revenue during any of the four years of its operations till March 2005. The project had been incurring losses since 2003-04 and the cumulative loss of the project till September 2005 was Rs. 9.03 crore.
- The Company also lost projected revenue of Rs. 442.19 crore due to delays ranging from nine to 19 months in the completion of various phases of the project. Internal delays in the processing of tenders and placement of orders contributed to the project delay.
- An investment of Rs. 36.66 crore on Dense Wavelength Division Multiplexing equipment, Rs 11.48 crore on the Optical Fibre cables and Rs. 12.99 crore on second duct made by the Company could not be put to fruitful use.

Oil and Natural Gas Corporation Limited

❖ **Availability and utilization of critical equipment of offshore installations in Mumbai Region**

- The production of Mumbai High Offshore of ONGC comprising three fields (assets) made a sizeable portion of the country's hydrocarbon production. For

ensuring uninterrupted production, ONGC had fixed targets of 100 per cent system availability and 95 per cent equipment availability of critical equipment engaged in production in the offshore fields.

- ONGC achieved the targeted system availability of critical equipment in Mumbai Offshore but could not achieve the targeted equipment availability due to maintenance related problems.
- There did not exist any policy in regard to maintenance, revamping and replacement of critical equipment, though the Management had since initiated corrective actions in this regard.
- Non-adherence to overhaul and preventative maintenance schedule of critical equipment caused high tripping, unplanned shutdown and pre-mature failure of the equipment. Deferment of production/revenue in Mumbai High due to maintenance reasons amounted to Rs.61 crore in 2003-04. The delay in procurement of spares and shortages of maintenance manpower further led to high down time of equipment and consequent lower availability of critical equipment.
- The utilisation of most of the equipment was below the minimum run hours requirements due to changing behaviour and depletion of fields but the equipment requirements were not reassessed in time to ensure its optimum utilisation. The utilisation of turbine generators on low load factor revealed excessive fuel gas consumption as compared to norms.
- In Neelam field, the installed capacity of gas compression was below the actual gas production since inception and delayed action for enhancement of gas compression facility resulted in flaring of gas valued at Rs.126.39 crore for the period 1998 to 2005.

MINISTRY OF POWER

NTPC Limited

❖ **Gas Based Power Stations**

- The Company commissioned six gas-based plants at Anta, Auraiya, Kawas, Dadri, Gandhar and Faridabad with generating capacity of 3657.64 MW. Though 14.17 MCMD of gas was required to utilize this capacity, the actual commitment from GAIL (India) Limited was for 12.75 MCMD only, which was sufficient to operate the plants at 66 per cent of the capacity. Thus, even at the initial stage, there was a mis-match between the requirement of gas for generating capacity and the quantity tied up by the GOI. Further, GAIL did not supply gas even up to the committed level. The GOI, which was primarily responsible for assignment of requisite gas for power stations, did not ensure availability of requisite gas.
- As the quantity of gas supplied by GAIL declined, the plants increasingly depended on generation through alternate fuel of naphtha/ high speed diesel. As the variable cost of generation of power on alternate fuel was four to five times the

cost of generation on gas, the beneficiaries were reluctant to purchase costlier power resulting in impairment of the efficient working of the power stations.

- In the agreement entered into with GAIL, the Company was required to pay for the minimum guaranteed quantity of gas in the event of short lifting of gas, while there was no corresponding compensating clause in case of short supply of gas by GAIL. The Company's financial interests were not, thus, guarded.

- The tariff fixation policy of Central Electricity Regulatory Commission allowed the Company to recover full fixed charges based on declared capacity, even when actual generated units were below the declared capacity. As a result, the beneficiaries had to bear an excessive charge of fixed cost for Rs.123.45 crore during 2003-04.

- Despite underutilization of the existing capacity due to inadequate gas supply, the Company planned to expand the capacity of four gas-based plants in the IX Five Year Plan. As the beneficiaries declined to take costlier power generated on naphtha, it deferred the expansion after incurring an expenditure of Rs.23.68 crore, out of which the sum of Rs.17.56 crore was not likely to be utilized till the end of 2011-12.

North Eastern Electric Power Corporation Limited

❖ **Gas Based Power Stations**

- The gas supply agreements with GAIL (India) Limited /Oil and Natural Gas Corporation Limited did not provide for waiver of Minimum Guaranteed Offtake (MGO) payment due to lower generation in Agartala Gas Turbine Project (AGTP) arising out of grid failure and no/low grid demand over which the Corporation could not exercise any control. As AGTP failed to draw/consume even the MGO quantity of gas due to evacuation constraints and low drawal of power by the beneficiaries, the project had to incur infructuous expenditure of Rs. 3.16 crore.

- The Management failed to take timely initiative to enhance the quantity of gas to be supplied keeping in view the availability and future requirement. While working out the gas requirement, the impact of steadily falling calorific value of gas over the years and a higher actual heat rate higher as compared to the norm was not considered.

- The Assam Gas Based Power Project (AGBPP) could not achieve the target availability because of lack of tie-up for supply of gas in requisite quantities. As a result, there was under-recovery of fixed charges of Rs. 9.94 crore.

- Main causes for lower generation in AGBPP were transformation and transmission limitations in the North-Eastern Region (NER), lower generation schedule given by North Eastern Regional Load Dispatch Centre and priority given to maximization of hydel generation during monsoon period.

- Under-utilisation of capacity of AGBPP and AGTP was also due to non-availability of associated transmission line and weak state-owned transmission system, import of power by Assam State Electricity Board from Eastern Region due to high cost of AGBPP power and commissioning of gas based power stations by Government of Tripura during 2002-03.

- Despite the gas-based stations not achieving the normative auxiliary consumption as well as Gross Station Heat Rate, the Corporation had not conducted any Energy Audit since the commissioning of the plants in July 1998.
- The Corporation had not developed any documented maintenance policy incorporating its own inspection schedules and associated procedures as well as defining responsibility of various functions even after seven years from the date of commissioning of the plants.
- Manufacturer's recommended periodicity of preventive maintenance of the machines was not adhered to in AGBPP and AGTP.
- Non-commissioning of the fire protection system and De-mineralised plant resulted in non-compliance of mandatory environmental requirements stipulated by various statutory authorities.

MINISTRY OF STEEL

Bharat Refractories Limited

❖ **Working of Bharat Refractories Limited**

- Bharat Refractories Limited (BRL) was incorporated in July 1974 as a Government Company. BRL and India Firebricks and Insulation Company (a subsidiary of BRL) were referred to Board of Industrial and Financial Reconstruction (BIFR) in 1992. The BIFR and the Government of India sanctioned three revival schemes during the period January 1997 to June 2002 under which, apart from other concessions, the Company received cash assistance of Rs. 234.60 crore in the shape of loan and equity. Despite these concessions, the Company did not achieve the targets of manpower reduction, production, sales and profitability set forth in the Techno-Economic Viability Report prepared by MECON Limited and it continued to incur losses. The accumulated losses on 31 March 2005 were Rs. 352.56 crore.
- The overall production of refractories was only 39 and 87 per cent of the re-assessed capacity during 2001-02 to 2004-05 and the shortfall in production was 1.19 lakh tonnes due to under-utilisation of capacity, non-availability of working capital leading to shortage of raw materials and excess manpower leading to increased labour cost of Rs. 9 crore annually.
- The Company was supplying magnesia carbon bricks and slide gate refractory under performance guarantee clause to Bokaro Steel Plant, who recovered/received materials free of cost amounting to Rs. 6.33 crore and Rs. 1.97 crore respectively due to non-achievement of the committed heats under the guarantee clause.
- As against the re-assessed capacity of 12,000 tonnes of silica bricks at BRP, the plant actually produced only 1790 tonnes during 1999-2000 to 2004-05 and there was no production during 2003-04, though the product had good contribution margin and market demand. The management was silent on the issue and had not examined the reasons for negligible/nil production.

- The actual rejection of bricks in the process of manufacture from green bricks (unburnt bricks pressed in Presses) to saleable bricks was much higher than 10 per cent considered in TEV report. The management neither fixed norms for rejection nor analyzed the reasons.
- The utilisation of a 2500 tonne Sacmi Press procured at a cost of Rs. 7.53 crore was only 37 per cent during 2000-01 to 2004-05. A press of lower capacity of 2000 tonne, which was considered earlier, could have well served the purpose.
- The Company could not implement the technology for manufacturing continuous casting refractories purchased from Japan in October 1991 at a fee of Rs. 1.12 crore, rendering the expenditure infructuous.

MSTC LTD

❖ **Performance Audit of High Seas Sale Activity**

- The Company's International Market Division was primarily engaged in 'back to back' sales and despite being planned in the MOU, failed to meet the target of ensuring that at least 20 per cent of the imports were for non-captive buyers.
- Specific profit contribution of High Seas sale to the overall financial performance could not be ascertained as no separate cost records for or allocation of overheads made to High Seas sale transactions were maintained by the Company.
- During the last five years ending 31 March 2005 maximum business was derived from four to five items. Growth in overall sales of the Company had been price driven and not volume driven. Concentration of sales on limited number of products and reliance on a single customer i.e. HPL involved attendant risk of loss of flexibility and sudden decline in volume of business in future. It also indicated that the Company had failed to widen its market base and product basket despite the same being planned in the strategic plan.
- The Company frequently failed to ensure adherence to the condition of the MOA by the customers. Due to deviation and relaxation given in the terms and condition of MOA to the parties, the Company had suffered a loss of Rs.4.85 crore.

Steel Authority of India Limited

❖ **Import of Coking Coal**

- Steel Authority of India Limited (SAIL) does not have captive coking coal mines and is dependent on outside suppliers. Its main suppliers of indigenous coking coal are the subsidiaries of Coal India Limited. In order to improve the technical parameters through blending with indigenous coal and meeting the gap between actual requirement and availability of indigenous coal, the Company had been importing coking coal since 1978-79. Such procurement was made through Long Term Agreements, Spot Tenders and Term Agreements.

- Due to the shortage of imported coking coal, there was a decline of 12 per cent (0.31 million tonnes) in SAIL's production of saleable steel for the first quarter of 2004-05.
- Failure by SAIL to take adequate and timely action through properly planned purchase of hard coking coal resulted in avoidable expenditure of Rs. 344 crore.
- In view of SAIL's current time frame for spot tendering, its poor past record in tendering whereby only one per cent of the quantity tendered between November 2000 and December 2004 was actually received and lack of adequate testing and quality assurance, it should consider spot tendering as the least preferred option for SAIL for meeting its planned or urgent requirements of coking coal.
- SAIL incurred avoidable additional expenditure of Rs. 87 crore and Rs. 89 crore, by signing term agreements for hard and soft coking coal with two foreign suppliers while simultaneously keeping deliveries under the Long Term agreements with them in abeyance.
- Failure by SAIL to exercise the mutual option quantity of 0.150 million tonnes of soft coking coal in the LT agreement with a supplier for 2003-04 resulted in a loss of Rs.32 crore.
- Failure by SAIL to take advantage of existing offers for hard coking coal and acquire 0.46 million tonnes of hard coking coal in 2003-04, resulted in excess expenditure of Rs.232 crore on spot purchases of hard coking coals.

MINISTRY OF TEXTILES

Cotton Corporation of India Limited

❖ **Trading activities**

- The National Commission of Agriculture recommended (1975) that the Corporation should endeavour to purchase 25 to 30 per cent of the total cotton production of the country by strengthening its network of offices. However, the Corporation's market share during the six years ending March 2005 ranged from 4.31 to 11.91 per cent.
- As per the textile policy (June 1985) of the Government of India, the Corporation has to undertake Minimum Support Price (MSP) operations without any quantitative limit. During the years 2001-02 and 2002-03, though the Corporation undertook MSP operations, it purchased only nine lakh bales representing 8.2 per cent of the total reported production of 109 lakh bales in MSP covered areas.
- One of the primary objectives of Corporation is to make available cotton at reasonable prices to the textile mills and other end users. During the six years ended March 2005 the Corporation paid commission of Rs.35.89 crore to the commission agents in the regulated markets where purchase of cotton through them was mandatory under the local APMC Act, thereby increasing the cost of procurement. The Corporation did not explore the possibility to get itself registered

as an agent in such regulated market yards in order to avoid payment of commission.

- The review of the cost sheets of the Ahmedabad branch of the Corporation during the five years ended March 2004 revealed that it did not emphasise purchase of varieties with higher contributions.
- Lapse on the part of the Corporation to obtain adequate security in the form of bank guarantee, letter of credit etc., resulted in non-recovery of Rs.111.53 crore on account of loss in disposal of unlifted bales at the risk and cost of the original buyers.
- The Corporation's achievement in exports fell short by 35 to 97.6 per cent of its targets during the six years ending March 2005.

DEPARTMENT OF ATOMIC ENERGY

CHAPTER: I

Electronics Corporation of India Limited

Computer Education Division

Highlights

The Company had not done any detailed assessment of market before entering into the business of IT education. It got into the business of IT education without assessing its own strengths and weaknesses.

(Para 1.6.1.2)

The Company did not obtain the approval from the Board of Directors before starting this business activity.

(Para 1.6.1.5)

The Company did not formulate any strategy to meet the objective of restructuring and repositioning the products/businesses to emerge as a commercially and economically viable Company and to match with the already established players in the field of computer education. Even the modest targets it set for itself could not be achieved and the Company suffered losses during the years 2001–02, 2002-03 and 2004-05 in this business segment.

(Para 1.6.1.2 and Para 1.6.2)

The underlying rationale of setting up Computer Education Division was to productively engage surplus staff of defunct Television Division. However the Company failed to evolve any policy for utilisation of this surplus staff due to which only a small number of surplus staff could eventually be engaged in the Computer Education Division.

(Para 1.6.3.2)

The Company failed to review operations of Computer Education Division effectively during the five years ending 31 March 2005.

(Para 1.6.3.1)

It also failed to evolve and implement an effective cash control mechanism. There were no internal controls in place to monitor the functioning of the franchisees. Due to this, the franchisees operated on their own and exploited the name and repute of the Company.

(Para 1.6.3.3 and Para 1.6.4)

Due to problems in implementation of school projects, decision was taken to complete the existing school projects and not to undertake any new school projects.

(Para 1.6.5)

Gist of Recommendations

- Necessary steps to resolve the pending issues with the franchisees and Local Service Providers may be initiated immediately. All the school projects may be reviewed and the dues from Business Associates may be collected as early as possible.
- The Company has so far not been very successful in achieving the objectives envisaged at the time of entering into computer education business. This not being a core activity for the Company, it may rethink its strategy on continuing in the said business after completion of its existing obligations.

1.1. Introduction

1.1.1 The Electronics Corporation of India Limited (Company) was incorporated in April 1967 with the objective of generating a strong indigenous capability in the field of professional grade electronics. It operates under the administrative control of Department of Atomic Energy. The Chairman cum Managing Director (CMD) is the Chief Executive of the Company. Three functional directors heading technical, finance and personnel wings, respectively assist the CMD. The financial performance of the Company for the past five years were as below:

Table 1

(Rs. in crore)

Parameters	2000-01	2001-02	2002-03	2003-04	2004-05
Paid up capital	81.25	126.37	129.88	136.88	145.88
Reserves & Surplus	-	20.53	72.41	162.76	175.95
Net Worth	30.79	146.11	201.68	299.28	321.54
Sales	568.75	674.12	1000.56	934.55	770.67
Profit after Tax	11.81	69.29	53.25	97.68	37.13
Accumulated Losses	48.76	--	--	--	--

The operations of the Company are broadly divided into four business groups and two service groups. The groups are further divided into 16 different production divisions for operational convenience. An Executive Director/General Manager heads each group. The major products of the Company include antenna systems, telecom exchanges, Flight Data Processing Systems, control instruments, X-ray baggage inspection units for airports, computer hardware, electronic voting machines, CCTV, etc.

1.1.2 Computer Education Division

1.1.2.1 The Software Training Unit (STU) of the Company was conducting computer-training courses for the customers of the systems marketed by the Company as part of customer support and after sales service. In March 2000, the Management decided to set up a full fledged Computer Education Division (CED) for imparting computer education based on a projection made by Director (Personnel) that the computer education business had potential for 20 *per cent* growth in India as well as in the gulf countries such as United Arab Emirates and Kuwait. The rationale for setting up the division was:

i. To reposition the products/business to emerge as a commercially and economically viable Company, by entering into computer education in a big way; and

ii. ECIL being a name to reckon with and known as one of the IT players, it was time for it to enter the market as one of the important players in Computer Education as it offered excellent opportunity both in terms of income and growth.

1.1.2.2 Accordingly, with the approval of the CMD of the Company, a separate division viz. CED was set up with effect from 1 April 2000 by renaming STU. The CED had the following objectives.

i. To attain the status of a notable player in computer education like NIIT (whose turnover was about Rs.600 crore for 1999-2000);

ii. Reposition the products/businesses and help the Company to emerge as a commercially and economically viable Company;

iii. Undertake Research and Development in the field of computer education and design appropriate courses.

iv. Establish franchisee operations both in urban and rural areas and design appropriate cost for franchising; and

v. Operate own computer education centers by using the existing branch offices.

1.1.2.3 The CED functioned under the overall control of Director (Personnel) at the corporate office assisted by a Vice President engaged from the open market for a period of three years from October 2002. An Assistant General Manager, three Deputy General Managers, two Senior Managers and one Accounts Manager at corporate office and five Deputy General Managers assisted the Vice President. The CED had a total staff strength of 72; of these 42 were at corporate office and the balance in field offices.

1.1.2.4 The Company offered various short-term and long-term courses in computer education under the brand name ECIT. The short-term courses e.g. MS Office, Visual Basics, Oracle, Windows NT, Accounting Tally, etc., ranged from two weeks to three months duration. Long-term courses e.g. Diploma in Computer Technology, Computer Applications, Post-Graduate Diploma in Embedded Software, Bio-informatics etc. ranged from four months to one year. Besides CED conducted courses in Computer Aided Design (CAD) and Computer Aided Management (CAM) since 2002 in association with Central Institute for Tool Design, Hyderabad (CITD).

1.1.2.5 As on 31 March 2005 CED had 11[♣] own centers and 80[♦] franchisees in four zones. This arrangement was similar to that adopted by other major players viz. NIIT and APTECH. Private individuals or corporate bodies operated centers as franchisees of the Company under the brand name ECIT. This was done under an agreement for sharing the revenue with the Company at agreed percentage. The Company was responsible for designing of course, fixing the fee structure, providing the course material, receipt books and the course diploma certificates to the students. The franchisees conducted the

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[♣] *North - 1, East - 1, West – 3 and South – 6*

[♦] *North - 20, East - 20, West – 9 and South – 31*

courses, collected fee from the students and remitted the same in the Company's Bank Account and took tests as per the guidelines of CED.

1.2 Audit Objectives

Audit sought to assess whether:

i. the Company undertook the project of setting up Computer Education Division after due diligence;

ii. the project was implemented as per plan and with due regard to economy, efficiency and effectiveness; and

iii. the project achieved its objectives.

1.3 Scope of Audit

The review covers the overall performance of the CED for the past five years i.e. from inception to 31 March 2005.

1.4 Audit Methodology

Audit tried to seek evidence to support the expectation that:

i. the decision of setting up of CED was based on some objective data / information such as market survey or study;

ii. the objectives of the project were clearly identified;

iii. if the project involved any capital expenditure, the same was justified by some generally accepted method of investment analysis;

iv. the required legal and administrative structures were identified and worked out;

v. the milestones (both physical and financial) were identified and listed;

vi. there was a mechanism to monitor achievement of the milestones; and

vii. the project was implemented with due regard to economy, efficiency and effectiveness.

For this purpose, audit examined the records at the corporate office and four zonal offices at Delhi, Kolkata, Chennai and Mumbai during October 2004 to March 2005. The branch offices at Bangalore and Jaipur were also covered with a focus on school project.

1.5 Acknowledgement

In addition to examination of records and documents, a number of issues were deliberated on for conducting this audit by the audit team. Audit acknowledges the co-operation and assistance extended by different levels of management at various stages of performance audit.

1.6 Audit Findings

1.6.1 Project launched without objective analysis

Though the Company envisaged becoming an important player in computer education business like NIIT, the Company's efforts did not at any time match this goal. To begin with, the Company targeted a turnover of Rs.5 crore before the end of second year and

Rs.15–20 crore before end of fourth year from this new business activity. However the Company failed to achieve even these modest targets.

1.6.1.2 The Company undertook the project without a proper analysis of opportunities in the area of computer education. There was no evidence of any market survey or study based on which the Company decided to launch into the new business. It did not have adequate appreciation of its own strengths and weaknesses in relation to the said venture. It did not formulate any strategy to match up to the already established players like NIIT and APTECH. The STU was renamed as CED and the manpower within the Company with no previous experience in imparting education was mobilised to assist in this activity. Staff who were considered low performers but intelligent enough to absorb and deliver the concepts related to the training were to be utilised to run this division. The so-called non-performers and mediocre performers were to be offered incentives to motivate them.

1.6.1.3 It was projected that the business had potential to grow at 20 *per cent* in India and Gulf countries. However, no business strategy/operational plan was formulated to achieve the growth potential.

1.6.1.4 The proposal only highlighted the mode of operations of NIIT, but the Company did not work out the relative costs and benefits nor did it work out legally defensible modalities for franchisee arrangements. As the Company did not work out proper arrangements for franchisees, it had to face several problems, which are discussed under paragraphs 1.6.3 to 1.6.5 below.

1.6.1.5 Considering that CED was set up with a view to be a big player in computer education and as part of restructuring the Company's products and businesses, the management should have taken the approval of the Board of Directors of the Company. The Management did not approach the Board for approval at the time of venturing into new business segment of CED and it was only in the year 2004 that the Board discussed the issue of collections of outstanding fees by CED after it was pointed out by the Statutory Auditor.

The Management stated (September 2005) that

i. Comparison with other notable players was to be a benchmark for only computer education. The business targets were set by taking into account the market situation. The objective of setting up CED was to utilise part of surplus manpower so that enough revenue could be earned to cover their wage bill;

ii. The proposal for setting up CED was based on special reports on education and detailed study of courses offered by other computer education players. Strategic plans were made based on the market conditions;

iii. CED operations including appointment of Vice President, were discussed in several Board meetings; and

iv. It agreed with audit observations about the target turnover being low considering the lofty objectives of the project.

Management's reply is not tenable for following reasons:

i. The Management's contention contradicts the projections made at the time of making the proposal. While the stated objective of setting up CED was to be a

major player in IT education, the Management's present stand was that the objective was to utilise surplus manpower of TV division. Audit could not see evidence of any special reports or studies based on which the decision to set up CED was taken.

ii. The Management did not put before the Board the proposal to start CED much less obtain its approval and entered into a new business segment with the approval of the CMD alone. The fact that the Board discussed performance of CED along with that of other divisions did not amount to approval.

1.6.2 Poor financial performance

The budgeted income vis-à-vis the actual income and the financial performance of the division during the last five years were as below:

Table 2

(Rs. in lakh)

	2000-01	2001-02	2002-03	2003-04	2004-05
Budgeted Income	-	-	3600.00	1000.00	2500.00
Actual Income	265.43	922.20	841.01	2315.94	979.10
Expenses	262.77	940.52	1080.99	2156.87	1252.04
Profit (+)/Loss (-)	2.66	(-) 18.32	(-) 239.98	159.07	(-) 272.94

It can be seen from the above that the CED incurred losses during the years 2001–02, 2002-03 and 2004-05. The income for the year 2003–04 included Rs.893.25 lakh towards supply of hardware and software made by Business Systems Division (BSD) of the Company in respect of School Projects undertaken in Karnataka. Similarly, expenses for the year included the expenditure incurred by BSD amounting to Rs.684.35 lakh on the school projects. Thus the profit of Rs.159.07 lakh for the year 2003-04 would in fact be a net loss of Rs.49.83 lakh as it included profit of Rs.208.90 lakh earned by BSD.

The Management stated (September 2005) that if the income of Business System Division was excluded, the corresponding overhead (in expenditure) would also be reduced which would result in a marginal loss to the CED.

1.6.3 Own Centers and franchisee operations did not yield expected results

1.6.3.1 The Company decided to run its own centres at places where it had its own space and ability to manage the centres with its own staff, while for other places franchisee centres were established. As on 31 March 2005, the Company had 11 own centers and 80 franchisees. This arrangement was similar to that adopted by other players viz., NIIT and APTECH. The Company however, adopted these models irrespective of the place and type of course to be conducted. It had not reviewed the performance during the first five years of its operations to see which model was faring better in terms of place and type of courses.

1.6.3.2 The TV Division (whose operations were discontinued from 1996) branches were converted into own centers. As stated by the Management one of the objectives of entering into the area of IT education was utilisation of the surplus manpower. However, the Company failed to evolve any policy for utilisation of the surplus manpower on

account of which only a small number of surplus staff could eventually be engaged in CED. Only 25 employees of the closed TV Division could be utilised in CED and 258 employees had to be deployed in other different divisions. Due to this the Company continued to depend on market talent for running CED business even in its own centers.

The Management replied (September 2005) that a player in IT education market could not survive on only one model to the exclusion of others. Further, the Company had now decided that only high-end courses would be conducted through its own centers and other courses would be run through franchisees.

The Management further replied (September 2005) that CED would take steps to review the performance of its staff and consider suitable steps to motivate them. The reply of the Company shows that it reviewed the position only after five years.

1.6.3.3 The franchisees are responsible for conducting the courses and taking tests as per guidelines of CED, for collection of fees from the students and for remitting the same to the Company's Bank Account. The following shortcomings were noticed in the working of franchisees:

i. Private individuals or corporate bodies operated centers as franchisee of the Company under an agreement for sharing of the revenues with the Company at agreed percentages. The Company had not set any criteria for selection of a franchisee.

ii. The Company failed to evolve and implement an effective cash control mechanism. While the agreement with the franchisees provided for remittance of the fee collected from students within 48 hours, there were delays ranging from three to thirteen days, in remittance of fees by these franchisees.

iii. In East Zone, the Master Franchisee agreement[▲] with M/s. RDL was terminated (July 2003) but the account had not been settled (November 2005). The Company had not considered the risk of misuse and potential loss in franchisees still holding some receipt books, course material, etc.

iv. One of the franchisees viz. M/s. Maharaja Incorporates at Jamshedpur appointed (April 2001) by M/s. RDL, the master franchisee, sold off (February 2002) its center to M/s. SIMS without prior approval. M/s. SIMS continued the operations and collections made by M/s SIMS were not deposited to the Company account. Only in March 2003 the CED approved the transfer of business between M/s Maharaja and M/s SIMS and permitted continuation of operations by M/s SIMS subject to signing of an agreement. However, M/s SIMS neither executed the agreement nor paid dues amounting to Rs.4.64 lakh. Consequently the Company filed (February 2004) a case for recovery of dues and the same is pending in the court.

v. The Company did not reconcile the number of the total receipts books printed, issued and balance retained by own centers/franchisees. Similarly the course materials printed and disbursed to own centers / franchisees were not reconciled

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▲ ***Master franchisees appointed by the Company were authorised to establish their own centres as well as appoint sub-franchisees for imparting computer education.***

with the total number of students (course-wise) who had undergone training. There were no systems in place for routinely checking these matters.

The Management replied (September 2005) that:

i. Capacity to invest and experience in computer education field were adopted as guiding principles for selection of franchisees in the beginning of the business. Further a set of detailed guidelines was issued in the year 2004.

The Company had to cancel as many as 63 franchisee agreements, which shows the selection criterion was not stringent. The reply clearly indicates that the guidelines were adopted after four years. Had this been done earlier, the Company could have avoided unproductive franchisee arrangements.

ii. It agreed with audit on the need to have an effective internal control mechanism to oversee the functioning of franchisees.

iii. Action had been initiated to ensure that there was no risk of misuse of unused stationery by the franchisees whose agreements had expired.

iv. CED had control over receipt books and the monitoring was being made more stringent.

1.6.4 Fallout of business tie-up with M/s Bureau of Data Processing Systems

The Company in association with M/s Bureau of Data Processing Systems (BDPS), Mumbai started in December 1998 (i.e. prior to setting up of CED) computer training courses under the name of ECIL-BDPS. BDPS was responsible for imparting computer education. The Company was to receive 10 *per cent* of the course fee collected by BDPS as royalty in respect of its own centers and 7.5 *per cent* in respect of centers under franchisees appointed by BDPS. In addition the Company was to receive a one-time payment for Licensee Fee (ranging from Rs.25,000 to Rs.75,000) for each center opened in rural, municipal and metropolitan area. The certificate for the completion of the course was to be issued by the Company in the name of ECIL-BDPS. The agreement was valid for five years.To overcome the various shortfalls in the agreement with BDPS such as lack of Company's control over business, non-reporting and non-payment of amounts collected by BDPS and to bring the business relationship on par with other franchisees after formation of CED, an amended agreement was entered into with BDPS in June 2001 with retrospective effect from 1 April 2000. BDPS did not adhere to the amended agreement and the Company suffered due to various shortcomings as detailed below:

i. New Centers/Franchisees were started by BDPS without any tripartite agreement. No data was furnished regarding students' strength, attendance, faculty, cost of compliance of all requirements etc.,

ii. BDPS/franchisees were not remitting the amount in Company's account. BDPS even requested for postponement of presentation of the post-dated cheques issued by it.

iii. BDPS had given new nomenclature to the courses and course material, reduced fee structure without any notice or permission and continued to issue their certificates instead of the Company's certificates.

iv. BDPS did not inform the Company of the details of closed centers.

v. BDPS failed to generate any business after April 2001.

The Company served a show-cause notice on BDPS in October 2001. As there was no improvement, the Company terminated the agreement with effect from March 2002 stating that all individual franchisees under BDPS would automatically come under the direct control of the Company. The Company served a legal notice (June 2002) on BDPS to pay the dues within 21 days along with interest at the rate of 18 *per cent* per annum failing which it would initiate appropriate legal proceedings. BDPS intimated in March 2003 that Income Tax (IT) authorities had attached their properties on account of non-payment of the arrears for the year 2001-02. The Management stated (November 2004) that resorting to arbitration/legal proceedings, which might cost Rs.3 lakh – Rs.4 lakh, was not prudent as the assets of BDPS were sealed by the Income Tax Department. It further stated (January 2005) that a registered notice demanding the payments due was issued to BDPS in January 2005.

Hence, the Company incurred a loss of Rs.67.13 lakh[▾] due to lack of adequate and timely steps for checking the accounts at centers of BDPS and franchisees at regular intervals and follow-up of demand and collections.

The Management further stated (September 2005) that after adjusting Rs.27 lakh towards reimbursement of expenditure to BDPS, the Company proposed to treat the balance Rs.40.13 lakh as irrecoverable.

The reply is not tenable as though the Company was incurring only overhead expenditure, it did not mean that it could allow a private operator to exploit its name to earn income for himself. The Company could have minimised its loss had it realised the amount from the franchisee.

1.6.5 School Projects

The CED undertook School Computer education projects under agreements with the State Governments from 2001–02. The scope under these projects covered installation and commissioning of the infrastructure and providing computer training in the school premises selected by the respective Governments.

The Company had five school projects in different states operated through agreements with franchisees / Business Associates (BAs) who in turn appointed Local Service Providers (LSPs) / sub franchisees to actually deliver the computer education in the schools. The business generated from these projects for the last four years is given below.

Table 3

(Rs. in lakh)

Year	2001-02	2002-03	2003-04	2004-05
Himanchal Pradesh	267.65	366.59	281.57	30.24
Delhi	65.32	102.85	82.85	45.75
Rajasthan	--	--	173.53	326.91
Karnataka	--	--	215.00	490.07
Uttaranchal	--	--	2.77	0.67
Total	**332.97**	**469.44**	**755.72**	**893.64**

[▾] *As worked out by the Management, the loss was Rs.13.74 lakh for 2001-02 and Rs.53.39 lakh for 2002-03*

Audit observed the following:

i. The Company relied totally on the local franchisee / BAs for execution of the project. Although, the Company had entered into agreements with Himachal Pradesh and Uttaranchal States in May/June 2001 and July 2003 for execution of School Projects, it appointed BAs/franchisees in August 2001 and October 2003 respectively. Thus, there was a delay of about three months in implementation of the scheme.

ii. Franchisees/BAs collected the fee from the schools based on the number of students enrolled and in the first instance deposited the amount in the Company's account. The Company paid back the share of franchisee / BAs from the amounts collected by BAs from the customer as per the rates agreed. However, in the absence of the details of the number of students in each class and school, the collections shown by the BAs could not be verified and the Company had to totally rely upon the receipts furnished by them along with the remittance.

iii. In Rajasthan, the BAs after receiving their share from the Company did not pay the amounts due to the LSPs. The LSPs were demanding their share from the Company. The Company although not bound contractually to pay the moneys due to LSPs, found itself in a fix because if it did not pay, the LSPs would stop providing the services and the Company would be liable to the Rajasthan Government for deficiency in service.

The Management replied (September 2005) that:

i. The delays were because the sites were not ready or for other reasons;

ii. As for the absence of details of students enrolled and the correctness of the collection (revenue) the management offered no comments; and

iii. It was directly regulating payments to LSP where the BAs had defaulted.

On account of the problems faced, the Company had decided that it would not undertake any new school projects.

Conclusions

The Company had not conducted any objective and detailed assessment of the business potential and its own strengths before setting up CED. The modalities of franchisee arrangements were not worked out properly and as a result there were many problems in implementing the franchisee agreements. The foray into school projects also was not properly conceived and implemented. Thus, the CED failed to achieve the objectives with which it was set up.

The review was issued to the Ministry in January 2006; its reply was awaited (February 2006).

MINISTRY OF CIVIL AVIATION

CHAPTER: II

Air India Limited

Fleet Utilisation and Maintenance

Highlights

The Company did not purchase any new aircraft after 1996 and augmented its fleet with dry leased aircraft since the year 2000 in the absence of effective fleet replacement policy. The utilisation of the available fleet was satisfactory and was more than the industry average as well as the planned hours in most cases. The Company, however, cancelled/rescheduled the flights in 3.05 to 12.04 *per cent* cases and delayed it by more than 20 minutes in 17.35 to 21.87 *per cent* cases during the last three years ended 2004-05. It did not maintain the industry data in regard to adherence to flight schedules for evaluation of its own performance *vis a vis* the other airlines.

(Para 2.4.1 to 2.4.4)

The Company duly carried out various checks on the aircraft to meet the requirements of Director General of Civil Aviation. However, the actual time taken for completion of these checks far exceeded the norms that led to excess grounding of aircraft and consequential loss of potential contribution amounting Rs.93.04 crore based on the loss of flying hours. The Company also resorted to outside agencies, on various grounds, for carrying out the major checks though it had the facilities to do the same in-house. During the last three years ended 2004-05, the Company made meager investment of Rs.6.14 crore in creation of repair and maintenance facility as against the capital budget of Rs.99.98 crore. Due to non-implementation of the schemes as per the capital budget, it incurred an expenditure of Rs.8.21 crore on outside repairs in three cases.

(Para 2.5.1 and 2.5.3)

Gist of Recommendations

For optimal fleet utilisation and proper maintenance of aircraft the Company may consider taking the following measures:

- firm up its future fleet composition and deployment and formalise a policy for its systematic aircraft replacement in order to optimise on maintenance and operating expenditure;
- use specialised software for drawing the flying schedules instead of doing it manually and conduct market surveys periodically to assess/re-assess potential of various routes to improve the service;
- identify accountability centres to minimise flight cancellations, rescheduling and delays which were due to reasons of operational, in-flight and ground handling services;

- properly plan and implement its capital budget to augment its existing facilities for repair and maintenance in order to avoid outside repairs;
- improve upon online information system among its various departments for better planning and coordination in order to avoid excess grounding of aircraft;
- analyse and optimise the manpower requirements on a regular basis, fix man hour standards for all routine maintenance activities, reassess its inventory requirements and reduce its internal processing time in ordering of spares;
- coordinate and initiate joint action along with Airport Authority of India and other civil authorities to reduce the number of incidents; and
- acquire the industry data in regard to flight delays/cancellations/rescheduling and the aircraft incidents and evaluate its performance for necessary corrective action.

2.1 Introduction

2.1.1 Air India Limited (the Company) had a fleet of 36 aircraft as on 31 March 2005, out of which 18 were owned by the Company and remaining were on dry lease[*]. The Company utilised these aircraft mainly for international flights and a limited number for domestic flights. Fleet composition of the Company as on 31 March of 2003, 2004 and 2005 was as follows:

Table-1: Fleet composition

(In numbers)

Sl. No.	Aircraft type	Average age of aircraft as on 31 March 2005	Fleet Strength					
			As on 31 March 2003		As on 31 March 2004		As on 31 March 2005	
			Owned	Dry leased	Owned	Dry leased	Owned	Dry leased
1.	Boeing 747-200	25	4	-	4	-	2	-
2	Boeing 747-300	16.3	2	-	2	-	2	-
3	Boeing 747-400	12.4	6	1	6	3	6	5
4	Boeing-777-222	6.7	-	-	-	-	-	2
5	Airbus 310-300	15	8	9	8	11	8	11
	Total		**20**	**10**	**20**	**14**	**18**	**18**

Over the last three years while the aircraft taken on dry lease increased from 10 to 18, the owned fleet came down from 20 to 18 on account of disposal of two Boeing 747-200 aircraft. Financial performance of the Company during the last three years ended 31 March 2005 was as highlighted in **Annexure-1**.

[*] *Dry lease means the aircraft taken on lease without the operational and cabin crew and maintenance to be undertaken by company itself.*

2.1.2 Organisational Set-up

Operations of the Company were organised and managed through 19 Departments located at Mumbai (Headquarters of the Company) and five Regional Offices located at New York (for USA and Canada), London (for UK and Europe), Tokyo (for Far East), Dubai (for the Middle East & Africa), and Mumbai (for India and Sri Lanka). The Commercial Department of the Company was responsible for drawing the flight schedules for operations, the Planning and International Department for planning especially for fleet acquisition and maintaining international relations and the Engineering and Engine Overhaul Departments carried out the maintenance of aircraft and ensured airworthiness and safety standards.

2.2. Scope and Objective of Audit

The purpose of this Performance Audit was to review the utilisation of the fleet and its maintenance by the Company during the period of three years from 2002-03 to 2004-05 with the primary objective of examining:

(i) whether the available fleet was utilised optimally and

(ii) whether the maintenance of fleet was carried out effectively and economically to ensure availability of the required fleet for planned operations.

2.3. Audit Methodology and Acknowledgement

2.3.1 The records of Commercial, Planning and International, Engineering and Engine Overhaul Departments for the last three years from 2002-03 to 2004-05 were examined in audit. Guidelines issued by Director General of Civil Aviation (DGCA) for maintenance checks, industry data and norms fixed by the Company as well as their compliance was also examined for evaluation of the Company's performance. The issues that emerged during the review process were discussed with the Management for clarification. List of records examined during the audit is given in **Annexure-2**.

2.3.2 Audit takes this opportunity to thank the management and staff of the Company for their co-operation and assistance in the conduct of this performance audit.

2.4 Audit findings on Fleet Utilisation

2.4.1 Fleet acquisition and replacement policy

2.4.1.1 The Company periodically assessed/reviewed its fleet requirement but did not purchase aircraft to bring efficiency, economy and effectiveness in its operations. It was observed in audit that the last purchase of aircraft by the Company was in 1996. In February 1992, the Ministry of Civil Aviation conveyed its approval to the Company's adoption of 'Ten-Year-Roll Over Policy' in its future fleet planning. While recommending the adoption of this policy, the Company had pointed out that to implement this policy in practice, it would be necessary to (i) drastically overhaul the existing lengthy and cumbersome procedures for the purchase/sale of aircraft in order to exploit the opportunities for profitable aircraft purchases/sales and, (ii) develop requisite in-house expertise in trading of used aircraft. The Company further requested that Board of Directors be given blanket approval to buy/sell aircraft, without Government approval, provided the required investment could be met without any budgetary support from the Government, i.e., through own resources and commercial borrowings. As the two pre-

requisites were not put in place, the Company could not implement the above policy and no aircraft was purchased after 1996.

2.4.1.2 In December 1996, the Company submitted a proposal for acquisition of three A310-300 aircraft, which was not cleared by the Ministry on account of availability of excess A320 aircraft with Indian Airlines Limited. Thereafter, even though acquisition of new aircraft was continued to be contemplated by the Company, the process was put on hold in view of the then on-going process of disinvestment. In January 2004, when the Company was finally taken off from the disinvestment list, it again sent a proposal to the Ministry for acquisition of ten Long Range aircraft and eighteen Short Range aircraft as phase-I of their acquisition plan. The Ministry directed (August 2004) the Company to revisit the proposal to offer competitive products with suitable aircraft as the introduction of low cost (low fare) carriers was decided to be carried out under the brand name "Air India Express" through Air India Charters Limited (a subsidiary of the Company) with dry leased aircraft. In April 2005, a proposal to acquire 50 aircraft from M/s Boeing Airplane Company based on competitive bidding was approved by the Board of Directors and forwarded to the Ministry for approval. The Government approved the above proposal in December 2005. Meanwhile, since 2000, the Company took aircraft on dry lease for specific durations and added 18 dry leased aircraft to its fleet. Thus, the Company did not have a clear vision of its long-term fleet composition. As discussed in the subsequent paras it needed to firm up its future fleet composition at the earliest and formalise an aircraft replacement policy in order to optimise its operating and maintenance arrangements.

2.4.2 Flight Scheduling

2.4.2.1 Process of drawing Schedules

The Company drew its schedules of operations twice a year viz., "Summer Schedule" and "Winter Schedule". The Commercial Department prepared the draft schedules after considering the previous schedules and current market requirements. While drawing the draft flying schedules, the Commercial Department obtained inputs from the Engineering Department regarding various mandatory maintenance checks and from Operations, In-flight Services and Ground Services Departments regarding availability of cockpit crew, cabin crew and ground handling facilities at airports respectively. The draft schedules were discussed in the meeting of the Schedules Committee represented by all the concerned Departments before finalisation of the schedules by the Commercial Department. It was observed in Audit that this procedure was strictly followed and the final Schedules for Summer 2002 to Winter 2004 were drawn in time.

2.4.2.2 Manual Scheduling

Drawing of flight schedules depends on various factors like pattern of operations in previous schedules, market requirements, availability of aircraft, availability of slots at the destination airports, additions/deletions of frequencies depending upon competitors' strategy, route profitability etc. Being a large Company and the national carrier, the Company had over 25000 flights per annum which were expected to increase further in view of proposed fleet acquisition. It was, however, noticed that the cumbersome process of schedule preparation and revisions was done manually. Taking into account the complexity of procedure, multiple agencies/departments involved and increase in activities, it would have been prudent for the Company to use specialised software for

drawing the flight schedules, as was being done by most of the premier International Airlines. The Management while accepting the audit observation stated (November 2005) that the Company might consider acquiring an integrated Planning and Scheduling Software, after evaluating the various available options, as with acquisition of additional aircraft the scheduling would become too complex to handle manually.

2.4.2.3 Review of routes and market survey

Financial performance of each route was periodically reviewed through discussion with the executives of Scheduling and Marketing Sections of Commercial Department. However, the Company did not conduct any market survey periodically to assess or re-assess the market (route) potential. It considered only performance reports given by Regional Directors/Station Managers for addition or deletions of frequencies. The Company prepared Market Survey Report only before starting any new route, based on the inputs from the Regional Director/Station Manager concerned. During the period from April 2002 to March 2005, the Company prepared such Market Survey Reports in respect of only five new routes, which were added subsequently. The Management agreed (November 2005) with the audit observations and stated that it should conduct market surveys periodically to reassess potential of various routes and also for assessing and improving the service.

2.4.3 Schedule adherence

On time performance is a key indicator of operational performance of an airline. Frequent delays not only harm goodwill of the airline but are also a financial burden.

2.4.3.1 Cancellation and rescheduling

The Company could not adhere to its flying schedules in 3.05 to 12.04 *per cent* cases during the period from Summer 2002 to Winter 2004. It had to cancel the flights in 0.029 to 1.95 *per cent* cases and reschedule the flights in 3.02 to 10.19 *per cent* cases. The cases of cancellation and rescheduling were mainly on account of commercial reasons like poor passenger load factor or closure of airport due to repairs/re-carpeting of runway, etc., engineering factors such as technical snag developed in the aircraft, operational reasons like non-availability of cockpit or cabin crew, VVIP factors like aircraft being used for VVIP movement and miscellaneous factors such as weather problem, restrictions by Air Traffic Controller, etc. as shown in **Annexure-3.** It was observed in audit that the Company had a system of taking corrective action by drawing succeeding schedules in such a way that the number of flight cancellation/rescheduling was reduced considerably. The percentage of cancellation and the rescheduling of flights came down from 1.85 and 10.19 *per cent* respectively in Summer 2003 to 0.029 and 3.02 *per cent* respectively in the Winter 2004.

The Management stated (August 2005) that in Summer 2003, the Company was forced to withdraw its flights for a considerable time due to outbreak of Severe Acute Respiratory Syndrome in South East Asia. It was observed in audit that proper planning and effective accountability system could reduce the flight cancellations/rescheduling, which were due to operational reasons.

2.4.3.2 Flight Delays

Flights were delayed by more than *20 minutes in a large number of cases ranging from 17.35 to 21.87 *per cent* of total flights during the period under review. The reasons for the delays were mainly commercial (delay in identification of baggage, passenger manifest reconciliation etc.), ground services (aircraft handling at airport), operational (delayed arrival of crew), engineering (last minute technical snags developed in the aircraft) and miscellaneous (delay in clearance from Air Traffic Control, Immigration/Custom related issues, weather conditions etc.) as shown in **Annexure-4.**

The Company did not maintain the industry data in regard to the adhering to flight schedules, for evaluation of its own performance *vis a vis* the other airlines. While the delays falling under categories like Commercial, Engineering and Miscellaneous categories were largely unavoidable, the delays due to non-availability of operating crew or cabin crew at the last moment and non availability of ground services could be avoided to some extent by proper planning and effective control system.

2.4.4 Utilisation of Aircraft

The schedule wise planned and actual utilisation of different types of aircraft *vis a vis* the industry average are given below:

Table-2

Average utilisation of aircraft

(in hours per day)

Schedules	Types of Aircraft			
	B747-400	**B747-300**	**B747-200#**	**A310-300**
Summer 2002				
Planned	11.62	9.88	3.04	9.37
Actual	11.10	5.62	4.82	9.35
Excess/(shortage)	(0.52)	(4.26)	1.78	(0.02)
Winter 2002				
Planned	11.60	11.52	3.00	9.50
Actual	12.75	8.36	5.68	9.67
Excess/(shortage)	1.15	(3.16)	2.68	0.17
For the year 2002-03				
Planned	11.61	10.70	3.02	9.44
Actual	11.93	6.99	5.25	9.51
Excess/(shortage)	**0.32**	**(3.71)**	**2.23**	**0.07**
Industry average	11.70	7.40	7.20	7.20
Summer 2003				
Planned	12.28	10.52	3.25	9.13
Actual	12.36	8.94	5.28	8.92

**The '20 minutes' criterion in respect of delays is the practice followed by the Company for past several years. Delayed departure upto '20 minutes' on various accounts is considered as normal and hence not counted against actual delays.*

Excess/(shortage)	0.08	(1.58)	2.03	(0.21)
Winter 2003				
Planned	12.39	10.59	4.06	9.80
Actual	13.09	7.87	6.94	9.96
Excess/(shortage)	0.70	(2.72)	1.88	0.16
For the year 2003-04				
Planned	12.34	10.56	3.66	9.47
Actual	12.73	8.41	6.11	9.44
Excess/(shortage)	**0.39**	**(2.15)**	**2.45**	**(0.03)**
Industry average	11.20	6.90	7.20	7.30
Summer 2004				
Planned	12.93	10.44	-	9.60
Actual	13.54	7.91	-	9.66
Excess/(shortage)	0.61	(2.53)	-	0.06
Winter 2004				
Planned	13.21	10.58	-	9.54
Actual	13.80	9.38	-	10.04
Excess/(shortage)	0.59	(1.20)	-	0.50
For the year 2004-05				
Planned	12.84	10.50	-	9.94
Actual	13.74	8.61	-	9.80
Excess/(shortage)	**0.90**	**(1.89)**	**-**	**(0.14)**
Industry average	11.90	7.50		7.70

B747-200 aircraft being very old was not considered for operations from Summer 2004 schedule.

It may be observed that the Company achieved the planned utilisation in respect of all aircraft and schedules except in respect of B747-300 aircraft. However, even for B747-300 aircraft, the actual utilisation was more than the industry average, except for the year 2002-03.

The Management stated (August 2005) that the actual utilisation of B747-300 aircraft was lower than the planned hours due to its grounding for maintenance as per the maintenance cycle and on account of sudden technical snags and operational reasons.

Thus, the performance of the Company in planning and uitilisation of the available fleet was satisfactory. However, there was scope for the increase in the fleet availability for operations by carrying out the maintenance activity efficiently as highlighted in the succeeding paragraphs.

2.5 Audit findings on Maintenance

2.5.1 Capital expenditure on fleet maintenance

The capital budget *vis a vis* actual expenditure on creation of repair and maintenance facilities during the period from 2002-03 to 2004-05 was as under:

Table-3: Capital Expenditure

(Rs. in crore)

Year	New Schemes		Continuing Schemes	
	Budget	**Actual**	**Budget**	**Actual**
Engineering Department:				
2002-03	5.02	0.05	13.70	1.90
2003-04	4.56	0.19	11.36	1.80
2004-05	3.88	0.04	17.59	0.28
Engine Overhaul Department:				
2002-03	0.46	0.08	14.01	0.72
2003-04	2.85	0.14	13.74	0.33
2004-05	2.00	0.01	10.81	0.60
TOTAL	**18.77**	**0.51**	**81.21**	**5.63**

It may be seen from the above table that against the budgeted capital expenditure of Rs.99.98 crore for repairs and maintenance facilities during the last three years ended 2004-05, the actual capital expenditure incurred for Engineering Department and Engine Overhaul Department was Rs.6.14 crore only.

The Management stated (November 2005) that the balance budgeted amount for all the three years was deferred mainly due to financial constraints. The reply is not tenable because the above schemes were intended to bring economy and effectiveness in repair and maintenance activities and by deferring the implementation of these schemes, the Company had to incur avoidable expenditure on outside repair as highlighted in the following cases.

(i) Non-procurement of Air Cycle Machines

The Company used to send Air Cycle Machines (ACMs) of B747-300, B747-400 and A-310 types of aircraft for overseas repairs, as the existing ACM Stand was capable of house repair of only B747-200 type of aircraft. In order to reduce the expenditure on overseas repair, an amount of Rs.3.47 crore was sanctioned in the capital budget of the Engineering Department for the year 2000-01 for procurement of Universal Cycle Machine stand. The payback period estimated by the Engineering Department in February 2000 was 2.5 years. However, the Company did not procure the equipment till date on grounds of space constraint. The Company incurred an expenditure of USD 1.50 million (Rs.6.76 crore) on overseas repairs during the period 2002-03 to 2004-05, which could have been avoided had the scheme been implemented as per Plan.

The Management stated (October 2005) that on receipt of details of the equipment it was found that the equipment required a vertical expansion in order to accommodate a part of it but suitable space was not available and, therefore, the proposal was put on hold. The Management's reply reflects lack of proper planning and co-ordination among different units.

(ii) Non-procurement of fuel test rig

Due to limitations of the existing fuel test rig, the refuel/defuel of valves of B-747 and A-310 aircraft were sent outside for testing and repair. In the capital budget for the year 2001-02, an amount of Rs.20 lakh was sanctioned for the procurement of a new fuel test rig for testing refuel/defuel valves of B-747 and A-310 aircraft. However, Engineering Department did not pursue the matter further for the next two years. Only in the capital budget for the 2004-05 an amount of Rs.68 lakh was again sanctioned towards the cost of the rig of increased capacity. Meanwhile the Company continued to incur expenditure on outside testing/repairs and incurred an expenditure of Rs.1.22 crore during the last three years ended 31 March 2005.

The Management stated (November 2005) that considering the cost of spares and the manpower involved, there was an extra expenditure of only about 10 to 15 *per cent* of the actual cost incurred on outside repair. The fact, however, remains that by not procuring the fuel test rig as per the plan, avoidable expenditure on outside repair was incurred.

(iii) Non- procurement of special tool for overhauling of compressor

In December 2003, Accessories Overhaul Division (AOD) sent a proposal for procurement of special tool used in overhauling of compressors of chiller in A-310 and B-747-200 aircraft at an estimated cost of only Rs.6.83 lakh. The tool was intended to be procured for saving the expenditure being incurred on sending the compressors overseas for repairs. However, till date, the Company did not procure the special tool on the grounds of space constraint and incurred an expenditure of USD 51,696 (Rs.23.26 lakh) during the last three years ended 2004-05 on the overseas repairs in 11 cases in respect of which data was made available to audit.

The Management stated (November 2005) that the equipment could not be procured due to non-availability of the required space for its installation. The Management's reply reflects lack of proper planning and co-ordination among different units.

Recommendation

The Company should properly plan and implement its capital budget to augment its infrastructure maintenance facilities to minimise recurring expenditure on outside repairs.

2.5.2 Revenue expenditure on fleet maintenance

The details of revenue expenditure incurred on repairs and maintenance during the last three years ended March 2005 are given below:

Table –4

Total Revenue Expenditure on Maintenance

(Rs. in crore)

Year	Size of Fleet	Operating Expenditure	Expenditure on fleet maintenance					Percentage of outside repairs to Total (6/8)	Percentage of Exp on fleet maint. to Operting exp. (8/3)
			Pay & Allow.	Material	Outside repairs	Other exp.	Total		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2002-03	30	5465.63	206.37	282.57	135.94	32.66	657.54	20.67	12.03
2003-04	34	6104.24	217.68	279.16	144.47	34.70	676.01	21.37	11.07
2004-05	36	7538.88	217.50	394.01	118.56	42.24	772.31	15.35	10.24

It may be seen that the expenditure on fleet repair and maintenance in proportion to operating expenditure had been decreasing. The decrease in in-house maintenance expenditure was due to the following reasons:

(i) Grounding of old B-747-200 aircraft during the last three years and sale of old A-300 aircraft which had incurred higher maintenance expenditure in the past;

(ii) Induction of more new leased aircraft in the fleet and consequent reduction in in-house maintenance expenditure and,

(iii) No proportionate increase in the technical staff against retirement/resignation *vis-à-vis* increase in the fleet size.

2.5.3 Utilisation of maintenance facility

Fleet maintenance carried out by Engineering Departments and Engine Overhaul Department was a key factor in determining the reliability and safety of fleet/passengers. Any inefficiency in the maintenance of the fleet also resulted in delays/cancellations of flights and consequent loss of goodwill, besides financial loss to the Company on account of operating revenue and maintenance cost. All the maintenance and overhaul facilities were located around Chhatrapati Shivaji International Airport, Mumbai and the maintenance of aircraft was carried out as per DGCA's prescribed maintenance schedule.

Engineering Department and Engine Overhaul Department comprised eight shops, *viz.*, Major Maintenance Division (MMD), Accessories Overhaul Division (AOD), Components Overhaul Division (COD), Instruments Overhaul Division (IOD), Electronics Overhaul Division (EOD), Line Maintenance Division (LMD) Equipments Facilities Division (EFD) and JET shop. These shops carried out all the repair work and necessary periodic checks on the aircraft.

2.5.3.1 Shop performance

The number of items of work which were awaiting completion or pending for want of spares in the various shops, at the end of the last three years ended March 2005, was as under:

Table-5

Shop performance (No. of pending work orders)

Shop	Year	Opening Balance	Receipts	Completion	Backlog* (Closing Stock)	Withdrawn
AOD	2002-03	1126	12393	11954	1565	677
	2003-04	1565	13144	13111	1598	329
	2004-05	1598	12692	13462	828	305
IOD	2002-03	569	6875	6900	544	127
	2003-04	544	6321	6389	476	166
	2004-05	476	5958	6002	432	73
EOD	2002-03	328	6147	6179	296	179
	2003-04	296	7348	7392	252	106
	2004-05	252	7524	7470	306	126
COD	2002-03	1626	12670	13284	1012	602
	2003-04	1012	12374	12394	992	435
	2004-05	992	12504	12500	996	293

It is evident from above that every year all the shops showed considerable backlog as well as withdrawn (*i.e.*, pending for want of spares) work orders. The Management stated (November 2005) that there would always be a backlog of unserviceable components in the pipeline awaiting repair for completion and certification, which could be around 3-4 weeks of production including around 30 *per cent* for want of spares. The Management added that shortage of manpower also contributed to some backlog. The reply, however, indicated a need to improve upon manpower planning and inventory control.

Recommendation

The Company should fix the productivity norms for routine maintenance activities, reassess its inventory requirements and reduce its internal processing time in ordering of spares.

2.5.3.2 Loss of contribution due to delay in completion of checks

Production Planning Division (PPD) of Engineering Department was responsible for planning and implementing the scheduled maintenance/checks of the aircraft to meet the requirements of DGCA. This included major jobs like landing gear change, thrust reverse replacement, aircraft painting, weighing, cabin refurbishment, corporate modification etc. Days planned (norms) for grounding of aircraft were decided on the basis of statistical data of actual time taken for various checks/major repair jobs in the past and the proposed workload.

It was observed in audit that during the years 2002-03 to 2004-05 the actual days of grounding of aircraft for the scheduled maintenance/checks far exceeded the planned

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* *Backlog includes withdrawn and withdrawn means pending for want of spares.*

grounding days due to shortage of spares (31 cases), limited manpower (6 cases), work starting late (32 cases) and multiple aircraft on the ground for checks (4 cases). The following table shows the cases where excess time of more than 20 days was taken over the planned days during last three years ended 2004-05.

Table-6

Excess time taken for aircraft maintenance work

Sr. No.	Aircraft	Check type	Plan Days	Actual Days	Excess Days	Reasons as per internal report
2002-03						
1.	VT-EJG	C	47	97	50	Shortage of spares
2.	VT-EPW	W+C	55	81	26	Delay in issue of transmission Assemblies – Non-availability of Engine
3.	VT-EJH	W+C	58	102	44	Transfer of spares to other aircraft and diversion of manpower
4.	VT-EJJ	C	67	90	23	Shortage of spares
5.	VT-EPX	C	38	66	28	Not mentioned in Report
6.	VT-EJI	C	32	62	30	Not mentioned in Report
7.	VT-EJK	C	40	69	29	Delay at Major Maintenance Shop
8.	VT-EVH	C	44	65	21	Shortage of spares.
2003-04						
1.	VT-EJK	C	40	97	57	Shortage of spares and manpower.
2.	VT-ESN	C	37	64	27	Shortage of spares.
3.	VT-EJL	C	27	104	77	Shortage of spares.
4.	VT-EVU	A	3	41	38	Shortage of spares.
5.	VT-EVF	A	3	23	20	Shortage of spares.
6.	VT-EGB	4A	13	46	33	Unplanned additional workload
2004-05						
1.	VT-EPX	C	34	54	20	Multiple aircraft on ground and shortages of spares
2.	VT-EJI	C	31	94	63	Unplanned additional work load and fuel leak
3.	VT-EGA	4A	13	36	23	Unplanned additional work load
4.	VT-EJL	C	63	90	27	Shortage of spares and fuel leak.

It may be seen that the excess time was taken in carrying out the 'C' checks▾ in maximum cases. Out of 48 'C' checks carried out during the last three years ended March 2005, there was delay of more than 20 days in 14 cases. This led to excess grounding of aircraft and adversely affected the fleet availability as well as adherence to the flight schedules. The loss of contribution due to the excess grounding of aircraft during years

▾*The checks were required to be statutorily carried out by the Company after completion of the flying hours as prescribed by DGCA for each type of aircraft.*

2002-03 and 2003-04 was estimated at Rs.93.04 crore based on the loss of flying hours as shown in **Annexure-5**.

The Management stated (November 2005) that the planning of maintenance work was done on the basis of certain assumptions, but the maintenance as per the plan could not be carried out due to extensive unplanned work, non-availability of spares, diversion of manpower to other works and induction of more leased aircraft. The reply, however, reflected lack of proper coordination and inadequate online information flow among various divisions of the Company.

The Management further stated that there was no significant disturbance to flight schedules as a result of the excess grounding because its revenue services were adjusted among the remaining A310 and B747 aircraft, which was a normal airline practice. The Management's reply is not tenable as the excess grounding affected the overall fleet availability for operations and the Company required to take adequate measures to tide over the bottlenecks in maintenance work for optimal availability and utilisation of the fleet.

2.5.3.3 Major maintenance of aircraft carried out outside India

The outside repair and maintenance was generally resorted to only if there did not exist in-house facility or if the operation was not economical. During the last three years ended March 2005, the Company sent 13 aircraft for overseas repairs and spent US$12.75 million (Rs.57.37 crore) on major maintenance such as 'C' and 'D' checks. It was observed in audit that the Company had the capacity to carry out simultaneously two 'C' checks and one '4A' check, besides carrying out minor checks. The Company carried out the following in-house 'C' checks during last three years:

Table-7

Number of major checks ('C' checks)

Year	In house	External	Reasons for external check
2002-03	14	5	Two leased aircraft as per lessor's requirement. One leased aircraft and two owned aircraft on grounds of capacity constraints.
2003-04	15	3	Two leased aircraft and one owned aircraft on grounds of capacity constraints.
2004-05	9	2	As per lessor's requirement in the agreement.

It may be seen from above that against 14 and 15 'C' checks carried out in-house during 2002-03 and 2003-04 respectively, only nine were carried out during 2004-05. The under-utilisation of the major maintenance facilities during 2004-05 was mainly due to phasing out of four owned aircraft and introduction of four new leased aircraft that reduced the requirement of 'C' checks. In some cases the lessor required the various checks to be carried out only by approved external parties as per agreement and thus inspite of having sufficient in-house capacity to carry out major checks, the Company had to send the aircraft to overseas parties for the checks. Also, one 'C' check was postponed during 2004-05 due to utilisation of the aircraft for Haj operations. Further, in April 2005, the Board of Directors of the Company approved a proposal for sending nine aircraft for

major repairs to overseas parties at an estimated cost of US$18 million (Rs.81 crore) mainly on the grounds of in-house capacity constraints.

The Management stated (November 2005) that the aircraft were sent for outside repairs due to (i) multiple aircraft falling due for major check during a shorter period, (ii) rapid induction of additional dry lease aircraft and no proportionate induction of additional and adequately qualified manpower, (iii) increased Haj operations by own fleet and manpower instead of outsourcing of the fleet, (iv) shifting of manpower from major maintenance to on-line maintenance on account of increase in number of stations and flight frequency and (v) shortage of spares in case of leased aircraft.

The reply is not tenable as these are managerial problems and should have been resolved with proper planning and coordination among its various departments. In order to meet the depletion in manpower of trained and qualified technical personnel due to superannuation, retirement, resignations etc., the Company recruited 53 graduate engineering trainees and 306 trainee service engineers during the year 2004-05. Other than this, the Management had not undertaken any scientific study for reassessing the requirement of technical personnel and no concerted study was conducted on utilisation and additional requirement of maintenance facilities.

2.5.4 Repeated repairs carried out at external facilities

A scrutiny of records revealed that the Company sent the following items several times to overseas parties for repairs during the years 2003-04 and 2004-05 as detailed below:

Table-8:

Repeated repair orders

Part No. and Purchase order No.	2003-04		2004-05	
	No. of occasions parts were sent to overseas repairs	Total cost (USD)	No. of occasions parts were sent to overseas repairs	Total cost (USD)
Nozzles				
9373M80 G25/35	6	305,500	7	385,900
1881M20G27/39/15	12	1,188,000	21	1,567,800
2080M19G27/19/07/01/25	6	488,800	16	1,319,100
1646M18G13	1	28,800	-	-
1713M88G19/15	4	381,600	-	-
9212M86G13/17/29/15	4	124,800	-	-
Diffuser case				
50J779	7	229,000	5	170,000
50J036	1	34,000	1	34,000
Flight augmentation computer				
B352AAMI	13	709,787	-	-

The Management stated (November 2005) that the Engineering Department did not have the capacity to carry out these modifications and hence outside repair was resorted to.

The reply indicated that the Company neither explored the alternative repair facility within the country nor carried out any cost benefit analysis for creation of the in-house facility for these repeated repairs.

2.5.5 Excess grounding due to cannibalisation of spares

Removal of items to satisfy the need of another aircraft or items is known as cannibalisation of spares. During cannibalisation, spares are transferred from an aircraft undergoing maintenance check to another aircraft scheduled for operation. This is generally done in the absence of spares in stores. A scrutiny of transfer listing record showed the following during the years 2003-04 and 2004-05.

Table- 9

Number of cannibalisation

Particulars	2003-04	2004-05
Transfer for maintenance convenience	292	521
Total transfers	1299	1602
Percentage of transfer for maintenance convenience to total transfers	22.48	32.52

It may be seen that the instances of transfer including those made for maintenance convenience (i.e despite availability of spares in stores) increased considerably in the year 2004-05. Cannibalisation of spares required extra manpower as spares had to be removed from one aircraft by authorised engineers and fitted to another aircraft. In some cases instead of speeding up the work, the transfer of spares resulted in deviation/delay from planned grounding days for maintenance. A few such instances are listed below:

Table- 10

Impact of cannibalisation of spares

Name of aircraft	Particulars
VT-EPW	4A check done from 7-9-2003 to 25-9-2003 was delayed by 10 days as LH I/B midflap was transferred to VT-EGC
VT-EVG	3 A+ CDM check done from 2-10-2003 to 23-10-2003 was delayed by 11 days due to transfer of spares to VT-EQS
VT-EVH	3A+CDM check from 15-10-2003 to 4-11-2003 was delayed by 7 days due to transfer of spares to VT-EVG

The Management stated (November 2005) that cannibalisation was done to avoid delay in meeting the urgent requirement of the operating aircraft and the same was as per the industry practice. This practice also helped keeping the high cost spares inventory to an optimum level. However, the reply did not explain the justification for cannibalisations in the above three cases.

2.5.6 Man power analysis

The position of standard force as against actual strength in Engineering Department and Engine Overhaul Departments for the last three years ended March 2005 is shown below:

Table-11

Manpower position

Category of staff	Year	Vacancy (Sanctioned strength)*			Percentage of vacancy to sanctioned strength
		Engineering Department	Engine Overhaul Department	Total	
Aircraft Maintenance Engineers	2002-03	33 (475)	11 (87)	44 (562)	7.83
	2003-04	35 (475)	11 (87)	46 (562)	8.18
	2004-05	-3 (475)	8 (87)	5 (562)	0.89
Service Engineers	2002-03	170 (1455)	51 (303)	221 (1758)	12.57
	2003-04	280 (1455)	69 (303)	349 (1758)	19.85
	2004-05	4 (1455)	81 (303)	85 (1758)	4.84
Technical Assistants	2002-03	59 (373)	15 (87)	74 (460)	16.08
	2003-04	65 (373)	19 (87)	84 (460)	18.26
	2004-05	75 (373)	21 (87)	96 (460)	20.86

* Sanctioned strength was fixed in 1997.

It may be seen that there was shortage of technical manpower during the last three years ended March 2005. Human Resource Department (HRD) of the Company had fixed the standard force way back in 1997, which had not been revised till date (November 2005) as no comprehensive study was conducted to assess the long-term requirements of manpower. The Engineering Department and Engine Overhaul Departments had conducted only a limited review of the manpower requirement considering the expansion, change in fleet composition and depletion of trained manpower due to retirements and it submitted a proposal for induction of additional manpower in July 2001, which was sanctioned only partially.

The Management stated (November 2005) that manpower issue was taken up with HRD regularly at the highest level but detailed exercise of manpower requirement was not carried out, as the fleet composition changed frequently in the recent past and future composition was not clear. Hence, the recruitment was done on an interim basis to meet the flight operational requirements only.

The lack of adequate manpower study and consequent shortage of technical manpower thus adversely affected the aircraft maintenance work time and again. With the process of acquisition of 50 aircraft under way, the future composition of the fleet was expected to be clearer and the Company would be required to take corrective action to address the imbalance.

2.5.7 *Air Safety*

2.5.7.1 An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft and disembarks, in which any person suffers death or serious injury or the aircraft incurs damage or failure which adversely affects the structural strength performance or flight characteristics of the aircraft and which would normally require major repair or replacement of the affected component is called accident. No accidents took place during the review period.

2.5.7.2 An incident is an occurrence other than an accident associated with the operation of an aircraft or could affect the safety of operations. Aircraft Rules, 1937 require notification of incidents such as damage to an aircraft, injury to a person etc. to DGCA by the airlines within 48 hours of the occurrence. During the period 2002 to 2004, 439

incidents occurred and the Company incurred an expenditure of Rs.62.29 crore on rectification as a result of the incidents as shown in the table below. In addition, the higher number of incidents led to higher rate of premium for insurance of aircraft. The Company was required to investigate all cases of incidents, which was done by its Air Safety Department. Number of incidents occurred during the last three years ended December 2004 are given below:

Table-12

Number of Incidents

	2002	2003	2004
1.Ground Incidents	10	14	15
2. Incidents (e.g., Precautionary landing/abandoned take off etc.)	8	8	5
3. Tyre capping coming of incidents	---	1	---
4. Tyre burst incidents	--	4	2
5. Bird hit including bird ingestion	24	30	27
6. Others (fuel spillage, windshield problem etc.)	93	105	93
Total	**135**	**162**	**142**
7. Expenditure incurred on rectification **(Rs. in crore)**	3.74	23.19	35.36

The position of incidents per 10000 hours of flight for the last three years ending December 2004 is indicated below:

Table-13:

Aircraft-wise incidents (in number of per 10000 hours of flight)

Type of Aircraft	2002	2003	2004	Average
B-747-300	24.35	30.95	28.01	27.77
B-747-400	9.48	15.27	14.17	12.97
A-310	16.5	13.2	13.26	14.32

From the above, it is seen that the incidents per 10000 hrs of flight were highest for B747-300 type of aircraft. Further scrutiny of the incidents to B747-300 aircraft revealed that incidents of fuel spillage while fuelling/refuelling from vent scoop / surge tank were frequent.

The Management stated (November 2005) that incidents due to bird hit and most of the ground incidents were beyond the control of the Company and the rectifications carried out by the Engineering wing were mainly due to these incidents. However, the Management did not explain the high incidence of incident in B747-300 aircraft. Due to non-availability of comparable industry data with the Company, its performance *vis a vis* the industry average in regard to the incidents could not be evaluated in Audit.

2.5.7.3 Action taken after Incidents

Air Safety measures in an airline company could be analysed through review of action taken on incidents/accidents. Test scrutiny of investigation reports of the Company on the incidents for the year 2003 revealed as under:

Date of incident/ Type of aircraft	Incident details	Investigation findings
31.10.2003 A-310	Fillet panel '471AL' located at forward end of out board side of LH pylon was ripped off and new panel had to be installed.	Most probable cause for the incident was improper installation of panel. The fillet panel P/N- A545152750040 was removed for inspection during "3A" check on 29.10.03
18.08.2003/ A-310	During take off engine throttle malfunctioned. Take off was abandoned and aircraft returned to bay.	Most probable cause for the engine throttle malfunction was interference by some foreign object lodged inside throttle control drum during installation in "C" check. A/c VT-EQT had undergone "C" check just prior to the incident flight. The said incident occurred on the second sector operated after "C" check.
25.02.2003/ B747-200	During take off roll, side clews from number 2 engine departed and the cowlings dropped on the runway. Another aircraft that landed on the same runway sustained substantial damages due to presence of side cowl pieces on runway.	Most probable cause for the departure of cowlings was improper latching of the cowls.

Investigation findings revealed that better maintenance could have prevented the occurrence of certain incidents, indicating scope for further improvement in safety standards and eventual reduction in maintenance costs.

The Management while accepting the above facts stated (November 2005) that in the above three cases appropriate punishment/warning letters were issued to the errant personnel. The Management also accepted that there was a scope for improvement to reduce the number of incidents, which were due to human error or deficiency in the system. It was observed in audit that there was also a need for vigorous efforts to coordinate with other agencies (such as airport authorities, civil authorities etc) to reduce number of incidents due to bird hit and ground incidents.

2.6 Conclusions

(i) For the last several years, the Company did not have a clear vision of its long-term fleet composition due to infirmity till January 2004 in regard to its disinvestments by the Government and the non-implementation of 'Ten Year Roll Over Policy' for future fleet planning. As a result of the unclear vision of the future fleet composition, the requirements of manpower and inventory for repair and maintenance could not be ascertained in a systematic way and impacted the fleet maintenance and availability. However, with the proposed acquisition of 50

aircraft in phases under way, the fleet composition on long-term basis was expected to be clearer.

(ii) The flight schedules were drawn in time and finalised as per the prescribed system. However, despite being a large airline carrier, the Company continued to draw/finalise the flight schedules manually and market surveys were not conducted to periodically assess/reassess the market potential on various routes.

(iii) The utilisation of the aircraft in terms of flown hours per day was more than the industry average as well as planned hours in most cases and the Company had appropriate system for taking corrective action for non-adherence to flight schedules. The performance in regard to the flight cancellation/rescheduling and delays could not be evaluated due to non-availability of industry data with the Company. However, there was scope for improvement by proper planning and effective control where the delays were due to operational, in-flight or ground handling services reasons.

(iv) Non-procurement of certain equipment despite fund availability in the capital budget resulted in avoidable expenditure of Rs.8.21 crore on outside repairs in three cases during the last three years ended March 2005. There was consistent backlog in various internal maintenance shops due to shortage of manpower and spares. The Company also did not explore new areas for creation of in-house repair and maintenance facilities despite cases of repeated repairs at external facilities.

(v) Though the Company had fixed norms for completion of various checks and carried out all the checks as per DGCA's requirements, the actual time taken for completion of the checks far exceeded the planned days and resulted in loss of flying hours valued at Rs.93.04 crore based on loss of contribution per flying hour.

(vi) Despite having in-house capabilities, a number of major checks were carried out outside at a cost of Rs.57.37 crore during the last three years ended March 2005 due to lack of proper planning and coordination among various departments.

(vii) Manpower analysis was not done regularly despite increase in the number aircraft deployed by the Company. Cannibalisation of spares for maintenance convenience led to excess grounding of aircraft in three cases.

(viii) In regard to air safety performance, no case of accident was noticed during the last three years. However, there was scope for reduction in number of incidents. The Company did not have industry data for evaluating its performance on the safety aspects.

2.7 Auditee's response

The Company stated (November 2005) that the Audit recommendations had been noted and it would take suitable and necessary action wherever possible after carrying out due process of laid down procedures, necessary cost benefit analysis, improving productivity through use of information technology systems and using industry practice and benchmarks wherever available for further improvement.

The review was issued to the Ministry in January 2006; its reply was awaited (February 2006).

DEPARTMENT OF COAL

CHAPTER III

Mahanadi Coalfields Limited

Project Implementation, Performance of HEMM, Manpower Analysis, Fund Management and Environmental Planning

Highlights

Implementation of Advance Action Plan for seven projects could not be completed even after one to 10 years from the scheduled date of completion, with likely adverse impact on the project completion schedule. The Company would require additional funds of Rs.66.29 crore over and above the original sanctioned estimates in implementation of these Plans because of the delays.

(Para 3.6.1.1)

Due to resistance from land oustees, the Company could not produce coal valued at Rs.118.25 crore during 2004-05 in six projects of Talcher Coalfields.

(Para 3.6.1.4)

The Company incurred avoidable extra expenditure of Rs.4.46 crore in 2002-03 by awarding the contract of hiring of surface miner at a higher rate.

(Para 3.6.1.7)

The Kalinga project completed in March 2000 had a poor record in coal production and over burden removal. The backlog in overburden removal stood at 10.46 M cum as on March 2005 and would further affect the working of the mine.

(Para 3.7.1.1)

The underground mines incurred persistent losses over the years. The Company was yet to take steps for phasing out of unviable mines.

(Para 3.7.2.1)

The Company had a workforce of 21,298 out of which 66 *per cent* was in unskilled category at the end of March 2005. There was no scientific assessment of manpower requirement.

(Para 3.11.1)

The Company's control on 'over time' remained ineffective.Despite the negative growth in OB removal, there was increase in over time payments by Rs.8.73 crore and Rs.13.96 crore in 2003-04 and 2004-05 respectively over the preceding year.

(Para 3.11.2)

Despite holding surplus fund (monthly) ranging between Rs.29.37 crore and Rs.97.10 crore from April 2002 to February 2004, the Company did not invest the same with Coal India Limited (CIL) and lost an interest of Rs.4.04 crore approximately.

(Para 3.12.1)

The Company could not recover loading charges of Rs.17.34 crore up to March 2005 in the absence of any agreement with the customers.

(Para 3.12.2)

Crushing charges of Rs.8.12 crore could not be recovered from customers on coal produced through surface miner for the period from June 2000 to January 2001 due to delay in approaching CIL for issuing the necessary notification.

(Para 3.12.3)

Gist of Recommendations

- The requirement of land for mining and other infrastructure facilities should be periodically reviewed considering the fast depletion of existing mines and the lead time in taking possession of land.
- After introduction of new technology i.e. surface miner and improved version of HEMM, the target of coal production as well as over burden removal should be assessed on realistic basis.
- Phasing out programme for closure of unviable mines should be chalked out and completion of ongoing underground mines should be expedited.
- History Sheets for each HEMM containing data regarding cost, operation and major repairs should be maintained.
- A comprehensive policy for introduction of surface miner should be devised for present and future workings as well as for projects to be covered.
- Rejects produced should be evaluated and reclaimed wherever possible both on financial and environmental considerations.
- The requirement of HEMM should be re assessed and surplus CHP should be shifted to other places for gainful utilisation.
- Steps should be taken for scientific assessment of manpower especially in view of introduction of new technology, outsourcing of coal production, OB removal and closure of mines.
- The incidence of surplus funds should be monitored at unit level also so that these are promptly transferred to Head Office.
- Suitable agreement should be entered into with the customers for recovery of loading charges at Belpahar OCP.
- The Company should revise EMPs and mining plans as desired by MOEF.

3.1.1. Introduction

Mahanadi Coalfields Limited (Company) was incorporated in April 1992 as a wholly owned subsidiary of Coal India Limited (CIL) by transfering two important Coalfields (IB Valley and Talcher) of Orissa from erstwhile South Eastern Coalfields Limited (SECL), also a subsidiary of CIL. IB Valley and Talcher Coalfields are spread over 2,723 Sq. Km and endowed with very thick quarryable seam.

Against India's total reserves (January 2005) of 248 billion tonnes, these coalfields account for 60.98 billion tonnes [♣](25 *per cent*). About 91 *per cent* of the coal produced in these coalfields is of thermal power grade, ranging from E to G category[♦] with corresponding Useful Heat Value (UHV). The ash content in coal varies from 37 to 48 *per cent*. Coal is extracted through Open Cast Projects (OCP) and Underground (UG) mines.

After incorporation, the Company completed 16 mining-projects, 13 projects were 'on-going' and five were under 'Advance Action Plan' as on March 2005. The Company out-sourced almost its entire coal production and transportation in OCPs and only over-burden (OB) removal and operation of UG mines was done departmentally. There had been an influx of Heavy Earth Moving Machinery (HEMM) with higher configuration funded through World Bank loan between 1999 and 2001. New technology of coal mining through surface-miner[▲] on hire basis was introduced in a number of big OCPs.

The Company made a total investment of Rs.2,113.41 crore in these projects. It recorded a profit (before tax) of Rs.1,604.70 crore on a record production of 66.08 MT in 2004-05.

3.2 Scope of Audit

The scope of the performance audit was to assess the extent to which the coal sector reforms and thrust areas as identified by the Planning Commission (IXth and Xth Five year plans) as well as the Ministry of Coal through its various directives had been implemented by the Company.

3.3 Audit Objectives

The performance audit of the Company was conducted with a view to assessing whether

(i) There was timely and realistic formulation and implementation of the Advanced Action Plan (AAP) and preparation of Project Reports (PR).

(ii) The projects were implemented as per the Project Report in terms of costs, time period, infrastructure development, selection of technology etc.

(iii) The performance of the mines was as planned.

(iv) The equipment functioned as per the stipulated performance standards fixed by Central Mine Planning and Design Institute Limited (CMPDIL).

(v) Manpower analysis was conducted.

(vi) Coal beneficiation (washing) was properly carried out in accordance with the directives of the Ministry of Environment and Forest (MOEF).

(vii) The funds were optimally utilised.

[♣] ***IB valley and Talcher accounted for 22.33 billion tones and 38.65 billion tones of coal reserves respectively.***

[♦] ***E, F and G grade coal have UHV ranging from 3360 to 4200, 2400 to 3360 and 1300 to 2400 Kilo calorie /Kg respectively***

[▲] ***Surface miner technology provided for selective mining of coal by eliminating shale /stone in bands (as rejects) during the process of extraction. Drilling and blasting were not required thus making it environment friendly.***

3.4 Audit Criteria

The fundamental criterion used for assessing the performance was whether corporate objectives were fulfilled by utilising the Company's technical and financial resources judiciously. The performance was further assessed with reference to the:

(i) Mission Statement and Corporate Plan of the Company;
(ii) Targets of coal production and removal of OB as fixed by the Company;
(iii) Project Report and the norms for utilisation of HEMM as fixed by the Company;
(iv) The norms fixed by World Bank for recovery of Burnt Oil;
(v) Optimal utilisation of funds allocated for financing projects and related activities and
(vi) The Environment Management Plan (EMP) as approved by the Government of India and circulars issued by the MOEF from time to time.

3.5 Audit Methodology and Acknowledgement

3.5.1 Performance audit was conducted by test check of records of the projects' Planning, Excavation, Commercial, Marketing and Electrical and Mechanical departments for the last five years ending March 2005. The coverage was extended to earlier years also wherever deemed necessary. The main records studied in audit are listed at **Annexure-6**.

The audit team made field visits to all projects and underground mines of the Company. Physical inspection in association with the concerned officials of Lakhanpur, IB valley Area on the working of surface miner, dragline and coal handling plants was also undertaken. The data collected was classified, grouped and variations from applicable standards/ norms adopted by CIL were analysed.

3.5.2 Audit takes this opportunity to thank the management and staff of the Company for their co-operation and assistance in the conduct of this performance audit.

Audit Findings

3.6 Formulation and Implementation of Projects

The Company's project profile as on 31 March 2005 was as under:

Table I

Description	Capacity (in MT)[Ψ]		Capital Outlay (Rs. in crore)		Number of Mines		Exp. On completion (Rs. In crore)		Exp. up to 31.03.2005 (Rs. in crore)	
	OCP	UG	OCP	UG	OCP	UG	OCP	UG	OCP	UG
Completed Projects	42.90	0.33	1696.54	17.95	15	01	1323.72	9.12	1975.65	29.81
Existing mines	-	1.77	-	-	-	07 [▲]	-	-	-	149.23
Total (Completed project)	42.90	2.10	1696.54	17.95	15	08	1323.72	9.12	1975.65	179.04

[Ψ] *Million Ton*

[▲] *These mines i.e. Orient and Talcher were under private ownership long before the formation of MCL. As such, the sanctioned capital outlay was not available.*

3.6.1 Project Planning Procedure:

Coal companies make plans to meet the requirement of coal by formulating new projects or expanding the existing projects. The work of projects formulation for the Company was entrusted to CMPDIL, a subsidiary of CIL. All projects costing Rs.50 crore and above were approved in two stages. The first stage consisted of approval of the AAP. At the second stage the PR was approved by the Government. The activities at the stage of AAP were as follows:

(i) carrying out land survey in the mine area;

(ii) acquisition of land including forest land and payment of compensation to the land oustees;

(iii) rehabilitation of land oustees including cost of resettlement;

(iv) collection of environmental data and preparation of EMP;

(v) construction of access road, power line, water line, temporary sheds for site office; and

(vi) purchase of HEMM

Expenditure under AAP was limited to Rs.20 crore in respect of projects costing Rs.100 crore and above. The time for implementation of AAP was 30 months. The PR was forwarded to the Empowered Sub-committee (ESC) of CIL Board, which considered the project after substantial progress was made in forest and EMP clearance. After approval by ESC, the PR was put up to CIL board for approval and thereafter to the Government for approval. The lead time for approval of draft PR from the Board of Directors of MCL to CIL (ESC) and the Ministry of Coal (MOC) ranged generally from three to five years. Thereafter till the project achieved 80 *per cent* production the same was treated as an 'on going project'. After this stage, a project was treated as completed.

Audit noted the following regarding the planning and implementation procedure.

3.6.1.1 Delay in implementation of AAP

The lead-time for approval of AAP from MCL Board to CIL (ESC) and the Ministry of Coal ranged from one to two years. Against the norm of 30 months in the implementation of AAP, there had been a time overrun of one to 10 years (March 2005) with consequential additional fund requirement of Rs.66.29 crore in seven OCPs[♣] since inception. Despite time overrun of seven years and five years in Bhubenswari and Garjanbahal OCPs, the Company was yet to incur Rs.23.25 crore out of Rs.38.45 crore on their respective AAPs. It was observed in audit that in Bubaneswari OCP time overrun was due to non settlement of land oustees and delay in creation of Railway siding. In respect of Garjabahal there was delay in obtaining forest and environment clearance. The AAP of Basundhara (W) OCP was completed in December 2003 after a time overrun of 10 years.

[♣] *Basundhara(W), Bhubenswari, Garjanbahal, Kaniha, Kulda, Gopalprasad and Talabira-III*

The Management stated (July 2004) that although 30 months had been given for implementation of AAP for land acquisition, forest clearance etc. but it actually took more than 30 months. The reply of the Management was not tenable as the period of 30 months had been determined by the MOC and should have been adhered to.

3.6.1.2 Recasting of Project Reports

PRs lay down the road map and critical activities with detailed specifications and schedules for implementation of projects. These are used as tools for planning and monitoring the implementation of the projects. It was observed that changes in technology and other operational developments could necessitate major deviations from the PR. In order to maintain cohesiveness in the project activities and to monitor them effectively, it becomes necessary to recast the PR in the absence of which adhoc decisions may be taken that may result in wasteful expenditure and delays in implementation of the project as discussed in para 3.6.1.6 (iii). However, the Company had no system of recasting the PRs though this practice was adopted by other subsidiaries of CIL.

The Management stated (July 2004) that PRs were prepared by CMPDIL and there was no recasting of projects.

3.6.1.3 Deficiencies in determination of the completion cost of a project

As has already been mentioned earlier the project was considered complete after achieving 80 *per cent* of the targeted production. However, the Company did not have any system to ascertain the stage of 100 *per cent* physical completion of the project and actual investment there against. The capital outlay of 16 completed projects was Rs.1,714.49 crore (at 80 *per cent* production) as against the actual expenditure of Rs.2,005.46 crore as on 31 March 2005. Of these 16 projects declared complete, the completion reports were prepared in respect of Kalinga and Lakhanpur OCP only. For remaining projects, though declared complete long back from 1991 to 1995 (seven projects), 1996 to 2000 (five projects) and 2001 to 2005 (one project), completion reports had not been prepared. One project declared complete in March 1984 had since been closed in 2004-05. In none of the above projects 100 *per cent* completion had been declared (2005). Thus, the actual expenditure incurred to achieve the 100 *per cent* completion stage could not be ascertained with accuracy.

The Management stated (July 2004) the completion reports were being prepared as per the guidance of the MOC. The reply of the Management was not tenable as the completion reports were prepared as soon as 80 *per cent* of the targeted production was achieved and the 100 *per cent* completion stage and expenditure there against was not identified.

3.6.1.4 Land acquisition

Acquisition of land and rehabilitation of displaced persons inter-alia are critical for implementation of major projects. The status of land acquisition as on 31 March 2005 was as follows:

Table II

(Land in Hectares)

Description	No. of Projects	Total requirement of land	Land acquired	Land to be acquired	Percentage of land to be acquired to total requirement
Completed Projects	16	11,621.223	6,504.174	5,117.049	44.03
On going Projects	14	3,950.567	605.831	3,344.736	84.66
Advance action proposals	3	1,731.010	181.130	1,549.880	89.54
Total	**33**	**17,302.800**	**7,291.135**	**10,011.665**	

It is evident from above that performance of the Company in this area was extremely poor. For the completed projects, the Company was yet to acquire 44 *per cent* of total requirements even after 13 to 22 years from the date of sanction and three to 14 years from the date of completion of projects.

The Management stated (July 2004) that the total land requirement for the life of the project was notified/acquired under Coal Bearing (Acquisition & Development) Act, 1957 at a time whereas physical possession was taken as and when the concerned land was required for mining operation. Generally, processing for taking physical possession of required land was undertaken in every five years.

Although the Company reviewed the requirement of land for mining purposes every five years, in practice, almost all the OCPs produce coal much more than the capacity determined by CMPDIL, resulting in faster depletion of land. In view of this, the Company was required to keep sufficient land physically available in advance. As on March 2005, out of land requirement of 15572 Ha for completed and 'on going projects', the Company could take possession of 7110 Ha and 8462 Ha was yet to be taken possession of. It was noticed in audit that in six projects[▲] at Talcher Coalfields (OCP) due to resistance from land oustees/villagers which led to delays in acquisition of land, the Company could not produce 2.79 MT coal valued at Rs.118.25 crore during 2004-05. Delays in taking physical possession of land also led to consequential delays in development of infrastructural facilities with consequential cost overruns and avoidable expenditure as discussed in para 3.6.1.5. The Company stated (March 2005) that it was difficult to acquire large area of land.

[▲] ***Jaggannath, Ananta, Kalinga, Bharatpur, Hingula and Lingaraj OCPs.***

3.6.1.5 Inadequate infrastructure development

Project formulation and implementation remain incomplete without a time bound programme for development of various infrastructural facilities needed for running a project. The infrastructure consists mainly of railway siding, coal handling plants (CHP), workshops, procurement of HEMM and induction of new technology.

(i) Belated development of Railway Siding Network

For evacuation of coal, the PR of Kalinga OCP envisaged construction of a railway siding scheduled to be completed in September 2000 at a cost of Rs.19.65 crore. Due to land dispute, the date of completion was rescheduled to December 2005. Apart from time overrun of about five years, the delay resulted in a cost overrun of Rs.5.12 crore. Further, due to the delay in completion of this railway siding, the coal was dispatched through the railway siding of Jagannath Area. This led to an additional expenditure of Rs.13 crore annually that could have been avoided had timely action been taken to complete the sidings.

Again, delay in acquisition of land, approval of necessary drawings etc. contributed to time overrun from one year to four years and total cost overrun of Rs.4.30 crore in Basundhara (Rs.2.85 crore) and Jagannath Area (Rs.1.45 crore) in developing the railway infrastructure (March 2005).

The Management stated (July 2004) that railway siding works got delayed due to non release of forest land in time. It was observed that CIL/subsidiaries have a Memorandum of Understandings (MOU) with the MOC to assist the Coal Companies in getting clearance for forest land by taking up the matter with the MOEF and the respective State Governments so that the land acquired under Land Acquisition /Coal Bearing Act is handed over to the Company under a time bound programme. Although the Committee on Public Undertakings (COPU) urged CIL (April 1992) for coordination between State Government, Central Government and the Coal Companies, there were delays in acquisition of land indicating more concerted action will have to be taken by the Company.

(ii) Setting up of Central Workshop (CWS)

For the purpose of major repair and overhaul of HEMM and sub assemblies of Dragline, Shovel, Drill etc., the Company decided to set up Central workshops at IB Valley and Talcher coalfields in 1989 with scheduled dates of completion as June 1993. While the Talcher workshop was officially declared complete in 1996 at a cost of Rs.16.16 crore, procurement of required machinery was yet to be completed. Similarly the IB valley workshop also became functional in 1993-94. Subsequently, augmentation works on these workshops were undertaken and completed in March 2004 with total cost capitalised on IB valley and Talcher Central Workshop being Rs.21.04 crore and Rs.36.48 crore respectively. However, the Company was yet (March 2005) to build up the required skilled manpower to absorb the technical know-how for changed technology necessary for repairing upgraded HEMM. This resulted in opting for outsourcing of repair work by both the workshops. The Company incurred Rs.19.67 crore on outsourcing during the last five years ending March 2005.

The Company stated (July 2004) that even if all infrastructure were available it was not possible to carry out the entire job departmentally due to lack of skilled manpower,

change of technology of HEMM, cost effectiveness, lack of technical know-how etc. The reply of the Company was not tenable in view of the fact that having created an infrastructure at a substantial cost of Rs.57.52 crore, the Company should have ensured development of matching manpower capabilities necessary for carrying out repairs in its own Workshops.

3.6.1.6 Injudicious purchase of HEMM

Audit noted the following instances of injudicious purchases of defective/ incompatible HEMM:

***(i) Terex Dumper*:** The Company purchased three Terex Dumpers in August 1998 at an aggregate cost of Rs.3.96 crore for Kalinga OCP (one of 85 T capacity) and Lingaraj OCP (two of 50 T capacity). As a result of intermittent break down of these equipment, the average working hours for 85T Dumper was 18 *per cent* of the shift hours, while that of 50 T Dumpers ranged from 16 to 18 *per cent*. While the Company recovered Rs.21 lakh from the suppliers as performance guarantee for poor performance in respect of 85 T Dumper, it did not take similar action against the supplier in respect of 50 T Dumpers despite existence of performance guarantee as the Company could not use these machines effectively due to non availability of adequate numbers of compatible equipment and also non-availability of spares.

The Management stated (May 2004) that the Dumpers were imported and spares availability was poor and many of them were uneconomical. The efforts to dispose them off to CCL and NCL did not materialise.

***(ii) Sparr Drills*:** The Company purchased five Sparr drills between March 1991 and September 1993 at a cost of Rs.1.87 crore from M/s Sparr Equipments Ltd. The drills had extremely poor performance since commissioning. The Company could not effect any recovery from the supplier for such unsatisfactory performance as the supplier closed its operation in April 1995. Thus, the entire expenditure of Rs.1.87 crore proved unfruitful. The Company had written off one drill in 1999-2000 due to uneconomic repairs and non-availability of spares.

The Company stated (July 2004) that orders for five Sparr drills were placed by CIL/SECL. The overall performance of the machines was found to be poor in other subsidiaries also and further purchases of this type of drills were stopped.

However, the fact remains that for the drills already purchased, the Company could not recover any sum from the supplier towards performance guarantee despite poor performance of the equipment.

(iii) Procurement of incompatible shovels and dumpers: Basundhara (W) OCP, an 'on going project' whose AAP was completed in December 2003, ordered one 1.8 Cum capacity shovel, six 85 tons capacity dumper and one 250 mm[♦] diesel drill. As the shovel did not match the 85 tons capacity dumpers, the Company had to transfer the dumpers to Kalinga OCP for utilisation. Thereafter, the Company proposed to outsource the work of overburden removal for a period of three years initially at a cost of Rs.14.15 crore. Due to such indecisions and non-availability of requisite equipment, the coal production fell

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♦ *Milli Metre*

short by 0.94 Mt and 0.84 M cum respectively during the period from December 2003 to March 2005.

3.6.1.7 Hiring of surface miner

The Company has given contracts for production of coal through surface miners at the rate of Rs.50.70 per cum. and Rs.50.90 per cum. for 2002-03 for Bharatpur and Lingaraj OCP respectively. In June and August 2002 it invited tender for the work of extraction of 5.50 M cum. coal removal through surface miner at rates ranging between Rs.50.70 and Rs 50.90 per cum. from different contractors. For similar work CCL had received (May 2002) offer from a contractor at the rate of Rs.30 per cum. against their tender. Based on the above, the Board of the Company decided (June 2003) to float open tenders to bring down the rates to Rs.30 per cum. The offered rates for 2003-04 for such work came down drastically to Rs.21.99 and Rs.26 per cum as a result of floating open tenders, indicating lack of initiative by the Company and lack of coordination amongst the subsidiaries of CIL. The Company incurred an avoidable additional expenditure of Rs.4.46 crore for two works awarded for 2002-03 at Lingaraj and Bharatpur OCP.

The Company stated (July 2004) that the reduced rates in CCL were not a restrictive parameter for tender process for it. The Company further stated that the Industrial Engineering Department (IED) had conducted a study for ascertaining the operating cost of surface miner and was under process of finding out a workable value.

Recommendations

- The Company should devise a mechanism to ascertain the 100 *per cent* completion stage of a project and expenditure thereagainst.
- The requirement of land for mining and other infrastructure facilities should be periodically reviewed considering the fast depletion of existing mines and the lead time in taking possession of land.
- A time bound programme for railway infrastructure should be undertaken for evacuation of coal.
- Skilled manpower should be deployed in the central workshops to minimise outsourcing.
- Procurement of HEMM should be need based and compatible with other equipment.

3.7 Production

3.7.1 Open Cast Projects

The table below indicates the target and achievement of production of coal, removal of OB and output per man shift (OMS) during the last five years ending March 2005:

Table III

Particulars	2000-01		2001-02		2002-03		2003-04		2004-05	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Coal	41.40	43.18	42.80	46.39	46.20	50.47	51.20	58.00	64.06	63.90

(MT)										
OB (MM^3)	46.60	49.61	50.00	50.56	53.00	54.05	55.60	52.70	63.00	49.81
OMS (tonne)	13.98	15.72	16.04	17.32	16.32	19.59	17.75	19.89	20.39	19.51

It would be seen that the targets fixed by the Management in respect of coal production and OMS in all the years were not done realistically and were lower than the actual achievement. For removal of OB, the Company failed to reach the target for the years 2003-04 and 2004-05, a factor that was likely to affect the future workings of the Company. Out of six mega projects, records of three mega projects viz. Kalinga, Lakhanpur and Belpahar were examined in audit. While the performance of Lakhanpur and Belpahar was satisfactory, it was below the target in Kalinga OCP. The audit findings in respect of Kalinga OCP are discussed in the succeeding paragraph.

As regards coal production, the Company stated (July 2004/March 2005) that targets were not fixed on the lower side but the actual achievements were higher than the targets. The reasons for negative growth of the overburden removal during 2003-04 were mainly due to ageing HEMM, land problem, rainfall and injunction from the Court for procurement of dumpers.

The reply of the Company was not tenable in view of the fact that the Company had been putting more emphasis on production through surface miner, which could be worked out with accuracy and the Company should have revised the target of production accordingly. As for ageing of HEMM despite the introduction of 13 HEMM at the cost of Rs.76.86 crore during 2004-05, there was a further fall of OB removal by 2.89 M cum in 2004-05.

3.7.1.1 Kalinga OCP

The Project was declared complete in March 2000 on achieving coal production of 6.41 MT (80 *per cent* of capacity) after incurring an expenditure of Rs.232.47 crore. The mineable reserve had been estimated at 165.79 MT with projected life of 27 years. Against yearly production of eight MT of coal and removal of 12 M cum of OB as envisaged in the PR, the annual target fixed by the Company and actual production for the last five years ending 31 March 2005 was as under:

Table IV

Year	Coal (MT)		OB (M cum)	
	Target	Actual	Target	Actual
2000-01	7.200	4.900	9.600	8.420
2001-02	6.000	5.276	11.000	7.737
2002-03	8.000	5.201	11.000	8.511
2003-04	7.800	4.028	10.000	8.000
2004-05	7.500	4.831	9.200	7.671

The project was not able to reach the targeted production of either coal or OB removal in any of the listed years, though the targets were revised downwards from time to time.

This was despite the fact that production of coal was done generally by outsourcing through surface miner. In the removal of overburden (done departmentally), there was gross underutilization of all categories of HEMM. There was backlog in OB removal of 10.46 M cum during the last five years ending 31 March 2005 with likely impact on the production of mine in future.

The Company stated (July 2004) that performance of the project had suffered due to land problem which was being sorted out and the project would produce at its targeted capacity in the near future.

The reply indicates that the Company went ahead with the project without resolving the land acquisition issues. These problems should have been taken into account at the time of AAP stage of the project.

3.7.2 Underground Mines

3.7.2.1 Performance of Under Ground (UG) Mines

As on 31 March 2005, the Company had eight completed underground (UG) mines. The aggregate capacity of these mines was 2.10 MTY[♠] and the total investment in UG mines was Rs.179.04 crore. While the capacity was kept constant at 2.10 MTY, the target of production of coal set by the Management was 2 MT. There was no significant move for proper mechanisation of the existing mines.

The mines were incurring loss ranging from Rs.300 to Rs 516 per tonne during the four years ending March 2005. The total loss during the year 2004-05 alone was Rs.23.54 crore. It was observed in audit that UG mines workforce constituted 78 *per cent* of the total productive manpower of OCPs and was a major contributing factor for incurring heavy losses. The performance of the UG mines was reviewed by the Board in March 2004, wherein it was stated that Himgir Rampur Colliery and Duelbera Collieries were incurring huge cash losses and were not economically viable.

The Company stated (July 2004) that UG mines were allowed to continue despite losses from the point of conservation and to recover the fixed costs. The reply of the Company was not tenable as operation of unviable mines resulted in losses to the Company.

3.7.2.2 Opening of new UG mines

Of the eight UG mines that the Company had, only one had been developed by it (Refer Table I, Para 3.6) since its formation. It was observed in audit that while there was a global trend to opt for highly mechanized UG mines with economies of scale on the grounds of quality and environmental consideration, it was only between January 2001 and February 2003 that three UG mine projects[♣] with aggregate capacity of 1.83 MTY were sanctioned. These were expected to be completed between March 2008 and March 2010 although it was anticipated that Nataraj UG itself would start production from 2005-06.

[♠] *Million Tons per year*

[♣] *Jagannath, Talcher and Nataraj*

Recommendations

- After introduction of new technology ie. surface miner and improved version of HEMM, the target of coal production as well as over burden removal should be assessed on realistic basis.
- Phasing out programme for closure of unviable mines should be chalked out.
- Completion of ongoing underground mines should be expedited.
- The possibility of developing economically viable underground mines should be explored.

3.8 Capacity utilisation, productivity and performance of HEMM

Utilisation of a mine's capacity is a very critical factor affecting productivity and profitability of mining operations. Mine capacity is the annual material handling capacity of an OCP expressed in million cubic metres (M cum). Capacity of a mine to produce is a function of inputs which include, inter-alia, machines, manpower, technology etc. Optimum utilisation of HEMM plays a vital role in the overall functioning of the mines. Instances of under utilisation of HEMM were noticed in audit and are discussed in subsequent paragraphs.

3.8.1 Under utilisation of HEMM

The dragline, shovel, dumper, dozer and drill are the HEMM mainly used in open cast mines for removal of overburden and production of coal. These equipment work in a combination in coal mines. As on March 2005, the Company had seven draglines, 652 shovels, 354 dumpers, 93 dozers and 91 drills valued at Rs.980.55 crore.

Status of major HEMM in different projects of the Company revealed (March 2005) higher population of HEMM as compared to the projections in the PRs, both with regard to number and configuration of HEMM. There was excess deployment of 29 equipment in Lilari, Lajkura, Hingula-II and Basundhara (East) OCPs.

The Company adopted CMPDIL's methodology of assessment of performance and utilisation of HEMM. Availability percentage of equipment was worked out considering idle hours plus working hours to shift hours and utilisation percentage was based on working hours to shift hours. While availability of HEMM generally conformed to the norms prescribed by CMPDIL, the utilisation was far below the norms as detailed below:

Table V

(in percentage)

Item	CMPDIL Norm of utilisation	Utilisation				
		2000-01	2001-02	2002-03	2003-04	2004-05
Dragline	73	62	58	62	62	64
Shovel	58	33	35	36	35	37
Dumper	50	22	23	26	27	28
Dozer	45	20	20	21	21	26
Drill	40	16	16	16	17	20

As is evident from Table V, the utilisation of HEMM was always lower than the norm. The Company stated (July 2004) that the utilisation was hampered due to proximity of mines to residential areas, delay in clearance of land and frequent interruption of work by villagers. Although there were some improvements in utilisation, there was further scope of improvement which was impeded due to non availability of work front for working of dragline at Balanda, ageing of shovels resulting in frequent breakdown, land constraints in Jagannath, Ananta and Kalinga OCP, extreme climatic conditions in summer seasons etc.

The contention of the Company was not tenable as the extreme climatic conditions in summer were also experienced by other subsidiaries of CIL but their performance was better than the Company. Availability of work front for the dragline should have been considered before its deployment. Breakdown of ageing shovels and other HEMM could have been prevented through timely repairs and efficient management of spare parts could ensure better availability of the equipment. In the Chairman cum Managing Directors' meeting in September 2004 also it was noted that the Company always ranked lowest amongst CIL subsidiaries in utilization of HEMM.

The Standing Committee on Energy[♣], in its Report also commented (February 2004) on the poor utilisation of HEMM equipment as against the liberal norms of CMPDIL and asked for an explanatory statement for such poor utilisation. The Committee recommended that major equipment should be transferred from one subsidiary to another for optimal utilisation. The suggestion also included that before procurement of HEMM, the expected utilisation should be considered specifically while working out cost benefit ratio. However, the Company had not drawn up any plan to implement the recommendations of the Committee (December 2005).

3.8.2 POL consumption vis-à-vis usage of HEMM

Petrol, oil and lubricants (POL) constitute a major element of expenditure for extraction of coal and removal of OB in OCPs. The Company had been following the Kapilla Committee norms for the consumption of POL. Despite direction from CIL (July 2001) and the Audit Committee (June 2004) to make in-depth study, the Company had not been able to fix the normative consumption of POL so far (May 2005), though the mine conditions had improved and higher capacity equipment had been introduced in the mines. Three sectoral studies on the subject were conducted by Industrial Engineering Department (IED) in June 2002, November 2004 and March 2005 but no concrete solution had emerged so far. The Company accepted the suggestion of Audit that there was a need to fix norms for consumption of POL for effective control and monitoring.

3.8.3 Recovery of burnt oil of HEMM

Extraction of coal in OCP is done by deploying hydraulic shovels, drills, dozers, dumpers, dragline etc. Lubricating oil is used in engines of the above equipment and is required to be drained out after certain hours of run. The burnt oil so drained out has disposable value and the Company has been selling it regularly. The World Bank Mission visited (November1999) one Project of Northern Coalfields Limited, a Coal India subsidiary, and observed that there was wide gap between the consumption of lubricant oil and recovery of burnt oil.

♣ *A departmentally related Standing Committee set up by the Parliament*

The recovery of burnt oil was important both from financial and environmental considerations. The Company made (March 2004) a study on burnt oil and fixed the percentage of recovery at 50 and 55 *per cent* for the years 2004-05 and 2005-06 respectively. Based on the above norm, the loss due to non recovery of burnt oil for the last five years ending March 2005 worked out to Rs.3.04 crore.

3.8.4 Injudicious maintenance contract for 10 cum shovel at Kalinga Project

Coal India Ltd. entered into an agreement (August 1997) with M/S Harnischfeger Gmbh, Germany for purchase and maintenance of three electric rope shovels for Kalinga Area of the Company. As per agreement, the manufacturer was to maintain the equipment for a period of seven years from the date of commissioning with minimum guaranteed availability of 85 *per cent*. For this the Company would pay for supply of spares at the rate of US $ 60.87 per hour of actual utilisation from the initial year and labour and overhead charges at the rate of US $ 20.15 per hour of actual availability. The equipment were commissioned between July and September 1998.

It was noticed in audit that the Company did not maintain (except for Lingaraj OCP) machine-wise record of coal production and OB removal nor did it work out the economics of introduction of such equipment. Despite incurring Rs.20.65 crore towards spares and Rs.14.36 crore for labour from July 1999 to 31 March 2005 and the availability of the equipment from 86 to 96 *per cent*, the utilisation of the machinery ranged between 43 and 55 *per cent*. There was no recorded reason for underutilisation of the machines.

The Company stated (December 2003) that the purchase of shovel was done by a high power committee of CIL and its subsidiaries considering the techno-commercial assessment of purchase.

Recommendations

- History Sheets for each HEMM containing data regarding cost, operation and major repairs should be maintained.
- A conditioning monitoring cell should be set up to assess the health and condition of equipment.

3.9 Use of surface miners

3.9.1 Introduction of new technology

Production of coal by surface miner technology was initially adopted in coal industries by the Company in its two projects e.g. Lakhanpur and Lingaraj OCP in June 1999. The technology provided for selective mining of coal by eliminating shale /stone in bands (as rejects) during the process of extraction. Drilling and blasting were not required thus making it environment friendly. Besides being cheaper to conventional production of coal, it was also expected to benefit the Company by bringing down the ash content of coal to less than 34 *per cent* which would enable the Company to supply coal to power houses situated more than 1000 KM from pit head.

The target of coal production in 2005-06 and 2006-07 was fixed at 72 MT and 80 MT respectively and it was expected that the major share of incremental production would come from surface miner.

3.9.2 Cartelisation by contractors

Although the surface miner technology was first introduced for selective mining of coal in two OCPs[*] in June 1999 and the Company inducted this mining procedure increasingly in its operations over the years, it had so far not reviewed its impact on requirement of manpower, utilisation of existing HEMM etc. in its projects. Besides, the Company continued to be dependent on contractors for providing this service and had not been able to procure the equipment or absorb the technology amongst its own work force. This could lead to a monopoly situation where the contractors could quote a higher rate, as discussed in paragraph 3.6.1.7. The Board of Directors also apprehended (June 2005) that contractors might develop an understanding among them and form a cartel which might put the Company in a disadvantageous position, even paralysing the coal production if their rates were not acceded to.

3.9.3 Performance of surface miner

Surface miners were in operation in six mines i.e. Kalinga, Belpahar, Hingula, Bharatpur, Lakhanpur and Lingaraj OCPs. Except Lakhanpur, other OCPs were using surface miner in combination with conventional mining method.

The production by surface miner vis-à-vis conventional method from 2000-2001 to 2004-05 was as under:

Table VI

Year	Production of Coal (in MT)			Percentage of surface miner production to total production
	surface miner	Conventional	Total	
2000-01	6.08	38.72	44.80	13.57
2001-02	7.80	40.00	47.80	16.32
2002-03	16.19	36.04	52.23	30.99
2003-04	22.54	37.51	60.05	38.03
2004-05	29.23	36.85	66.08	44.23

One of the main advantages of surface miner was improvement in quality of coal extracted. But the Company was not able to bring down the ash percentage of coal produced through surface miner to 34 *per cent* except in Kalinga OCP.

3.9.4 Failure in reclamation of saleable coal rejects

The Company did not explore the possibility of reclamation of saleable coal, if any, from the rejects produced through surface miner. Test check of data of rejects in audit at Lakhanpur OCP revealed that the rejects had Gross Calorific Value (GCV) ranging from 2,778 to 3,024 Kcal /Kg. Had the Company tried appropriate technology to recover the saleable coal in the rejects thrown in dump, it could have earned some revenue.

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[*] *Lakhanpur and Lingaraj*

The Company stated (July 2004) that there was no notified price for such coal (ungraded coal). As such, there was no possibility of sale of rejects. However, the Management agreed (March 2006), in principle, to explore the possibility of selling mining rejects on experimental basis.

Recommendations

- A comprehensive policy for introduction of surface miner should be devised for present and future workings as well as projects to be covered. If required, a strategic plan for procurement of surface mining equipment and developing necessary manpower should be formulated and in the interim, close interaction with other subsidiaries of CIL should be maintained in order to get competitive rates for surface mining contracts.
- Rejects produced should be evaluated and reclaimed wherever possible both on financial and environmental considerations.

3.10. Under utilisation of Coal Handling Plants (CHP)

The year wise performances of CHP for the last five years ending 31 March 2005 was as under:

Table VII

Year	Shift hours	Maintenance hours	Idle time		Break Down time		Working hours	Percentage	
			Hours	Percentage of Shift. Hr.	Hours	Percentage of Shift. Hr.		Availability 2-(6+3)	Utilisation (8/2)
1	2	3	4	5	6	7	8	9	10
00-01	278048	38545	78386	28.19	24394	8.77	137236	77.36	49.36
01-02	353400	47078	135250	38.27	30982	8.76	131503	77.91	37.21
02-03	391328	49196	152579	38.99	42522	10.87	127800	76.56	32.65
03-04	384288	46977	161935	42.13	40806	10.62	131015	77.16	34.09
04-05	396576	44245	175051	44.14	42521	10.72	130651	78.12	32.94

It would be evident from above that the performance of the CHP was unsatisfactory as the utilisation showed a downward trend despite slight increase in availability over the years.

Due to introduction of surface miner in some OCP, there was gross under utilisation of CHP capacity since surface miner had an inbuilt arrangement for crushing of coal and no further crushing of coal by the CHP was required. However, no concrete program was drawn for effective deployment of these CHP or their transfer to other projects/subsidiaries. Despite having spare capacity of CHP, the Company incurred an expenditure of Rs.2.16 crore for construction of the fifth CHP at Lakhanpur project, which was commissioned in November 2000. The work order for the said plant was issued on September 1999 by which time two surface miners were already deployed (June 1999). This new CHP was declared surplus (November 2004). Although mechanical and structural portion was transferred to SECL (Gevra Project), the civil works valued at Rs.1.06 crore proved infructuous due to defective planning.

Despite having one feeder breaker of 2.4 MT capacity installed in June 2000, the Company installed another feeder breaker at a cost of Rs.2.35 crore in March 2001 at

Hingula Project. The latter had a poor performance since installation and became inoperative in November 2004. The procurement of the equipment thus proved infructuous as the existing facility was sufficient for the requirement.

Recommendations

- The CHP should be optimally utilised.
- The requirement should be re assessed and surplus CHP should be shifted to other projects/ subsidiaries for gainful utilisation.

3.11 Manpower Analysis

3.11.1 Manpower policy

The Company did not have a structured manpower policy. As on March 2005, the Company had workforce of 21,298 as against 21,658 in the year of its formation. The Company outsourced the entire work of coal winning and transportation in mid nineties and decided (2004-05) to outsource the OB removal also in new projects. Despite these developments, there was recruitment of 2,121 persons since 1998-99. The Company stated (July 2004) that such recruitment was necessary for its expansion and growth. The Company had not made any scientific assessment of manpower so far considering changed technology of mining, use of higher configuration of equipment, faster depletion of coal reserves due to intensive mining in existing projects, technical and geological constraints and above all, outsourcing of production of coal and OB removal. The deployment pattern of workforce was based on the age-old practice in a mine and was mine specific. The norms for deployment of workers were yet to be devised by the Company through its IED although a study had already been conducted (February 2005) revealing surplus deployment of 152 executives. Considering average emoluments of Rs.20,000 per month per executive, the Company would pay Rs.3.65 crore annually towards salaries to the executives identified as surplus. Further, Human Resource Department of the Company identified (March 2004) excess manpower of 627 employees who would be paid Rs.7.52 crore annually towards salaries at an average of Rs.10,000 per month.

As on 31 March 2005, 66 *per cent* of the workforce belonged to unskilled category. Since inception, it had recruited 6,027 persons (1,550 under NCWA[•], 3,219 under land looser scheme and 86 as replacement against VRS of female workers and outside recruitment 1,172). However, the Company was experiencing difficulties in deployment of manpower in respect of new recruits appointed from land oustees or through NCWA and also from existing manpower working in OCP as they were unwilling to work in the underground mines.

The manpower profile of the Company indicated that there was a shortage of operating personnel i.e. HEMM operators and statutory personnel like mine surveyor, sirdar, electrical supervisor and multi-skilled workers. The Company admitted that capacity utilisation was not up to the mark due to acute shortage of operating personnel and connected jobs pertaining to maintenance of HEMM. The Company proposed (March 2004) to fill up the shortage of 59 statutory personnel such as mining sirdar, junior overseer and deputy surveyor.

[•] ***National Coal Wage Agreement***

The Company *inter alia* stated (July, 2004) that the piece rated workers had been converted into multi-skilled category following rapid mechanization of under ground mines and the Company was seriously trying to balance shortage /excess manpower through various training schemes.

However, the fact remained that no scientific assessment of manpower vis-à-vis requirement of skilled work force had yet been carried out.

3.11.2 Increase in Overtime

The Company's workforce was mainly engaged in removal of overburden and about 650 persons (50 persons per OCP for 13 OCPs) were engaged in preparation of coal face. Coal winning and transportation was outsourced except for various operations in UG mining and OB removal in OCPs. The OB removal during the last two years ending 31 March 2005 was 52.70 M cum and 49.81 M cum as against 54.05 M cum in 2002-03 (refer Table III). Despite negative growth in OB removal in 2003-04 and 2004-05, the expenditure towards overtime payment for both OCP and underground production was Rs.46.19 crore, Rs.54.92 crore and Rs.60.15 crore in 2002-03, 2003-04 and 2004-05 respectively. There were no recorded reasons for the increase of Rs.8.73 crore and Rs.13.96 crore in 2003-04 and 2004-05 over the preceding year. As reported by the Directors in the Annual General Meeting (August 2005), operators of HEMM were paid unrealistic overtime allowance without having worked for such duration as revealed in a study conducted in one project.

The Company had not fixed any norms for overtime so far. Despite the COPU's recommendation in April 1992, no perceptible reduction in overtime cost had been achieved though negative growth in OB removal was noticed during the last two years and 98 *per cent* coal production was achieved through contractual labour.

Recommendations

- Immediate steps should be taken for scientific assessment of manpower especially in view of introduction of new technology, outsourcing of coal production, OB removal and closure of mines.
- Training programme for unskilled worker should be expedited.
- Norm for over time should be fixed, overtime cost should be reduced and supplemented by incentives scheme.

3.12 Management of funds

Though the Company earned substantial profits over the years despite shortfalls in production performance as discussed in the preceding paragraphs, Audit noted deficiencies in the management of funds in certain cases which are discussed in the succeeding paragraphs.

3.12.1 Injudicious management of funds

Surplus funds of subsidiaries are invested with CIL at different rates of interest as fixed by CIL from time to time. From the monthly cash flow statements of April 2002 to February 2004, Audit noticed that the Company had surplus funds ranging from Rs.29.37 crore to Rs.97.10 crore after meeting all probable expenditure. In spite of having

significant surplus fund, the Company did not invest the funds with CIL or its subsidiaries and, thereby, suffered loss of interest of Rs.4.04[♠] crore from April 2002 to February 2004 even after setting aside a sum of Rs.20 crore for meeting essential time bound payments. From March 2004, the Company started investing the surplus fund in current accounts, either with CIL or outside.

The Management stated (July 2004) that the Company's current accounts were tied up with Corporate Liquidity Term Deposit Scheme of different commercial banks from March 2004 for earning interest varying from 4.5 to 5.25 *per cent* depending upon the period of balance.

However, the fact remained that the Company could have invested surplus fund with CIL till March 2004. The Company also needed a proper fund management programme at Area level. Test check revealed that Kalinga Area had kept bank balance of Rs.3 crore to Rs.10 crore on a number of occasions during 2004-05.

3.12.2 Non recovery of loading charges

The Unit Train Load System (UTLS) was constructed (September 2001) in Belpahar OCP at a total cost of Rs.42.25 crore for automatic loading of coal into wagons. The Project Report stipulated recovery of loading charges of Rs.21.33 per tonne from the customers for automatic loading of wagons. However, Audit noted that the Company did not enter into any agreement for recovery of loading charges and as such, could not recover Rs.17.34 crore on loading of 8.13 MT of coal up to March 2005 from customers.

The Management accepted (July 2004) the audit observation.

3.12.3 Non recovery of crushing charges

The Company, while justifying the introduction of surface miner in November 1998, proposed recovery of Rs.21 per tonne as crushing charges from customers for supply of coal of (-) 100 mm size. The Company introduced the surface miner at Lakhanpur and Lingaraj OCPs in June 1999 and December 1999 respectively, but did not approach CIL for notification of revised price of coal. The loss to the Company stood at Rs.8.12 crore for the period from June 2000 to January 2001 for not billing the crushing charges in respect of Lakhanpur and Lingaraj OCPs.

The Company stated (July 2004) that notification for levying sizing charges for (-) 100 mm coal was issued in February 2001 and charges were levied from that date. Factors such as customers' reluctance, market competition, change in adoption of methods and technologies, etc. affected the decision for revision of price earlier.

The reply of the Company was not tenable as it could have approached CIL for issue of the notification well in time to safeguard its financial interest.

3.12.4 Non recovery of penalty for over size coal

The agreement with the contractors included a clause for sizing of coal to (-) 100 mm for which Rs.50 per tonne was payable. However, there was no provision for penalty for production of oversized coal. About 21 *per cent* of coal produced in Lakhanpur OCP by surface miner did not conform to the size as revealed in a screening test of coal in 2002-

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[♠] ***calculated @ 7.5 per cent up to March 2003 and @ 6.25 per cent thereafter up to February 2004***

03. Though in the absence of a penalty clause no action could be taken against the contractor, the Management had to pay Rs.43.75 lakh to the contractor for sizing of coal as per agreement.

3.12.5 Discrepancies in the work of OB removal at Balanda

The Company did not generate daily report for maintaining/ supervision of work done by the contractors in respect of OB removal. It transpired from records that in the year 1996-97, alleged overpayment to a contractor at Balanda OCP for an amount of Rs.95.10 lakh was made for OB removal in excess of quantities actually removed by the contractor. Although a Bank Guarantee of Rs.50 lakh (revalidated) was obtained from the contractor, the Company leveled charge against the contractor in 2003 after a period of over seven years from the date of event. The party filed suit in the Court of Civil Judge (Senior Division) Sambalpur restraining the Company from encashing the Bank Guarantee. The case was sub-judice (October 2004).

Recommendations

- The incidence of surplus funds should be monitored at unit level also so that these are promptly transferred to Head Office.
- Suitable agreement should be entered into with the customers for recovery of loading charges at Belpahar OCP.

3.13 Environmental Planning and Management

Exploitation of minerals creates enormous environmental challenges. The Government of India formulated the National Mineral Policy in 1993, emphasising the need to minimise adverse effect of mineral development on forest, environment and ecology. It also directed implementation of afforestation programme concurrently with acquisition of land and comprehensive programme for backfilling and biological reclamation of the mining areas. Accordingly, Environment Management Plan (EMP) was prepared by CMPDIL for each coalfield separately.

3.13.1 The Ministry of Environment and Forest (MOEF) made (June 1998) it mandatory that from June 2001 onwards thermal power stations located beyond 1000 KM from pit head or located in an urban area or critically polluted area or sensitive area, irrespective of their distance from the pit head, must use coal with less than 34 *per cent* ash. The total coal requirement for less than 34 *per cent* ash for distant power houses for the year 2006-07 (terminal year of X Plan) would be 17.38 MT. Against that, the Company could supply 3 to 4 MT of coal annually during the last three years ending 31 March 2005. It would be difficult for the Company to meet such obligation in the absence of proper beneficiation (washing) programme.

The Company stated (July 2004) that power houses were tailor made to use coal having ash content of more than 34 *per cent* also. The contention of the Company was not tenable as the Ninth and Tenth Five Year Plan emphasised on beneficiation of coal (washing) for compliance with MOEF directives.

3.13.2 The Company was required to take a number of measures to protect and improve the environment which included afforestation and land reclamation. From the annual statement submitted by the Company to the State Pollution Control Board, it was seen that as against the excavated area of 2429.54 Ha as on 31 March 2005, area reclaimed was only 1518.75 Ha (63 *per cent*) while biological reclamation was in 1044.89 Ha (43

per cent) only. This indicated that mine management did not proceed as desired by the environment laws and rules.

The Company stated (July 2004) that because of low stripping ratio in MCL, the volume of overburden to be backfilled was less in relation to total volume of excavation. Moreover, a minimum area of de-coaled void was required to be left open at pit bottom for safety and operational infrastructure like sump, haulage etc. As such, it was contended that mine management proceeded as desired by the environment laws and rules.

The fact remained that the EMP did not progress as per the project reports, resulting in disproportionate removal of overburden vis-à-vis area reclaimed biologically. The Company was yet to submit revised EMPs and mining plans in this respect as desired by the MOEF.

3.13.3 The Company did not have a structured organisational set up for mine closure which could be properly built in the Environment Management Plan itself with cost estimates. It had not framed any comprehensive programme for filling up the ultimate void of OCPs which were on the verge of exhaustion e.g. Balanda, Lilari etc.

The Company stated (July 2004) that mine closure plans were under preparation for the mines to be closed within a few years. There had not been any major deviation from the stipulation of Project Reports of any mine including Balanda OCP except in the residual voids of the mines to be filled up with ash from power plants for which MOU between the Company and National Aluminium Company and National Thermal Power Corporation was under implementation.

Recommendations

- The Company should revise EMPs and mining plans in this respect as desired by MOEF.
- Setting up of coal beneficiation plant either by the company or by its consumers for transportation of coal with less than 34 *per cent* ash to distant power houses should be considered.

Conclusion

Advance Action Plans of seven projects remained incomplete even after periods of one to ten years from the scheduled dates of completion, which is likely to have a cascading effect on completion of the Projects. During implementation of projects, there were delays in development of related infrastructure resulting in avoidable expenditure. These were primarily due to problems in taking physical possession of land required for mining operations. These resulted in loss of coal production and revenue.

There was gross under utilisation of HEMM and Coal Handling Plants. The Company was yet to absorb new technology of surface miner in its HEMM and in the meantime, had not devised a mechanism for ensuring that it hired the equipment at a reasonable economic rate. No policy regarding reclamation of coal rejects produced from surface miner had been formulated. Underground mines were incurring persistent losses. The Company had not chalked out any plan for closure of unviable mines. Scientific assessment of manpower was not made. Despite poor production/removal of over burden and insignificant increase in coal production, the Company made sizeable payments for overtime to its workers. The performance of the Company in refilling of open pits was short of targets and it was still to revise the EMP.

The review was issued to the Company/ Ministry in November/December 2005; their reply was awaited (February 2006).

CHAPTER: IV

NEYVELI LIGNITE CORPORATION LIMITED

BUCKET WHEEL EXCAVATORS

Highlights

Neyveli Lignite Corporation Limited did not fix fresh norms for technically advanced Bucket Wheel Excavators (BWEs) procured after 1983 but adopted achievable capacities already fixed for old BWEs.

(Para 4.6.2.2)

HRC did not fix norms for achievable hourly output or annual effective working hours for BWEs deployed in lignite bench. BWEs deployed in the lignite bench thus worked without norms.

(Para 4.6.2.3)

Annual average shortfall of lignite extracted worked out to 5.10 MT (Mine I including Expansion) and 5.12 MT (Mine II) when actual output of BWEs was compared with normative output.

(Paras 4.6.3.1 and 4.6.3.2)

The transportation of lignite from Mine-I to Thermal Power Station II at a cost of Rs.21.61 crore during the period from 2000-01 to 2004-05 to meet the shortage of lignite in Thermal Power Station II could have been avoided.

(Para 4.6.3.3)

Excess consumption of power and teeth was Rs.17.73 crore in Mine I including Expansion and Rs.24.99 crore in Mine II. M/s MECON conducted the Energy Audit of Mines II and gave its recommendations (November 2003), which were yet to be implemented.

(Para 4.7.1.1 and Para 4.7.1.2)

A total of 93,677 hours were consumed in excess over norms for the maintenance of BWEs during the period from 2000-01 to 2004-05 resulting in short excavation of 24.27 MT lignite in both Mine I including Expansion and Mine II.

(Para 4.8.1)

The downtime due to forced outages in respect of BWE Nos. 1420 & 1421 was around 20 *per cent* of the calendar hours during 2000-01 to 2004-05 due to non-execution of overhaul in time.

(Para 4.8.3)

Boom head modification in BWEs MAN I and MAN II at a cost of Rs.20.53 crore did not produce the desired hourly output.

(Para 4.8.4)

Gist of Recommendations

- Norms have to be fixed for old and new BWEs separately. For the BWEs working in Bottom Bench/Lignite Bench, HRC did not fix norm for achievable hourly output as well as annual effective working hours for different capacities of BWEs. The Corporation may fix norms for them for assessing the performance of different BWEs in BB/LB.
- As there was shortfall in production of OB and lignite vis-à-vis achievable capacities, the Corporation may analyse the variance in the actual production to identify the reasons for adverse performance and initiate corrective action.
- Norms for hourly output and annual effective working hours should be reviewed periodically and should conform to the actual working hours of the BWEs.
- Depending on parameters for hard and soft strata of soil, the norms for teeth consumption should be fixed separately for hard/soft strata. The actual consumption of teeth should also be recorded for hard and soft strata separately. These norms should be reviewed periodically.
- Energy Audit needs to be conducted in Mine I. After implementing the recommendations of the Consultant in Mine II, the energy consumption should be reviewed periodically in both the mines.
- Allocation of hours for forced/planned stoppages made as per HRC should be studied afresh and norms re-fixed. The norms should be reviewed periodically with reference to the working conditions.

4.1 Introduction

4.1.1 Neyveli Lignite Corporation Limited (Corporation) was incorporated in November 1956 with the main objective of excavating lignite from the lignite deposits available in the Neyveli area and generating power there from. The Corporation at present has three mines with lignite excavating capacity of 24 million tonne per annum (MTPA). The capacities and the year of attaining commercial production of these mines are given below:

Table 1
Capacities of Mines

Sl No	Mines	Capacity (MTPA)		Year of commercial Production
1	Mine-I	4.5		1962
2	Mine-I First Expansion	2.0		1984
3	Mine-I Second Expansion	4.0	10.5	2003
4	Mine-IA	3.0	3.00	2003
5	Mine-II Stage I	4.7		1991
6	Mine-II Stage II	5.8	10.5	1997
	Total Capacity		24.0	

The lignite excavated from Mine-I including expansion and Mine-II of the Corporation is exclusively meant for power generation in TPS-I and TPS-II respectively.

4.1.2 For mining operations, the Corporation deploys a system of Specialised Mining Equipment (SMEs) consisting of Bucket Wheel Excavators (BWEs), Mobile Transfer Conveyors (MTCs), Conveyor System and Spreaders for stripping of overburden and excavation of lignite. Conventional Mining Equipment (CMEs) like dozers, dumpers, pipe-layers, tipper lorries, trench cutters for executing preparatory and auxiliary works viz. front preparation, shifting equipments/materials from one place to another are also used.

4.1.3 Overburden (OB) is removed in four stages called surface bench (SB), top bench (TB), middle bench (MB) and bottom bench (BB). Lignite is removed in the final stage called lignite bench (LB). One more stage called 'New Surface Bench (NSB) was also introduced in Mine I Expansion in August 2000. Each bench has one / two sets of SMEs and required number of CMEs as decided by the management. The Corporation makes forward preparation of mines by using explosives for blasting at required levels to loosen the hard strata before commencement of excavation.

BWEs excavate the OB / lignite and transport it to the conveyor system in the bench. Every BWE has a cutting portion i.e., buckets with teeth fixed in a wheel which extract OB / lignite and drop it on the in-built small conveyor. The machine conveyor transports the OB/lignite to the independent conveyor system, which transports the OB/lignite to the dump yard/ground storage bunker. The performance of BWEs has a direct bearing on the lignite production and ultimately power generation in the downstream Thermal Power Stations (TPS) with a total installed capacity of 2490 MW.

4.2 Scope and Objectives of Audit

A review of the performance of the Bucket Wheel Excavators used in Mine I including expansion and Mine II was taken up to ascertain whether:

(i) BWEs functioned efficiently with reference to the norms fixed;

(ii) Production performance was planned and achieved;

(iii) Norms were fixed for the consumption of utilities and the actual consumptions were within the norms; and

(iv) Maintenance programme for each BWE was drawn up annually as per norms and executed without any deviation.

The review was made with reference to production planning, actual working hours of BWEs, actual output and maintenance of BWEs for the years from 2000-01 to 2004-05. This review does not cover the performance of BWEs deployed in Mine IA as the mine was opened only in April 2003.

The performance of BWEs 1400 and 700 only has been studied as these were deployed in Mines I & II.

4.3. Audit Methodology

The following methodology for the review of the performance of BWEs was adopted.

(i) Discussion and interaction with concerned officers of the Corporation

(ii) Review of the documents such as Board minutes and agenda papers, Bucket wheel Excavator wise production reports, etc., theoretical and achievable capacity from Hanumantha Rao Committee Report, Annual Performance Review of the production units and monthly production statements, overhaul related files, breakdown reports, Industrial Engineering Wing records

(iii) Data relating to stoppages of BWEs was obtained from the Corporation and analysed.

4.4 Audit Criteria

The Corporation has four types of Bucket Wheel Excavators (BWEs) viz., 1400 litre, 700 litre, 500 litre and 350 litre with theoretical capacity of excavating 3766 M^3/Hour, 1847 M^3/Hour, 1086 M^3/Hour, 782 M^3/Hour respectively. The list of BWEs in the Corporation with their location in the mines is given in **Annexure-7**. Based on these capacities and actual data, Hanumantha Rao Committee had fixed the achievable capacities, which have been used in audit as norms for comparison of actual performance.

4.5 Acknowledgement

In addition to examination of records and documents, a number of issues were deliberated on for conducting this performance audit by the audit team. Audit acknowledges the co-operation and assistance extended by different levels of management at various stages of conducting the performance audit.

4.6 Performance of Bucket Wheel Excavators

4.6.1 The performance of the BWEs is discussed below after mine-wise grouping of the 22 BWEs working in different benches of each mine.

4.6.2 Fixation of achievable capacity

4.6.2.1 Hanumantha Rao Committee (HRC) was constituted in September 1982 to determine bench-wise achievable capacities of the BWEs. HRC conducted a detailed study of Mine I and the operational constraints faced by BWEs during the period from 1969 to 1982 while determining the achievable capacity of each type of BWE. The theoretical and achievable capacities of OB removal of the BWEs as fixed by the HRC are given below:

Table 2

Theoretical and Achievable capacities of BWEs

S.No.	Type of BWE (Litre)	No. of BWEs		Effective working hours per annum	Theoretical Capacity (M^3/Hr) per BWE	Achievable capacity♣ per BWE (M^3/Hr)
		Mine I	Mine II			
1	1400	6	5	4000	3766	2250
2	700	5	6	4000	1847	739

4.6.2.2 The HRC fixed (1983) norms for operation of BWEs based on the data available for the period 1969 to 1982. After the norms were fixed, new BWEs with advanced technical features were procured. Instead of determining the theoretical/achievable capacities of these new BWEs afresh, the Corporation adopted achievable capacities fixed by HRC for old BWEs procured prior to 1980. The technical superiority, which enhanced the designed capacity, was thus ignored.

4.6.2.3 Further, HRC had not fixed any norms for BWEs for extraction of lignite from the lignite bench. As the Corporation also had not fixed any norms, it could not assess its own performance in the LB. For the purpose of this study, Audit adopted norms, based on the formula adopted by HRC for BWEs on the OB bench, of 1425 MT♦ per hour for BWE 700 litre and 2272 MT♦ per hour for BWE 1400 to assess the performance of BWEs deployed in the LB.

4.6.3 Shortfall in Production with reference to Normative Output

4.6.3.1 Mine I including Expansion

The total hours worked by the BWEs, OB removed, OB that should have been removed as per norms for the actual hours worked (achievable capacity) and shortfall in OB removal is given in Table 1 of **Annexure-8.** It was seen that 1400 Litre BWEs worked for more hours than the norms but the output was less than the normative level as the hourly output of the BWEs was less than the norm. The average annual shortfall in OB removal was 11.59 Mm^3 resulting in short exposure of lignite to the extent of 2.11 MTPA.

The Corporation stated (July 2004) that due to hard strata conditions prevailing at Mine I especially during the last few years the strain on the structural members would be more if

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♣ ***Achievable capacity had been calculated by HRC by multiplying Bucket size with ring factor, number of discharges per minute and bench factor divided by swell factor. (Ring factor: Since the speed of the 700 Litre BWE is higher the discount factor of .75 was adopted by HRC for covering the possibility of buckets not getting filled fully. This was applicable to BWE 700 only. Bench factor: Discount factor given by the HRC on the output of the machine to cover the various operational and geological constraints during operation. Swell factor: The discount factor given by HRC in each filling to cover the void occurring due to presence of boulders/lumps.)***

♦ ***Norms for achievable capacity for excavation of lignite has been calculated by Audit on the same basis as adopted by HRC and mentioned at above footnote. The bench factor as calculated by HRC for LB has been applied in the formula.***

the BWEs worked at the rate fixed by the HRC which would lead to more forced outages. The Corporation also stated that to tide over the problem and to achieve the desired output, the BWEs were used for increased hours with marginal reduction in output per hour.

The reply of the Corporation is not acceptable because HRC had considered all geological and operational constraints while fixing the achievable capacity of BWEs. The contention of the Corporation that the reduction in hourly output of BWEs was marginal is not acceptable as the average annual shortfall in production of lignite worked out 2.11 MTPA based on HRC norms for hourly output.

Table 2 of **Annexure-8** depicts the details of short production of lignite due to performance of BWEs below their achievable capacity in LB. The annual average production of lignite for the five years from 2000-01 to 2004-05 was 8.59 MT only whereas the BWE had the normative capacity of excavating 13.69 MT. Against this, the requirement of lignite for the downstream plants worked out to 9.2 MT considering the PLF achieved in five years from 2000-01 to 2004-05. Therefore, surplus capacity of BWEs was available in Mine I including Expansion. Considering the average annual shortfall of 5.10 MT in production of lignite with available BWEs, the total production of Mine I including expansion could go up to 13.69 MT, thereby minimizing the losses of generation suffered by TPS I due to shortage of lignite.

The Management stated (July 2004) that face length, bench height and width along with geo-mining conditions decided the excavation output. They further stated that out of two alternatives of either having more working hours with less output rate or operating at normative level the Corporation opted for the former option to prevent strain on the machines.

The reply is not acceptable as the strength of the critical components of the SMEs was determined in view of the terrain and other prevailing conditions of the mining area. Hence, production should not be affected by the terrain. Further, working of BWEs for more hours had the effect of substantially increasing power consumption.

4.6.3.2 MINE II

Though BWEs engaged in Mine-II worked for more than 4000 hours, the actual output was less than the achievable output rate, resulting in shortfall in the removal of OB. Due to performance of BWEs below their achievable capacity, the average annual OB removal fell short by 9.96 Mm^3 resulting in short exposure of lignite to the extent of 1.90 MT as detailed in Table 1 of **Annexure-9**. The shortfall in production of lignite due to lower output rate per hour in Mine II has been depicted in Table 2 of **Annexure-9**. The average annual lignite production during the period 2001-02 to 2004-05 fell short by 5.12 MTPA. The average lignite output for the five years period under review was 9.28 MT. Considering the average annual shortfall in production of 5.12 MT of lignite with available BWEs, the total production of Mine II could go up to 14.40 MT which would be sufficient to meet the lignite requirement of 11.90 MT in TPS II even at a higher plant load factor of 85 per cent. This potential was not exploited and TPS II suffered loss of generation of power due to shortage of lignite.

4.6.3.3 To meet the actual shortfall of lignite at TPS II, the Corporation transported 6.21 MT lignite from Mine I to TPS II and incurred transportation cost of Rs.21.61 crore during the five-year period ending March 2005, which could not be recovered as a part of

power tariff. Had the Corporation achieved the normative rate for lignite extraction, the transportation of lignite from Mine I to TPS II to meet the shortage of lignite at a cost of Rs.21.61 crore during the period from 2000-01 to 2004-05 could have been avoided.

The Corporation stated (July 2004) that BWEs worked for longer hours at lower output rate to avoid any stress on the components and to improve productivity.

The reply is not tenable because HRC fixed the normative hourly rate after considering various operational constraints that were duly accepted by the Corporation. Further, working of BWEs for more hours had the effect of substantial increase in power consumption.

Recommendations

- The Corporation adopted old norms for the new BWEs procured subsequent to 1983 and thus ignored the technical superiority of new machines. The norms for new BWEs may be fixed separately.
- HRC did not fix norms for achievable hourly output as well as annual effective working hours for different capacities of BWEs working in BB/LB. The norms need to be fixed for these also for the Management to be able to realistically assess the performance of BWE deployed in these benches.
- Variance in the actual output to norms needs to be extensively analysed to identify reasons for adverse performance and for initiating rectificatory action.

4.7 Consumption of Utilities by BWES

4.7.1.1 Consumption of Power

Power is consumed for operating Specialized Mining Equipment /other equipment and other activities including Ground/Storm Water control and maintenance. The Industrial Engineering Wing of the Corporation had fixed the overall Specific Energy Consumption (SEC) at 31.79 kwhr / tonne of lignite for Mine I and at 33.66 kwhr / tonne of lignite for Mine II for the year 2002-03. The additional cost of production on account of excess power consumption over the above norms worked out to Rs.10.50 crore in Mine I including Expansion and Rs.21.79 crore in Mine II as detailed in **Annexure-10.**

The Corporation stated (July 2004) that the specific power consumption increased during the period 2000-01 to 2002-03 since power was consumed for development of Mine-I Expansion. In Mine II, the Corporation replied (July 2004) that the norm fixed for power consumption was only a broad objective and that it depended on mine movement, pumping lift involved etc. Further no scientific norms could be determined in view of too many variables and complexity involved.

The reply of the Corporation is not acceptable since norms fixed should have been adhered to and the deviations minimised through suitable control over consumption of power. Further, though M/s MECON conducted Energy Audit of Mine II and recommended (November 2003) certain measures for energy conservation that would result in substantial savings in energy cost, the Corporation was yet (August 2005) to implement the recommendations. Energy Audit had not been conducted (August 2005) in respect of Mine I including expansion.

4.7.1.2 Consumption of Teeth

The working life of teeth in the BWEs mainly depends upon the soil condition coupled with the forward preparation of the ground by effecting systematic blasting programme. The Corporation fixed the norms of 94.90 teeth per Mm^3 during the year 2000-01. The extra expenditure due to excess consumption of teeth during the five years has been depicted in **Annexure-10** and worked out to Rs.7.23 crore in Mine I and Rs.3.20 crore in Mine II.

The Corporation stated (July 2004) that the consumption of teeth depended on the strata conditions, sudden occurrence of rocks etc. and that there were bound to be variations according to the geological conditions.

The reply is not tenable because the Corporation prescribed suitable technical specifications for the quality of teeth depending on the geological conditions.

Recommendations

- Depending on parameters for hard and soft strata of soil, the norms for teeth consumption should be fixed separately to judge the efficiency. The actual consumption of teeth should also be recorded for hard and soft strata separately. These norms should be reviewed periodically.
- Energy Audit has to be conducted in Mine I. After implementing the recommendations of the Consultant in Mine II, the energy consumption should be reviewed periodically in both the Mines.

4.8 Maintenance of BWEs AND DOWNTIME ANALYSIS

4.8.1 The Corporation planned stoppage of SMEs for both preventive maintenance apart from breakdown stoppages. Hours estimated for Daily/Weekly/planned maintenance, inspection & overhaul, conveyor shifting and vulcanizing of conveyor belts were classified under planned stoppages. All other categories of stoppages such as machine mechanical, conveyor mechanical, electrical, operational and auxiliary stoppages were classified as breakdown stoppages.

The ceilings of stoppages, machine wise / year wise as fixed by the Management were not made available to Audit. Hence Audit took the recommendations of HRC for reference and downtime analysis was done on that basis.

The stoppages under both the planned and the breakdown categories were in excess over the norms during the period from 2000-01 to 2004-05 in respect of both Mine I including Expansion and Mine II. It may be seen from **Annexure-11** that excess hours over the norms worked out to 93,677 and excavation of OB to the extent of 131.27 Mm^3 could not be carried out. This resulted in short excavation of lignite to the extent of 24.27 MT.

The Corporation stated (July 2004) that excess stoppages under one head would be compensated by curtailing stoppages under other heads and that as the achievable capacity as recommended by HRC was reached there was no loss to the Corporation.

The reply is not tenable as excess stoppages had been worked out after applying the overall ceiling for all categories of stoppages.

The Corporation further stated (July 2004) that they were following the recommendations of HRC in all the years after taking into account operating conditions, OB to lignite ratio, availability of machines and requirement of downstream units.

The reply of the Corporation is not acceptable as it had not followed the ceilings prescribed by HRC for different categories of stoppages. This resulted in short excavation of lignite to the extent of 24.27 MT and avoidable loss of generation for want of lignite in TPS II.

4.8.2 Analysis of the stoppages of BWEs for more than 24 hours for maintenance / repairs showed that on a number of occasions the repair/maintenance of the same component had to be attended to within two days to eight months indicating the repairs were not attended to properly, and 5,997 hours were lost due to such stoppages. A list of such stoppages is given in **Annexure-12.**

4.8.3 Overhauls of BWEs have to be carried out normally after 20,000 hours or after five years. During an analysis of breakdown of machineries for the past five years ending March 2005, it was observed that no major overhaul was conducted in respect of 1400 litre BWE Nos. 1420 and 1421. In respect of BWE No. 1421, though major overhaul was planned to be carried out during 2000-01 and 2001-02, no such overhaul was actually carried out. While in respect of BWE No. 1420, no overhaul was planned in any of these five years. It may be seen from **Annexure-13** that the average forced stoppages of both the BWEs hovered around 20 per cent of the calendar hours (8,760) during all the five years.

The Corporation stated (July 2004) that due to production constraints the BWEs could not be released for overhaul. The Corporation further stated that the working hours were well above the norm of 4,000 hours and that the working hours of the BWEs depended on various operating conditions.

The reply of the Corporation on production constraints is not tenable as the Corporation allotted 1470 hours every year for each BWE towards overhaul before arriving at the targets.

4.8.4 Boom Head modification in MAN BWEs

The BWEs MAN I and MAN II were required to perform at the rate of 2250 m^3/hour for 4,000 effective hours per annum as per norms. Against this, they were giving average output of 1500 m^3/hour. The work of Boom Head modification in these BWEs was proposed during the year 1998-99 and was to be completed within two years. The proposal for modification envisaged an incremental increase in the output by 750 m^3/hour for each BWE i.e., equal to the hourly output fixed by HRC. The modifications were carried out at a cost of Rs.20.53 crore in the BWEs in 2002-03 (MAN II) and 2003-04 (MAN I) and the Performance/ Load Tests (Take Over Tests) of BWEs MAN I and MAN II were conducted in July 2004 and December 2003 respectively which gave outputs of 2565 m^3/hour and 2507 m^3/hour respectively. However, on deployment in Mine II, these BWEs gave reduced outputs of 1600 m^3/hour (Man I) and 1760 m^3/hour (Man II) during 2004-05. The expected hourly output rate of 2250 m^3/hour as envisaged in the proposal was not achieved.

The Corporation stated (July 2005) that the rate per hour achieved was 1204 m^3/hour for MAN I and 1313 m^3/hour for MAN II before modification and that the rate had increased to 1700 m^3/hour after modification.

The reply is not acceptable because the average performance at the time of planning the modification was around 1500 m^3/hour and the execution of modification during 2000-01 and 2001-02 was to result in output of 2250 m^3/hour as envisaged in the proposal. The modification work was actually carried out only after further deterioration of output due to delay in taking up the work and the output further decreased to around 1200 m^3/hour. The modification resulted in only marginal improvement but failed substantially to attain the targeted level. Thus, the expenditure of Rs.20.53 crore had not brought out the results projected in the proposal.

Recommendation

Allocation of hours for forced/planned stoppages made as per HRC should be studied afresh and norms re-fixed. The norms should be reviewed periodically with reference to the working conditions.

4.9 Conclusion

The achievable capacities for OB removal by BWEs were fixed by HRC after considering the actual performance data of the BWEs, which had taken care of technical and operational constraints. The Corporation, however, could not adhere to these norms and there was shortfall in the production of OB and extraction of lignite. The Corporation had not analysed in detail the variance in the actual output from the norms to identify the reasons for adverse performance and initiate corrective action. Further, norms had also not been fixed for the BWEs working in the BB/LB. In the absence of norms, the Corporation could not judge the efficiency of performance of BWEs. The consumption of power and teeth in operating the BWEs also exceeded the norms and needed to be controlled.

The review was issued to the Ministry in January 2006; its reply was awaited (February 2006).

DEPARTMENT OF HEAVY INDUSTRIES

CHAPTER: V

HMT Limited

Marketing activities of Tractor Business Group

Highlights

The Tractor Business group (Group) persisted with the higher and unrealistic targets set in Turnaround Plan (TAP) despite the downward markets trends. Even the revised /downgraded targets for the years 2002-03, 2003-04 and 2004-05 were not achieved.

(Para 5.3.1.2)

The Group's market share of tractors declined from 6.1 *per cent* (1999-00) to 2.9 *per cent* (2004-05). Working capital shortage and quality problems contributed to the decline in the market share.

(Paras 5.3.1.9 and 5.3.1.11)

The Group was inflating sales by resorting to aggressive marketing techniques through advancing of tractors to the dealers over and above their requirements without considering the operational and financial risks. Dispatches to dealers exceeded the requirement indicated by the Area Offices in the years up to 2001-02, the excess ranging between 102 *per cent* (1999-00) to 130 *per cent* (2000-01). Stock with the dealers at the end of each year ranged from 36 *per cent* (2004-05) to 82 *per cent* (2002-03) of the total sales during the last five years ending March 2005.

(Paras 5.4.2.2 and 5.4.2.3)

The financial soundness of the dealers was not ensured. As a result, the Company was not in a position to execute decrees arising out of arbitration awards for recovery of dues from dealers in 15 cases amounting to Rs.5.54 crore. A dealer appraisal system after appointment/renewal of dealership was not in vogue.

(Para 5.4.3.1)

The unsold tractors with dealers were taken back irrespective of their physical condition and credit was given to the dealers (as sales return) amounting to Rs.3.68 crore, Rs.17.25 crore, Rs.9.42 crore and Rs.1.18 crore representing 1.28 *per cent*, 6.66 *per cent*, 5.76 *per cent* and 0.58 *per cent* of sales in 2001-02, 2002-03, 2003-04 and 2004-05 respectively.

(Para 5.4.3.3)

Sundry debtors of the Group ranged from 43.55 *per cent* (1999-00) to 89.59 *per cent* (2002-03) of the turnover and doubtful debts rose from Rs.0.99 crore in 1999-00 to Rs.26.76 crore in 2004-05 due to injudicious practice of dumping tractors on dealers.

(Para 5.7.1.1 and 5.7.1.2)

Gist of Recommendations

- A Marketing Manual prescribing the systems and procedures to be adopted by the Marketing Division/ Area Offices needs to be prepared.
- Tractors need to be dispatched based on the genuine requirement projected by dealers.
- Memorandum of Understanding entered into / renewed with dealers need to spell out annual target for off take, credit period, credit limit, interest on delayed payment, priority of adjustments of payment received etc. The compliance of the above conditions need to be watched irrespective of the status of the dealers.
- Area Offices need to be motivated with suitable schemes based on performance.
- Dealer Appraisal System needs to be introduced to analyse the performance of each dealer with regard to sales and collection.
- As far as possible, demand drafts and letters of credit be accepted as payment instruments. Security obtained be preferably in the form of bank guarantee with timely renewals.
- The Group needs to introduce a system of evaluating the benefits accruing out of incentive schemes vis-a-vis cost incurred on the scheme.

5.1 Introduction

5.1.1 HMT Limited (Company), incorporated in 1953 to produce machine tools, later diversified into production of watches and tractors etc. In terms of Turnaround Plan (TAP) implemented in August 2000, Machine Tools and Watch Business groups of the Company were converted into separate subsidiaries and Tractor Business group (Group) was retained with the Company. The Group comprises a tractor manufacturing division at Pinjore set up in 1971, (with a licensed capacity of 25,000 tractors and an installed capacity of 18,000 tractors per annum), marketing division at Chandigarh and a network of dealers and Area Offices all over India.

5.1.2 The decline in the turnover of the group for the period 1999-00 to 2003-04 was 64 *per cent* compared to 25 *per cent* in the industry during the above period. Hence, the marketing activities of the Group for the period 1999-00 to 2004-05 were taken up for performance review with a view to assessing the effectiveness of the strategies adopted as also reasons for accumulation of debtors.

5.1.3 Scope of Audit

The activities of the Group were reviewed based on the records/ information available in Tractor Division, Pinjore, selected Area Offices and Corporate Head office at Bangalore.

5.1.4 Audit Objectives

Performance audit was carried out to assess –

i. Whether the marketing activities in respect of tractors were effective

ii. Whether the targets fixed for turnover were based on realistic market potential

iii. Whether Area Offices could assess the market requirements and optimally utilise the dealer network

iv. Whether the Company's dealer management techniques were effective

v. Whether the dealer appointment/ appraisal system in existence was efficient

vi. Whether the credit policy, incentive schemes etc., resulted in recovery of debts

vii. Whether effective internal control was exercised on realisation of debtors

viii. Action taken by the Company against defaulting dealers

5.1.5 Audit criteria

The following criteria were adopted for judging the performance:

i. The policies and the guidelines issued by the Board of Directors of the Company regarding marketing activities and sales promotion,

ii. The credit policies followed by the Group,

iii. Various schemes introduced by the Group to boost the sales performance and recovery of debts,

iv. The internal accounting guidelines and internal control procedures available,

v. The guidelines for recovery of debts, and

vi. Policy/procedure in appointing/ appraisal of the performance of the dealers.

5.1.6 Acknowledgement

The audit programme and objectives were discussed in meetings during the course of audit with the Group General Manager (Tractors) and other officers of the Group. The audit findings were discussed with the Management in June 2005. The co-operation of the Group during the meetings and course of audit is acknowledged.

5.2 Performance

5.2.1 Tractor Market in India

India, with an economy highly dependent on agriculture, has one of the largest tractor markets in the world. The industry is segmented on the basis of the power of the tractor engine expressed in terms of horse power (HP). Major factors that influence the demand for tractors are monsoon, land holding pattern, availability of credit, growth in income of farmers and level of implementation of scientific farming practices. The capacity of the tractor industry in the country grew from 1,50,300 tractors (1992) to 4,75,000 tractors (2000) (approximately) and ended up in negative growth since 2000-01.

5.3.1 Targets and Achievements

5.3.1.1 The target and actual production, sales and profit of the Group during 1999-00 to 2004-05 are indicated below:

Year/ Details	Production			Sales			Profit		
	Target	Actual	Short fall (*per cent*)	Target	Actual	Short fall (*per cent*)	Target	Actual	Short fall (*per cent*)
1999-00 (in Nos)	22,500	16,335	27.40	22,500	15,488	31.16	-	-	
(Rs. in crore)	485.00	337.52	30.41	485.00	386.39	20.33	24.62	7.91	67.87
2000-01 (in Nos)	20,750	13,460	35.13	21,500	13,001	39.53	-	-	
(Rs. in crore)	436.06	293.40	32.72	474.76	341.63	28.04	21.95	5.28	75.95
2001-02 (in Nos)	18,000	9,800	45.56	19,000	10,467	44.91	-	-	
(Rs. in crore)	393.99	215.15	45.39	534.50	284.63	46.75	19.06	1.85	90.29
2002-03 (in Nos)	14,000	6,361	54.56	14,000	6,802	51.41	-	-	
(Rs. in crore)	308.20	139.78	54.65	603.81 440.00*	181.86	69.88 58.67	7.25	(-)43.71	702.90
2003-04 (in Nos)	14,000	5,601	59.99	14,000	5,563	60.26	-	-	
(Rs. in crore)	316.00	126.01	60.12	690.23 348.00*	154.22	77.66 55.68	27.09	(-)51.09	288.59
2004-05 in Nos)	10,000	7,007	29.93	10,000	7,032	29.68	-	-	
(Rs. in crore)	280.35	183.97	34.38	781.91 349.00*	201.13	74.28 42.37	(-) 8.40	(-)35.17	318.69

* Targets revised in February 2002.

5.3.1.2 Though the Group was aware of the market trend and was not able to achieve the targets, yet it persisted with higher and unrealistic targets set in the TAP viz., Rs.475 crore in 2000-01 progressively to be increased to Rs.782 crore in the year 2004-05. However, during the MOU negotiation meeting with the Ministry for 2002-03, due to negative growth of the industry since 2000-01, the Company wanted (February 2002) mid course correction for the targets set. Consequently, targets were scaled down to Rs.440 crore, Rs.348 crore and Rs.349 crore for the Group, for the years 2002-03 to 2004-05 respectively. The year 2003-04 was planned to be the year of achieving the break even of the Company in view of the favourable market conditions of its products viz. tractors. Even the revised reduced targets were not achieved by the Group in the last three years.

5.3.1.3 With the increase in capacities and entry of new players in the market, the supply had far outstripped the demand, forcing the suppliers to resort to aggressive marketing practices such as dumping tractors to dealers and offering unlimited credit to the dealers who in turn advanced tractors to the customers, etc. Despite the above practices, the growth achieved by the Group was low.

5.3.1.4 The Management stated (October 2005) that advancing of tractors to dealers and then putting pressure on them to liquidate the same was a normal trade practice followed by all the tractor manufacturers all over in India. It further stated that the Company had to resort to high pressure selling to achieve set targets and its purpose was never to inflate sales figures.

5.3.1.5 However, adopting industrial practice to achieve set targets which were higher and unrealistic compared to the market trend, without effective dealer management and recovery mechanism in place, was not prudent and resulted in accumulation of debts and consequent working capital constraints.

5.3.1.6 The following graph depicts the turnover and profit/loss of the Group from 1999-00 to 2004-05.

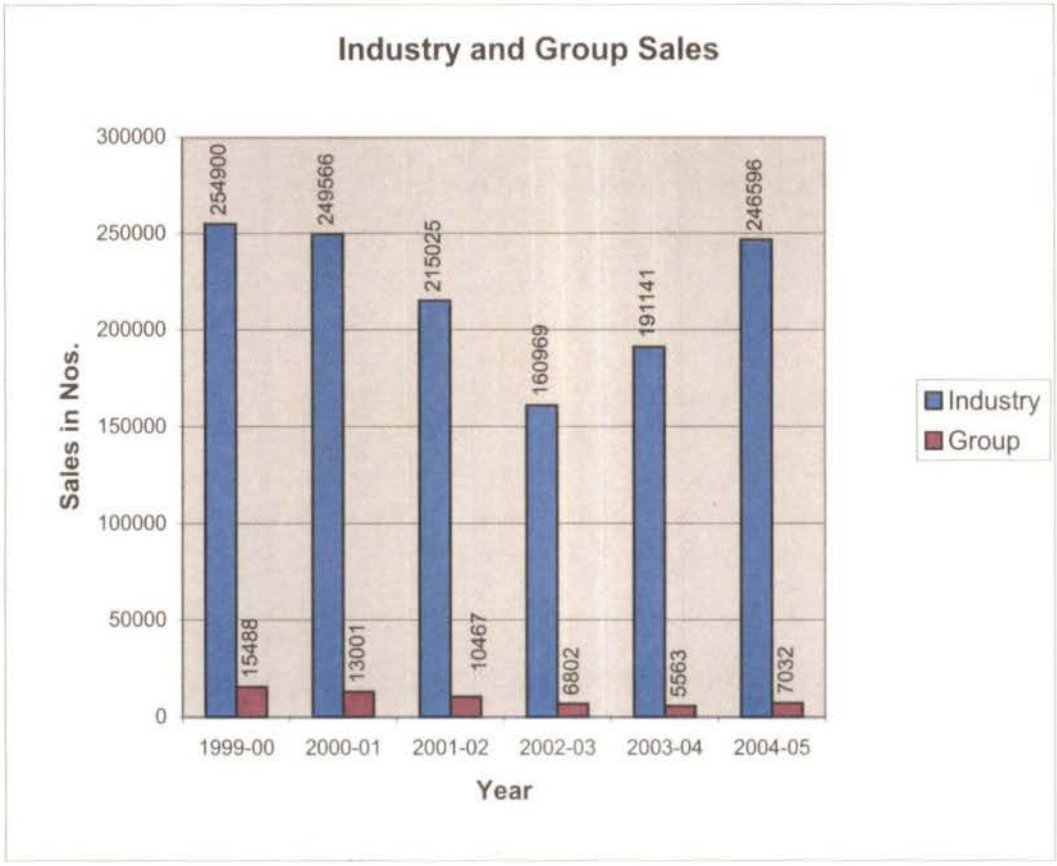
5.3.1.7 Moreover, the actual performance has to be viewed in the light of the practice followed by the Group till 2001-02 of advancing tractors to dealers over and above their requirement without considering the operational and financial risks (Paras 5.4.2.2 and 5.4.2.3 refer).

5.3.1.8 The Management stated (October 2005) that the increased sales during the year 2004-05 resulted in bringing down the loss and it was hopeful of wiping out the losses during the coming years in view of good monsoon and positive economic outlook, GDP* growth at seven *per cent* and impetus given by the Government to agricultural sector and availability of bank finance with relaxed norms and lower interest rates.

The fact, however, remains that though the year 2003-04 was planned to be the year of achieving break even, yet it incurred losses of Rs.51.09 crore and Rs.35.17 crore in 2003-04 and 2004-05 respectively mainly due to its failure to compete in the market.

* *Gross Domestic Product*

5.3.1.9 The Group's market share declined from 6.1 *per cent* in 1999-00 to 2.9 per in 2004-05 as indicated in **Annexure-14.** Sales of the Group vis-a-vis Industry during the last six years ending 2004-05 is indicated in the graph below:



5.3.1.10 Though the industry showed signs of recovery from 2003-04 and there was substantial improvement in 2004-05, the Group's performance in 2003-04 was the lowest. Despite marginal improvement in sales in 2004-05, the market share of the Group has not increased significantly.

5.3.1.11 The Management stated (October 2005) that the production during 2003-04 was intentionally slowed down to avoid accumulation of stock. The reply contradicts the statement made in the Directors' Report (2003-04) which stated that the planned levels of operations could not be achieved due to severe working capital shortage on account of slow recovery of funds locked up in the market and quality problems. Moreover, the Directors' Report also pointed out perennial complaints of breakdown thereby implying that the Company's tractors were not maintaining high standards in quality.

5.4 Marketing set up

5.4.1 The marketing activities of the Group are managed by the Marketing Department established in 1979 at Chandigarh with 19 Area Offices which take care of 24 territories (March 2005). The Group has 279, 13, 61 and 17 operative dealers for 'tractors and their spare parts', engines, spare parts and agros respectively (March 2005).

Though HMT has been in competitive business since 1970s it has not prepared any Marketing Manual prescribing the systems and procedures to be adopted by the

Marketing Department/Area Offices including procedures for marketing the tractors and realisation of the dues.

The Management stated (October 2005) that well laid down existing system for marketing of tractors/operation of marketing offices, would be compiled in the form of a marketing manual as per audit suggestion.

Recommendation

A Marketing Manual prescribing the systems and procedures to be adopted by the Marketing Division/ Area Offices needs to be prepared.

5.4.2 Performance of Area Offices

5.4.2.1 The Area Offices collect the requirement of dealers in their territory on annual/monthly basis and submit the same to the Marketing department for obtaining tractors for onward sales to their dealers. The Marketing department dispatches the tractors as per the requirement of Area Offices taking into account the availability of tractors.

5.4.2.2 As a part of aggressive marketing practice adopted by the Group of advancing tractors to dealers, the requirement projected by the Area offices was more than they could sell, resulting in accumulation of stock with dealers during 1999-00 to 2004-05 as indicated below:

(Figures in numbers)

Year	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Requirement	15,239	10,034	10,400	8,077	7,095	7,289
Dispatches*	15,488	13,001	10,467	6,802	5,563	7,032
Dispatches as percentage of requirement	102	130	101	84	78	96
Stock with dealers at the end of the year	7,452	7,290	7,560	5,572	3,280	2,513
Stock at the year end in terms of dispatches during the year (in months)	6	7	9	10	7	4

* Dispatches to Area offices who in turn sold to dealers

5.4.2.3 It would be seen from the above that:

i. Apart from unrealistic projections by the Area offices, dispatches to Area offices and consequent sales to dealers exceeded even the requirement indicated by the Area Offices (maximum being in the year 2000-01). Dealers in turn sold these tractors by advancing them to the customers, and

ii. stock with the dealers at the end of each of the above years ranged between 36 *per cent* (2004-05) and 82 *per cent* (2002-03) of the total sales.

5.4.2.4 The Management stated (October 2005) that stock of tractors for a minimum of four months' requirement was to be maintained to continue the business cycle.

The fact, however, remains that the year end stock with the dealers in terms of months' dispatches was ranging between 6 and 10 months during the years 1999-00 and 2003-04.

5.4.2.5 Out of 19 Area offices, Patna and Bangalore Area Offices contributed substantially to the sales during the years 1999-00 to 2004-05 even though there was reduction in absolute number of tractors sold in line with the trend. The contribution by other Area Offices was not substantial. Area Offices were responsible for monitoring the sales and realisation of sale proceeds from the dealers. The number of tractors sold by the Area Offices was not in line with the trend in the market and collection of debts were also unsatisfactory, leading to debts outstanding to the extent of Rs.31.43 crore relating to the period prior to April 2003. No documentary evidence was made available to Audit of the existence of any mechanism for assessing the performance of the Area Offices which were not viable in terms of either sales or collection of debts with a view to closing down non-performing Area Offices or re-locate the geographical areas to performing Area Offices.

The Management stated (October 2005) that the assessment system was getting revamped in view of recent changes observed in marketing style of competitors.

5.4.2.6 Targets for collection of dues from the dealers were fixed to Area Offices by the Marketing Department only from 2003-04 onwards. An analysis of the targets and the actual for the years 2003-04 and 2004-05 revealed that in these two years the achievement by all the Area Offices put together was only in the range of 60 to 65 *per cent*. The outstanding sundry debtors of Rs.126.01 crore as at end of March 2005 included Rs.31.43 crore relating to the period prior to April 2003 and Rs.19.33 crore relating to 2003-04.

Recommendations

- Area Offices need to be motivated with suitable schemes based on performance.
- Tractors need to be dispatched based on genuine requirement projected by dealers.

5.4.3 Performance of Dealers

5.4.3.1 On a review of cases relating to 56 out of total 364 dealers, the following was observed:

i. The financial soundness of the dealers was not ensured by verification of title/value of the property indicated in the application for dealerships, verification from the bankers of the dealers' financial status or survey reports from the Area Office. As a result, the Group could not execute decrees arising out of 15 arbitration awards for recovery of dues amounting to Rs.5.54 crore.

The Management stated (October 2005) that the financial soundness of all the dealers appointed since 2003-04 was ensured by verifications of their property titles, value of the property etc.

ii. The MOU with the dealers was renewed periodically in a routine manner by specifying the territory allotted or minimum off-take without incorporating the latest changes in the sales policy, credit policy, inclusion of targets allotted, increase in deposit etc. Though the MOU spelt out mode of payment as irrevocable revolving LC/demand draft covering the full value of minimum monthly off-take, yet hundies,

bills of exchange etc., were accepted as mode of payment which in some cases were subsequently dishonoured.

The Management stated (March 2005) that MOU from 2004-05 incorporated hundi as one of the modes of payment and possibility of covering hundi with bank guarantee in future was being examined.

iii. Dealer appraisal system after appointment/renewal of dealership was not in vogue. The existing Management Information System (MIS) report on dealers evaluated the dealer performance only with regard to the off take of tractors against the target fixed. A dealer appraisal system to assess whether the performance was based on the market potential of the area, the effectiveness in realisation of dues from the customers, quality of after sales service provided in respect of tractors sold, customer relations, sales practices adopted and other related issues like businesses, property assessment, change in partnership constitution, etc., was considered essential to provide essential information about the performance of each of the dealers.

The Management stated (March 2005) that dealers' appraisal system would be made applicable from the year 2005-06.

5.4.3.2 On account of the inadequacies in the agreement with dealers as brought out in the preceding paragraph, the Group could not protect its financial interests and had to resort to legal recourse to recover the dues from the dealers. As at the end of March 2005, 41 dealers became inoperative, legal action had been initiated against 36 dealers and legal notices had been issued against 27 defaulted dealers for recovery of Rs.8.63 crore (Principal) and Rs.6.88 crore (Interest).

The Management stated (October 2005) that MOU signed with the dealers was primarily an agreement between the Company and the dealer to continue business for the financial year and to achieve the set targets. It also stated that bad debts created by the dealer were due to either dealer's financial loss or bad intention of the dealer for not making payments to the Company which could not be foreseen and hence could not be protected in the MOU.

The reply of the Management is not tenable as there were deficiencies in the dealers' appraisal system as mentioned in para 5.4.3.1.

5.4.3.3 The Group resorted to aggressive marketing techniques through advance of tractors to dealers through Area offices as discussed in paras 5.4.2.2 and 5.4.2.3. Dealers in turn advanced most of the tractors to customers to show higher sales. The unsold tractors with dealers were taken back irrespective of their physical condition and credit was given to the dealers accounting the same as sales return. The sales returns, thus, amounted to Rs.3.68 crore, Rs.17.25 crore, Rs.9.42 crore and Rs.1.18 crore representing 1.28 *per cent*, 6.66 *per cent*, 5.76 *per cent* and 0.58 *per cent* of sales in 2001-02, 2002-03, 2003-04 and 2004-05 respectively. Thus, the aggressive marketing practice of the Group ended up in huge sales returns.

5.4.3.4 Out of the tractors returned, 275 old tractors (value-Rs.7.15 crore) were not in 'sale worthy' condition and 80 tractors (value-Rs.2.08 crore) were of obsolete models. The total financial impact, to rectify the defects and sell these, was worked out by the Management as Rs.1.48 crore.

5.4.3.5 The Management admitted (October 2005) that their action of bringing high pressure on dealers resulted in certain bad deliveries. Some of the dealers pulled back the tractors advanced earlier to the customers from whom payments were not forthcoming and the Company had to help the dealers in liquidating these tractors.

Recommendations

- Dealer Appraisal System needs to be introduced to analyse the performance of each dealer with regard to sales and collection.
- As far as possible demand drafts and letters of credits be accepted as payment instruments. Security obtained be preferably in the form of bank guarantee and the same needs to be got renewed regularly.

5.5 Credit policy

5.5.1 A Committee headed by Professor S. Sundararajan appointed by the Company to report on credit policy recommended (June 1995):

- inclusion of the recovery dead line, action options and recovery responsibility in credit policy,
- evaluation of credit performance,
- payment pattern approach showing the pattern of collection of debt and
- strengthening the credit policy with regular marketing audit.

5.5.1.1 The modus operandi of the transactions with the dealers and the collections was laid down in the credit policy of the Group approved by the Board in the year 1995. However, the approved credit policy did not consider the above recommendations of Professor Sundararajan Committee. Even subsequent modifications to the credit policy during 2000-01 to 2003-04 amended only the period of credit and rate of interest and had not incorporated any modifications based on the above recommendations.

5.5.1.2 The Management stated (October 2005) that the credit policy of the Group approved by the Board of Directors in 1995 and subsequent changes/modifications were based on the then prevailing market conditions.

5.5.1.3 Thus, non implementation of the recommendations of Professor Sundararajan Committee led to ineffective monitoring and accumulation of debts of the Group resulting in severe financial constraints.

5.5.2.1 A new credit policy was introduced (October 2004) to be applicable on invoices raised with effect from 1 November 2004. According to the new policy:

i. dealers were categorised into A, B and C based on the off take and payment against bills in the previous three years.

ii. the credit period was fixed as 90 days for category A, 60 days for category B and no credit for category C.

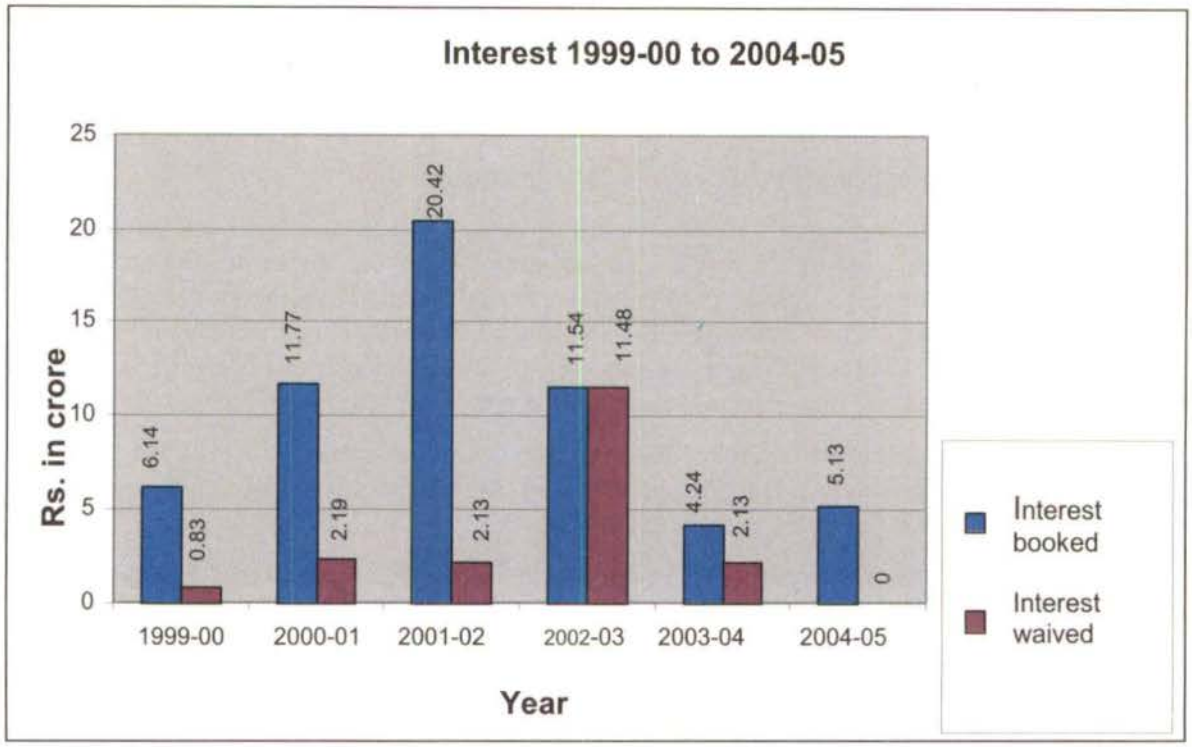
iii. the dues against the dealers were not to exceed the credit limits fixed.

5.5.2.2 The Management stated (October 2005) that under the new credit policy, before invoicing to any dealer, the availability of credit limit of the dealer and monthly account statement of each dealer was verified to stop further billing as well as recovery of any

debt beyond limit. It also stated that, as suggested by Audit, new monthly MIS report of each Area Office for strict adherence to billing against credit to dealer was being explored.

5.5.2.3 The effectiveness of the new policy in regard to timely recovery of sales proceeds etc. would be applicable only to the operative dealers who continue to lift the tractors, get billed and pay as per the new credit policy. These changes would have no effect on the bad and inoperative dealers from whom recovery was not forthcoming leading to legal cases.

5.5.2.4 Based on the credit policy prevailing in each year, the Group charged interest (Rs.59.24 crore) during 1999-00 to 2004-05 on the outstanding amount in the dealers' accounts beyond the credit period. However, the dealers protested the charging of interest on the plea that the outstanding mainly related to tractors dumped on them. Considering the protests of the dealers, the Group waived interest of Rs.18.76 crore which amounted to 32 *per cent* of the interest charged on the dealers in all the six years up to 2004-05 as indicated in the graph below:



5.5.2.5 The Management stated (October 2005) that interest waiver was a part of various collection mobilisation schemes offered to dealers duly sanctioned by the competent authorities during these years.

The fact, however, remains that the interest of Rs.18.76 crore waived represents the interest on the locked up funds on tractors produced in excess of the demand.

Recommendation

Memorandum of Understanding entered into/renewed with dealers needs to spell out annual target for off take, credit period, credit limit, interest on delayed payment beyond

applicable credit period, priority of adjustments of payment received etc. The compliance of the above conditions need to be watched irrespective of the status of the dealers.

5.6 Incentive/ Payment mobilisation Schemes

5.6.1 The Group introduced and implemented many incentive schemes for improving the sales performance, collection and realisation of old dues since 1998-99. Some of these schemes introduced and implemented are listed in **Annexure-15.** However, after completion of their duration, the schemes were not evaluated as to their effectiveness. Such evaluation would have provided valuable inputs to the Management either for continuation of the scheme or introduction of new/ similar schemes and to analyse whether the benefits derived by implementation of such schemes were commensurate with the expenditure/cost incurred on the scheme.

5.6.2 The Management accepted (October 2005) the audit observations and stated that in future such incentive scheme would have cost/benefit analysis also.

Recommendation

The Group needs to introduce a system of cost-benefit analysis of incentive schemes.

5.7 Debtors Management

5.7.1 Accumulation of Debtors

5.7.1.1 The details of turnover, sales returns and sundry debtors for the years from 1999-00 to 2004-05 were as indicated below:

(Rs. in crore)

Details	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Turnover (net of sales return)	386.39	341.63	284.63	181.86	154.22	201.13
Sales returns	0.44	1.41	3.68	17.25	9.42	1.18
Sundry debtors	168.28	174.98	202.14	162.93	123.73	126.01
Interest booked	6.14	11.77	20.42	11.54	4.24	5.13
Profit	7.91	5.28	1.85	(-) 43.71	(-) 51.09	(-) 35.17
Provision for bad and doubtful debts	0.99	1.87	3.77	4.61	23.69	26.76
Percentage of Sundry debtors to Turnover (net of sales return)	43.55	51.22	71.02	89.59	80.23	62.65
Sundry debtors expressed in days of turnover	159	187	259	327	293	229

5.7.1.2 Even though there was a continuous decline in the turnover of the Group during the years 1999-00 to 2002-03, there was a steady increase in the percentage of sundry debtors to turnover during those years. Sundry debtors expressed in terms of number of days of turnover ranged between 159 (1999-00) and 327 (2002-03) which was indicative of extension of credit beyond agreed credit period of 90 days. The provision towards doubtful debts increased from Rs.0.99 crore in 1999-00 to Rs.26.76 crore in 2004-05, which could be attributed to the injudicious practice of dumping tractors on dealers. Despite accounting for accrued interest of around Rs.11.77 crore and Rs.20.42 crore in 2000-01 and 2001-02 respectively, the Group could show a meager profit of Rs.5.28

crore and Rs.1.85 crore only in these years. Mounting dues resulted in cash crunch consequent to low volume of production / sales and loss of Rs.43.71 crore for the year 2002-03. Even with increased sales in 2004-05 the Group suffered loss of Rs.35.17 crore. Thus, the Group was caught up in a vicious circle of poor generation of funds leading to poor performance.

5.7.1.3 The Committee appointed (August 2000) by the Government of India to ascertain *inter alia* the reasons for the decline in performance of the Company observed (November 2000) that the sundry debtors position of the Tractor Business group was alarming leading to severe cash crunch and the Corporate Management was not giving sufficient attention to this group. Despite the above there was no improvement and sundry debtors ranged from 63 *per cent* to 90 *per cent* of the sales in the last three years ending 2004-05. The Company also admitted in the MOU negotiation meeting for the year 2003-04 that the sundry debtors accumulation was mainly due to advancing of tractors to dealers.

5.7.2 Recovery of debts

5.7.2.1 As per the agreements entered into with the dealers any dispute or difference arising out of or in relation to the agreement would be referred to a sole arbitrator to be appointed by the Group and would be subject to the exclusive jurisdiction of Panchkula Court in the State of Haryana. As the number of inoperative dealers increased and the dues from them also increased, the Group had to take legal recourse for recovering the outstanding. The position of legal and arbitration cases as on March 2005 was as under:

Sl. No	**Details**	**No. of dealers**	**Amount due (Rs. in crore)**
1.	Legal notices issued	27	10.40
2.	Arbitration award obtained between June 1997 and August 2004 but yet to be executed	15	5.54
3.	Arbitration proceedings in progress	8	5.19
4.	Cases filed for dishonour of cheques	12	4.26

Even in five cases where arbitration awards had been obtained, the Group had to file execution petition for execution of the award. The filing of execution petition in the concerned courts of the area where the dealers were operating was getting delayed in the absence of details of property of the dealers as these were not collected at the time of their appointment.

5.8 Conclusions

i. The Group did not have Marketing Manual prescribing the systems and procedures to be adopted by the Marketing Division/Area Offices.

ii. The Group was inflating sales by resorting to aggressive marketing techniques and advancing of tractors to dealers without considering the operational and financial risks.

iii. The Group did not have effective mechanism for assessing the performance of Area Offices.

iv. Tractors were supplied to a large number of dealers without taking into account the credit worthiness and without obtaining adequate security resulting in blocking up of funds and non-realisation of debts.

v. The impact of many incentive schemes implemented by the Group for improving sales performance and collection of debts had not been assessed after completion of their duration.

The review was issued to the Ministry in December 2005; its reply was awaited (February 2006).

MINISTRY OF PETROLEUM AND NATURAL GAS

CHAPTER:VI

GAIL (India) Limited

Telecom-Business

Highlights

The Company commenced the GAIL Tel project without Detailed Project Report and implemented subsequent phase (Phase IIB) without considering the actual performance of the previous phase.

(Paras 6.5.1 and 6.5.3)

The Company lost projected revenue of Rs.442.19 crore due to delays ranging from nine to 19 months in the completion of various phases of the project.

(Paras 6.5.1, 6.5.2 and 6.5.4)

Internal delays in the processing of tenders and placement of orders was one of the reasons for project delay.

(Paras 6.5.1, 6.5.2 and 6.5.4)

Investment of Rs.36.66 crore on DWDM equipment, Rs.11.48 crore on the OFC and Rs.12.99 crore on second duct could not be put to fruitful use.

(Para 6.6.1, 6.6.2 and 6.6.3)

Gist of Recommendations

- In view of the current scenario in telecom sector there is a need for the Company to strengthen its internal systems to avoid further delays in Phase III
- To explore the possibility of leasing the unused fibres
- To formulate achievable market strategy based on available infrastructure and implement it strictly as per plan to avoid negative margin in future
- There was also a need for a proactive action by the Company to assess marketability of GAIL-Tel.
- Rationalisation of GAIL Tel assets may again be reviewed.

6.1 Introduction

6.1.1 GAIL (India) Limited (Company) had developed a network of five pipelines[♣] in the country for transporting Natural Gas, Liquified Petroleum Gas and Regasified-Liquid Natural Gas for various consumers.

[♣] ***Hazira Bijaipur Jagdishpur (HBJ) Pipeline, Gas Rehabilitation and Expansion Project (GREP) Pipeline, Jamnagar Loni (JL) Pipeline, Dahej Vijaipur (DV) Pipeline and Vizag Secunderabad (VS) Pipeline.***

6.1.2 The Company had its telecommunication systems along the pipelines for Communication and Supervisory Control and Data Acquisition (SCADA) to ensure their smooth operation. The initial facilities were predominantly created for captive use but had unutilised capacities. Their further capacity augmentation was possible at a relatively low investment. National Telecom Policy (NTP) 1999 permitted the Company to use its existing telecom network for the purpose of national long distance data and voice communications. The Company decided (January 2000) to conduct a detailed study within two-three months covering market assessment, technology evaluations, entry options, potential strategic partners, compatibility and reliability aspects with captive communication requirements.

6.1.3 The Company engaged M/s Tata Consultancy Services (TCS) (March 2000) as consultants for evaluation of options for the Company's entry into Telecom sector. Considering the recommendations of M/s TCS, the Company decided (June 2000) to take up the project in three phases and completed (December 2003) two phases of the project at a cost of Rs.262.95 crore.

6.1.4 As a result of implementation of the project up to two phases the Company developed about 8494 km Optical Fiber Cable (OFC) based network equipped with Telecom system having Synchronous Transport Modules[♣] (STMs) and Dense Wavelength Division Multiplexing[♦] (DWDMs) equipment of which 3614 km was on pipeline routes and 4880 km on non-pipeline routes. The network had 128 nodes[▼] (66 on pipeline routes and 62 on non-pipeline routes) at different locations. The designed capacity of the system was 160 Gbps[▲], the installed capacity was 10 Gbps and the activated capacity was 2.5 Gbps.

6.2 Organization set up of GAIL-Tel

The GAIL-Tel (Telecom Business unit of the Company) is headed by a General Manager (GAIL-Tel) at NOIDA under the overall control of Executive Director and Director (Marketing). General Manager (GAIL-Tel) is assisted by Dy General Manager (O&M) who looks after the operation and maintenance (O&M) work of the network. For marketing of GAIL-Tel business, the Company recruited 11 marketing officers during May 2002 and March 2004. The Company's Telecom market related activities were undertaken by ten Zonal Offices (ZO) and their accounts are maintained at three accounting units at NOIDA, Baroda and Mumbai.

6.3 Objectives of Audit, Audit criteria and Acknowledgements

6.3.1 A Performance Audit of GAIL-Tel business was taken up to review the implementation of the project and the performance of the business. The performance was evaluated in terms of the projections and internal targets fixed by the Company for time and cost of completion of the project, capacity sales and sales revenue.

6.3.2 Audit takes this opportunity to thank the management and staff of the Company for their co-operation and assistance in the conduct of this performance audit.

♣ *equipment using standard technology for synchronous data transmission*

♦ *A fibre optic transmission technique that employs the parallel transmission of multiple data streams using light stream of different wavelengths over an optical fibre.*

▼ *A place where telecom equipment are installed to cater telecom services*

▲ *Giga bytes per second*

6.4 Scope of Audit

In order to review the overall performance of GAIL-Tel, audit reviewed the records for the period 2000-01 to 2004-05 relating to: –

i. procurement / laying of Telecom system, Optical Fibre Cables (OFC) and High Density Poly-ethylene (HDPE) ducts used in the development of 'OFC based Telecom Network'

ii. marketing activities undertaken by eight out of ten zonal offices of the Company located at Ahmedabad, Bhopal, Chandigarh, Delhi, Hyderabad, Jaipur, Lucknow and Mumbai. Two Zonal offices at Chennai and Bangalore were not covered as GAIL-Tel had no business at these stations for want of telecom network.

6.5 Audit findings

Deficiencies in the execution of GAIL –Tel project

6.5.1 Delay in Phase-I

After considering the initial recommendations of M/s TCS the Company decided (April 2000) to prepare a Detailed Project Report (DPR) through an external consultant, on the primary market survey and the strategy for the market entry, capacity sales, Operations & Maintenance and detailed financial projections.

The DPR was to be prepared in three phases, as below:

i. Phase-I: Connecting Mumbai to Jamnagar-Loni Network for creating a Delhi-Mumbai interconnection.

ii. Phase-II: Upgradation of HBJ network to OFC based network to create a reliable network in the North-Western part of the country and extend the network towards North.

iii. Phase-III: Implementation of OFC network along the Company's LPG pipeline networks in the Southern part of the country and their integration through Chennai and interconnection with North-Western network through Mumbai.

The Company took up Phase-I Project work without preparation of the DPR. Phase I of the project was approved (June 2000) at a cost of Rs.60 crore, further enhanced to Rs.96.55 crore in December 2000, with scheduled completion date of June 2001. The work involved obtaining licences from the authorities for conducting business, Right of Use of land for laying ducts, purchase of OFC and HDPE ducts, laying of ducts, splicing of OFC and purchase of telecom equipment. Phase I was actually completed in April, 2002 at a cost of Rs.96.58 crore.

It was observed in audit that the delay was due to lack of planning on the part of the Company as detailed below:

i The purchase order for procurement of OFC was placed in December 2000 as against September 2000 (as per plans) and the procurement was completed in September 2001 resulting in overall delay of three months in the project.

ii Though the scheduled completion date was June 2001, the detailed engineering work for Phase-I was awarded to M/s Telecommunications Consultants India Limited only in May 2001.

iii The procurement of Telecom System was to be completed by March 2001 but the Company invited tenders only in March 2001 and opened them in April 2001. The work was awarded in August 2001.

Apart from the above, the delays in receipt of permissions for Right of Use (ROU) of land also resulted in delay of the project which resulted in loss of revenue of Rs.58.17 crore to the Company during July 2001 to March 2002 based on the projections of M/s TCS.

The Management stated (November 2005/December 2005) that:

i. Going by the advantages pointed out by M/s TCS and to derive the benefits of being the first company to operate in this sector, the Company did not wait for the DPR.

ii. The Company had timely and pro-actively taken steps to complete the work and delay was almost entirely caused by the long time taken by the authorities in according the ROU permissions and issuance of Infrastructure Provider-II licence.

iii. M/s TCS was primarily engaged to suggest how the Company should position itself in the Telecom Business. As regards, the revenue and growth of business, M/s KPMG was subsequently engaged to draw the detailed business plan and their projection would be more relevant to make any comparisons of actual with projected revenues for delayed completion of Phase I.

The reply of the Management is not tenable because:

i. Absence of DPR indicated lack of proper planning in going ahead with the project.

ii. Delay in getting ROUs was in addition to the Company's own delays as pointed out above.

iii. The delay in the receipt of Infrastructure Provider –II Licence was due to clause 21 inserted by the Company (September 2000) in its Memorandum and Articles of Association which was not in conformity with the Indian Telegraph Act 1885. Further the delay in obtaining the licence also resulted in delay in getting ROUs because ROU clearance was linked with issuance of licence.

iv The Company decided to execute Phase I of the project based on the report of the consultants M/s TCS and at that time M/s KPMG had not been engaged.

6.5.2 Loss of revenue due to delayed completion of Phase IIA Project

M/s TCS recommended that the work of Phase-II be taken up by end 2000 and completed by mid-2001. The Company decided to take up Phase II in two parts IIA and IIB. Phase IIA mainly involved connecting Vadodara-Vijaipur through upgradation of HBJ and GREP pipelines to complete a ring for reliability of network. While Phase-I work was in progress, the Company decided (February 2001) to take up Phase-IIA and complete it by February 2002 (revised to May 2002) at an estimated cost of Rs.99.60 crore. Phase-IIA was completed (December 2003) at a cost of Rs.87.22 crore, with delay of 19 months for the reasons indicated below:

i. The work of laying of OFC scheduled to be awarded in November 2001 was actually awarded in March 2002.

ii. The Company included the responsibility of obtaining ROU permissions from authorities as well as payment of restoration charges in the scope of the work of

contractors. The contractors did not deposit the restoration charges timely resulting in delay in obtaining the ROU permissions and the contracts had to be terminated and re-awarded. In Phase I, the Company itself arranged ROUs and the phase was delayed by nine months as against 19 months in Phase II A.

The Management stated (November 2005/ December 2005) that

i. the delay in release of order for laying work was due to receipt of 45 bids which resulted in long time for bid analysis. The bid qualification criteria had subsequently been made more stringent in Phase II B and many modifications in the contract and purchase procedure were introduced to reduce the ordering cycle.

ii. The contractors to whom the incomplete work was off loaded did not face difficulty in discharging their responsibility relating to ROU permission in their scope. Similarly in Phase IIB, all contractors had ROU permission in their scope and no work was delayed inordinately.

iii. There was no loss of business opportunity and not a single order was lost. The Company bagged the first order as early as June 2001. The inadequacy in the network was addressed by bandwidth swap with Rail Tel at an expenditure of Rs.74 lakh.

The reply is not tenable because

i. Deficiency in the contract and purchase procedure (including absence of dedicated contract & procurement and finance personnel in different working groups, non-preparation of DPR and development of appropriate bid qualification criteria) shows lack of proper planning before taking up the work

ii. The scope of work of the contractors to whom the incomplete work of the original contractor (M/s Supreme Telecom) was offloaded was curtailed as they were not required to pay restoration charges to obtain ROU permission. Phase IIB was also delayed by 12 months.

iii. M/s Bharti Telesonic, a customer had asked for the capacity of 10 E1* (20 Mbps) on Delhi-Vijaipur route, 10 E1 on Delhi-Jaipur, 20 E1 for Delhi-Rajkot-Jamnagar by January 2001, which the Company could not provide due to delayed completion of network. The connectivity on Delhi-Vijaipur to Bharti Telesonic was provided in June 2001 and on Delhi-Mumbai in June 2002. The delay in completion of network thus resulted in loss of business to the Company during January 2001 to June 2001. The Company also incurred an additional expenditure of Rs.74 lakh for inadequacy in the network.

Thus, delay in award of works and including payment of restoration charges for obtaining permission for ROU in the scope of work of the contractors resulted in delay in project and consequent loss of revenue of Rs.270.12 crore for the period June 2002 to December 2003 based on the projections made by TCS.

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* *1E1=2Mbps*

6.5.3 Decision for implementing Phase II B without considering actual performance in earlier phases

The Company appointed (March 2001) M/s KPMG to provide consultancy services for detailed business plan for GAIL Tel, financial feasibility, operations & expansion strategy alongwith revised pricing strategy for Phase I and Phase II. M/s KPMG submitted their reports during May 2001 to January 2002.

M/s KPMG projected a revenue of Rs.8.30 crore for the year 2001-02 for the project after completion of Phase IIB which mainly involved upgradation of Vijaipur-Kanpur and creation of an alternate path to GREP. It was, however, noticed that as against the projected net revenue of Rs.8.30 crore for 2001-02, the actual revenue earned by the Company during April 2001 to December 2001 (including advance billed for the quarter October-December 2001) was only Rs.1.29 crore. The Company did not consider the actual revenue earned vis-à-vis the KPMG projections at the time of deciding (November 2001) to proceed with the Phase IIB at a cost of Rs.99.30 crore.

The Management stated (November 2005/December 2005) that

i. The deliberation by Board of Directors on the actual realization not matching KPMG's projection in the initial period was not warranted because initial experience of few months could not have been so significant as to influence a major decision of going ahead with Phase IIB.

ii. Phase IIB was a complementation of Phase IIA in the sense that only Phase IIB completion would lead to the completion of redundancy in the Delhi-Mumbai route. As such the project could not have been left incomplete after Phase IIA.

The reply of the Management is not tenable as the Company went ahead with the project without deliberating on further remedial steps required to be taken before committing funds for the next stage when the actual revenue earned was only one fifth of the projections.

6.5.4 Delayed execution of Phase IIB of the Project

Phase II B of the GAIL-Tel Project estimated to cost Rs.99.30 crore was scheduled to be completed in December 2002 but was actually completed in December 2003 at a cost of Rs.79.15 crore. Audit noticed the following reasons for the delay:

i. The Company invited bids for OFC purchase in April 2002 but due to time taken in tender processing the work was awarded in October 2002 as against the schedule of June 2002, resulting in delay of four months.

ii. The order of procurement of HDPE duct was scheduled to be awarded in June 2002 but was actually placed in August 2002. The supply of the HDPE duct was completed in March 2003 as against the target date of October 2002. The delay in completion of work was due to delay on the part of the Company to supply granules for duct, supply of the bank guarantee format and issue of Form-31 to the contractor apart from the delay on the part of contractor.

iii. The work of laying of OFC was scheduled to be awarded in July 2002 but was actually awarded in October 2002. The laying of OFC work was planned to be completed by January 2003, whereas it was actually completed in December 2003

(except some minor works) for the following reasons mainly attributable to the Company:

- Delay of seven months (after issue of Notice Inviting Tenders for the work of laying of HDPE duct and OFC) in signing of agreement to lay network by the Company with Government of Maharashtra,
- Delay of up to 39 days in paying fees or bank guarantees to authorities for obtaining ROU/ROW[♣] clearance
- Delay in issue of the OFC/HDPE duct to the contractors.
- Delay in finalization of nodes by 143 days.

iv. The order of telecom equipment was scheduled to be awarded in August 2002 but it was actually placed in March 2003. The supply of the equipment was completed in May 2005 as against the scheduled date of February 2003.

The Management stated (November 2005) that:

i. The delay in the project to some extent was caused by delay in placement of order. The Company had taken many initiatives such as independent and dedicated staff in the Contract & Procurement and Finance working groups (July 2004) in order to reduce the ordering cycle. As a result the Company had succeeded in completing the tendering and award process of Phase III in 49 days.

ii. There were other reasons which led to the delay in completion of Duct/OFC laying works, such as hiring of node accommodations and signing of agreement with State Government. These were not entirely due to reasons attributable to the Company but were attributable to availability in market and priorities of State Government.

The reply of the Management is not tenable because:

i. There were internal delays in the system of placement of orders.

ii. Despite facing tender processing delays in Phase IIA during November 2001 to March 2002, the Company allocated the strength of Contract and Procurement and Finance working groups exclusively for Telecom work only in July 2004 after completing Phase II B in December 2003.

iii. Despite the completion schedule approved by the Board of Directors and also the problems faced during the implementation of Phase I & IIA project work, the Company did not initiate the project work for Phase IIB in time.

iv. Signing of agreement with Government of Maharashtra was delayed by the Company. After issue of notice inviting tenders for the work of laying the ducts (March 2002) the Company requested Government of Maharashtra for agreement after seven months in October 2002 which was signed within two months (December 2002).

[♣] *Right of Use/Right of Way*

On account of delays in completion of the Phase IIB the Company suffered a loss of revenue of Rs.113.90 crore during January 2003 to December 2003 as projected by M/s KPMG.

6.5.5 Payment of Rs.1.80 crore to M/s TCIL for construction management without commensurate benefits

The work of engineering consultancy services including supervision for Phase-IIA of GAIL-Tel Project was awarded (February 2002) to Telecommunication India Limited, New Delhi (TCIL) on single nomination basis with the approval of Executive Purchase Committee of the Company for Rs.2.50 crore (Service Tax extra).

After issuance of the letter of award to TCIL the Company modified the scope of contract from construction supervision to construction management and increased the fees by an amount of Rs.1.80 crore (Service tax extra). This was done to ensure total responsibility of construction management by TCIL to achieve completion targets and minimize problem in coordination, ensure smooth and timely completion of construction activities by contractors and prompt decision making at site including those related to any contingency measures.

It was observed that the work for laying of HDPE duct was awarded to six contractors (March 2002) with a scheduled completion date of September 2002. The contractors could not complete their work as per schedule. The works awarded to three contractors had to be terminated by the Company due to non-starting of the work or non-completion of the work within scheduled or extended time and the left over works were awarded to other parties. The works were actually completed by the contractors in December 2003.

Thus, TCIL could not manage the work with the contractors or other concerned agencies for timely completion of the Project as per schedule.

The Management stated (November 2005/ December 2005) that Phase-IIA project got delayed mainly due to poor performance of the contractors which was beyond the control of TCIL and the Company. The project management role was played by TCIL and progress of works was continuously monitored by them for which extra fees of Rs.1.8 crore was paid to them.

The reply of the Management is not tenable because the additional payment of Rs.1.80 crore was made to TCIL with a view to entrust total responsibility of construction management to them and ensure timely completion of construction activities by contractors. TCIL was not able to minimize the problem of coordination, smooth and timely completion of construction activities with contractors. The payment of the additional fees of Rs.1.80 crore to TCIL for construction management work could not produce the desired results.

6.6. Development of excess capacity in the network

6.6.1 Excess capacity due to procurement of high capacity DWDMs

For developing the GAIL-Tel network the Company procured Telecom system from Nortel, Singapore (for Phase-I and Phase-II-A) and from M/s Fibcom India (for Phase-IIB). The Telecom system comprised four types of DWDM[♣]s and three types of

[♣] *DWDM (1 channel)= 10 Gbps*

STMs[♦]. By using DWDM/STM equipment, the Company created a network having designed capacity of up to 160 Gbps. Out of this, the capacity installed was only 10 Gbps and the capacity activated was 2.5 Gbps (2500 Mbps[▼]) (September 2005). It was noticed in audit that the Company did not utilize (March 2005 and September 2005) even the activated capacity of 2500 Mbps, indicating that the high capacity equipment were not fruitfully utilized.

Further scrutiny of the capacity sold in E1s/DS3[▲]/STMs (September 2005) revealed that in one link the Company sold the capacity to the maximum of one STM-1, in four links the capacity sold ranged between one DS3 to two DS3 and in other 162 cases the Company sold the capacity ranging between one E1 to 23 E1s.

Thus the capacity so far utilized for commercial usage and captive usage by the Company never exceeded the capacity of STM-16 and the expenditure on DWDMs valuing Rs.36.66 crore incurred by the Company could not be fruitfully utilized.

The Management stated (November 2005/ December 2005) that:

i. the system as designed and installed was on the basis of estimation of traffic projections. On the basis of the projections from the Consultants and market, it was considered reasonable to go for a DWDM system initially equipped for 2.5 Gbps capacity (equivalent to STM-16) and upgradable to 10 Gbps with minimum expenditure, the ultimate capacity being 160 Gbps.

ii. The network capacity had to be determined from the maximum aggregated traffic flowing in any leg. Right from the very beginning, the aggregated traffic (actual and projection) was more than STM-4. In the Gas Rehabilitation and Expansion Project (GREP) pipeline section, there was the need to enhance capacity beyond STM-16 (2.5 Gbps) to cater to total requirement of commercial and captive traffic. Therefore, the decision of having a minimal DWDM–STM-16 system was quite correct and the installed capacity of the systems was necessary for the amount of traffic to be handled.

iii. The investment was made for capacity of only 2.5 Gbps and not for 10 Gbps or 160 Gbps.

The reply of the Management is not acceptable because:

i. Out of the activated capacity of 2.5 Gbps the Company was able to utilize only 2091 Mbps (2.091 Gbps) (March 2005) and 2256 Mbps (2.256 Gbps) (September 2005).

ii. Even in GREP link, the total traffic ranged between the capacity of STM –4 and STM-16 from December 2003 to December 2005. The actual total traffic in December 2005 in GREP link was only 13.2 STM-1.

iii. With the present business scenario it might not be possible for the Company to utilize even the installed capacity of 10 Gbps whereas the system was designed for a capacity of 160 Gbps.

[♦] *STM-1 (155 Mbps), STM-4 (622 Mbps) and STM-16 (2.5 Gbps)*

[▼] *Mega bytes per second*

[▲] *DS3= 45Mbps*

iv. The DWDM system had a provision for handling the capacity of 10 Gbps per channel and 160 Gbps in all for which the Company had already made an investment of Rs.36.66 crore

Thus, the GAIL-Tel network was developed with high capacity equipment (DWDMs) at a cost of Rs.36.66 crore but were not fruitfully utilized.

6.6.2 Avoidable expenditure on procurement of 24 core Optical Fibre Cable

For the purpose of creating the GAIL-Tel network, the Company procured OFC and other equipment. The Company purchased OFC for 6440 km (5250 km of 24 core and 1190 km of 12 core) during the period December 2000 to November 2002.

Out of 12 or 24 core OFC laid in the network, the Company used (December 2004) only four to eight fibers for both commercial and captive usage. Even with a 100 *per cent* backup for the fibres in use i.e. for every pair of fibre used for creating the network, one additional pair kept as standby, the spare fibres available all across the network ranged between four to 16 (except GREP route where the Company had only six fibre network). The Company had thus laid excess core OFC which was not utilised. The Company could have saved Rs.11.48 crore if it had procured only 12 core OFC.

The Management in their reply (November 2005) stated that

i. Though at that point of time i.e. four years earlier, the difference in cost was more significant, in the present scenario, the cost of the OFC, duct and equipment had significantly got reduced. The cost differential between 12 fibre to 24 fibre was only Rs.7 per meter at present with saving to the extent of not more than Rs.2 to 3 crore.

ii. Number of fibers required along the trunk route might vary from two to eight in different sections. Considering that some fibres went bad and became unworthy of use, 12 fibre should be necessary for captive use.

iii. Exploitation of the cable infrastructure applications like lease of fibre (which could fetch handsome returns) would only be possible through a higher cable size than 12 fibre.

iv. It was the prevailing practice of all operators including probably BSNL and Oil and Gas sector to lay OFC of minimum 24 fibres.

The reply of the Management is not tenable as:

i. at the time of procuring the cable (October /November 2002) for the network there was a difference of Rs.21.88 per metre between the rates of the 12 fibre and 24 fibre OFC

ii. the Company while taking a decision to obtain Infrastructure Provider-I license (December 2004) noted that it had 16 spare fibers in more than 3700 km of network laid along the highways and up to eight spare fibers in the spur routes (approximately 1000 km). This indicated that the Company was using eight fibres in 24 fibre and four fibers in 12 fibre OFC.

iii. The Company had not so far (November 2005) leased its fibre.

iv. Indian Oil Corporation had also laid OFC up to a maximum of 12 fibres for its pipelines communication and SCADA.

Thus, expenditure of Rs.11.48 crore on the procurement of 24 fibre OFC was avoidable.

6.6.3 Wasteful expenditure on laying of Second (spare) duct

The Company decided (December 2000) to lay a spare duct to

i. enable laying of higher grade OFC in future without disturbing existing system.

ii. avail optimum utility of the trenching work which had a significant cost element (30 *per cent* of the project cost) and

iii. improve the reliability of the system in case of interruption due to cable failure.

The Company laid a spare duct on the 5600 Km network at a cost of Rs.12.99 crore (December 2001 to March 2003)

It was, however, noticed that the second duct was not utilized till November 2005 by the Company as the need did not arise due to availability of four to sixteen spare fibres out of the OFC laid in the first duct. Accordingly, in view of the spare fiber availability the chances of utilization of second duct laid at a cost of Rs.12.99 crore were remote and the expenditure of Rs.12.99 crore incurred on laying of spare duct was not gainfully utilised.

The Management stated (November 2005 /December 2005) that

i. There was no plan to use second duct but under IP-I license the duct might be required to be used in the future. It could be leased out or sold at profit.

ii. At any time in future the second duct might need to be used when the main duct or OFC therein became unserviceable. The Company already faced such a situation in Delhi-Meerut section when OFC became faulty and the main duct was unserviceable because of sludge. New OFC was blown in the affected section and traffic to customer was restored.

The reply of the Management is not tenable because

i. After obtaining IP-I license (June 2005) the Company was not able to execute any business under this license (November 2005) and nor did it have any future plan to use the second duct.

ii. The incident indicated by the Management was an isolated incident that did not justify the investment of Rs 12.99 crore over the second duct. The affected section could be replaced to rectify the defect instead of laying a spare duct on the entire network.

6.7 Operational Performance

6.7.1 Performance analysis vis-à-vis targets for sales and revenue

The position of business undertaken by the Company vis-à-vis the projections made by the consultant KPMG and internal targets of the Company during the last four years ended March 2005 were as under:

	Capacity Sales (Mbps)				Sales revenue (Rs. in Crore)			
Year	2001-02	2002-03	2003-04	2004-05	2001-02	2002-03	2003-04	2004-05
KPMG Targets	650	1316	2369	3453	9.8	87.80	122.60	149.20

Company's Internal Targets	-	1550	1772	2107	3.5	29.50	28.50	35.22
Actual	20	627	1149	1347	1.83	11.71	20.51	18.92
Percent of Actual vis-à-vis KPMG Projected Targets	3.07	47.64	48.50	39	18.67	13.33	16.72	12.68
Percent of Actual vis-à-vis Company's Internal Targets	-	40.45	64.84	63.9	52.28	39.69	71.96	53.71
Profit/Loss (-)					1.00	0.99	(-) 9.02	(-) 1.43

From the above, it was observed that:

i. The Company could neither achieve the KPMG targets nor its own internal targets in terms of capacity sales and sales revenue during any of the last four years ended March 2005.

ii. Financial performance of GAIL-Tel was not satisfactory during 2003-04 as the Company suffered a loss of Rs.9.02 crore.

The main reasons for decline in losses during 2004-05 were:

i. rationalization and transfer of the GAIL-Tel business assets valuing Rs.203.63 crore to Company's gas business and

ii. apportionment of common expenditure on O&M in GAIL-Tel business and other business segments in the ratio of usage of OFC with effect from April 2004 which was earlier apportioned between GAIL-Tel and other businesses in equal ratio.

Even after rationalization, there were losses from GAIL-Tel business amounting Rs.1.43 crore during 2004-05 and Rs.0.57 crore (during 2005-06 upto September 2005). Audit observations on rationalization of accounting are separately dealt with in Para 6.8.1 below.

The Management stated (November 2005/December 2005) that:

i. they had set targets based on the network readiness, prevailing competition and the available manpower in the region.

ii. The slippage was due to delay in launch of services by cellular service providers in new circles, Bharti and VSNL were building their own OFC network for meeting captive requirements, delay in receipt of permission by the customers from BSNL to load capacity in the Company's network, reversal of Government decision to grant National Long Distance licence to Mahanagar Telephone Nigam Limited.

The reply of the Management is not tenable because:

i. despite fixing of internal targets keeping in consideration various factors as stated above, the Company was not able to achieve them.

ii. Reasons for non-achievement of targets cited by the Company are factors faced in a dynamic business scenario and need to be addressed by appropriate strategic planning.

6.7.2 Zone/Accounting unit-wise performance of GAIL Tel business

The position of business executed by zones/accounting units during the last three years ended March 2005 was as under:-

		Actual		Targets		
Year	Zone/ Accounting unit	Capacity Sold (Mbps)	Revenue earned (in crore)	Capacity (Mbps)	Revenue (in crore)	Staff deployed
2002-03	Noida	286.664	5.53	600	-	6
	Mumbai	267.640	6.05	600	-	2
	Baroda	72.704	0.34	350	-	1
	Total	**627.008**	**11.92**	**1550**	-	9
2003-04	Noida	260.352	4.69	678	9.20	7
	Mumbai	730.592	13.55	777	13.54	2
	Baroda	157.888	2.16	317	4.81	1
	Total	**1148.832**	**20.40**	**1772**	**28.55**	**10**
2004-05	Noida	530.012	5.25	887	14.82	8
	Mumbai	381.048	9.03	694	11.60	3
	Baroda	435.904	4.21	526	8.80	3
	Total	**1346.964**	**18.49**	**2107**	**35.22**	**14**

It was observed that:

i. Neither the capacity nor the sales revenue targets were achieved by any accounting unit (except Mumbai where revenue target was achieved during 2003-04).

ii. Further analysis disclosed that during 2004-05 the zonal offices at Hyderabad, Chennai and Bangalore did no business. Chandigarh and Bhopal zonal offices sold capacity of 2 Mbps only and the revenue earned was only Rs.0.13 lakh and Rs.7.00 lakh respectively against the target of Rs.82 lakh and Rs.1.00 crore respectively.

iii. Three Marketing Officers deployed at Chandigarh, Chennai and Bangalore could not execute any business for GAIL-Tel as such the expenditure of about Rs.49 lakh on account of staff cost proved unfruitful.

iv. Further the following marketing constraints were intimated to Audit (July 2005 to November 2005) by the zonal offices:

- The Company's OFC network was available in the outskirts and not within the major cities like Hyderabad, Vijayawada and Visakhapatnam. The Company had limited coverage of Western Madhya Pradesh and Rajasthan.
- No presence of the Company's network in cities like Kota, Ganganagar, Jaisalmer, Bikaner, Barmer, Bhilwara, Hanumangarh, Dholpur, Karauli Mohali, Panchkula, Yamuna Nagar, Rewari, Baddi which had good business potential.
- Competitors like Bharti, VSNL, BSNL, Shyam Telelink, Reliance and RAIL-Tel were already having their presence in most of the cities.
- There was non-availability of ring network in Thane-Pune-Solapur section of Maharashtra region, Delhi-Chandigarh network, Andhra Pradesh region, Bhopal, Indore and Gwalior in Madhya Pradesh.

The Management stated (November 2005/December 2005) that:

i. the Marketing Officers at Chandigarh, Chennai and Bangalore had been deployed for other jobs like Gas/Polymer Marketing, MIS, IT, getting Bandwidth connectivity. The Chandigarh Zonal office in 2005-06 had acquired business of more than 30 E1s (60 Mbps). The officers at Chennai and Bangalore Zonal Offices were doing the preparatory work in view of the Southern expansion.

ii. There was delay in completion of Phase I & II network and the Company lost the first mover advantage. Further the Company was a new entrant in the field. The telecom operators who were taking bulk capacity had built their own network. The glut in Bandwidth market led to fall in demand.

iii. Addressing the shortcomings in network such as point of presence in outskirts, linearity of network, absence of network was a continuing process.

The reply of the Management indicated that delays in execution of projects had affected the Company's business and the Company's network was not yet broad-based enough to meet the market requirements.

6.8. Accounting and control aspects

6.8.1 Rationalization of telecom assets and related expenses

Based on the recommendations of consultants M/s Mckinsey, the Company decided (April 2005) to rationalize GAIL-Tel assets and related expenses between GAIL-Tel and other segments of the Company on the basis of usage with retrospective effect from April 2004 which had the following salient features:-

i. All DWDM equipment were booked in GAIL-Tel.

ii. All assets (OFC network and equipment up to STM 16) along the gas pipelines and linkages with Company's offices were booked in Gas/LPG business.

iii. Common expenses related to the assets and their maintenance were booked in the Gas/LPG and GAIL-Tel business in the ratio of fibres allocated (5:1) on the basis of technical estimates.

iv. Accordingly, the Company segregated the total assets of GAIL-Tel valuing Rs.262.95 crore as on April 2004 into Gas Business of Rs.203.63 crore and GAIL-Tel Business of Rs.59.32 crore. The expenses of the Gail Tel were also accordingly segregated.

It was observed that:

i. The allocation and rationalization of assets and expenditure was done by the Company with an objective of re-aligning the telecom assets and expenditure between gas business and GAIL Tel based on actual usage pattern so that the respective business segments reflected the true and fair view of their performance. At the time of allocation, the Company noted that the actual usage between gas business and GAIL-Tel was 7:13 (i.e.0.54:1) but it allocated the assets in the ratio of 203.63 : 59.32 (i.e.3.43:1) due to allocation of high capacity equipment to gas business.

ii. The actual capacity usage for captive purposes on various links ranged between 1 E1 to 16 E1s (32 Mbps) (September 2005) which could have been met by STM-1 (155 Mbps) and did not require high capacity equipment like STM-4 (622 Mbps)

or STM-16 (2.5 Gbps). Thus, the Company allocated high capacity equipment (STM-4/STM-16) to gas business where these were not required.

iii. Network created for linking the Company offices, also formed part of GAIL-Tel business project because the network was created for marketing GAIL-Tel business and earning revenue. The Company's offices did not require high capacity equipment for linking.

iv. The Company was utilizing four to eight fibres (including standby) (December 2004) OFC both for captive as well as commercial usage. Accordingly, the allocation of 20 fibres for gas business out of total 24 fibres was not justified as these were not being used there.

The Management stated (November 2005) that:

i. Even before the Company's entry in telecom business, OFC with six fibers in GREP and subsequently 12 fibers in Jamnagar-Loni Pipeline had been used for networks for entirely captive use by the Company. As per the practice followed in oil sector, 24 fibres OFC were used in new pipelines after Jamnagar-Loni Pipeline. The cable size would be 24 fibers notwithstanding any consideration of its use only for the Company's internal applications or dual use (internal and business).

ii. Even in Jamnagar Loni Pipeline, which was established much earlier to the entry of the Company in telecom business, STM-16 equipment were used to meet increasing possibilities of new applications like video conferencing, and ERP applications.

iii. Based on allocation as suggested by Audit the loss would be Rs.20.77 crore as on March 2005.

The justification given by the Management was not tenable because:

i. For the purpose of captive usage, the requirement of 24 fibres OFC and high capacity equipment like STM-16 was not necessary as even before going for telecom business the Company was meeting its requirements in the case of GREP with six fibres OFC and microwave system. The high capacity STMs/DWDMs were required keeping in view the projected business of the GAIL Tel and not for captive usage. Even after implementation of video conferencing for all offices and the Enterprise Resource Planning system (August 2005), the actual capacity usage for captive purposes for any link did not exceed STM-1 (September 2005). Accordingly, allocation of telecom assets like STM-4/STM-16 to gas business appeared to be without adequate justification.

ii. Installation of STM-16 with 12 fibers OFC on Jamnagar Loni Pipeline created high capacity on the pipeline which had not been utilized (September 2005).

iii. Indian Oil Corporation Limited had also installed only STM-1/STM-4 for their pipelines with 12 core OFC for monitoring and communication systems.

6.8.2 Doubtful recovery of outstanding dues

As of March 2005 debts of Rs.1.21 crore were outstanding from six customers out of which five had closed the business links with the Company as per details below:

S.No.	Name of the party	Debts outstanding (March 2005) (Rs. in lakh)	Date of closures of links
1.	VSNL	51.90	Not closed
2.	D2V	7.75	01.09.2003
3.	Data Access	58.37	14.12.2004
4.	Exatt net	1.51	13.12.2004
5.	Emsons	0.05	01.01.2004
6.	KVM	1.33	04.11.2004
Total		120.91	

It was noticed that

i. Out of five customers who had stopped business terms with the Company, the dues of three customers (Data Access, Exatt net and D2V) were under litigation, one customer (Emsons) refused to pay and one customer (KVM) had withheld the payment due to their financial problems.

ii. An amount of Rs.51.90 lakh was due to be recovered from VSNL owing to non-reconciliation of accounts by the Company with them (November 2005).

The Management stated (November 2005) that:

i. For the amount of Rs.69.01 lakh remaining outstanding against five customers petitions had already been filed in Telecom Disputes Settlement and Appellate Tribunal and their legal department was pursuing the cases.

ii. Out of the total outstanding amount from VSNL the Company accepted and treated Rs.29.62 lakh as non-recoverable. Another Rs.19.90 lakh was owing to downtime mismatch and the data was to be reconciled with VSNL. The balance amount of Rs.2.38 lakh was fully recoverable from VSNL.

On the facts accepted by the Management it is added that the Company was required to obtain the monthly/quarterly advance payments from the customers as per the agreed terms. The outstanding in these cases could have been avoided by obtaining advance payments.

6.9 Conclusions

The Company was not able to achieve its targets from Telecom business even after making investment of about Rs.263 crore on the development of its 8494 kms OFC based network and it suffered a loss of Rs.9.03 crore since its entry till September 2005. Further: -

i. The Company lost projected revenue of Rs.442.19 crore due to delayed implementation of various phases of the project.

ii. The Company commenced the project without DPR and implemented subsequent phase (Phase IIB) without considering the actual performance of the previous phase.

iii. There were internal delays in the processing of tenders and placement of orders.

iv. The Company made investment of Rs.36.66 crore on high capacity DWDM equipment, Rs.11.48 crore on the high capacity OFC and Rs.12.99 crore on second duct without any fruitful use.

v. The Company could not achieve targets in terms of capacity sales and revenue during any of the last four years ended March 2005.

The review was issued to the Ministry in January 2006; its reply was awaited (February 2006).

CHAPTER:VII

Oil and Natural Gas Corporation Limited

Availability and Utilisation of Critical Equipment of offshore installations

Highlights

The system availability in all the assets in Mumbai Offshore was satisfactory and there was an overall improvement in the last three years. However, equipment availability was lower than the targets due to old aged equipment, maintenance related problems and absence of maintenance/replacement policy of equipment.

(Para 7.5)

The Company did not adhere to its plan of overhaul/preventive maintenance leading to high number of unplanned shutdowns and tripping of critical equipment. Deferment of production/revenue due to maintenance reasons amounted to Rs.61 crore during 2003-04 in Mumbai High Asset. There was shortage of manpower and waiting time for spares was more than the norm prescribed, reflecting that due importance was not given to maintenance activities. Coordinated efforts were intensified recently to ensure timely completion of the maintenance work and a replacement policy for old aged equipment was also under finalisation.

(Para 7.6)

There was under utilisation of critical equipment but the requirement of operating and standby critical equipment was not reassessed to ensure their optimum utilisation. The Company was working on hiring of 'Domain Expert' to assess the condition of equipment and reassess the operational requirement in order to minimise the operating cost. Turbine generators were operated on low load factors resulting in higher rate of fuel gas consumption compared to norms prescribed by manufacturer and the Company had initiated a project study for improving the load factor by an under-water electric network and supply of excess power to the shore. Actual utilisation of crude oil handling and gas compression facility was also much below the installed capacity, except gas compression facility at Neelam field where the Company flared gas worth of Rs.126.39 crore during 1998 to 2005 for want of sufficient gas compression facility.

(Para 7.7)

Gist of recommendations:

- Policy for revamping/replacement of equipment should be completed urgently to ensure the reliability of the system.
- ONGC should follow original equiment manufacturer's (OEM) norms for overhauling of critical equipment. Specific extension to overhaul schedules, if warranted, should be spelt out clearly for maintaining the reliability of the system and for the longevity of the equipment. Preventative Maintenance Schedule should be adhered to and monitored regularly to reduce the instances of unplanned shutdown and tripping. Documentation of the same should be ensured for reference and corrective action.
- Operational and Maintenance contracts for equipment maintenance should be resorted to only after cost-benefit analysis of outsourcing *vis-a-vis* in-house maintenance through additional manpower.
- Lead-time for procurement of maintenance spares should be streamlined so as to avoid delays in finalisation of purchase order and curtail downtime of critical equipment.
- The requirement of the equipment should be reassessed urgently so as to ensure their optimum utilisation and reduction in operating expenditure on the equipment. The Company should make all efforts for utilisation of excess power capacity available in various assets.

7.1 Introduction

7.1.1 Oil and Natural Gas Corporation (ONGC) discovered hydrocarbon in Mumbai offshore in 1974 and started production in Mumbai High in 1976. Subsequently other western offshore fields were discovered and production from these fields started between 1983 and 1999*.

7.1.2 ONGC's share of crude oil and natural gas production to the country's production for the last three years ending 2004-05 was about 78 and 75 *per cent* respectively. Out of the total production of ONGC, production of crude oil and natural gas from offshore fields during the same period was about 68 and 76 *per cent* respectively making it a sizeable portion of the country's hydrocarbon production.

7.1.3 In Mumbai High Offshore there were three fields (assets) in total *viz.* Mumbai High (MH), Neelam & Heera (NH) and Bassein & Satellite (B&S) having total 12 process complexes♣, 25 production platforms♦ and five well-cum process platforms▲. The major equipment installed on these offshore facilities were broadly classified by

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* *Details of various fields and years in which production started is given in* ***Annexure-16.***

♣ ***Process Complexes are those platforms where well fluids from the connected production platforms are collected, processed and segregated into crude oil, natural gas and water. The crude oil and natural gas is then transmitted through separate trunk lines/tanker to onshore terminal(s). In such complexes the water injection and living quarter facilities are also available.***

♦ ***Production Platforms are those platforms where well fluids from all connected wells are collected and transported through flow lines to the nearby process platform for segregation into crude oil, natural gas and water.***

▲ ***Well-cum process platform is a production cum process platform where well fluid is processed from the same platform constructed on a well.***

ONGC into two categories, *viz.*, critical equipment and essential equipment. Critical equipment were those equipment, which directly contributed to oil and gas production and were meant for un-interrupted operation. Essential equipment were those equipment, which did not directly contribute to oil and gas production but were essential for supporting operations relating to it. The graphical presentation of a typical processing of well fluid at offshore process platform is given at **Annexure-17**.

7.1.4 In the Mumbai Offshore of ONGC the category-wise total number of critical equipment as on 31 March 2005 and its function were as under:

Table-1

Critical equipment	Function	Total population
Turbine Generator (TG),	Generate power to run the platform	42
Process Gas Compressors (PGC) / Booster Pumps (BP) #	Injection of lift gas and dispatch gas to shore/ To increase the pressure of gas from well head for transmission to shore terminal	38
Main Oil Pumps/ Crude Transfer Pumps (MOLP/CTP), including condensate oil pump	Dispatch oil to shore	34
Main (Water) Injection Pumps (MIP),	Inject treated water into reservoir (s) to boost oil production	34
Sea Water Lift Pump (SWLP)	Service pump for water injection and other utility	27
Total (including 57 nos. as standby)		175

BP were installed at B&S Asset so as to increase gas pressure

7.2 Scope and Objective of audit

7.2.1 The purpose of this performance audit was to review the availability, maintenance and utilisation of critical equipment in Mumbai Offshore of ONGC covering the period of three years ending 31 March 2005. Audit was conducted during the period from May 2005 to July 2005.

7.2.2 Performance Audit was undertaken with the objective of examining the following issues with reference to essentiality of the critical equipment in the production of crude oil and natural gas.

- The extent to which the 'system availability'[♣] and 'equipment availability'[♦] of critical equipment did not meet the targets and resulted in loss of crude/gas production.

[♣] ***The term 'system availability' of any critical equipment denoted 'availability of equipment (both operating and standby) for uninterrupted flow of production'.***

[♦] ***The term 'equipment availability' of any critical equipment denoted 'the availability of that particular equipment for operating purposes'.***

- Whether there existed appropriate policies in regard to overhaul/maintenance and replacement of critical equipment and how far the same were effectively implemented to bring economy and efficiency in production.
- The extent of adherence of planned overhaul/maintenance and the impact of non-adherence in terms of tripping/breakdown/premature failure of critical equipment.
- How far the shortage of manpower and the delay in procurement of spares affected the maintenance work and availability of critical equipment.
- Whether the requirement of critical equipment was reviewed/reassessed for their optimum utilisation and what was the extent to which there was under-utilisation of critical equipment resulting in increased operating cost.

7.3 Audit Criteria

The 'system availability' and 'equipment availability' of critical equipment was examined with reference to the target fixed by the Company and analysis of the achievement and shortfall was made so as to ascertain the reasons and verify the action, if any, taken during the period of audit coverage. The existence of various polices viz. overhauling, preventative maintenance & replacement, and its implementation were generally examined. Various Management Information Systems/Reports and production profile were also examined for verification of utilisation of critical equipment with reference to the specific planned capacity.

7.4 Audit Methodology and Acknowledgement

7.4.1 A meeting was held with the Management representatives (March 2005) for apprising the purpose of the Performance Audit and to understand the functioning and importance of critical equipment in offshore production activities. The monthly performance and activity reports of each asset for the last three years containing the equipment-wise data of availability under various profiles were collected. This data was fed manually in excel sheets and interrogated with the help of CAAT (Computer Aided Audit Technique) tool Excel by way of filtering the data from the monthly reports. The audit team also visited one of the offshore platforms for witnessing the running of the critical equipment, understanding its functioning, record maintenance and reporting procedures. The team scrutinised the records of repair/overhaul cases and investigation/enquiry reports related to premature failures. It also visited the Equipment Management Cell at Dehradun and discussed various issues/polices relating to maintenance activities of critical equipment. The in-house Technical, Energy, Safety, Environmental and Internal Audit Reports, Agenda/Minutes of Board of Directors and the minutes of the meetings of the Executive Committee of the Company were examined and wherever relevant, the issues were discussed with the Management representatives. The draft audit report containing the audit observations on various issues was issued to the Management in August 2005. The Management reply to the draft audit report was received in January 2006 and the draft audit report, incorporating the Management's views thereon, was issued to the Ministry of Petroleum and Natural Gas in January 2006.

7.4.2 Audit acknowledges the co-operation and assistance extended by all levels of Management at various stages for timely completion of the Performance Audit.

7.5. Audit findings on availability of critical equipment

7.5.1 System availability of critical equipment was of vital importance as the chain of equipment required for uninterrupted flow of production needed to be in operating condition throughout the year. While setting the production targets the system availability of 100 *per cent* was assured to the extent that the equipment down time was less than equipment standby time. Equipment availability was taken care of by the standby equipment during the period of its maintenance and repairs. Considering this philosophy, ONGC had set the target of 100 *per cent* for system availability and 95 *per cent* for equipment availability.

7.5.2 The following table indicates the overall system and equipment availability of critical equipment of all three assets in Mumbai Offshore of ONGC for the last three years ending March 2005.

Table -2

(Figures in per cent)

Year	Target		Mumbai High (MH)		Neelam & Heera (NH)		Bassein & Satellite (B&S)	
	System	Equip	System	Equip	System	Equip	System	Equip
2002-03	100	95	99.20	86.18	97.75	NA	99.50	NA
2003-04	100	95	99.78	87.37	99.80	92.4	100.00	86.40
2004-05	100	95	100.00	91.01	99.58	89.3	100.00	88.02

Source: Compilation of monthly data provided by the Company

It may be seen from above that in all the assets of Mumbai Offshore there was overall improvement in system availability during the last three years, attaining the targeted level of 100 *per cent* in MH and B&S by 2004-05. However, during 2002-03 and 2003-04 all the assets, except B&S in 2003-04, could not attain the system availability of 100 *per cent* that adversely affected production. The overall equipment availability was lower than the target of 95 *per cent* in all the assets and showed a downward trend in NH Asset during the last three years.

The equipment-wise availability of critical equipment of each asset during the last two years was as given below:

Table-3

(Figures in per cent)

Critical Equipment	MH		NH		B&S	
	2003-04	2004-05	2003-04	2004-05	2003-04	2004-05
TG	91.47	97.16	92.5	88.2	87.26	81.12
PGC	86.57	92.99	93.6	94.1	99.79	97.24
MOL	88.9	92.34	99.7	98.8	78.83	91.89
MIP	77.85	84.27	81.9	99.6	*	*
SWLP	92.39	85.42	94.2	64.8	79.72	81.82

* Equipment not installed

It may be seen from the above that the equipment availability during these two years was largely below the target of 95 *per cent*. However, there was an overall improvement in the equipment availability of critical equipment in 2004-05 in MH except in case of SWLP. In NH and B&S Assets, there was a mixed trend in the equipment availability.

For system availability, the Management of MH Asset stated (January 2006) that while setting the production target the assumption of system availability of nearly 100 *per cent* was considered as long as the estimated equipment down time was less than the equipment standby provision. The Management of NH Asset stated (January 2006) that if there were four equipment in a system and if running of two equipment fulfilled the system availability even though the other two equipment were down, still the system availability was 100 *per cent* but the equipment availability was less.

It was observed in audit that the high system availability could be achieved either by maintaining the targeted availability of the equipment or by putting in higher than the required number of equipment in the production system. As discussed in subsequent para 7.7, there was significant under utilisation of the available equipment, as compared to their minimum operating run hours requirements. This indicated that the system availability was maintained due to existence of higher than the required number of equipment, which, in turn, led to increased operating cost.

For lower equipment availability, the Management of MH and B&S Assets stated (January 2006) that 95 *per cent* equipment availability was expected to be achieved by the year 2007-08. The Management of NH Asset stated that equipment availability in NH was down due to considerable lead-time in procurement of spares and that major capital overhauls of critical equipment were taken in the year 2004-05. The Management of B&S Asset also stated that most of the equipment were outsourced from different companies and different places and equipment were very old. As a consequence, all the major equipment were becoming due for major overhauling. It was predominantly due to this reason that down time of critical equipment had increased. During the recent past there had been a change in process of procurement and hiring of services as a consequence of implementation of SAP (System Application and Programming for data processing) system. Once the system matured the spares procurement and the equipment down time would be reduced. In addition, to achieve the target of 95 *per cent* equipment availability in future, an exhaustive plan had been made for replacement and overhauling of equipment.

Audit noticed non-adherence to overhaul and preventative maintenance schedule of critical equipment, which caused high tripping/unplanned shutdown/pre-mature failure of the equipment. The delay in procurement of spares and shortages of maintenance manpower further led to high down time of equipment and consequent lower availability of critical equipment. There also did not exist any policy in regard to maintenance/ revamping/replacement, though the Management had since initiated corrective actions in this regard, as discussed in the following paragraphs.

7.6. Audit findings on maintenance activities

7.6.1 Maintenance Policies

In 1999, ONGC initiated Project IMPETUS (Implementing Maintenance & Procurement Efforts Through Upgraded System) as a result of bench marking study conducted by M/s A.T. Kearney Limited in 1998. The study recommended development of maintenance

policy, redesign of procurement process and implementation of redesigned maintenance practices/systems. The aim of the Project IMPETUS was to improve upon operational efficiency and asset utilisation.

The overall objective of the maintenance policy was to provide a consistent set of guidelines in order to achieve superior operational effectiveness in terms of system availability, safety, equipment life and operating cost relative to production requirements. Project IMPETUS had been integrated with Project ICE (Information Consolidation for Efficiency) for ensuring organisation wide uniformity for maintenance and procurement for maintenance. The Maintenance Policy Module for specific Asset, Rig & Plant had been prepared and was being implemented in a phased manner. As the recently implemented IMPETUS was yet to stabilise, the effectiveness of the System could not be assessed in audit. Further, documented policies on the equipment of offshore installations were reported (October 2005) to be under preparation by constituting a special task force, the recommendations of which were still awaited.

7.6.2 Replacement policy

Framing a policy for replacement of critical equipment was under consideration of the Management since 2002, when the issue of low availability of rotating equipment was discussed in Engineering Services Review meeting (November 2002). The entire maintenance activities were reviewed and an action plan was drawn up for replacement of equipment/floats for major assemblies. Approval of the Executive Committee was sought for procurement of floats/ replacement of equipment at an estimated cost of Rs.75.53 crore. Executive Committee desired (May 2004) that the criteria for replacement policy should consist of a need for replacement where average annual equipment availability was less than 75 *per cent*, increase of fuel energy consumption was more than 30 *per cent* during the last three years and the expenditure on overhaul exceeded 50 *per cent* of the estimated replacement cost. The replacement policy and these criteria were discussed in the Executive Committee held in July 2005, but the same was yet to be approved. As such, no replacement policy was in existence in the organisation.

The Management stated (January 2006) that a Committee had been constituted and policy for replacement/refurbishment would be worked out.

The reply reflected absence of systematic approach in the past in regard to the replacement of equipment with likely impact on the long-term interest of the Company.

Recommendation

Policy for revamping/replacement of equipment should be completed urgently to ensure the reliability of the system.

7.6.3 Delay in carrying out overhaul

The following table indicated the overhauling schedule of main components of the critical equipment and their implementation during 2004-05 in respect of all the three assets of Mumbai Offshore.

Table-4
Plan and actual overhaul in 2004-05

(in numbers)

Asset		Gas Generator	Power Turbine	Gear Box	Low/High Pressure Compressor	High Tension Machine	Main Injection Pump	Total
MH	Overhaul due	12	7	14	15	16	9	73
	Overhaul carried	11	3	4	5	7	4	34
	Shortfall	1	4	10	10	9	5	39
NH	Overhaul due	6	4	4	8	3	9	34
	Overhaul Carried	5	3	0	2	1	5	16
	Shortfall	1	1	4	6	2	4	18
B&S	Overhaul due	1	1	0	3	1	6	12
	Overhaul carried	1	1	0	1	1	6	10
	Shortfall	0	0	0	2	0	0	2

It is evident from the above table that there had been substantial deviation in the plan and actual overhaul implementation. The MH and NH Assets had carried out only 47 *per cent* of planned overhaul whereas B&S Asset had carried out 83 *per cent* of planned overhaul. Further analysis of the pending cases where overhauling was not completed revealed that in MH Asset, out of 73 due cases, only in 34 cases the overhauling was carried out. Out of the balance 39 cases, 15 cases could not be released for overhaul due to operational reasons and in the remaining 24 cases action was initiated for overhaul. Similarly in NH Asset out of 18 due cases pending, 10 were still with the asset and not released for overhaul for operational reasons. Action was initiated in respect of the balance eight cases. The two pending cases of B&S Asset were not overhauled for want of spares. Instances of delays in overhauling of critical equipment were also brought out by the in-house technical audit of ONGC in its several reports. Technical audit had also suggested that the policy for overhaul and postponement of overhaul needed to be spelt out for reliability of the system.

The entire maintenance activities were reviewed by Executive Committee in April 2004 and an action plan was drawn up to improve equipment availability and it was decided that the recommendations of OEMs were to be followed for overhauling of equipment.

The Management of all the assets of Mumbai Offshore accepted (January 2006) that the maintenance performance in terms of major equipment overhauls was not satisfactory due to procedural delays and in operational interest. They further stated that it had intensified co-ordination effort for timely completion of the planned jobs to meet the overhaul target.

The fact however remained that there was significant deviation with the overhaul schedule, which adversely affected the equipment longevity and increased the risk in production process.

Recommendation

ONGC should follow OEM norms for overhauling of critical equipment. Specific extension to overhaul schedules, if warranted, should be spelt out clearly for maintaining the reliability of the system.

7.6.4 Preventative Maintenance Schedule (PMS)

The scrutiny of planned *vis-a-vis* actual implementation of PMS in MH revealed that in most of the cases PMS had been followed. However, in case of NH and B&S Assets, audit observed the non-adherence of PMS in a number of cases. In B&S Asset at BPB platform adherence to planned overhaul schedule was limited to 85 to 90 *per cent* during the year 2002-03 and 2003-04.

The Management stated (January 2006) that manpower shortage was responsible for non-adherence to PMS schedule and that it had taken step to fill this gap by awarding the various operational and maintenance (O&M) contracts for equipment so as to maintain PMS schedule.

However, the Management did not explain the rationale for opting for O&M contracts instead of putting in adequate in-house maintenance resources.

Recommendation

Operational and Maintenance contracts for equipment maintenance should be resorted to only after cost-benefit analysis of outsourcing *vis-a-vis* in-house maintenance through additional manpower.

7.6.5 Premature failure[♣] of critical equipment

The Equipment Management Cell (EMC) at ONGC's Headquarters at Dehradun had issued instructions to all the assets and Basin Managers to report cases of equipment failures for proper analysis of causes of failure with the objective of issuing guidelines/ instruction to avoid recurrence of failure and dissemination of information to different users. Three cases of premature failure pertaining to Mumbai Region (two in MH and one in NH) during the years 1997 to 2005 were reported to EMC whereas the actual premature failure were nine in MH and two in NH during the last three years. This indicated that there was no proper reporting to Headquarters. Thus, proper analysis of causes of failure and dissemination of information to the different users with the objective of issuing guidelines/ instruction to avoid recurrence of failures was defeated. It was also noticed that the three cases reported to EMC during 1997-2005 were on account of maintenance failure. Non-reporting of the cases to EMC had thus deprived the Management of an opportunity of taking corrective action.

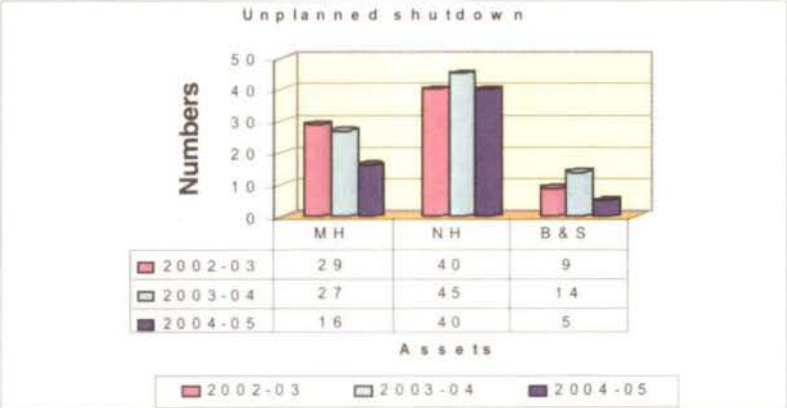
The Management of MH Asset assured (January 2006) that as per recent instructions of EMC all major failures would be reported in time in future.

♣ ***Failure of an equipment/component before the expiry of life prescribed by Original Equipment Manufacturer.***

7.6.6 Unplanned shutdown:*

Proper maintenance systems should aim at uninterrupted operation of the plant without encountering any tripping or shutdowns. The efficiency of the maintenance system of an organization is gauged by number of shutdowns during a period. The graph below in respect of all three assets indicates the incidence of shutdown during the last three years:

Graph-1



The deferment of production and revenue due to maintenance reasons as presented by MH Asset in the Technical Meet of 2004 was as tabulated below.

Table-5

Year	2001-02	2002-03	2003-04
Gas Loss (MMSCM)	51.8	47.2	31.4
Oil Loss (in lakh bbls)	8.4	2.9	1.9
Daily Loss (Rs.in lakh)	38	21	17
Percentage of loss to sales revenue	0.85	0.65	0.50

It may be seen from above that though maintenance related production loss was reduced gradually over a period of time, the daily production loss (deferment of revenue) of Rs.17 lakh, which amounted to Rs.61 crore in the year 2003-04, was still a significant amount. Efforts needed to be made to reduce the same to the barest minimum.

The deferred revenue in terms of quantity and value due to unplanned shutdown in respect of NH and B&S Assets is given below:

Table-6

Year	**NH**		**B&S**	
	Quantity (oil/ barrels)	**Rs. in crore**	**Quantity (gas/ MMSCM)**	**Rs. in crore**
2002-03	3981	0.28	3.664	0.77
2003-04	3312	0.23	6.581	1.39

* ***Shutdown of the plant/equipment because of any unexpected tripping due to process malfunction or control system or safety system malfunction/actuation by false alarm.***

2004-05	125972	8.79	3.618	0.76
Total	133265	9.30	13.863	2.92

Note: One MT is equal to 7.5 barrels; Value of one MT was taken as Rs.5236 being the average net realisation price of 2003-04; Gas price was taken as Rs.2116/1000 cm of gas.

The Management of MH and NH Assets stated (January, 2006) that a key reason for un-planned shutdowns was the ageing of package peripherals. During the last three years considerable efforts in system revamp had been put in which resulted in significant reduction in equipment failures and the same trend of performance improvement would continue.

The Management had since initiated corrective action for formulating revamping/replacement policy for offshore equipment, which was under finalisation.

Recommendation

Preventative Maintenance Schedule should be adhered to and monitored regularly to reduce the instances of unplanned shutdown and tripping. Documentation of the same should be ensured for reference and corrective action.

7.6.7 Tripping of critical equipment:

The details (numbers) of tripping of critical equipment during the last three years and target set for 2005-06 was as under.

Table-7:

Number of tripping

Year	MH	NH	B&S
2002-03	438	NA	9
2003-04	312	NA	14
2004-05	226	42	65
2005-06*	180	35	35

**Target set as per internal service level agreement.*

The number of tripping during the period from 2002-03 to 2004-05 were higher as compared to the target set up as per 'service level agreement' (2005-06) except in B&S Asset in 2002-03 and 2003-04. The number of tripping during 2002-03 and 2003-04 in respect of NH Asset though assured was not made available to Audit.

The Management stated (January, 2006) that number of tripping and associated loss was gradually reducing due to significant maintenance efforts in this direction and all efforts would be made to improve performance in this regard in future.

7.6.8 Delay in procurement of spares

Scrutiny of data on procurement of spares revealed that during the period from October 2003 to March 2005, the time taken for placement of supply order from the date of issue of purchase requisition was on an average 100 days whereas average time taken for receipt of goods from the placement of supply order during the same period was 19.07 days. Purchase Manual of ONGC stipulated finalisation of tender within 120 days from

the date of tender invitation. Analysis of the data revealed that the actual time taken in respect of 2489 cases was more than 120 days and in 1090 cases it took more than 180 days. This represented 31.19 and 14 *per cent* of the total number of purchase cases processed during October 2003 to March 2005. Audit reviewed sample cases of non availability of critical equipment of B&S Asset during 2003-04 and 2004-05 and observed that in the following cases waiting time for spares was responsible for non-availability of equipment for 18.63 to 100 *per cent* of total equipment hours in a year.

Table-8

Platform	Year	Equipment	Tag no.	Percentage of non availability of equipment to total equipment hours due to waiting time for spares
BPA	2003-04	CP	P2641 C	100
BPB	2003-04	TG	G1170D	55.74
BPB	2003-04	CP	P670A	26.77
BPA	2004-05	SWLP	P2611A	39.45
BPA	2004-05	SWLP	P2611B	29.06
BPB	2004-05	TG	G1170A	29.04
BPB	2004-05	TG	G1170B	18.63

The Management of B&S Asset stated (January 2006) that the delay in repairs to condensate pump number P2641-C and TG-G1170D was on account of revamping and further stated that all the equipment listed above were operational now and all efforts were being made to reduce the procurement cycle for spares.

The reply of the Management with regard to condensate pump and TG referred above was not acceptable as the audit observation was based on the data of 'waiting for spares' for these equipment as made available by the Management. However, Audit noted that the Management had since taken necessary steps to reduce lead-time of procurement of spares by entering into long term equipment overhaul contract on turnkey basis with OEM/OES[♣] and long term spare parts contracts with OEMs.

Recommendation

Lead-time for procurement of maintenance spares should be streamlined so as to avoid delays in finalisation of purchase order and curtail downtime of critical equipment.

7.7. Audit findings on utilisation of critical equipment and production facilities

7.7.1 Utilisation of equipment

7.7.1.1 The utilisation of critical equipment in terms of percentage of running hours to the minimum operating run hours requirement during the last years 2003-04 and 2004-05 was as given in **Annexure-18**. It may be seen from the annexure that in MH and B&S the actual utilisation of critical equipment, as compared to minimum operating run hours

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♣ *Original equiment supplier*

requirement, was considerably less in respect of all equipment except TG. In Neelam Asset, while the actual run hours of TG/PGC/MIP was higher than the minimum operating run hours requirement, the actual run hours of MOLP/SWLP was considerably less. However, the actual utilisation of critical equipment in Heera Asset was largely satisfactory being more than 96 *per cent* of the minimum operating run hours requirement in all the cases except SWLP.

The Management of MH stated (January 2006) that most of the critical equipment were over 12 to 21 years old. These equipment were originally installed as per field reservoir conditions during that time and that there had been a considerable difference in the field conditions, which determined the optimum utilisation of those equipment. Further, they proposed (June 2005) to hire the service of 'Domain Expert' to look into this aspect for optimum utilisation of existing equipment.

It was noticed in audit that in Mumbai Offshore there were 175 critical equipment in total consisting of 118 for minimum operating requirement and 57 as standby. These requirements were envisaged long back at the time of development of the respective fields but the same was never reassessed to ensure optimum utilisation of the equipment.

Recommendation

The requirement of the equipment should be reassessed urgently so as to ensure their optimum utilisation and reduction in operating expenditure on the equipment.

7.7.1.2 Though the TGs largely met the minimum operating run hours requirement in all the assets, these were operated at lower load factor compared to the installed capacity. During 2004-05, the TGs were operated on 8.13 to 70 *per cent* load at the various platforms of all the assets as detailed in **Annexure-19**. The utilisation of TGs on low load factor resulted in higher fuel gas consumption per unit of power generated and the total excess gas consumption, compared to OEM's norms, worked out to Rs.5.12 crore during 2004-05.

The Management stated (January 2006) that the TGs with higher capacity were required to meet the peak demand while starting high tension/low tension motors and that ONGC had since initiated (May 2004) a project study to have an underwater electric network (gas to wire project) to share the buffer power available with each platform and supply the excess power to shore, which was likely to increase the load factors of TGs and also reduce the fuel consumption rate.

Audit recommends that all action for supply of the excess power to shore needs to be taken expeditiously.

7.7.1.3 In B&S Asset, ONGC had installed four condensate pumps (CP) in BPB field in 1989 having replacement value of Rs. six crore during 2002 and three booster compressor pumps (BCP) in 1999 at a cost of Rs.615.86 crore to pump the condensate and gas into trunk line. As the reservoir pressure of gas was adequate to push the production quantity without the use of these pumps, the same were not required till the year 2002. However, when the requirement of these pumps was felt in 2002-03 due to the decline in reservoir pressure, these could not be used due to various technical problems with CPs, and the BCPs could not be operated without running of the CPs. After rectification of CPs, ONGC started using these CPs and BCPs only in 2004-05. Thus critical equipment

(pumps and compressors) which were installed in 1989/1999 could not be utilised till 2003-04 and were also not kept well maintained affecting their availability.

7.7.2 Utilisation of oil handling and gas compression facilities

7.7.2.1 The utilisation of minimum operating crude oil handling facility and the gas compression facility in various assets is given below.

Table-9
Crude oil

Complex	Installed capacity (MMT)	Production (MMT)			Utilsation (percentage)			Past peak production (MMT)	Max. utilisation at peak production (%)	Max. production as per LTOP (MMT)	Max. utilisation in future (%)
		02-03	03-04	04-05	02-03	03-04	04-05				
Neelam	6.252	1.335	1.280	1.143	21.35	20.47	18.28	3.807	60.90	1	16.00
Heera	6	2.429	2.489	2.268	40.48	41.48	37.8	3.842	64.03	2.54	42.33
MH	36.5	11.378	11.646	12.593	31.17	31.90	34.50	20.085	55.02	7.34	20.11

Natural Gas

Asset/ Complex	Installed capacity (MMSCMD)	Gas compression (MMSCMD)			Utilisation (percentage)			Past peak compression (MMSCMD)	Max. utilisation at peak compression (%)	Max. compression as per LTOP (MMSCMD)	Max. utilisation in future (%)
		02-03	03-04	04-05	02-03	03-04	04-05				
MH	44.18	29.49	30.54	32.97	66.75	69.12	74.63	NA	NA	NA	NA
B&S	30	31.04	29.17	27.96	103.5	97.23	93.2	32.38	108	26.45	88.17
Neelam	3.84	3.12	3.66	3.68	81.25	95.31	95.83	3.00	78.12	NA	NA
Heera	4.8	4.21	4.29	4.37	87.70	89.37	91.04	4.766	99.29	NA	NA

It is evident from the above table that the utilisation of crude oil handling facility and gas compression facility during the last three years in all the assets, except B&S Asset, was much below the installed capacity, even after considering peak production/compression achieved in earlier years and future peak production envisaged in the Long Term Oil Production (LTOP) and Long Term Gas Production (LTGP) profile's drawn by ONGC in August 2000.

The Management of NH Asset stated (January 2006) that the facility was developed for maximum crude and gas handling. Presently the system was able to handle the crude and gas capacities from the field and the process gas compressors (PGCs) were upgraded.

From the reply it is evident that the actual utilisation of crude handling and gas compression facility was below the installed capacity. Considering the decline in the production the possibility of utilising the installed capacity in future was remote.

7.7.2.2 While the utilisation of gas compression facility during the last three years was below the installed capacity, since inception (1994) the gas from Neelam field and entire gas production from B-173A satellite field that was hooked up to Neelam field was being

flared for want of sufficient gas compression facility. Audit had already pointed out loss due to flaring of gas worth Rs 48.80 crore during the period from 1994-95 to 1997-98 in the Comptroller and Auditor General's Audit Report no.4 (Union Government-Commercial) of 2001. However, ONGC took action for up-gradation of gas compression facility in January 2001 and the up-gradation work was completed in 2004-05. ONGC continued to suffer gas-flaring loss, which worked out to Rs.126.39 crore during the years 1998 to 2005.

7.8 Conclusions

i. ONGC achieved the targeted system availability of critical equipment in Mumbai Offshore but could not achieve the targeted equipment availability during the period of audit due to old aged equipment, maintenance related problems and the absence of equipment maintenance/replacement policies

ii. Though the equipment had become old, in the absence of laid down documented policies in respect of replacement/revamping, the work of major maintenance/up gradation/revamping was undertaken on a need basis and not in a systematic manner.

iii. There was non-adherence to overhaul/preventative maintenance schedule of equipment mainly due to operational reasons and shortage of manpower. This caused high tripping/unplanned shutdown/pre-mature failure of the critical equipment, which adversely affected their longevity and resulted in deferment of production/revenue. Deferment of production/revenue in MH due to maintenance reasons amounted to Rs.61 crore in 2003-04. The delay in procurement of spares and shortages of maintenance manpower further led to high down time and consequent lower equipment availability.

iv. The utilisation of most of the equipment was below the minimum run hours requirements due to changing behaviour/depletion of fields but the equipment requirements were not reassessed in time to ensure their optimum utilisation. The utilisation of TGs on low load factor revealed excessive fuel gas consumption as compared to OEM norms leading to extra fuel gas consumption valuing Rs.5.12 crore during 2004-05.

v. In Neelam field, the installed capacity of gas compression was below the actual gas production since inception (1994). Delayed action for enhancement of gas compression facility resulted in flaring of gas valued at Rs 126.39 crore for the period 1998 to 2005.

vi. The Company had since initiated steps for timely completion of planned maintenance, framing of the maintenance/revamping/replacement policy and the optimum utilisation of the critical equipment.

The review was issued to the Ministry in January 2006; its reply was awaited (February 2006).

MINISTRY OF POWER

CHAPTER: VIII

NTPC Limited

Gas Based Power Stations

Highlights

While 14.17 MCMD of gas was required to utilize the generating capacity of 3657.64 MW created at six gas-based power projects, the actual availability of gas was 12.75 MCMD, sufficient only to operate the plants at 66 *per cent* of the capacity.

(Para 8.8.7)

The Company entered into an inequitable gas supply agreement with GAIL which cast an obligation on it to pay for a minimum guaranteed off take of gas whereas no corresponding liability fell on GAIL for short supply of gas. This made the Company liable for an amount of Rs.12.09 crore.

(Paras 8.9.1.1 and 8.9.1.2)

Considering utilization factor of 80 *per cent* of gas-based plants, generation capacity of 375.68 MW remained unutilised.

(Para 8.10.1.2)

The tariff fixation policy of CERC allowed the generating company to recover full fixed charges based on declared capacity, even though actual generation was below the declared capacity. As a result, the beneficiaries had to bear an excessive charge of fixed cost to the tune of Rs.123.45 crore.

(Para 8.10.4.4)

The Company sustained a loss of Rs.157.57 crore due to not achieving the qualifying requirement by Gandhar station for recovery of full fixed charges.

(Para 8.10.5.2)

Despite underutilisation of the existing capacity due to inadequate gas supply, the Company planned to expand the capacity of four gas-based plants in the 9th Five Year Plan. As beneficiaries declined to take costlier power generated on naphtha, the Company deferred the expansion after incurring an expenditure of Rs.23.68 crore, out of which the sum of Rs.17.56 crore was not likely to be utilized till the end of 2011-12.

(Paras 8.11.2 and 8.11.4)

Because of change in technology of Kayamkulam project, land measuring 811 acres became surplus, resulting in blocking of funds amounting to Rs.25.29 crore.

(Para 8.13.1.3)

Gist of Recommendations

- There was an urgent need for the nodal Ministries to ensure that the availability of gas was realistically assessed, the committed quantity was supplied and interests of the Company were safeguarded.
- In view of the precarious state of availability of gas and the underutilised capacity of existing gas-based plants, the Company's plans of expansion of existing gas-based plants require a re-look.

8.1. Introduction

8.1.1 NTPC Limited (Company) was incorporated on 7 November 1975 as a wholly owned company of the Central Government with the objective of planning, promoting and organizing an integrated and efficient development of thermal and hydel power; including construction, generation, operation, maintenance, renovation and modernization of power stations in India and abroad.

8.1.2 In pursuit of these objectives, the Company had programmes of establishing power plants in the country. As on 31 March 2005, the Company was operating 13 coal-based power plants and seven gas-turbine based power plants all over the country with a total generating capacity of 23435 Mega Watt (MW). Apart from this, the Company planned capacity addition of 9370 MW in the 10th Five Year Plan (2002-07) and 17052 MW in 11th Five Year Plan (2007-12) by establishing new thermal and hydro-electric power plants in addition to expansion of the capacity of some of the existing power plants.

8.2 Scope of Audit

The review covers the operational performance of all the seven gas-based power plants of the Company (Anta, Auraiya, Kawas, Dadri, Gandhar, Faridabad and Kayamkulam) during the period of five years from 1999-2000 to 2003-04.

8.3 Audit Objectives

The audit objectives were to examine:

(i) The economic prudence of conceptualization, planning and setting up of the gas-based power plants.

(ii) The operational efficiency of the gas-based plants.

(iii) The expansion plans of four gas-based plants.

8.4 Audit Criteria

In order to achieve the aforementioned audit objectives, following criteria were fixed:

(i) Conceptualization Stage: Consideration of availability of primary fuel, water, appropriate technology, financing of the projects and suitability of location.

(ii) Operation Stage: Actual achievements against norms of operation including the norms of target availability and plant load factor (PLF) prescribed by the Central Electricity Regulatory Commission (CERC); renovation and modernization of the plants.

8.5 Acknowledgement

Audit is thankful for the co-operation received from the Management in obtaining information, data, clarifications to the queries raised from time to time and for arranging discussions with the concerned officers of the Company as and when the need was felt. Without their co-operation it would not have been possible to complete the review within the given time frame.

8.6. Audit Findings

8.6.1 The performance audit of the gas-based power plants of the Company revealed that availability of committed supply of primary fuel was not ensured at the time of conceptualization of the plants and actual supply was much less than the quantity assured by the Government of India (GOI). Despite having experience of failure in getting assured supply of primary fuel, expansion of four projects was undertaken by the Company, without ensuring availability of primary fuel. On the other hand, the cost of underutilisation of capacity due to non availability of gas got passed on to the beneficiaries by taking benefits of the present tariff system.

8.6.2 The findings of audit are detailed in the succeeding paragraphs.

8.7 Conceptualization of Gas Based Power Projects

8.7.1 Use of natural gas in the country was initially restricted only for the purposes of fertilizer, petro-chemicals and extraction of liquefied petroleum gas. However, discovery of natural gas in the early 80's in large quantity in the Western off-shore region influenced GOI to consider utilisation of this gas for power generation. The question of coal-oil-gas substitution, including allocation of hydrocarbon fuels for power generation, was discussed (February1984), in a meeting convened by the Economic Advisory Council with follow up meetings by the Department of Power and the Planning Commission. Based on these meetings, a working group, under the convenorship of Advisor (Energy), Planning Commission, submitted a report in June 1984, regarding the availability of lean gas from the Western offshore fields for power generation. The group concluded that approximately four to six million cubic meters per day (MCMD) of lean gas could be made available for power generation on a combined cycle using gas turbines and steam turbines. This quantity of gas was considered sufficient to sustain power plants of 1000 – 1500 MW capacity in a combined cycle mode of operation. On the basis of these recommendations, GOI requested the Company to set up three Combined Cycle Power Projects. Based on the availability of four to six MCMD of gas as indicated by the Ministry of Petroleum and Natural Gas (MOP&NG), the Company took up (1985) the work of three gas-based power projects namely, Kawas (600 MW) in Gujarat, Anta (430 MW) in Rajasthan and Auraiya (600 MW) in Uttar Pradesh, with a total capacity of 1630 MW.

8.7.2 As MOP&NG confirmed (December 1985) availability of only four MCMD of gas against requirement of six MCMD, the Company decided that Anta and Auraiya would operate as base load stations on gas with facility to switchover to naphtha in case of contingencies and Kawas would operate on naphtha till gas was available for all the three projects.

8.7.3 GOI confirmed (January/February 1986) naphtha linkages of 0.75 million ton per annum for Kawas and gas linkage of only 3.75 MCMD (1.50 MCMD for Anta and 2.25

MCMD for Auraiya). Further gas linkage of 2.25 MCMD to Kawas project was accorded subsequently in September 1990. Based on further gas commitment/ linkage by the Government, projects at Dadri, Gandhar and Faridabad were taken up by the Company subsequently. Thus, during the period from 1989 to 1999, the Company commissioned seven gas-based plants at Anta, Auraiya, Kawas, Dadri, Gandhar, Faridabad and Kayamkulam as given in **Annexure-20.**

8.8. Incorrect Assessment of Gas Requirement

8.8.1 For obtaining supply of primary fuel of gas, the Company is dependant upon the Gas Authority of India Limited (GAIL). GAIL supplies gas to the power stations at Anta, Auraiya, Kawas, Dadri and Faridabad through the Hazira-Bijaipur-Jagdishpur (HBJ) gas pipeline. Gandhar power station was initially to get gas supply only from Gandhar gas fields through Jhanor gas pipeline and was not designed to operate on alternate fuel. Subsequently, due to depletion of Gandhar gas fields, this station was also provided a linkage to HBJ pipeline (August 2000) through Kawas station resulting in sharing of gas committed for Kawas between the two stations. GOI has not taken any concrete action to provide gas linkage to Kayamkulam Power Station so far (August 2005).

8.8.2 The plant-wise position of requirement, availability and shortage of gas during the period from 1999-2000 to 2003-04 is given at **Annexure-21.** Based on this data, the performance of the gas-based plants along with the resultant observations are given in succeeding paras.

8.8.3 Anta, Auraiya and Kawas gas-based power plants

8.8.3.1 The gas stations at Anta, Auraiya and Kawas were commissioned (1989 to 1992) with 1738.89 MW capacity, which required gas supply of 9.17 MCMD to operate at 100 *per cent* PLF. According to the Management, the annual utilization factor of gas plants was 73.5 *per cent* after taking into account maintenance period (planned and unplanned) and grid demand pattern. With this, 6.74 MCMD of gas was required to operate these three plants at 73.5 *per cent* PLF. However, the Company had a commitment from GAIL for supply of 6.43 MCMD of gas which meant that even ab-initio, PLF would only be 70 *per cent* i.e. less than the utilization factor. This gap in requirement of gas resulted in ab-initio underutilisation of the capacity of Auraiya plant by three *per cent* and Kawas by 14 *per cent*, making these plants inherently dependent on alternate fuel to operate them up to the utilization factor.

8.8.3.2 The GOI is primarily responsible for assignment of requisite gas for power stations. However, neither the GOI, nor the Company took measures to properly assess availability of gas at the initial stage of DPR/FR to effectively control cost in the interest of the beneficiaries.

8.8.4 Dadri gas-based power plant

8.8.4.1 Dadri gas-based power station was established (1992) with generating capacity of 829.78 MW and a gas requirement of 4.38 MCMD for 100 *per cent* PLF. Taking into consideration the annual utilization factor of 73.5 *per cent*, 3.22 MCMD of gas was required to utilize the installed capacity of this plant against which commitment of only three MCMD was taken from GAIL. Therefore, this plant was also created with inherent underutilisation of capacity by 6.83 *per cent* (with reference to 73.5 *per cent* PLF) and was dependent on alternate fuel. During 2000-01, actual average supply of gas was 2.72

MCMD, which further depleted to 2.45 MCMD during 2003-04 increasing thereby its dependence on alternate fuel. This pushed up the cost of generation, as the per unit variable cost of generation on alternate fuel (high speed diesel) was much higher in the range of Rs.2.45 to Rs.4.10, as compared to the cost of generation on gas ranging between Re.0.80 to Re.0.88 during the five years ending 31 March 2004.

8.8.5 Gandhar gas based power plant

8.8.5.1 Gandhar gas-based power station was set up (1994) with a capacity of 657.39 MW and a gas requirement of 3.47 MCMD for 100 *per cent* PLF. At 73.5 *per cent* utilisation factor, the requirement of gas was 2.55 MCMD, against which the commitment by GAIL was for 1.50 MCMD which was sufficient to operate the plant up to a PLF of 43.22 *per cent*. As the plant was solely dependent on gas and was not designed to run on alternate fuel, the plant was created with a potential underutilisation of capacity. In 2000, the gas supply to Gandhar plant was augmented by connecting it with Kawas station, following which the gas supply initially committed to Kawas was shared with Gandhar, increasing the dependence of Kawas on alternate fuel.

8.8.5.2 The Management stated (August 2005) that necessity of creating alternate fuel facility for Kawas plant was reviewed as suggested by the Central Electricity Authority (CEA). Based on this review, the creation of alternate fuel facility was deleted while finalising the feasibility report for Gandhar power plant.

The reply is not convincing as even the assured supply of gas (1.50 MCMD) was sufficient for running the plant only at 43.22 *per cent* PLF, which called for availability of facility in the design of the plant for using alternate fuel.

8.8.5.3 The Management further stated (August 2005) that the Company did its best to augment the generation but time and again GAIL showed its inability to augment gas supplies citing reasons of depletion of gas fields in the Gandhar belt. They added that due to persistent follow up as also due to the Kawas link, gas supplies to Gandhar improved to about 3.03 MCMD in June 2005, which corresponded to almost 90 *per cent* PLF level.

8.8.5.4 The reply is not tenable, as the stated improvement in gas supplies to Gandhar was due to diversion of gas supplies meant for Kawas, which increased the dependence of the latter on costlier fuel (naphtha). Further, the availability of gas was assured by the GOI at the time of approval of power plants which in fact did not happen and proved to be incorrect.

8.8.6 Kayamkulam plant

8.8.6.1 Kayamkulam plant was commissioned in 1998 with installed capacity of 359.56 MW. Though the plant was designed to be operated on naphtha, with the provision for operation on gas, no linkage for supply of gas was ensured for more than seven years since inception.

8.8.6.2 The Management stated (August 2005) that since there was no gas supply infrastructure in the region, the question of taking gas linkage did not arise at the inception stage and also that gas procurement was in process.

8.8.6.3 The reply is not convincing since the cost of power generation by use of naphtha was much higher than that of gas. During the years 2002-03 to 2004-05, the plant capacity was grossly underutilised due to lack of generation schedule from the beneficiaries as they declined to take costlier power. The position was worst during the

year 2004-05 when three units of the plant had to be shut down for 5463 hours, 4703 hours and 5305 hours respectively and the plant could not be utilized at all during the period from July 2004 to December 2004 due to unwillingness of beneficiaries to accept costlier power. Hence, availability of gas for this plant should have been envisaged right from inception to overcome such eventualities while changing the mode of operation from coal to naphtha.

8.8.7 From the above analysis it can be seen that while the capacity created by the Company was 3657.64 MW (excluding Kayamkulam plant) and 14.17 MCMD of gas was required to run the six gas-based plants at 73.5 *per cent* PLF, the actual commitment from GAIL for supply of gas was only 12.75 MCMD which was sufficient to operate the created capacity at only 66.1 *per cent* PLF. Thus, even at the initial stage, there was a mis-match between the requirement of primary fuel for generating capacity and the quantity tied up by the GOI for various gas based power plants of the Company. As the GOI was primarily responsible for assignment of requisite gas for power stations, it needed to ensure availability of requisite gas to cater to the generation capacity created by the Company. The Company also needed to properly assess availability of gas at the initial stage of DPR/FR to effectively control cost in the interest of the beneficiaries.

8.9 Gas Supply Tie Ups

8.9.1 Inequitable agreement

8.9.1.1 The Company executed agreements with GAIL for station-wise supply of gas. In terms of the agreements, the Company had to pay for actual quantity of gas supplied by GAIL subject to minimum of 80 *per cent* of the agreed quantity [known as minimum guaranteed off-take (MGO) quantity of gas]. As such, if the quantity actually lifted by the Company fell short of MGO, it had to pay for quantity of gas not drawn by it. However, there was no reciprocal clause for payment of any penalty by GAIL in the event of its failure to supply gas as committed in the agreement. Thus, the Company failed to safeguard its interest by not insisting on incorporating a penalty clause in the agreements for short supply of gas by GAIL against the committed quantities.

8.9.1.2 The Company became liable to pay an amount of Rs.12.09 crore to GAIL towards MGO charges in respect of Anta and Gandhar power plants for the period from March 1994 to March 2001.

8.9.1.3 The Management stated (August 2005) that the matter regarding levy of penalty was taken up with the Ministry of Petroleum and Natural Gas.

8.9.1.4 There is an urgent need for the nodal Ministries to ensure that interests of the Company were safeguarded.

8.9.2 Short supply of gas

8.9.2.1 Analysis of data regarding supply of gas by GAIL to each plant **(Annexure-21)** during the period from 1999 to 2004 indicated that:

(i) The shortfall in supply of gas to Dadri plant ranged between 9-18 *per cent* and to Faridabad plant between 19-67 per cent. The combined supply to Kawas and Gandhar plants fell short by 10-34 *per cent*.

(ii) The shortfall in respect of Anta plant during the years 2000-01, 2002-03 and 2003-04 ranged between 3-16 *per cent*. In Auraiya, the short supply during the years 2000-01 to 2003-04 ranged between 4-16 *per cent*.

(iii) The quantity of gas committed by GAIL was always less than the respective requirement of Auraiya, Dadri, Gandhar and Kawas plants for generation at utilization factor of 73.5 *per cent*. GAIL did not generally supply gas even up to the committed level, which increased the dependence of the plants on costlier fuel.

8.9.2.2 The Management stated (August 2005) that the generation with alternate fuel was not against the concept of economic power generation.

8.9.2.3 This is not acceptable as the variable cost of power generated on alternate fuel was significantly higher than that of gas due to which the beneficiaries did not buy such power and generation capacities created by the Company remained under-utilised during the period under review. Besides, the Company could not effectively take up with the GOI for meeting shortfall in supply of gas.

8.10 Operational Efficiency

8.10.1 Underutilisation of generation capacity

8.10.1.1 The position of PLF achieved by various gas-based stations during the period from 1999-2000 to 2003-04 is given at **Annexure-22.** It may be observed that the gas-based stations could operate only up to PLF ranging between 39.5 *per cent* (Gandhar, 1999-2000) and 87.1 *per cent* (Auraiya, 1999-2000) of the respective installed capacity during the period from 1999-2000 to 2003-04♦. On an average, 29.74 *per cent* of the total installed capacity over a period of five years was not utilized, leaving an unutilised capacity of 1179.11 MW. This mainly resulted because of lesser supply of gas than the quantity assured by the GOI.

8.10.1.2 The Management stated (August 2005) that the difference between 100 *per cent* and the actual annual PLF could not be termed as under-utilisation and cost of under-utilised capacity as excess investment. They added that CERC had notified reasonable utilization factor as 80 *per cent*. However, even if the utilization factor of 80 *per cent* is considered, the under-utilization during last five years ended 31 March 2004 came to 375.68 MW.

8.10.2 Loss of generation due to operation of plants on naphtha

8.10.2.1 As the quantity of gas supplied by GAIL gradually declined, the plants increasingly depended on generation through alternate fuel of naphtha.

8.10.2.2 There was lower generation of power when operated on alternate fuel (naphtha) due to higher auxiliary power consumption leaving less units of power for sale. Accordingly, due to operation of the gas plants on alternate fuel, there was loss of generation of 5727.20 MUs of power during the period from 1999-2000 to 2003-04, of which maximum loss of 3393.69 MUs was attributed to Auraiya plant. Analysis of the

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♦ *PLF of Faridabad at 32.9 per cent and of Kayamkulam at 50 per cent achieved in 1999-2000 has not been considered, being the performance of the part of the year of commissioning.*

loss of generation showed that the loss increased from 813.81 MUs in 1999-2000 to 1290.24 MUs in 2003-04.

8.10.2.3 The Management stated (August 2005) that there was no loss of capacity with alternate fuel. The reply did not take into account the fact that the number of units available for sale got reduced due to higher auxiliary power consumption.

8.10.3 Loss of generation due to grid restriction

8.10.3.1 The plant-wise comparative cost of generation using gas and alternate fuel are placed at **Annexure-23**. While the variable cost per unit of power generated on gas in various stations during the period from 1999-2000 to 2003-04 was within a range of 72.43 paise/unit (Gandhar, 1999-2000) and 117 paise/unit (Faridabad, 1999-2000), the variable cost through alternate fuel was in the range of 228.93 paise (Kayamkulam, 1999-2000) and 410 paise (Dadri, 2003-04). Thus, the variable cost of generation of power on alternate fuel (naphtha/HSD) was two to four times the cost of generation of power on gas.

8.10.3.2 As the generation of power on alternate fuel was costlier than generation of power on gas, the beneficiaries had least preference for costlier power generated on alternate fuel as per the least cost merit order, according to which the beneficiaries had the option of choosing the cheaper power and gave first preference to hydro stations and the last preference to liquid fuel generation (naphtha, high speed diesel, etc.). Non acceptance of the costlier power by the beneficiaries resulted in operating the plant at a PLF lower than the machine availability/ declared capacity **(Annexure-24).** During the period from 1999-2000 to 2003-04, such loss of generation was 13586.85 MUs. Analysis of this loss showed that this trend was increasing in each gas plant with the total loss increasing from 1521.18 MUs in 1999-2000 to 5056.73 MUs in 2003-04.

8.10.3.3 The Management stated (August 2005) that low generation from gas stations was on account of low schedules given by the beneficiaries due to their demand / supply position. They added that cost of power from these stations was much lower than the rates at which power was available from other sources such as unscheduled interchange[*] (UI) route and purchase through trading company.

8.10.3.4 The reply is not acceptable, as beneficiaries offered their schedule keeping in view the least cost merit order for power. This is apparent from the data for year 2003-04 given in **Annexure-25** which indicates that the beneficiaries preferred to place their schedule for generation capacity declared by plants on cheaper fuel i.e. gas and never placed schedule for whole of the capacity declared by the Company on alternate fuel. Further, the beneficiaries would not normally purchase costlier power through UI route and trading option by giving up their allocation in generation of power stations.

8.10.4 Recovery of fixed charges without attaining normative plant load factor

8.10.4.1 The tariff as fixed by CERC for sale of electricity comprised of annual fixed charges and variable charges. The fixed charges consist of interest on loan capital, depreciation, return on equity, operation and maintenance expenses and interest on working capital. The variable charges cover fuel cost.

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[*] ***Represented variation between actual generation/drawal and scheduled generation/drawal***

8.10.4.2 In 2002-03, CERC introduced the Availability Based Tariff (ABT) system covering all the generating stations (except Faridabad and Kayamkulam). Under ABT system, the recovery of full fixed charges depended upon declaration of availability equal to 80 *per cent* or above by a generating station. While each generating station was required to declare its generating capacity to the Regional Load Dispatch Centre in advance, the beneficiary placed schedule on the generating station for purchase of power by applying the least cost merit order preference.

8.10.4.3 Analysis of performance of the gas stations **(Annexure-25),** where ABT was implemented, for the year 2003-04 revealed that all the gas-based stations (except Faridabad and Kayamkulam) recovered full fixed charges on the basis of their declared capacity, though actual generation ranged from 62.5-75 *per cent*. The actual PLF attained by these stations was lower than the normative PLF of 80 *per cent* mainly because the beneficiaries did not buy power generated on costlier fuel due to non-availability of gas.

8.10.4.4 Thus, the tariff fixation policy of CERC allowed the generating company to recover full fixed charges based on declared capacity, even though actual generated units were below the declared capacity. As a result, the beneficiaries had to bear an excessive charge of fixed cost to the tune of Rs.123.45 crore during the year 2003-04. This issue needs to be revisited by the GOI.

8.10.5 Non-recovery of fixed charges

8.10.5.1 Gandhar gas station could not achieve the qualifying requirements for recovery of fixed charges in full and consequently failed to recover fixed charges amounting to Rs.115.19 crore from the beneficiaries during 1999-2000 and 2000-01, mainly because of inadequate gas supply to operate the station up to the normative PLF and absence of facility in the design of the station to use alternate fuel.

8.10.5.2 In order to facilitate recovery of full fixed charges by the Gandhar plant, a special arrangement was allowed by CERC for considering the combined PLF of this plant with that of Kawas gas plant, which continued from July 2002 to the end of 2003-04. After cessation of this arrangement from the year 2004-05, the Gandhar plant again failed to recover fixed charges to the extent of Rs.42.38 crore during the year 2004-05 due to inadequate gas supply. Thus, Gandhar station could not recover fixed charges amounting to Rs.157.57 crore during the last six years ended 31 March 2005.

8.11 Expansion of existing plants

8.11.1 Despite underutilisation of the existing capacity due to inadequate gas supply, the Company planned (1997) to add a capacity of 2600 MW during the 9th Five Year Plan (1997-2002) by way of expansion of the existing capacity of Anta, Auraiya, Gandhar and Kawas gas-based power stations by 650 MW each. The proposed expansion was on the assumption that the additional capacity would be run on naphtha till additional supply of gas became available, though the prices of naphtha in April 1997 and the anticipated variable cost per unit of electricity generated on this fuel was 2.07 to 2.70 times the variable cost of energy on gas as shown in **Annexure-26.** Even then, the Company went ahead with the expansion of these plants and obtained techno-economic approval of the Central Electricity Authority.

8.11.2 Subsequently in 1998, the Company anticipated that the variable cost of generation with naphtha would be Rs.2.04 per unit, which was expected to increase to

Rs.3.33 during the year 1999. The Project Sub-Committee of the Board of Directors recommended (October 1999) that no investment approval and contract for plant and equipment should be awarded before signing Power Purchase Agreement (PPA) with the customers. However, the Company continued to incur expenditure in connection with the additional capacity installation beyond October 1999 without signing PPAs with the beneficiaries. The Company incurred an expenditure of Rs.23.68 crore till August 2003 on the expansion programmes of the four projects that had been deferred.

8.11.3 The Management stated that the recommendations were not applicable to the advance expenditure to be incurred for facilitating faster implementation of the project for which the Board had delegated powers separately. The contention is not tenable as advance expenditure was also an integral part of the total investment/expenditure likely to be incurred on a project.

8.11.4 Further, in the revised capacity addition programme for 10th (2002-07) and 11th (2007-12) Five Year Plans, the Company did not consider expansion of Anta and Auraiya plants though a substantial expenditure of Rs.17.56 crore had been incurred for expansion of these plants, thus leaving no prospects of utilizing this expenditure till the end of 2011-12. The Management stated (August 2005) that expansion of Anta and Auraiya could be considered in future subject to availability of basic inputs and fuel and confirmation by the beneficiaries. The fact, however, remained that the Company did not contemplate the revival of the expansion of these plants even up to the end of 2012.

8.11.5 The Management stated (August 2005) that the Company planned to add additional capacity in line with the GOI plan for gas based power generation capacity to increase to 20 *per cent* of total installed capacity as against the current figure of about 10 *per cent*.

8.11.6 In view of non-availability of gas and the rising trend of cost of gas, the Company's plan to add another 4550 MW in the 10th and 11th Plans, on gas, may require re-look given the present scenario.

8.12 Renovation and Modernization of Plants

8.12.1 The Company framed a renovation and modernization policy (May 2002) for the gas-based power plants with a view to extend useful life of plant equipment/ systems. The policy provided that the renovation and modernization (R&M) of gas plants would begin on completion of 80,000 hours of operation to sustain the expected production/ generation level.

8.12.2 Status of completion of equivalent operating hours (EOH) as on 31 March 2004 by different units of all the gas power plants and expected date of their becoming due for renovation and modernization in the light of the guidelines are given in **Annexure-27.** It may be seen that units of Anta, Auraiya, Dadri and Kawas stations became due for R&M after completion of 80,000 EOH by November 2004. However, despite finalizing renovation and modernization policy in May 2002, the Company could not implement R&M schemes at these stations due to delay in initiating action for obtaining clearance from CERC (October 2005).

8.12.3 The Management stated (August 2005) that the Company prepared guidelines based on operating experience and manufacturer's recommendation and that as per GOI notification of January 1992 for depreciation of assets, the life of gas turbines was

considered as 15 years. Accordingly, R&M of Anta and Auraiya plants became due from 2004 onwards. The reply is not acceptable as Anta and Auraiya plants had already completed more than 80,000 EOH by December 2000 and as such implementation of R&M at these stations had already been delayed as per the Company's own policy.

8.12.4 The Company needs to carry out the repair and maintenance of the gas-based power stations without any delay in accordance with its policy of May 2002.

8.13 Setting up of Kayamkulam project

8.13.1 Blocking of funds

8.13.1.1 Kerala State Electricity Board (KSEB) originally conceived a power project at Kayamkulam based on coal availability from Talcher coalfields. Subsequently, the Ministry of Power (MOP), assigned (June 1994) this project to the Company for implementation in the Central sector as resources with the State Government for this purpose were not sufficient.

8.13.1.2 The Company conceived the project with ultimate capacity of 2420 MW. On finding the estimated capital cost of two units (210 MW each) at Rs.1681.85 crore and cost of generation at 283.21 paise per unit, MOP desired (September 1994) to explore more economic modes of power generation. Accordingly, the cost of generation for a Combined Cycle Plant based on imported naphtha was assessed to be the lowest and a power project of 400 MW was approved (September 1996) by GOI at a cost of Rs.1310.58 crore and the plant was set up with a capacity of 359.56 MW at a cost of Rs.1125.31 crore.

8.13.1.3 Before switching over to naphtha based plant, the Company had acquired 1166 acres of land for the coal based plant for Rs.36.36 crore. However, because of change in the technology and scope of the project, the land actually utilized was 335 acres. Of the surplus 831 acres land, 20 acres were transferred to Power Grid Corporation of India Limited (PGCIL) in March 1999 for switchyard at a cost of Rs.42 lakh, payment for which had not been received so far (October 2005). Thus, an amount of Rs.25.29 crore, paid towards cost of the surplus land of 811 acres, remained blocked (December 2005).

8.13.1.4 Further, the objective of changing the technology and scope of the project could not be realized as the cost per MW of installation could not be reduced significantly as it came down from Rs.4 crore per MW for a coal station to Rs.3.13 crore for a naphtha based station. Besides, the cost of generation on naphtha remained higher in the range of Rs.3.34 to Rs.4.08 during 1999-2000 to 2003-04 as compared to the cost of generation of Rs.2.83 per unit of thermal power stations. This uneconomic cost of power generated by the station deprived the State of full benefits of the power plant, besides bearing the unfruitful fixed charges.

8.13.1.5 The Management stated (August 2005) that the acquired land would be utilized as stage-II (1950 MW) of the project was to be developed on the surplus land. However, no tie up for gas-linkage for this project had been firmed up so far.

8.14 Conclusions

8.14.1 While 14.17 MCMD of gas was required to utilize the generating capacity of 3657.64 MW created at six gas-based power projects, the actual commitment from Gas Authority of India Limited was for 12.75 MCMD gas only, which was sufficient to

operate the plants at 66 *per cent* of the capacity. Further, GAIL did not supply gas even up to the committed level. As a result, the Company was forced to depend on alternate fuel of naphtha/ HSD, which in turn led to a cascading effect on the cost of generation. The beneficiaries were reluctant to purchase costlier power generated on naphtha resulting in impairment of the efficient working of the plants. The GOI, which was primarily responsible for assignment of requisite gas for power stations, had obliviously failed in this regard.

8.14.2 In the agreement entered into with GAIL, in the event of short lifting of gas, the Company was required to pay for the minimum guaranteed quantity of gas. While there was no corresponding clause in case of short supply of gas by GAIL. The Company's financial interests were not, thus, equally guarded.

8.14.3 The tariff fixation policy of CERC allowed the generating company to recover full fixed charges based on declared capacity, even though actual generated units were below the declared capacity. As a result, the beneficiaries had to bear an excessive charge of fixed cost to the tune of Rs.123.45 crore during 2003-04.

8.14.4 Despite underutilisation of the existing capacity due to inadequate gas supply, the Company planned to expand the capacity of four gas-based plants in the 9th Five Year Plan. As beneficiaries declined to take costlier power generated on naphtha, the Company deferred the expansion after incurring an expenditure of Rs.23.68 crore, out of which the sum of Rs.17.56 crore was not likely to be utilized till the end of 2011-12.

The review was issued to the Ministry of Power and the Ministry of Petroleum and Natural Gas in December 2005; their replies were awaited (February 2006).

CHAPTER IX:

North Eastern Electric Power Corporation Limited

Gas Based Power Stations

Highlights

In case of Agartala Gas Turbine Power Project (AGTP), gas supply agreements with GAIL/ONGC did not permit waiver of MGO payment due to lower generation arising out of grid failure and no/low grid demand over which the Corporation could not exercise any control. As AGTP failed to draw/consume even the MGO quantity of gas due to evacuation constraints and low drawal of power by the beneficiaries, the project had to incur infructuous expenditure of Rs.3.16 crore.

(Para 9.6.1.1)

The impact of steadily falling calorific value of gas over the years and actual heat rate higher than the norm was not considered while working out the gas requirement and the Management failed to take timely initiative to enhance the quantity of gas to be supplied keeping in view the availability and future requirement.

(Para 9.6.1.2)

During post-ABT period (November 2003 to March 2005), Assam Gas Based Power Project (AGBPP) could not achieve the target availability because of lack of tie-up for

supply of requisite gas. As a result, there was under-recovery of fixed charges of Rs.9.94 crore.

(Para 9.6.1.4)

In none of the years (2000-01 to 2004-05) AGBPP could achieve its Design Energy. AGTP also could not achieve the Design Energy during 2000-01.

(Para 9.6.2.1)

Main causes for lower generation in AGBPP were transformation and transmission limitations in the NER, lower generation schedule given by NERLDC and priority in maximization of hydel generation during monsoon period.

(Para 9.6.3.1)

Non-availability of associated transmission line and weak state-owned transmission system, import of power by ASEB from Eastern Region due to high cost of AGBPP power and commissioning of gas based power stations by Government of Tripura during 2002-03 also led to under-utilisation of capacity of AGBPP and AGTP.

(Paras 9.6.3.2 to 9.6.3.3)

Both AGTP and AGBPP failed to restrict the auxiliary consumption within the norm fixed by CERC during 2000-01 to 2004-05. Loss due to excess auxiliary consumption during the said period worked out to and Rs.3.43 crore for AGTP and Rs.10.24 crore for AGBPP.

(Para 9.6.4)

Gross Station Heat Rate (GSHR) for both the plants was much higher than the norm fixed by CERC leading to excess gas consumption.

(Para 9.6.5)

Despite the gas based stations not achieving the normative auxiliary consumption as well as GSHR, the Corporation did not conduct any Energy Audit since commissioning of the plants in July 1998.

(Para 9.6.6)

In the absence of determination of the sanctioned strength for O&M Projects, the deployment of manpower at both the plants exceeded the Man/MW ratio of 0.61 set by National Power Plan (1985-2000). Man/MW ratio in both the plants was consistently higher varying from 1.20 to 1.33 in case of AGBPP and from 1.69 to 2.0 in case of AGTP.

(Para 9.6.7)

Expenditure incurred in operation and maintenance of both the gas based generating stations was substantially higher than the normative O&M expenses recoverable as a component of Annual Fixed Charge in the tariff.

(Para 9.6.8)

Though both the gas based power plants were commissioned seven years back, the Corporation had not developed any documented maintenance policy incorporating its

own inspection schedules and associated procedures as well as defining responsibility of various functions e.g. Operations, Maintenance, Stores etc.

(***Para 9.7.1***)

Recommended periodicity of preventive maintenance of the machines was not adhered to both in AGBPP and in AGTP.

(***Para 9.7.2***)

Non commissioning the fire protection system and DM plant resulted in non-compliance of environmental requirements as stipulated by various statutory authorities

(***Para 9.8***)

Gist of Recommendations

- Terms of the agreement entered into with GAIL and OIL for supply of gas to AGTP and AGBPP need to be amended to incorporate a clause allowing waiver of MGO payment due to lower generation arising out of grid failure and no/low grid demand, factors over which the Corporation had no control. Accordingly, the issue may be taken up appropriately through the MOP.
- The Management needs to explore the possibility of including a clause in the agreement with AGTP as it was done in the recent agreement with AGBPP (January 2005) to provide for supply of additional quantity of gas (at same price and other terms and conditions) required by the Corporation for fall in calorific value of gas supplied.
- One of the two Double Circuit (D/C) 132 KV lines proposed for construction by NEEPCO from the Tripura Gas Based Power Project (280 MW), Monarchak, to Agartala Sub-Station may be considered for looping in and looping out at AGTP which will provide additional facility for evacuation of power from AGTP and avoid hindrance in the existing system.
- Corporation should create its own internal Energy Audit Group consisting of adequate skilled manpower for conducting regular energy audit at the earliest.
- The Corporation should immediately assess the requirement of manpower in different categories for its O & M projects and get the same formally approved.
- The Corporation should also take effective steps to bring down the Man/MW ratio in both the gas based power plants to conform with the manpower norm set in the National Power Plan (1985-2000).
- Both the power stations may initiate steps for limiting the O&M expenses within the level set by CERC to avoid under-recovery on this count.
- The Corporation should strictly follow the prudent maintenance practice recommended by OEMs. The Corporation may manualise the 'Maintenance Policy' of each plant defining responsibilities of various functional wings e.g. Operations, Maintenance, Stores etc to ensure accountability and to further improve productivity, plant availability and safety.
- Compliance with environmental requirements as stipulated by various statutory authorities should be given high priority.

- To avoid mismatch between the construction of generation system and evacuation and distribution, it is imperative to share information at the planning, implementation and operational stages and on monitoring and progress of generation as well as matching transmission projects by the generation and transmission utilities and beneficiaries with active participation/intervention of the Ministry concerned.

9.1 Introduction

North Eastern Electric Power Corporation Ltd., (NEEPCO) was incorporated in April 1976 as a wholly owned Government of India Enterprise under the Ministry of Power with mandate to plan, promote, investigate, survey, design, construct, generate, operate and maintain hydro and thermal power stations in the North Eastern Region (NER). The installed capacity of the Corporation was 1130 MW in March 2005,which was equivalent to 48.87 *per cent* of the total installed capacity in NER (2312.06 MW).

Though large oil and gas fields are located in Upper Assam Valley, due to lack of consumers, the demand for gas had not picked up in the NER even during mid-eighties. This led to flaring of around 52 *per cent* (2.94 million M^3) of gas produced (1984-85) in Assam. For utilisation of the associated gas, which was being flared up, setting up of gas turbine power station at Kathalguri in Assam, by NEEPCO, gestation period for which was quite low, was considered necessary by the Government of India. It was also envisaged (April 1986) that as the NER was expected to have a comfortable power supply position, it would be necessary to evacuate power available from this power station to the Eastern Region (ER) to meet the shortages in that region. Some of the basic considerations for selection of site for the proposed Gas Based Combined Cycle Power Station at Kathalguri, Assam were the proximity of the gas gathering stations and existence of basic infrastructure such as railways and roads, and proper approach to the site. It was estimated that about one million standard cubic metre gas per day (with an average calorific value of 10000 K.cal/M^3) would be available from Oil India Ltd. (OIL) at a pressure of about 7.7 Kg/CM2. To transmit the power generated, Kathalguri Power Station would be connected by a double circuit (D/C) 220KV transmission line with 400KV parameters to the proposed Misa Sub Station of NEEPCO. One circuit of the said D/C transmission line would be bussed at Mariani Sub-station of ASEB. For this arrangement it was proposed to have a 220KV Switchyard with a duplicate bus system at Kathalguri. The Combined Cycle Assam Gas Based Power Project (AGBPP) with 3x2x33.5 MW Gas turbines and 3x30 MW Steam Turbines (totalling 291 MW) was approved by the Government of India (GOI) in November 1987 at an estimated cost of Rs.203.17 crore. The Project, scheduled to be commissioned by March 1992, was commissioned in July 1998 after a delay of 76 months at a cost of Rs.1513.64 crore.

Subsequently, GOI approved (December 1994) the Open Cycle Agartala Gas Turbine Power Project (AGTP) of NEEPCO with an installed capacity of 84MW (4x21MW) at an estimated cost of Rs.294.05 crore to be commissioned during February to May 1996. As per the Detailed Project Report (DPR) (December 1992) of AGTP, it was envisaged, *inter-alia*, that the main source of gas would be Baramura Gas fields and approximately 20Km pipeline would have to be laid by Oil and Natural Gas Corporation (ONGC)/ Gas Authority of India Limited (GAIL). Gas linkage of 0.75 MCMD for the project was already available at concessional rate. The proposed 84 MW Plant would be commissioned in time to overcome the chronic shortage of power in Tripura, Mizoram

and South of Assam. The project scheduled to be commissioned by May 1996, was commissioned in July 1998 after a delay of 24 months at a cost of Rs.322.55 crore.

Beneficiaries of the above two gas based stations were the seven states of the NER namely Assam, Meghalaya, Tripura, Arunachal Pradesh, Nagaland, Manipur and Mizoram.

9.2 Scope of Audit

The Performance Audit reviewed the Operation and Maintenance (O & M) of the AGBPP and AGTP, the two gas based Power Stations of NEEPCO for the last five years from 2000-01 to 2004-05.

9.3 Audit Objective

The audit was conducted to assess whether:

- adequate and assured availability of gas at a reasonable price was ensured for the plant;
- the gas based Power Plants could be operated and maintained efficiently;
- adequate and timely co-ordination existed between the Corporation and multilateral Government agencies for generation and evacuation of power;
- adequate and timely steps were initiated by the Corporation to overcome/minimize the operational inefficiencies/constraints;
- the beneficiaries/constituents of NER could get adequate and reliable power at a reasonable tariff;
- the Corporation complied with the stipulations prescribed by the Ministry of Environment and Forest (MOE&F), GOI and State/Central Pollution Control Boards for thermal projects and
- the gas based power plants served the purpose that was envisaged in the DPR.

9.4 Audit Methodology

Based on initial study, a discussion paper containing preliminary observations of audit was issued to the Corporation in August 2005. Further detailed study at field level was conducted during August - September 2005 when major findings were also deliberated with the Head of the Projects as well as the Management at corporate level. Finally, an Exit Conference was held on 28 September 2005.

9.5 Acknowledgement

For conducting this performance audit, the audit team visited both the gas based power plants (AGBPP and AGTP) as well as the Corporate Office. Audit acknowledges the co-operation and assistance extended by all levels of Management at various stages for timely completion of the Performance Audit.

9.6 Audit findings:

9.6.1 Gas supply agreement

The Corporation entered into agreements with OIL and ONGC/GAIL for supply of gas to AGBPP and AGTP in March 1994 and September 1995 respectively. Audit observed that

certain unfavourable terms in the gas supply agreements entered into by the Corporation had an adverse impact on the performance of the two gas based plants as discussed below:

9.6.1.1 Payment on account of Minimum Guaranteed Off take (MGO) and failure to amend terms of the contract

In case of AGTP, gas supply agreements with GAIL/ONGC did not permit waiver of MGO payment due to lower generation arising out of grid failure and no/low grid demand, factors over which the Corporation could not exercise any control. As AGTP failed to draw the MGO quantity of gas due to evacuation constraints and low drawal of power by the beneficiary states (refer to para 9.6.3) the project had to incur avoidable expenditure of Rs.3.16 crore (non- consumed MGO quantity being 21770983 SCM) during 2000-01 to 2004-2005. This could have been avoided, if the agreement with GAIL/ONGC had been drawn in line with the agreement of AGBPP with OIL (March 1994) which allowed waiver of MGO clause in the event of non evacuation of gas due to grid restrictions. It was also known to the Management that it was unable to generate power as per the design capacity of AGTP due to low grid demand/power evacuation problem since commissioning of the units, but there was no effort till October 2003 to amend the contract by reducing the contracted quantity of gas / modifying other terms of contract. It was further observed in Audit that while the MOU (March 1994) for supply of gas to AGBPP between OIL and the Corporation provided for such waiver through *force majeure* clause, as per the latest agreement (January 2005) entered into with OIL such provision was not incorporated which could prove to be to the detriment of the Corporation in future. The Management contended (September 2005) that the agreement for supply of gas was more or less a standard one and the gas supplier remained reluctant to deviate from the standard terms. However, the Management on its part made no effort to take up the issue through the Ministry of Power (MOP) explaining the constraints over which it had no control and seek remedy.

9.6.1.2 Fall in calorific value of gas

The average calorific value of gas supplied to AGBPP by OIL fell steadily from 8612 Kcal/SCM to 8307 Kcal/SCM between 1996-97 to 2004-05. While the agreement had a provision for adjustment of price i.e. premium to be paid to the supplier for more calorific value and rebate on gas price for lower calorific value of gas actually supplied, the gas supply agreements with OIL for AGBPP and with GAIL/ONGC for AGTP and subsequent amendments made thereto did not provide for supply of additional quantity of gas (at same price and other terms and conditions) required by the Corporation for fall in calorific value of gas supplied. In case of supply of gas with calorific value at the lower end of the scale, the requirement of gas increased, a factor that was to have an adverse impact on generation.

9.6.1.3 Lack of control over flow of gas

Running of the units of AGTP at partial load was due to lack of control over flow of gas as the Flare stack was installed at ONGC/GAIL end who operated the gas valve once a day as per agreement.

9.6.1.4 Failure to arrange for adequate quantities of gas supply

In AGBPP, prior to the introduction of Availability Based Tariff[♣] (ABT) regime in November 2003, gas tie up was restricted to 1.00 MMSCMD[♦] to meet the requirement of gas for operation at design Plant Load Factor (PLF) of 68.49 *per cent*. This was enhanced (January 2005) to 1.4 MMSCMD of gas to attain post-ABT normative availability of 80 *per cent* based on the design heat rate of 2167 Kcal/Kwh and original average net calorific value of 8500 Kcal/ SCM[♥]. It was observed in audit that the quantity of gas supply arranged for under the agreement was deficient *ab initio* as it did not reckon the following factors:

(i) With the implementation of the ABT regime, the gas quantity required for maintaining normative availability of 80 *per cent* was 1.52 MMSCMD[♠]. Further to meet the MOU target of 92 *per cent* availability, 1.75 MMSCMD of gas was required.

(ii) The proposal did not reckon that to run one combined cycle (CC) module at part load or even one Gas Turbine (GT) on open cycle commensurate with the varying schedule given by NERLDC[■], the heat rate would always be higher than the designed heat rate. The plant had also been recording a higher heat rate consistently from 2000-01 to 2004-05 (Refer **Annexure-29**). A higher heat rate implied greater consumption of gas to generate each unit of power at the same calorific value.

(iii) The impact of steadily falling calorific value of gas over the years (from 8614 Kcal/ SCM in 1997-98 to 8122 Kcal/ SCM in December 2004) was not considered while working out the gas requirement.

Further, the Corporation being a proponent of implementation of ABT in NER since July 2000 should have been able to anticipate the need for enhanced gas commitment to maintain availability at 80 *per cent*. Therefore, it should have taken timely action to enter into a revised agreement with OIL to meet the enhanced requirement but the agreement with OIL was revised only in January 2005.

Due to under assessment of requirement of gas and lack of timely tie-up for supply of gas in requisite quantities, AGBPP could not achieve the target availability and it resulted in under-recovery of fixed charges amounting to Rs.9.94 crore during the post ABT period[♣]. An early initiative to enhance the required quantity of gas based on realistic assessment could have avoided generation loss thereby improving the Corporation's revenue as well as reducing the cost of generation considerably.

♣ ***Availability Based Tariff (ABT) system , the tariff as fixed by CERC comprised annual fixed charges and variable charges. Full recovery of fixed charges depended upon the declaration of 80 per cent or above plant availability. While each plant was required to declare its generating capacity for the Regional Load Dispatch Center in advance, the beneficiary placed schedule on the plant for purchase of power.***

♦ ***Million metric standard cubic meter per day***

♥ ***Standard Cubic Meter***

♠ ***Calculated on the basis of expected average net calorific value of 8250 Kcal/SCM and the normative heat rate of 2250 Kcal/Kwh***

■ ***North Eastern Regional Load Dispatch Centre***

♣ ***November 2003 to March 2005***

The Management, *inter alia*, contended (December 2005) that prediction of trend of calorific value was not possible as gas supplier maintained confidentiality about its source and gas was a mining product. However, the fact of declining calorific value was evident from the monthly gas bills of the Corporation and records revealed that this fact was also known to the Management but it did not take any remedial measures.

The Management further stated that they had taken necessary steps to enhance contracted quantity to 1.4 MMSCMD in April 2003, well in advance of implementation of ABT. However, it was observed that the request for 1.65 MMSCMD gas was made only in December 2004 after 14 months of implementation of ABT and the Ministry of Petroleum & Natural Gas (MOP & NG) intimated (June 2005) the inability of OIL to supply the same.

Recommendations

- Terms of the agreement entered into with GAIL and OIL for supply of gas to AGTP and AGBPP need to be amended to incorporate a clause allowing waiver of MGO payment due to lower generation arising out of grid failure and no/low grid demand over which the Corporation had no control. Accordingly, the issue may be taken up appropriately through the MOP.
- The Management needs to explore the possibility of including a clause in the agreement with AGTP as it was done in the recent agreement with AGBPP (January 2005) to provide for supply of additional quantity of gas (at same price and other terms and conditions) required by the Corporation for fall in calorific value of gas supplied.
- Terms of the gas supply agreement need to be revised if necessary through the concerned Ministry, to make GAIL/ONGC contractually liable to operate the gas valve to suit the varying schedule of generation enforced by grid authorities to meet grid demand and maintain grid discipline. The Possibility of installation of remote control device to control gas flow during odd hours at GAIL/ONGC end also needs to be explored.
- The MOP & NG needs to explore all possible means to supply the additional requirement of gas to AGBPP in the interest of the project and the NER beneficiaries as the project was taken up (1987) to utilise the associated gas flared at that time in upper Assam valley.

9.6.2 Operational Performance

The Installed Capacity, Design Energy, MOU target of generation, Plant Load Factor (PLF) and other performance indicators in respect of AGBPP and AGTP during 2000-01 to 2004-05 given at **Annexure-28** and **29** revealed the following:

9.6.2.1 Non-achievement of Design Energy

AGBPP could not achieve its design energy between 2000 and 2005. The project could not even achieve the MOU generation target agreed with the MOP, which was much lower than the design energy till 2002-03. AGTP also could not achieve the design energy during 2000-01. The Management in its reply (December 2005) stated that it would not be correct to relate actual generation with design energy for arriving at a decision on performance. However, as the installation of a power plant entails huge

public investment, the plants are expected to achieve the design energy level as stipulated in the DPR. Audit observed that this could not be done because of various controllable and non-controllable factors which have been discussed in para 9.6.3.

9.6.2.2 Lower Declared Capacity

During monsoon in the NER which was generally from May to October every year, hydel generation was utilised to the fullest extent and planned maintenance was carried out in thermal units. During the non-monsoon period (November to April) maximum availability from thermal units of AGBPP/AGTP was required to ensure optimum benefit for NER. In fact, maximum output from NER thermal units during non-monsoon period would have ensured minimum Unschedule Interchange (UI)[♣] import from Eastern Region (ER) thereby reducing financial burden on NER States. However, since commencement of ABT in NER, average Declared Capacity (DC) of AGBPP during non-monsoon period (November 2003 to April 2004) was around 225 MW only (against installed capacity of 291 MW). During non-monsoon period of 2004-05, although DC marginally improved (226 MW to 231 MW), it was still far less than the installed capacity. Less DC, due to lack of appropriate gas tie-up at times resulted in UI/contracted import from ER, putting additional burden on NER States.

9.6.3 It was observed in audit that a number of factors resulted in low generation of power, some of which like lower industrialisation and consequential low demand and lower generation schedules given by beneficiaries were not in the control of the Corporation. However, the following factors that contributed to lower generation could have been controlled, if not completely avoided, by taking appropriate action at the level of the Corporation or the other agencies working in the power sector through proper co-ordination.

9.6.3.1 Transformation and transmission constraints

There were transformation and transmission limitations in the NER power evacuation system as connectivity among the major load centres within NER system was far from adequate. There were constraints in state-owned 132 KV transmission system leading to overloading of lines and Inter-Connecting Transformer (ICTs). Evacuation constraints also existed in the inter-regional transfer of power beyond NER.

Further, though simultaneous setting up of AGBPP and inter- regional transmission line from Kathalguri to Malda was approved by the GOI in November 1987, Kathalguri to Malda transmission line was commissioned only in October 1999. However, power could not be exported to Eastern Region prior to November 2000 due to delayed approval (August 2000) from Northern Eastern Regional Electricity Board. Though the plant at Agartala was commissioned in July 1998, the associated transmission system was commissioned only in November 2000. Prior to that, the only transmission line available for evacuation of power from AGTP was a 132KV D/C Line (Line I and II) of the Power Department, Government of Tripura which was more than 30 years old at the time of commissioning of the units (1998-99). This restricted flow of power to 20-25MW only. With the commissioning of Line-III by Power Grid Corporation of India Ltd (PGCIL) in November 2000 the scenario improved. However, even after that evacuation was

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♣ ***UI for generating station shall be equal to its actual generation minus its scheduled generation. UI for beneficiary shall be equal to its total actual drawal minus its total scheduled drawal***

restricted upto 50 to 60 MW for a considerable period of time because of frequent outage of line due to tower collapses, conductor snapping and pilferage of tower members. Only from September 2004, PGCIL allowed AGTP to evacuate upto 70 MW through Line- III.

Although the Inter-Disciplinary Group of Ministry of Power in their report (March 2001) stressed upon quick establishment of transmission links on priority basis for inter-regional flow to ensure that all under-utilised capacities in any region were utilised to meet power demand in other regions, there was absence of time bound concerted efforts by the Central and State level organisations to overcome the evacuation constraints and facilitate export of surplus power in NER. Early action by the Corporation, PGCIL and Assam State Electricity Board (ASEB) to make the 220 KV Samaguri-Balipara line operational, which was done as late as in May 2004, although AGBPP and AGTP were operational from July 1998, would have helped in improving the system redundancy, provided stronger connectivity with ER system and allowed additional export of power.

9.6.3.2 High cost of AGBPP power

There was net import of power in NER from ER during 1999-00 to 2002-03 (ranging from 292.978 MU to 752.898 MU in a year) when there was surplus capacity available in NER. Net export from NER to ER commenced only in 2003-04 (191.20 MU) onwards with the implementation of ABT in NER. Import of power to the extent of 752.898 MU from NTPC units of ER was resorted to by ASEB for meeting its power requirement, as NTPC power was cheaper compared to that of AGBPP and transmission charges for NTPC power were nil as against 35 paisa per unit for AGBPP power. Non-drawal of major portion of allocated power by the beneficiary states was due to high cost of AGBPP power compared to the cost of power of other NEEPCO projects. ASEB resorted to merit order scheduling preferring drawal of cheaper power from the available sources. Accordingly, the tariff being the highest, AGBPP power got the lowest priority in the order of receiving schedule from ASEB. High cost of AGBPP power was primarily because of abnormally high capital cost, which was Rs.5.20 crore per MW compared to Rs.2.70 crore to Rs.3.63 crore per MW in respect of gas / Naphtha based combined cycle power projects cleared by CEA around 2000-01. High capital cost of the project was stated (December 2005) to be due to adverse law and order situation prevailing in the region, geographical remoteness of the project etc.

9.6.3.3 Commissioning of new generating units by Government of Tripura

Baramura Gas Based Thermal Power Project (21MW) was sanctioned by the Government of India in October 2000 under Northern Eastern Council funding when there was already substantial under-utilization of the capacity of AGTP due to lack of demand and evacuation facilities. The project was scheduled to be completed in two years. The power station was commissioned in November 2002. The available power was to be shared among the states of Assam, Tripura and Mizoram in the ratio of 2:1:1. Further, one 21 MW unit was commissioned in Rokhia Gas Based Power Plant of Tripura Government in July 2002. Consequent to commissioning of these units, the drawal of power by the Government of Tripura from Central sector generating units fell drastically from 344.29 MU (2002-03) to 146.12 MU (2003-04). This indicated poor planning in development of generating capacity by the authorities concerned. The Corporation had also not taken up the issue appropriately with the concerned authorities.

Recommendations

- One of the two Double Circuit (D/C) 132 KV line proposed for construction by NEEPCO from the proposed Tripura Gas Based Power Project (280 MW), Monarchak, to Agartala Sub-Station may be considered for looping in and looping out at AGTP which will provide additional facility for evacuation of power from AGTP and avoid hindrance in the existing system.
- The Corporation should vigorously pursue to ensure that PGCIL takes adequate steps to remove evacuation constraints and take up with NER states (through NEREB/NEC) for strengthening their transmission network.
- The Corporation along with beneficiaries of NER should vigorously pursue with CERC/MOP so that transmission tariff is brought down to the level of other regions to make export of surplus NER power commercially viable.
- To avoid mismatch between the construction of generation system and evacuation and distribution as happened in case of AGBPP, AGTP and RHEP♣, it was imperative to share the information on monitoring and progress of generation as well as matching transmission projects by both the generation and transmission utilities with active participation/intervention of the Ministry concerned in the appraisal process. Further, closer co-ordination and interaction among concerned authorities like MOP, MOP&NG, CEA, CPSUs (NEEPCO, PGCIL, NTPC♦, GAIL[1], OIL, ONGC) North Eastern Regional Electricity Board (NEREB), State Governments/State Electricity Boards etc. was required with constant follow up at the planning, implementation and operational stages to ensure optimum operational efficiency of power projects.

9.6.4 Auxiliary Consumption

Both AGTP and AGBPP failed to restrict the auxiliary consumption▼ within the norm• of one and three *per cent* respectively during 2000-01 to 2004-05. Loss due to excess auxiliary consumption during the said period worked out to Rs.10.24 crore for AGBPP and Rs.3.43 crore for AGTP. Reasons for such excess auxiliary consumption were not on record. In reply (December 2005) the Management stated that excess auxiliary consumption was due to operation of the units at partial loads/ Full Speed No Load (FSNL) at times because of restriction in demand from the beneficiaries. However, the Corporation did not explain the link between partial load/FSNL and higher auxiliary consumption. No analysis in this regard was also made by the Corporation.

♣ *Ranganadi Hydro-Electric Power Project owned by NEEPCO*

♦ *National Thermal Power Corporation*

1 GAIL (India) Limited

▼ *in relation to any period, means the ratio, expressed as a percentage, of energy in Kwh generated at Generator terminals minus energy in Kwh delivered at the Generation Station switchyard to gross energy in Kwh generated at the Generator terminals.*

• *Fixed by CERC*

9.6.5 Gross Station Heat Rate

Gross station Heat Rate [']*(GSHR)* for both the plants was much higher (ranged between 236 to 1036 Kcal/Kwh) than the norm* fixed by CERC and resulted in excess consumption of heat in AGBPP (4963021 million Kcal) and AGTP (1163762 million Kcal) during the period covered under audit implying excess gas consumption. In case of AGBPP, the higher GSHR was stated (September 2005) to be due to part load and open cycle operation of the units while in case of AGTP, higher GSHR was because of the part load operation of the machines and running of the machines at FSNL conditions under compelling circumstances in pre-ABT period when the beneficiaries did not draw their allocated shares for various reasons. The Management contended (December 2005) that the situation improved with implementation of ABT with effect from November 2003. However, even with the introduction of ABT, the heat rate was still higher (ranged between 442 to 556 Kcal/Kwh) than the norms.

9.6.6 Energy Audit

Despite the gas-based stations not achieving the normative auxiliary consumption as well as GSHR, the Corporation did not conduct any energy audit since commissioning of the plants (July 1998). In fact, comprehensive energy audit from time to time to identify potential areas of savings and to evolve and implement appropriate action could lead to significant savings in the cost of generation. Accordingly, the Inter-Disciplinary Group (IDG) (March 2001) of the Ministry of Power, advised the power stations to create internal Energy Audit Group and also expose their working from time to time to outside experts, to critically analyse and evaluate various actions. However, the Corporation neither created Energy Audit Group nor conducted energy audit through outside agency/experts (December 2005).

9.6.7 Man/MW Ratio

Although both the projects were commissioned in July 1998, the sanctioned manpower as fixed during the construction stage was not revised to correspond to the requirement of the power plants in Operation and Maintenance (O&M) stage. Even after seven years, the Corporation was unable to firm up manpower requirement at O & M stage power plants. In the absence of any sanctioned strength, the deployment of manpower at various projects exceeded the limits set by National Power Plan (1985-2000) wherein the norm for Man/MW ratio for gas based power plants was fixed at 0.61. The Man/MW ratio was consistently higher varying from 1.20 to 1.33 in case of AGBPP and from 1.69 to 2.0 in case of AGTP as shown in **Annexure-29**. In reply (December 2005) the Management stated that the reason for such high Man/MW ratio was smaller unit size of the machines which increased the number of machines compared to projects in other parts of the country. However, this contention was not tenable in view of the norm fixed by CERC for recovery of O & M expenditure for small gas based plants.

[']*The head produced in Kcal input required to generate one KWh of electric energy at Generator Terminals.*

* *2250 Kcal/Kwh for AGBPP and 3580 Kcal/kwh for AGTP*

Recommendations

- The Corporation should immediately assess the requirement of manpower in different categories for its O & M projects and get the same formally approved.
- The Corporation should also take effective steps to bring down the Man/MW ratio in both the gas based power plants to conform to the manpower norm set in the National Power Plan (1985-2000).

9.6.8 Operation and Maintenance (O & M) Expenditure

Expenditure incurred on O&M of both the gas based generating stations was substantially higher than the normative O&M expenses recoverable as a component of Annual Fixed Charge in the tariff. Of the total O&M expenditure, Corporate Office expenses constituted 21 to 31 *per cent* in case of AGBPP and 17 to 35 *per cent* in case of AGTP. These alongwith increased repair and maintenance cost for AGBPP led to under-recovery of O & M expenses. In case of AGBPP, the inventory (spares) level in terms of months of consumption ranged from 50 months (2003-04) to an abnormally high level of 385 months (2001-02) leading to blocking up of working capital. While CEA had indicated inventory level for each power plant at around 2.5 *per cent* of capital cost, it ranged from 3.7 to 5.5 *per cent* in AGBPP.

Recommendations

- Both the power stations may initiate steps for limiting the O&M expenses within the level set by CERC to avoid under-recovery on this count.
- The Corporation should take steps to bring down inventory levels within 2.5 *per cent* of capital cost.

9.7 Maintenance of Gas based power plants

9.7.1 Maintenance Policy

The inspection routines for maintenance of gas turbines of different make were laid down by the Original Equipment Manufacturers (OEMs) in their maintenance manuals which emphasised the importance of developing a schedule of inspection intervals and maintenance procedures based on the utilization of the equipment and the experience accumulated during its operation. The CEA also highlighted that maintenance management function was as important as generation and stressed upon the power plants the necessity of having a written down Maintenance Policy. Though both the gas based power plants were commissioned seven years back, the Corporation had not developed any documented maintenance policy incorporating its own inspection schedules and associated procedures as well as defining the responsibility of various functions e.g. Operations, Maintenance, Stores etc.

9.7.2 Non-adherence to scheduled inspections

9.7.2.1 As per recommendations of the OEM the scheduled inspections were required to be carried out for AGTP machines for first Combustion Inspection after 8000 hours, Hot Parts Inspection after 24000 hours, second Combustion cum Baroscopic Inspection after 36000 hours and Major Inspection after 48000 hours. In most of the cases, the scheduled maintenance could not be conducted as per the recommended time schedule and were actually conducted after 8388 to 10179 hour, 24192 to 29300 hours, 38148 to 40422

hours and 54233 to 54240 hours respectively. As such, the units at AGTP had to be operated over a considerable period of time on 'risk hours'. This increased the probability of malfunctioning and under-performance of the machines. The machines were also subjected to faster wear and tear due to excess use without proper maintenance.

9.7.2.2 Maintenance of the Units in AGBPP

As per recommendations of the OEM, the first and second Hot Parts Inspection (HPI) of the gas turbines of Units I to IV of AGBPP were required to be carried out after the machines completed 9000 and 28000 running hours respectively. Against the recommended HPI to be carried out after 9000 hours, the first such inspection in respect of all the four units was delayed by 3347 to 7529 hours. Further, major inspection for these machines was carried out during non-monsoon period when gas turbines were expected to be utilised to the fullest extent to meet the power requirement of the NER/other regions.

Similarly the Combustion Inspection of the gas turbines in Units V and VI were to be carried out after 8000 fired hours as per the manufacture's recommendation. However, it was carried out after 21465 and 14879 hours respectively. Hence, in AGBPP too the units operated on 'risk hours' for a considerable period of time.

9.7.3 Inspection of 'Generators' and 'Exciters'

The 'Generators' and 'Exciters' of Mitsubishi make Gas Turbines were to be inspected after one year from initial start up or when operation exceeded 300 starts. Similarly, the 'Generators' and 'Exciters' of BHEL make Gas Turbines were to be inspected after one year of commissioning or on completion of 8000 running hours. The said inspections had, however, not been carried out, with attendant risk of high restoration cost and loss of generation in case of any forced breakdown of the machines.

Thus, recommended periodicity of preventive maintenance of the machines was not adhered to strictly in conformity with the respective OEM's guidelines. There was no justification for non-adherence to the prudent maintenance practice recommended by the manufacturers as there was no pressing demand for continuous operation of plants in the NER in view of the low demand.

The Management stated (September 2005) that delays in maintenance of the machines beyond OEM's recommended periodicity was due to high lead-time in procurement of imported spares, requirement of unforeseen spares and necessity for approval of NERLDC/NEREB for shutdown programme etc. The reply is not tenable as forwarding of indents for planned outage jobs to the material management department well in advance (say 24 months as recommended by CEA), commencement of outage planning 12-18 months in advance (as also recommended by CEA) could have avoided delays in carrying out recommended maintenance inspections.

Recommendations

- The Corporation should strictly follow the prudent maintenance practice recommended by OEMs.
- The Corporation may consider manualising the 'Maintenance Policy' of each plant defining responsibilities of various functional wings e.g. Operations,

Maintenance, Stores etc to ensure accountability and to further improve productivity, plant availability and safety.

9.8 Ecology and Environment

Non-compliance of statutory stipulations

The Ministry of Environment and Forest (MOE&F) accorded provisional clearance for AGTP in January 1992 and Tripura State Pollution Control Board (TSPCB) issued (December 1991) No Objection Certificate (NOC) to the project, subject to fulfilment of some stipulations which included, *inter-alia*, installation of Fire Protection System (FPS) and commissioning of DM water plant for controlling NOX emission level. However, even after seven years of commissioning of the project the FPS for the plant and DM plant could not be commissioned due to selection of non-performing vendors. Besides, the project was yet (August 2005) to comply with the requirements in regard to the off-site Emergency Plan called for (1992) by the MOE&F. The issue had, however, been taken up with the State Government.

Recommendations

Compliance with environmental requirements as stipulated by various statutory authorities should be given high priority.

9.9 Conclusion

Although the machine availability of both the power stations in the pre-ABT period was enough to meet the power requirements of NER, comparatively high cost of generation alongwith transmission and transformation constraints in the region limited the generation of power from these stations and its drawal by the beneficiary states. In the post-ABT period, AGBPP was unable to generate upto its installed capacity, as demanded by the beneficiaries, due to lack of adequate gas tie-up with Oil India Ltd which, in turn, increased cost of power drawn by them from AGBPP. Though at the time of conceptualisation and approval of the projects, the need for parallel development of evacuation infrastructure was planned, the same was not implemented simultaneously resulting in bottlenecks. Further, the Management failed to time its maintenance activities in the monsoon period so as to generate maximum power during the non-monsoon period to optimise its operations. There was an absence of a well planned and time bound effort by all the multilateral agencies involved in the sector for removal/minimisation of constraints in generation and evacuation of power in the NER. Such concerted efforts will also minimise wastage of scarce and exhaustible natural gas and under utilisation of gas based power plants in the NER constructed at considerable cost.

The review was issued to the Ministry in December 2005; its reply was awaited.

MINISTRY OF STEEL

CHAPTER: X

BHARAT REFRACTORIES LIMITED

Working of Bharat Refractories Limited

Highlights

Despite receipt of concessions and cash assistance of Rs.234.60 crore during 1995-96 to 2004-05, the Company did not achieve the targets of manpower reduction, production, sales and profitability set forth in the TEV report.

(Para 10.3)

The overall production of refractories was only 39 and 87 *per cent* of the re-assessed capacity during 2001-02 to 2004-05 and the shortfall in production was 1.19 lakh tonnes due to under-utilisation of capacity, non-availability of working capital leading to shortage of raw materials and excess manpower leading to increased labour cost of Rs.9 crore annually.

(Para 10.4.1.1)

The Company was supplying magnesia carbon bricks and slide gate refractory under performance guarantee clause to Bokaro Steel Plant, who recovered/received materials free of cost amounting to Rs.6.33 crore and Rs.1.97 crore respectively due to non-achievement of the committed heats under the guarantee clause.

(Paras 10.4.2 and 10.4.3)

As against the re-assessed capacity of 12,000 tonnes of silica bricks at Bhilai Refractories Plant (BRP), the plant actually produced only 1790 tonnes during 1999-2000 to 2004-05 and there was no production during 2003-04. The Management was silent on the issue and had not examined the reasons for negligible/nil production.

(Para 10.4.4)

The actual rejection of bricks in the process of manufacture from green bricks (un-burnt bricks pressed in Presses) to saleable bricks was much higher than 10 *per cent* considered in TEV report. The Management neither fixed norms for rejection nor analysed the reasons.

(Para 10.4.5)

The Company consumed coal and furnace oil valuing Rs.5.21 crore at IFCORP in excess of the required consumption.

(Para 10.4.7)

The Company supplied refractory materials to a private company [M/s Otto India (P) Limited] on credit, without any security, resulting in loss of Rs.1.23 crore.

(Para 10.5.2)

The Company awarded (August 1999) the work of conversion of three units of coke-based gas producer plants to coal-based to achieve economy in firing of bricks at BRP, which had not been completed so far (December 2005). One unit completed at a cost of Rs.1 crore in July 2004 indicated increased fuel cost by Rs.206 per tonne.

(Para 10.6.4)

The utilisation of a 2500 tonne Sacmi Press procured at a cost of Rs.7.53 crore was only 37 per cent during 2000-01 to 2004-05. Alternatively, a press of lower capacity of 2000 tonne, which was considered earlier, could have well served the purpose.

(Para 10.6.5)

The Company could not implement the technology for manufacturing continuous casting refractories purchased from Japan in October 1991 at a fee of Rs.1.12 crore, rendering the expenditure infructuous.

(Para 10.7)

The labour productivity of the Company remained in the range of 8.30 – 56.40 tonnes per man per year as against 58 tonnes per man per year envisaged in the TEV report.

(Para 10.8)

The Company had no internal audit department. The last internal audit was conducted by an outside firm in the year 1999-2000.

(Para 10.10)

Gist of Recommendations

- The Company should take the following steps to bring improvement in its productivity and profitability:
- cut down its work force by separating 393 employees as per TEV recommendations to avoid recurring revenue expenditure of Rs.9 crore per annum.
- enhance capacity utilisation to the level of 100 *per cent* of the capacity reassessed in the TEV report.
- establish the production of silica bricks at least to an economical level at BRP and increase demand and enforce proper quality control on production of MCB sets at RRRP, if necessary by appointment of experts/consultants.
- reduce the rates of rejection during process, excess consumption of raw materials and fuel etc. For this purpose, the management should approve suitable norms for operation, raw materials and fuel consumption, analysis of idle time of presses so as to avoid excess idle time and overall increase in production.
- decision on implementation of AMR schemes should be taken after careful study of the project and taking into account the techno-economic study made by some expert agency in the field. To avoid delay in implementation of the capital schemes, a proper monitoring system should be evolved.
- start a standard and uniform costing system after getting a costing manual prepared.

- strengthen the internal audit system without loss of time.

Further, with almost all major steel producers, e.g. SAIL, TISCO etc. increasingly switching over to 100 *per cent* continuous casting of steel, the Company has to get into manufacture of the entire suite of refractories for this process, especially since these are high contribution products. Unless immediate action was taken on this project, the medium to long-term viability of the Company would be in doubt.

10.1 Introduction

10.1.1 Background

Refractories are processed substances that are able to withstand high temperatures without melting. It is used in the iron and steel industry to make linings inside coke oven batteries, furnaces, foundries and hot metal/slag ladles etc.

Refractories are of two types, shaped and monolithic or unshaped (also called Masses/Mortar). The shaped refractories are manufactured through the process of (i) crushing and grinding of raw materials (ii) mixing of raw materials in the required ratio (iii) pressing into different sizes and shapes (iv) drying of pressed bricks and (v) firing of dried bricks in the kilns. The unshaped refractories undergo the process of crushing, grinding and mixing raw materials only.

10.1.2 Company profile

Bharat Refractories Limited (Company) having its corporate office at Bokaro Steel City was incorporated in July 1974 with 100 *per cent* Government holding to manufacture and deal in refractory products. It has four manufacturing units viz. (i) Bhandaridah Refractories Plant (BHRP), (ii) Ranchi Road Refractories Plant (RRRP), (iii) Bhilai Refractories Plant (BRP) and (iv) India Firebricks and Insulation Company Refractory Plant (IFICORP), who supply their products mainly to steel plants of Steel Authority of India Limited (SAIL), Indian Iron and Steel Company Limited (IISCO), Rashtriya Ispat Nigam Limited (RINL), Neelachal Ispat in the public sector and some other steel plants like Tata Metalliks Limited (TML), MESCO, TISCO etc. in the private sector.

10.1.3 Capital Structure and Profitability

The authorised/paid up share capital of the Company as on 31 March 2005 was Rs.246 crore and Rs.215.79 crore respectively. As on that date the Company also borrowed Rs.161.50 crore from the Government of India. The Company had also taken cash credit loan/ short-term loans from Banks and the amount outstanding, as on 31 March 2005 was Rs.49.18 crore. The Company was incurring continuous losses and the accumulated losses as on 31 March 2005 stood at Rs.352.56 crores. The accumulated losses of the Company had already eroded the entire paid up capital and a substantial portion of the loan received from the Government of India. The Company is a sick company and got three revival schemes by the Board of Industrial and Financial Reconstruction (BIFR) over a period of five years from January 1997 to June 2002.

10.1.4 Organisational Setup

The Company is managed by a Board of Directors comprising of a full time Chairman-cum Managing Director (CMD) and five Directors. The Managing Directors of Bokaro Steel Plant (BOSP), Bhilai Steel Plant (BSP) and Rourkela Steel Plant (RSP) of Steel Authority of India Limited are on the Company's Board.

The CMD is the chief executive of the Company, assisted by one Additional General Manager (HRD), three Deputy General Managers holding charge of Finance, Personnel and Administration and Material Management at Head Office. All the four plants are headed by one Deputy General Manager-in-charge each.

10.1.5 Audit Objective

The primary objective of the performance review was to assess the extent of achievement of the targets specified in the Techno-Economic Viability (TEV) study prepared by MECON in July 2001 as part of BIFR revival scheme and identify and analyse the reasons for shortfall in achievements.

10.1.6 Scope of Audit

The review seeks to evaluate production & sales performance of the Company specially the contrasting performance of its different plants, technological advancements and capital expenditure projects. It covers assessment of financial and operational management in the areas of utilisation of equipment, working capital management, budgeting and business planning, costing system, management information system and internal audit for the period from 2001-02 to 2004-05.

Audit scrutiny covered the following aspects relating to the performance of the various plants of the Company:

- Lower production performance of refractory bricks.
- Negligible/nil production of silica bricks.
- Huge rejection of manufactured bricks.
- Delay in completion of capital schemes.
- Management control system, costing system and internal audit.
- Non-realisation/delayed realisation of sundry debtors.

10.1.7 Audit Methodology

An entry conference was held with the Management on 12 April 2004. After a preliminary survey and collection of background information, guidelines for the audit review were finalised. The test audit was conducted during August-October 2004 covering visits to the Head office as well as all the four plants. The audit findings are based on the documents and records as well as information furnished by the Management.

The draft performance audit report was issued to the Management on 7 April 2005, and was discussed in the exit conference held on 13 May 2005.

The Management provided a written reply on 26 May 2005 to the draft audit report. Their comments have been considered and included appropriately in this report. The draft audit report after incorporating management's reply and audit's further comments was issued to the Ministry of Steel in October 2005. The reply of the Ministry was received in February 2006.

10.1.8 Acknowledgement

Audit takes this opportunity to thank the management and staff of the Company for their co-operation and assistance in the conduct of this performance audit.

10.2 BIFR Revival Schemes

Pursuant to the amendment to Sick Industrial Companies (Special Provisions) Act (SICA) 1985, the Company and IFICO, (a subsidiary of the Company since 1978), came under the purview of section 3(I) (O) of SICA and were referred to BIFR in 1992. The BIFR/Cabinet committee of Economic Affairs (CCEA) sanctioned a revival scheme for the company in January 1997. According to the scheme, (i) interest amounting to Rs.61.64 crore accrued on loan as on 31 March 1995 was waived (ii) 50 *per cent* of the loan of Rs.79.52 crore i.e. Rs.39.76 crore was converted into equity, and non-plan loan of Rs.12.05 crore was converted into preference shares (iii) cash credit limit of Rs.14 crore from bank was allowed against government guarantee (iv) IFICO was merged and became a plant of the Company in October 1997 and (v) State Bank of India (SBI) was appointed to conduct a techno-economic viability (TEV) study of the four plants to explore possibility of their recovering all costs in the long run.

As this scheme failed due to delay in its implementation, under-utilisation of capacity, low manpower utilisation, incorrect initial projections etc. and there was also a delay in conducting techno-economic viability study, Government of India approved a second scheme in 1999, under which, the Company got (i) grant of Rs.4 crore for revision of wages, (ii) interest free working capital loan of Rs.16 crore, (iii) Government of India guarantee for cash credit and letter of credit upto Rs.24 crore from banks, (iv) interest holiday till 2007-08 on loan paid upto 31 March 1999 and (v) four years moratorium period upto 2003-04 on repayment of loan.

In pursuance of the first revival scheme of the year 1992, SBI appointed (April 2001) MECON Limited to conduct TEV study. MECON Limited submitted its report in July 2001, which, considering the available infrastructure in each plant, re-assessed the existing annual installed capacity from 1,35,500 tonne to 75,645 tonne for all the four plants of the Company. The TEV report also recommended reduction in manpower from 3,013 to 1,311 by March 2002 and estimated the cost of rehabilitation as Rs.186 crore. Accordingly, the Government of India sanctioned the third revival scheme in June 2002 under which (i). loan of Rs.97.89 crore was converted into equity, (ii) further equity of Rs.35 crore was sanctioned for addition, modification and replacement (AMR) schemes to be released over a period of five years at the rate of Rs.7 crore per year and (iii) working capital loan of Rs.30 crore was allowed against Government guarantee without guarantee fee.

Apart from the financial packages mentioned above, the Company received total cash assistance of Rs.234.60 crore[♣] from Government of India during the period 1995-96 to 2004-05 against the estimated rehabilitation cost of Rs.186 crore.

10.3 Audit Findings

It was observed in audit that inspite of waiver of accrued interest of Rs.61.64 crore, conversion of total loan of Rs.149.70 crore into equity/preference shares, cash receipt in

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[♣] ***Rs.219.63 crore in the shape of loan and Rs.14.97 crore in the shape of equity.***

the shape of loans and equity amounting to Rs.234.60 crore and Government guarantee for raising working capital loan from banks upto Rs.30 crore without guarantee fee, the Company could not achieve the targets set forth in the TEV report as below:

- Three hundred ninety three employees were yet to be separated to achieve the target of 1,311 employees recommended in TEV report, resulting in excess wages payment of Rs.9 crore per annum as discussed in paras No. 10.4.1.1 and 10.8.
- The actual production was only 46 *per cent* during the second year (2002-03) against the target of 90 *per cent* of reassessed capacity and 87 *per cent* in the fourth year (2004-05) against the target of 100 *per cent* of the re-assessed capacity as discussed in para No. 10.4.1.1.
- The net sales were only Rs.58.28 crore (2002-03), Rs.86.41 crore (2003-04) and Rs.109.35 crore (2004-05) as against Rs.116.86 crore as per TEV report as discussed in para No.10. 5.1.
- The Company was to achieve net profit after prior period adjustment/VRS of Rs.11.95 crore. But it incurred loss of Rs.74.51 crore, Rs.9.40 crore and Rs.5.21 crore in the years 2002-03, 2003-04 and 2004-05 as discussed in para No. 10.5.1.

10.4 Production Performance

In the TEV report, the annual requirement of refractory materials by the steel industry of the country during 2001-02 was assessed at 2.57 lakh tonnes of bricks and 0.56 lakh tonne of masses/mortar. Against this, the reassessed production capacity of BRL was 0.76 lakh, which also remained underutilised as discussed in the subsequent paragraphs.

10.4.1 Product Mix & Capacity

In the TEV report, the production capacity and product mix of the four refractory plants was re-assessed on the basis of physical status of infra-structures available and demand for the product as under:

Name of Units	Product Mix	Capacity as per TEV study (in metric tons)		
		Bricks	Masses	Total
BHRP	Fireclay bricks & Masses (trough mix, Castable, Mud Gun Mass etc.	10060	14500	24560
RRRP	Magnesia Carbon Bricks (MCB) for converters and ladles & Masses	8200	2200	10400
IFICORP	Fireclay bricks, Hi-Alumina bricks and Slide Gate Plates & Accessories and Masses	20725	160	20885
BRP[♣]	MCB, MCH, CHM, MGT (basic bricks), Silica bricks & Masses	17000	2800	19800
Total		55985	19660	75645

[♣] ***manufacturing magnesia carbon bricks for BSP on conversion cost basis.***

10.4.1.1 Shortfall in production

The actual production of bricks and masses for the years 2001-02 to 2004-05 compared to the re-assessed capacity (TEV) and the target fixed by management was as under:

(quantity in tonne)

Plant/capacity as per TEV	**Year**	**Target**	**Actual**	**Shortfall**		**Achievement (in percentage)**	
				TEV	**Target**	**TEV**	**Target**
BHRP (24560)	01-02	24900	16325	8235	8575	66	66
	02-03	19648	19833	4912	+185	81	101
	03-04	22104	23974	586	+1870	98	108
	04-05	24560	23616	944	944	96	96
RRRP (10400)	01-02	9400	4147	6253	5253	40	44
	02-03	8320	4477	5923	3843	43	54
	03-04	9360	5125	5275	4235	49	55
	04-05	10400	5037	5363	5363	48	48
IFICORP (20885)	01-02	20580	6882	14003	13698	33	33
	02-03	16708	9472	11413	7236	45	57
	03-04	18797	13636	7249	5161	65	73
	04-05	20885	19644	1241	1241	94	94
BRP (19800)	01-02	38400	2068	17732	36332	10	5
	02-03	15850	1378	18422	14472	7	9
	03-04	17820	10381	9419	7439	52	58
	04-05	19800	17187	2613	2613	87	87
BRL (as a whole) (75645)	01-02	93280	29422	46223	63858	39	32
	02-03	60526	35160	40485	25366	46	58
	03-04	68081	53116	22529	14965	70	78
	04-05	75645	65484	10161	10161	87	87

From the above, it may be seen that the production of BRP was abnormally poor at 10 and 7 *per cent* of the re-assessed capacity during the years 2001-02 and 2002-03 and there was an overall shortfall in production (Bricks and Masses) of 1.19 lakh tonnes during the last four years ending 2004-05 as compared to TEV projections. Further, the overall production of bricks and masses was in the range of 39 and 87 *per cent* against the re-assessed capacity and between 32 and 87 *per cent* compared to targets as per

Annual Plan during the years 2001-02 to 2004-05. The main reasons for under-utilisation of capacity were (i) non-availability of working capital leading to shortage of raw materials and (ii) excess manpower leading to increased labour cost of Rs.9 crore annually.

While accepting the facts, the Management stated (May 2005) that late release of dues by the majority of customers, acute power crisis, sanction of loan with high interest burden as against grant-in-aid envisaged in the TEV report and un-remunerative selling price vis-à-vis all round increase in rate of critical inputs were the main reasons due to which the Company could not achieve the TEV targets.

The contention of the management is not acceptable as (i) the clients were giving advance towards raw materials of 50 *per cent* of cost of purchase orders placed (ii) the Company had received the full amount of non-plan loan assistance with interest subsidy from the Government of India for reduction of the excess manpower, but the manpower was not reduced and (iii) the Government of India had sanctioned non-plan interest free loan of Rs 16 crore for meeting working capital in addition to guarantee for Rs 30 crore for raising cash credit limit. The conversion cost scheme at BRP involved no expenses on raw materials by BRL and the matter regarding high interest rate on loans should have been taken up with the Government of India for reduction in the rates in view of low interest rate prevailing in the market. Further, selling goods on un-remunerative prices is a failure on the part of the management in taking commercial decisions.

Audit noted that the main problems were that of quality and operational issues, as described in the subsequent paragraphs.

10.4.2 Performance Guarantee System for MCB (RRRP)

Ranchi Road Refractories Plant (RRRP) received (March 2000 to January 2005) nine Purchase Orders from Bokaro Steel Plant (BOSP) for supply of Magnesia Carbon Bricks (MCB) required for relining of converters in its two Steel Melting Shops (SMS). The purchase orders provided for a performance guarantee clause, under which each set of MCB supplied was required to achieve a minimum number of heats[♣] and rate of payment was graded to the number of heats achieved. The Company could not achieve the target of 1231/1232 number of heats in respect of 20 sets out of 22 supplied for SMS-I. Similarly it did not achieve the target of 1300/1600 number of heats in respect of three sets out of five sets supplied for SMS-II. Thus, against the total of 30928 numbers of achievable heats for the total 27 sets supplied during 2001-02 to 2004-05, the Company achieved 24384 number of heats only. As such there was a total shortfall of 6544 number of heats. As a result BOSP recovered from the company a sum of Rs.5.65 crore as penalty for non-achievement of desired heats and also recovered Rs.0.68 crore towards cost of materials supplied by the purchaser in order to complete the sets and for maintaining the sets in operating condition. Thus, the Company suffered a loss of Rs.6.33 crore in the supply of MCBs under performance guarantee system due to non-achievement of prescribed heats.

The Management stated (May 2005) that RRRP was totally dependent on orders from BOSP and hence had to accept the price and estimated life fixed by BOSP. The life of

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♣ ***Heat indicates the number of operation cycles of SMS converter achieved by each relining of converter with MCB set.***

converter depended on operational parameters, which were poor in case of SMS-I, and hence the target life could not be achieved.

Management's reply is not tenable as (i) it was for the Company to take a commercially viable decision to accept BOSP's orders for supply of MCB sets for SMS-I, especially when other manufacturers were not willing to supply sets for SMS-I, (ii) due to poor past performance, the Company was no longer receiving orders from BOSP for MCB sets for SMS-II, which was more lucrative and (iii) the Company had not investigated the reasons for non-achievement of prescribed heats of the MCB supplied to BOSP.

The Ministry stated (February 2006) that RRRP achieved guaranteed 800 heats in all converters except in two cases which was due to operational reasons and committee set up by BSL confirmed the same and recommended for full per heat payment.

Ministry's reply is not tenable since estimated heats could not be achieved and payments were limited to the number of heats achieved, resulting in loss to the company. As regards full payment in respect of two cases, the same has not yet been received by the Company (February 2006).

10.4.3 Performance guarantee system in Slide Gate Refractories (IFICORP)

Bokaro Steel Plant (BOSP) placed eight purchase orders on India Firebricks and Insulation Co. Refractory Plant (IFICORP) between April 2000 and March 2004 for supply of Slide Gate (S/G) Plates and accessories. In the event of non-achievement of estimated heats, the purchase orders provided for recovery of penalty in the form of extra S/G refractory to be supplied by IFICORP free of cost. S/G Refractory supplied by IFICORP failed to achieve the estimated heat guarantee in respect of all the purchase orders due to which it supplied extra refractory materials worth Rs.1.97 crore free of cost during 2002-03 to 2004-05.

The Management stated (May 2005) that IFICORP was buying back used S/G Refractory at Rs.25/- per plate, the application of which, along with introduction of other technical measures, had reduced the batch cost without sacrificing the quality of end product. Thus, if IFICORP had supplied certain materials free of cost, it could save money through reduction in batch cost.

Management's reply is not tenable as the quality of S/G refractory produced in IFICORP was not up to the mark and the Company did not produce figures of purported savings, nor could Audit work this out in the absence of any record.

Ministry stated (February 2006) that though IFICORP had to supply some material free of cost it could save Rs 1.43 crore during 2000-01 to 2003-04 by optimising the cost of production with reduction of raw material cost and introduction of other technical measures.

Ministry's reply is not tenable since the Company, by optimisation of cost of production, could have achieved improved margin in supply of S/G refractory. It could not achieve this due to poor quality of S/G refractory supplied and consequently had to supply it free of cost.

10.4.4 Negligible Production of Silica Bricks (BRP)

Initially the production capacity of silica bricks at BRP was 20000 tonnes, which was reassessed under TEV report to 12000 tonnes. Against this production capacity, the actual

production after rejections during the years 1999-00 to 2004-05 was only 1790 tonnes, and no silica bricks were produced during 2003-04.

Further, during the physical verification of stocks for the year 1999-2000 to 2001-02, 1525 tonnes of silica bricks were found to be short due to which the Company suffered a loss of Rs.1.31 crore.

The Company also suffered a loss of Rs.59 lakh due to excess consumption of raw material (quartzite). During the years from 1999-2000 to 2004-05 it consumed on an average three tonnes of quartzite for every tonne of silica bricks against the norm of 1.05 tonne envisaged in the detailed project report (DPR). This resulted in excess consumption of 3484 tonnes of quartzite valuing Rs.59 lakh.

The Management stated (May 2005) that since inception, silica bricks could not be produced at a stretch due to various reasons and hence quality norm could not be substantiated. The reply of the Management is however, silent on the issues of reasons for negligible/nil production, abnormally high rejections, heavy shortage during physical verifications and abnormally excess consumption of raw materials.

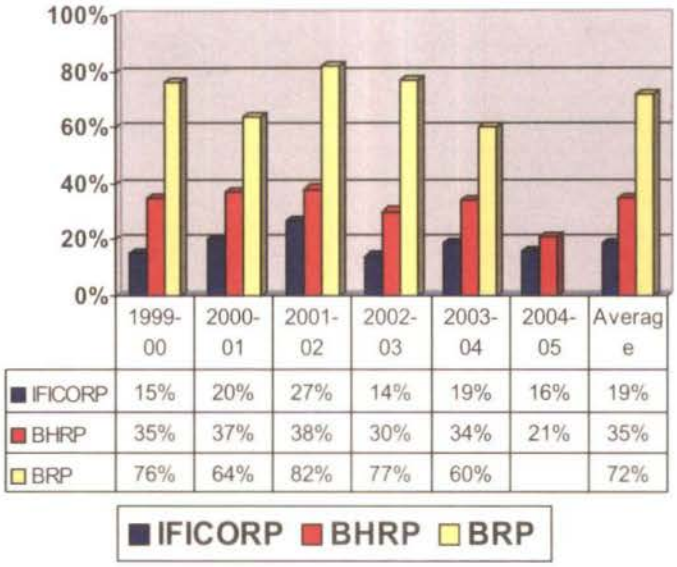
Ministry stated (February 2006) that BRP never had sufficient orders, as such quality of bricks could not be established and the norms of raw materials fixed in the DPR were not practical.

Ministry's reply is not tenable since it could not succeed in obtaining orders and improving the quality. Moreover, no norms were fixed by the Company even though the norms fixed in the DPR were not practical.

10.4.5 Excess Rejection of Bricks

Rejection of bricks occurs at two stages viz. (i) green rejects which cover rejects till the firing stages and (ii) burnt rejects which cover fired bricks rejected during sorting/ inspection.

The company had not fixed any norms for either of the two rejections. However, the TEV study implied a total rejection rate of 10 *per cent*. The actual percentage of rejection of bricks at IFICORP, BHRP and BRP was as follows:



	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	Average
IFICORP	15%	20%	27%	14%	19%	16%	19%
BHRP	35%	37%	38%	30%	34%	21%	35%
BRP	76%	64%	82%	77%	60%		72%

Note: The figures for production of "green bricks" and rejects for basic bricks at RRRP for the period 1999-00 to 2002-03 are not available with management, and have thus not been considered.

The total excess rejection of bricks beyond 10 *per cent* during the period 1999-00 to 2003-04 at these three plants amounted to 20,115 tonnes, resulting in extra operating costs of Rs.20.74 crore. Since the Management did not furnish details of production of green bricks by the three units during 2004-05, the extra expenditure on recycling the rejected bricks during 2004-05 could not be worked out. It would be noticed that even in BHRP, where the quality of masses and castables was being maintained, the process for production of bricks was unsatisfactory.

The Management did not analyse the reasons for such high rejections and also did not offer their comments on the issue.

10.4.6 Poor Utilisation of Presses

One of the reasons for shortfall in production of bricks and lower production of green bricks was poor utilisation of presses installed in the Plants as detailed in the following table:

	Percentage Utilisation	**Average Productivity (Tonnes / machine hr)**	**Productivity as per TEV Study (Tonnes/machine hr.)**
IFICORP (Figures in hours)			
2001-02	26	0.54	0.67
2002-03	26	0.56	
2003-04	36	0.58	
2004-05	44	0.56	

BHRP (Figures in shifts)			
2001-02	23	1.76	3.13
2002-03	19	1.36	
2003-04	17	2.28	
2004-05	NA*	NA*	
RRRP (Figures in shifts)			
2001-02	35	4.16	6.67
2002-03	36	4.68	
2003-04	39	5.00	
2004-05	44	4.8	
BRP (Figures in hours)			
2001-02			
2002-03			
2003-04	47	1.00	1.02
2004-05	30	NA*	

Note: Management did not furnish the figures for production of green bricks and running hours of presses. Hence, productivity of presses for 2004-05 could not be ascertained.

It was observed that:

- Only IFICORP maintained records of downtime by reason, which revealed that out of the 56 *per cent* – 74 *per cent* downtime during 2001-02 to 2004-05, only 6.5 *per cent* was on account of external reasons such as power failure. Other units did not have records of downtime by reason.
- BHRP and RRRP maintained records of utilisation only in shifts (and not in hours), which did not indicate whether the shift was fully utilised or not.
- BRP maintained records for working hours only from 2003-04 onwards

Thus, the utilisation of presses was poor during the period of report and the production in tonnes/machine hour was further lower than the TEV projections. In the absence of detailed records and reasons for downtime, Management would be unable to analyse the data and take effective remedial action.

The Management neither analysed the reasons for poor utilisation of presses nor furnished their comments on the issue.

10.4.7 Excess Consumption of Raw Materials and Fuel

The Company produces various types of refractories for which different raw materials are required. However the Company had not fixed norms for consumption of each type of raw material for each product. On an average, the actual consumption of total raw materials (excluding quartzite for silica bricks) varied from plant to plant. The

consumption of raw materials was in the range of 1044-1104 kgs per tonne of refractories in BHRP, 996-1039 kgs per tonne of refractories in RRRP, 373-1176 kgs per tonne in BRP and 1054-1267 kgs per tonne in IFICORP. There was no reason on record either for the wide variations in consumption of raw materials in different plants when one tonne of refractory was produced with 996 Kg of raw material in RRRP and 373 Kg of raw material in BRP.

Similarly, no norms were fixed for consumption of fuel (coal/coke and furnace oil) at any of the plants. As a result, management had no yardstick against which to properly manage consumption of fuel, or check excess consumption. However, in a proposal for modification/modernisation of existing producer gas plant from coke based to coal as feed stock, the Management projected the consumption of coal and furnace oil as 247 Kg and 53 litres respectively per tonne of refractory on an approximate basis in one of the units of IFICORP.

Based on the above consumption pattern, Audit estimated the excess consumption of coal and furnace oil at IFICORP during the period 1999-00 to 2004-05 at Rs.5.21 crore. The unit also consumed 284 KL HSD oil valuing Rs.64 lakh during 2003-04 & 2004-05 in addition to the furnace oil.

Though the reply (May 2005) of the Management was silent on the issues of non-fixation of norms as well as for wide variations in actual consumption by various plants, it, however, contended that the norms of consumption pattern of coal and furnace oil as pointed out by audit could not be achieved as the unit was running with a very low level of production due to lack of sufficient order for high value product and the position improved with increase in production during 2003-04 and 2004-05.

The Management's reply is not tenable as the consumption of furnace oil and coal was 86 litres per MT and 282 Kgs per MT respectively during the year 2004-05 which was still substantially higher than the consumption pattern indicated above even though the production was increased to 94 *per cent* of reassessed capacity during that year.

Ministry (February 2006) agreed to audit's view point for fixation of norms of raw material and assured to take up the matter with the Company to formulate norms for consumption of raw material.

10.5 Financial performance

10.5.1 Sales/Profitability

The order balance at the end of the year, target vis-à-vis actual sales in quantity and value and gross/net margin in respect of all the four plants for the years 2001-02 to 2004-05 are given in the following table:

Plant	Year	Target sales (MT)	Actual sales (MT)	Value of Sales (Rs. in crore)	Gross Profit (Rs. in crore)	Net Profit (Rs. in crore)	Order balance at the end of the year (MT)
BHRP	2001-02	24900	16215	22.51	(7.60)	(8.68)	19711
	2002-03	19648	19970	29.72	1.20	(11.34)	15726

	2003-04	22104	24018	36.08	5.24	1.13	16161
	2004-05	24560	23616	36.94	4.64	0.15	24239
As per TEV report				26.13	4.75	3.47	
RRRP	2001-02	9400	4503	13.89	(2.13)	(5.22)	3171
	2002-03	8320	4844	14.17	(1.03)	(7.39)	1677
	2003-04	9360	4522	15.68	1.21	(1.46)	3596
	2004-05	10400	5321	17.03	1.79	(3.75)	2767
	As per TEV report			28.43	3.38	2.00	
BRP	2001-02	38400	2119	2.80	(23.68)	(27.46)	42403
	2002-03	15840	1914	2.30	(12.63)	(30.72)	15628
	2003-04	17820	9526	11.99	(0.83)	(7.64)	21593
	2004-05	19800	16697	24.39	4.17	(2.42)	7827
As per TEV report				28.77	6.85	3.48	
IFIC ORP	2001-02	20580	8511	10.80	(20.32)	(21.99)	15858
	2002-03	16708	10019	12.09	(7.55)	(25.06)	21029
	2003-04	18797	13332	22.66	1.33	(1.43)	21593
	2004-05	20885	19019	30.99	4.10	0.81	26313
	As per TEV report			33.53	5.01	3.00	
BRL as a whole	2001-02	93280	55145	50.00	(53.73)	(63.35)	81143
	2002-03	60516	36747	58.28	(20.01)	(74.51)	54060
	2003-04	64585	51398	86.41	6.95	(9.40)	56636
	2004-05	75645	64653	109.35	14.70	(5.21)	61146
As per TEV report				116.86	19.99	11.95	

It may be seen from the above that though one plant viz. BHRP met the sales target for the years 2002-03 and 2003-04, the Company as a whole could never achieve the same throughout the period covered in audit. In terms of value also, the company remained much behind the projections envisaged in the TEV report in all the four years ending March 2005.

Evidently the performance of sales remained poor despite the fact that all the four plants of the Company had sufficient order quantities yet to be executed at the end of each year.

Though, the Company earned operational profits (Gross profit) of Rs.6.95 crore and Rs.14.70 crore during the years 2003-04 and 2004-05 respectively, it incurred net losses of Rs.9.40 crore and Rs.5.21 crore during the above years, mainly due to high incidence of interest burden of Rs.12.97 crore and Rs.14.85 crore coupled with labour cost of excess manpower.

The Management in their reply (May 2005) accepted the facts.

10.5.2 Non-Realisation of Sundry Debtors

The position of sundry debtors for the period 2001-02 to 2004-05 was as follows:

(Rs. in crore)

Year	Sales	Sundry Debtors	Debtors in terms month's sale	Provision
2001-02	58.10	38.93	8.04	12.56
2002-03	68.00	44.40	7.84	14.23
2003-04	100.48	57.34	6.84	14.58
2004-05	127.34	68.23	6.43	16.02

It may be seen from the above that sundry debtors always remained more than 50 *per cent* of sales during the period of report. Doubtful debts also increased from Rs.12.56 crore in the year 2001-02 to Rs.16.02 crore in the year 2004-05. Though the debtors in terms of months sales decreased during the period of report but the same, equivalent to 6.43 months sales was still on the high side.

One major outstanding debt was from M/s Otto India (P) Ltd., a private customer who placed purchase orders on RRRP for converter bottom lining and MCB refractories for work relating to SMS-II of BOSP. Out of Rs.1.70 crore payable for the work, the customer paid only Rs.0.47 crore and the balance of Rs.1.23 crore remained outstanding since March 2003 though M/s Otto India (P) Ltd. received full payment from BOSP. Thus prospect of recovery of the amount remained bleak.

On the issue of huge outstandings, the Management did not furnish any comments in their reply (May 2005). However, on the issue of outstanding from M/s Otto India, it stated that the matter was being pursued with the party for early release of the payment and they also filed a case in the Jharkhand High Court for appointment of an arbitrator.

Ministry stated (February 2006) that the Company had drawn up a plan for realisation of dues from public sector steel plants and efforts were being made through out-of court settlement, apart from legal action, for realisation of dues from M/s OTTO India (P) Ltd.

10.6 Execution of Addition Modification and Replacement (AMR) Schemes

10.6.1 Utilisation of AMR Funds

Between 1999-2000 and 2004-05, the Government released a total of Rs.37.50 crore (Rs.23.50 crore as plan loan, and Rs.14 crore as equity) for executing AMR/capital schemes. Out of this the Company distributed (upto 2004-05) only 25.45 crore to its units. The amount distributed to its various units and the utilisation of the amount on AMR schemes by the units are given in the following table:

(Rupees in crore)

Fund received from Govt. of India			*Fund distributed to the units*				*Funds spent by units*			
Year	*Plan Loan*	*Equity*	*BHRP*	*RRRP*	*BRP*	*IFICORP*	*BHRP*	*RRRP*	*BRP*	*IFICORP*
1999-00	*3.50*	*00*	*0.17*	*1.83*	*0.00*	*1.50*	*0.34*	*0.55*	*0.11*	*0.23*

2000-01	*3.50*	*00*	*0.00*	*0.00*	*2.00*	*1.50*	*0.14*	*0.27*	*0.30*	*0.25*
2001-02	*3.50*	*00*	*1.00*	*1.00*	*0.00*	*1.50*	*0.11*	*0.04*	*0.21*	*0.51*
2002-03	*5.00*	*00*	*1.15*	*0.45*	*0.20*	*3.15*	*0.25*	*0.73*	*0.53*	*0.17*
2003-04	*5.00*	*7.00*	*0.00*	*0.00*	*0.00*	*0.00*	*2.27*	*0.00*	*1.53*	*1.71*
2004-05	*3.00*	*7.00*	*2.00*	*3.75*	*1.75*	*2.50*	*0.01*	*0.29*	*0.57*	*1.76*
Total	*23.50*	*14.00*	*4.32*	*7.03*	*3.95*	*10.15*	*3.12*	*1.89*	*3.24*	*4.63*
Grand Total	*37.50*		*25.45*				*12.88*			

It may be seen from the above that out of the total funds of Rs.25.45 crore distributed by the Company for AMR schemes, the units invested Rs.12.88 crore only on these schemes. Thus, out of the total Rs.37.50 crore meant for AMR schemes, a sum of Rs.12.88 crore was invested for the purpose leaving the balance amount of Rs.24.62 crore, which was inappropriately diverted to other revenue expenses.

Management did not furnish any comment on this issue.

Ministry stated (February 2006) that funds received from the Government under AMR schemes had been utilized for AMR purpose only. However, the Company would verify booking and classification of expenditure.

Confirmation of booking and classification of expenditure is awaited (February 2006).

It was observed in audit that the Company took hasty and injudicious decisions in procurement and installation of plant/equipment valuing Rs.10.02 crore on the major projects under the AMR scheme. The cases are discussed below.

10.6.2 Purchase of an Intensive Mixing Machine by RRRP

While Ranchi Road Refractories Plant (RRRP) had existing mixing capacity of 38,000 tonnes per annum (p.a.) against the requirement of only 12,000 tonnes p.a. as per the TEV report, the plant placed a purchase order in April 2002 for an intensive type counter current mixing machine at a price of Rs.29 lakh against a purchase indent of April 1999. The machine was received only in March 2003, and commissioned in November 2003.

The mixing machine was procured for using Novalac resin, in place of the existing resole resin. According to Management, a gain of Rs.29 lakh per annum on account of this machine was envisaged in 2000-01, when the life of the BOSP converter linings was between 900 and 1000 heats; however, as the life had gone up beyond 2000 heats, the gain would come down. In fact, another PSU viz. Burn Standard Company Limited, having the same machine, had indicated in October 2000 that even after considerable rectification, the performance of this type of machine was unsatisfactory. Out of the available 568 shifts for the period November 2003 to August 2004, the mixing machine was used for only 42 shifts (seven *per cent*). Thus the investment in the machine was injudicious.

The management stated (May 2005) that efforts were made to establish the technology for manufacture of bricks through use of Novolac resin but the same was delayed as the right specification of Novolac resin had not been developed by its suppliers so far.

The reply is not tenable as the purchase of the mixer was made before establishing the technology and development of the required specification of Novolac resin to be used.

Ministry stated (February 2006) that the Mixer would be put into more effective use which would ensure proper mixing and better performance.

Further action is awaited.

10.6.3 Installation of Shuttle Kiln at IFICORP

In May 1998, India Firebricks and Insulation Co. Refractory Plant (IFICORP) obtained administrative approval for installation of a LDO-based 40 tonne batch capacity Shuttle Kiln to achieve firing temperature of 1600 degree centigrade (^{O}C) at an estimated cost of Rs.1.50 crore. Since the bids received were much higher, the project was shelved, but was re-opened in 2001.

In December 2002, a letter of intent for 20 tonne capacity Oil Fired Shuttle Kiln to achieve firing temperature of 1550^{0}C was issued to the lowest tenderer at a cost of Rs.1.82 crore for completion by September 2003. As of May 2005, the kiln had not been completed, and a total of Rs.1.20 crore had been paid to the contractor.

IFICORP had an existing coal gas fired tunnel kiln, with a capacity of 21,200 tonnes per annum, against which the actual maximum production was 65 *per cent* and 94 *per cent* during the years 2003-04 and 2004-05 respectively. The new Shuttle Kiln would thus be redundant. Further, its operation, using costly LDO, would be expensive, as compared to the coal-gas fired kiln. The expenditure of Rs.1.82 crore on the kiln was thus injudicious.

Management stated (May 2005) that they had planned to go in for high value products like high performance S/G plates with zirconia inserts, mullite bricks and Zirmul for glass industries, zero cement castables suitable for fusion case blocks etc., which were highly remunerative. These products required high temperatures (1500^{0}C to 1600^{0}C), which was not possible in the existing Tunnel Kiln. Hence, it was decided to construct a shuttle kiln. There was delay in starting the project due to delay in handing over the site, in dismantling and cleaning of old construction, in civil works etc.

The Management's reply is not acceptable as the technical specification indicating the firing temperature of the Kiln originally planned for 1600^{O}C was later changed to 1550^{0}C and the existing Coal based Tunnel Kiln could achieve the required temperature. The project had not been completed even after seven years.

10.6.4 Modification of Producer Gas Plant at BRP

Bhilai Refractories Plant (BRP) decided to modify its coke-based three – unit Producer Gas Plant (PGP) to a coal-based PGP. As per the techno-economic analysis, the estimated investment of Rs.1.80 crore would generate a net annual saving of Rs.1.96 crore, primarily through replacement of costly furnace oil being consumed in the tunnel kilns for production of basic bricks with producer gas. Accordingly a work order at a total price of Rs.1.85 crore for all three units was issued in August 1999 on M/s India Industrial Enterprises (IIE); the work was to be completed by July 2000, with the first PGP unit by February 2000.

Analysis in audit revealed that the first PGP was modified and commissioned in July 2004. However, a number of complaints were reported which required rectification. Modification of second PGP had not been taken up so far (March 2005). In August 2003, the modification of the third unit was diverted to IFICORP at the same rates, terms and conditions.

There was a delay in commissioning of 16 months from March 2003 due to the failure of the Company to procure coal; this was finally procured from BSP. In this connection Audit observed as under:

- A comparison of fuel costs for July 2004 and September 2004 (after connection of the PGP gas line) for production of basic bricks in the tunnel kiln indicated that the fuel cost/tonne had gone up from Rs.1,355 to Rs.1,561, an increase of Rs.206/tonne as against the envisaged reduction.
- The contractor was paid Rs.1 crore upto June 2005. There was no progress on the modification of the other two units.
- The expenditure on modification of the PGP had thus become infructuous.

The management has not furnished any comment.

Ministry stated (February 2006) that the complaints had been rectified and PGP was running smoothly. The contractor was paid as per the payment schedule which was linked with the progress of job.

Ministry however, had not given its comments about non-completion of the modification of the other two units although Rs 1 crore had already been spent on the project.

10.6.5 Purchase of Sacmi Press

Ranchi Road Refractories Plant (RRRP) installed a new 2500 tonne Sacmi hydraulic press at a cost of Rs.7.53 crore in December 1999. The 2500 tonne press was purchased, as against a global tender for only a 2000 tonne press initially, on the grounds that the larger press would be able to make larger sized MCBs. However, during the period 2000-01 to 2003-04, the average capacity utilisation of this press remained at 37 *per cent* of the production capacity of 4800 tonne of bricks per annum. As such, this press on which expenditure of Rs.7.53 crore was incurred was grossly underutilised.

The management stated that if they had procured the 2000 T press, 800 X 125 mm and 900 X 125 mm brick could not have been produced at RRRP. The reply is not tenable, since as per the proposal for purchase of the press, even a 2000 T press could produce bricks of the above sizes.

Management further contended that provision for producing 1000 X 125 mm bricks in future was made. This is also not tenable, since no order for the above sized bricks had been received even after five years of installation of the press.

10.7 Other points of interest

10.7.1 Continuous Casting Project

In order to develop the capacity for manufacturing refractories for continuous casting of steel, BRL entered into three collaboration agreements in October 1991 with Shinagawa Refractories Company, Japan (SRC) for transfer of technology/know-how for setting up a 3000 tonnes p.a. plant at a lump sum royalty of 63 million yen (equivalent to Rs.1.45 crore). Between 1992 and 1997, the company paid Rs.1.12 crore to SRC on this account.

The Board of Directors also approved setting up of a refractories project in December 1992 for continuous casting of steel at an estimated capital cost of Rs.19.88 crore. While Government of India sanctioned and paid Rs.20 crore for this project between 1997-98 and 2000-01, these funds were utilised for replacement/revamping of obsolete machinery. Subsequently, the Company signed an MOU with Monnet Ispat Limited in May 1999 for setting up this project as a Joint Venture (JV) at an estimated cost of Rs.35 crore, and the Board of Directors also approved the formation of the JV Company in February 2001.

However, till date, no action had been taken to set up this project, and the expenditure of Rs.1.12 crore on technology transfer had become infructuous.

The Management stated (May 2005) that the project was not implemented for want of resources. Budgetary support of Rs.20 crore earmarked for the project was utilised on other schemes for replacement/revamping of obsolete machinery. It also stated that the Company was pursuing the setting up of the project at the earliest.

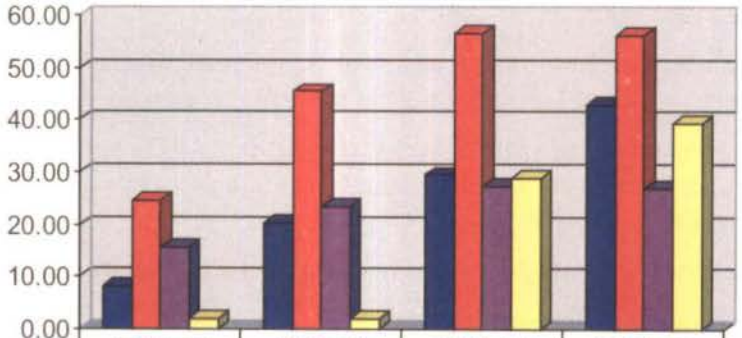
The reply is not tenable since, despite the technology transfer agreement with SRC being signed in 1991, the project has not yet been started (May 2005), especially when large number of manufacturers have entered the market. It was doubtful whether a 15 years old technology would be fruitful at this juncture, rendering the expenditure of Rs.1.12 crore incurred infructuous.

10.8 Manpower

The TEV Study recommended a reduction in total manpower from 3013 as of March 2001 to 1311 by March 2002. However, even as of March 2005, the total manpower was 1704, which was in excess of the TEV norm by 393 employees.

According to the TEV Study, the projected reduction in manpower would have ensured that BRL's labour productivity would go from 11 tonnes per man per year to 58 tonnes per man per year, as compared to the average of 60-70 tonnes per man per year for Indian refractory producers and 100-300 tonnes per man per year for foreign producers. The position of each unit was as follows:

(Productivity in tonnes per man/year)



	2001-02	2002-03	2003-04	2004-05
IFICORP	8.30	20.30	29.40	42.90
BHRP	24.70	45.40	56.40	56.00
RRRP	15.60	23.40	27.30	26.90
BRP*	2.04	1.96	28.80	39.40

Note: For the above calculations, casual workers engaged by units have also been included.

* Labour productivity in BRP for 2003-04 & 2004-05 has been worked out considering conversion job of MCB also.

With the improvement in their capacity utilisation, BHRP also substantially improved its labour productivity, though it was still below the TEV projections. The position in other

units, particularly RRRP, was much below the TEV projections. Production at BRP increased substantially but labour productivity indicated was less due to excess strength of manpower.

Ministry stated (February 2006) that productivity of RRRP had reduced due to lack of working capital and orders and there was increase in labour productivity during 2005-06.

Audit observed that although there was improvement in the labour productivity, yet it was far below the industry norm.

10.9 Business Planning and Financial Management

10.9.1 Business Plan

At its 140 meeting in September 2004, the Board of the Company asked for a Business Plan for five years. In response, the Company prepared and submitted a production plan for five years, with the following noteworthy features:

- The plan did not cover investment and profitability aspects. No increase in capacity had been indicated, nor any techno-economic studies conducted.
- The plan indicated 100 *per cent* capacity utilisation for 2005-06 and 2006-07 (except RRRP) and more than 100 *per cent* capacity from 2007-08 to 2009-10. In particular, it projected BRP's production of bricks at 14,000- 16,000 tonnes p.a., against the re-assessed capacity of 19800 tonnes.
- It projected the production of Concast refractories at IFICORP from Rs.10 crore to Rs.15 crore during 2007-08 to 2009-10, although no action to set up this project had yet been taken as commented upon in para No. 10.7.1.

The optimistic projections in the plan, without detailed justification, was indicative of the Management's lack of serious interest in the planning process.

The Management stated (May 2005) that the Board of Directors desired preparation of business plan through an outside agency. Accordingly, preparation of business plan was under progress by MECON.

Ministry stated (February 2006) that business plan had since been prepared by MECON.

10.9.2 Costing and Budgeting System

The Company did not prepare any costing manual, nor had it adopted any proper costing system (with standard and actual costs) for the purpose of cost accounting and cost control. As stated in para No 10.4.7, no norms were fixed for consumption of raw materials and other inputs like fuel and electricity. Cost of production was worked out on a rough basis for a group of products, primarily for valuation of inventory. While original and revised budgets were prepared annually, variance analysis of actual vis-à-vis budgeted expenditure was not conducted. Thus, the Company's controls over budget and cost were weak.

Ministry stated (February2006) that the Company was in the process of setting up a Costing and Budgeting department for the purpose of cost accounting and cost control.

10.10 Internal Audit set up

The last internal audit of the Company was conducted by an outside firm for the year 1999-2000 for four units. The company had no internal audit department, and the post of

Chief Internal Auditor was vacant. Though a Chief Manager (Finance) was appointed as Chief of Internal Audit in August 2005, no internal audit team had been constituted as yet (December 2005).

Ministry stated that during 2002-03, a large number of finance executive and staff opted for voluntary retirement and the present strength was fully utilized in accounts job. The Company was contemplating transfer of staff from departments other than finance for setting up the internal audit department. Considering the cost and present financial crisis, engagement of outside parties might not be desirable.

Further action is awaited (February 2006).

10.11 Conclusion

The Company received three revival packages during the years 1997 to 2002, wherein it got various concessions like waiver of interest on loans upto March 1995, grant of interest free working capital loan, interest holiday upto 2007-08, four years moratorium for repayment of loan, conversion of loans into equity and cash assistance of Rs.234.60 crore in the shape of loan and equity.

Despite these substantial concessions, the Company could achieve maximum 87 *per cent* of the reassessed production capacity of 75645 tonne per annum due to under utilisation of presses, excess rejection of bricks, lower demand of MCB sets on account of poor quality, negligible production and abnormally higher rejection in case of silica bricks at BRP. The Company managed to earn operational profit of Rs.6.95 crore and Rs.14.70 crore during 2003-04 and 2004-05 respectively as against TEV projection of Rs.19.19 crore and Rs.19.23 crore for the third and fourth year of the revival scheme respectively. However, it could not earn net profit and instead incurred net loss ranged between Rs.74.51 crore and Rs.5.21 crore during the years 2002-03 and 2004-05 respectively against the TEV projection of Rs.11.95 crore. The accumulated loss on 31 March 2005 was Rs.325.56 crore which had eroded the entire paid up capital and a substantial portion of loan received from Government of India. The main reasons for non achievement of profit targets were lower production, negligible production of silica bricks, production of poor quality of MCB sets, S/G refractory, excess manpower leading to excess expenditure of Rs.9 crore per annum, non realisation of sundry debtors and excess consumption of raw materials.

The Company had taken a number of hasty and injudicious decisions for procurement and installation of equipment/plant etc. resulting in blocking up of capital and loss of interest. The Company could not achieve the desired results from installation of Mixing machine, gas producer plant, Sacmi press etc and the same were lying un-utilised/under-utilised.

The mechanism of managerial control in the company like costing and budgeting system, internal audit system etc. was weak. The Management had not fixed operational norms, norms for consumption of raw materials and fuels etc. against which it could measure its performance. The Company had also not prepared and approved manuals for purchase, contract, stores, costing, accounting etc.

CHAPTER: XI

MSTC Limited

High Seas Sale Activity

Highlights

During 2002-03 the Company surpassed the targets of turnover and was also rated 'Excellent' in terms of MOU; however, it failed to meet the target of ensuring that at least 20 *per cent* of the imports were for non-captive buyers.

(Para 11.7.1.1)

The specific contribution of High Seas sale activity to the overall financial performance could not be ascertained as no separate cost records had been maintained for allocation of overheads made to this activity.

(Para 11.7.1.2)

During the last five years ending 31 March 2005 maximum business was derived from four to five items. Growth in overall sales of the Company had been price driven and not volume driven. Concentration of sales on limited number of products and a single customer i.e. HPL involved attendant risk of loss of flexibility and sudden decline in volume of business in future.

(Para 11.7.1.3)

Internal audit of International Marketing Division was conducted by an external agency from 2002-03 onwards. However, Board was not apprised of major internal audit findings.

(Para 11.7.2.1)

Scrutiny of records did not reveal any process of verification of rates of the suppliers with the prevailing market price to ensure acceptance of competitive rates.

(Para 11.7.3.1)

As envisaged in the Strategic Plan (2003-07), the Company had not developed the market research function till October 2005.

(Para 11.7.3.2)

The existing Manual for Import of the Company does not provide for scrutinizing credentials of new buyers and foreign sellers through independent rating agencies.

(Para 11.7.4.2)

Deviations from the terms and conditions of MOAs e.g. terms of lifting of goods, provision of bank guarantees, storage of goods in Company controlled warehouses and stockyards, issue of goods at prices less than provisional issue prices, etc. were noticed in several cases.

(Para 11.7.4.3)

As a result of allowing waiver of third party inspections and quality and quantity certification by the supplier in the MOA with Reliance Silicones (India) Pvt. Ltd., the Company incurred a loss of Rs.4.03 crore.

(Para 11.7.4.5)

Non-inclusion of adequate safeguards in the MOA entered into with Shamon Ispat Limited (SIL), a 100 *per cent* EOU client led to waiver of interest of Rs.82.00 lakh, which was otherwise recoverable as per MOA.

(Para 11.7.4.6)

Gist of recommendations

- Operational Plans need to be drawn up based on data analysis specifying the concrete measures/actions to be taken and quantifying the levels of various activities required to achieve the MOU targets.
- Cost Records may be maintained so that product-wise/ segment-wise (import/export/domestic)/activity-wise (trading/selling agency) performance is ascertainable which will provide the management with information for control and decision making and also help in developing Strategic Business Unit (SBU) concept.
- Management should develop competence in the area of procurement of materials at competitive cost to be able to carry out full-fledged trading activity as envisaged in the Strategic Plan.
- To ensure its emergence as a diversified trading house, the Company needs to actively identify buyers' needs and attune the activities of its Marketing Division to the market trends.
- The Company should insist on adherence to the conditions of MOA by the customer. Relaxation may be permitted only after amending the MOA after approval by the competent authority.

11.1 Introduction

11.1.1 MSTC Limited (formerly known as Metal Scrap Trade Corporation Limited) was incorporated under the Companies Act, 1956 in September 1964 under the administrative control of the Ministry of Steel. The Company became a subsidiary of Steel Authority of India Limited (SAIL) in February 1974. In the year 1982-83, it was converted into an independent Company by transfer of its shares from SAIL to the President of India. It was declared a Mini Ratna Company in 2001.

11.1.2 The Company has two major spheres of activities viz; selling and marketing. As a selling agency, the Company undertakes disposal of ferrous scrap and other secondary arisings generated in integrated steel plants and disposal of scrap, surplus stores, etc. from other public sector enterprises and government departments including the Ministry of Defence. In the area of marketing, the Company imports material required by large industrial houses on back-to-back basis and transfers the same to the buyer through High Seas sales. Under High Sea Sales system, buyer approaches the Company with the purchase requirement and a Memorandum of Agreement (MOA) is entered into with the buyer. The Company then floats the tender on its website and obtains quotes, the offers are sent to the buyer for their comments and acceptance and after receiving the buyer's acceptance, the Company finalises the Purchase Order followed by opening of Foreign Letter of Credit after acceptance of Purchase Order by the seller. After receipt of Bill of Entry from the foreign supplier the Company sells the entire quantity of material to the

buyer on High Seas Sale basis prior to arrival of the ship at the unloading port and takes post dated cheques for the invoice amount. On the basis of that sale, the buyer files the Bill of Entry with the Customs authority and pays the customs duty. The buyer pledges the materials to the Company and stores it in a stockyard controlled by its authorized custodian and takes delivery of the material as and when required after making necessary payments to the Company. The items imported include petroleum products, Low Ash Metallurgical (LAM) coke, Coking coal, Direct Reduced pellets, Hot Rolled (HR) Coils and melting scrap. The International Marketing Division at the Corporate Office in Kolkata looks after the High Seas sale operations. Marketing activity also includes direct trade in items within the country.

11.2 Organisations Structure

The Management of the Company is vested with the Board of Directors headed by the Chairman cum Managing Director (CMD). The members of the Board are nominated by the Ministry of Steel. Though the Memorandum of Association stipulates a minimum of three Directors, the actual number was two from May 2003 onwards. The functional areas of the Company are looked after by executive officers of the rank of Chief General Manager/General Manager.

11.3 Scope Of Audit

Performance Audit was conducted to review the performance of the company on account of the marketing operation with reference to the strategic plan/MOU targets and the process and transactions on account of High Seas sales. The thrust areas of audit were contract management and effectiveness of the process for High Seas sale and related internal controls. Audit examination covered 63 MOA the Company had entered into with 21 parties during the period April 2000 to March 2005 and other records/files related to High Seas sale.

11.4 Audit Objective

Performance Audit of High Seas sale activity was taken up to ascertain whether:

i. the goals set in the operational plans/MOUs were consistent with the strategic plan of the Company and same were achieved;

ii. internal control and accountability within the Company provided sufficient assurance for safeguarding the financial interest of the Company;

iii. systems and procedures for entering and executing MOA for High Seas sales ensured protection of the Company's financial interests.

11.5 Audit Methodology

Audit methodology involved detailed examination and analysis of MOA files and records relating to High Seas sale for the period April 2000 to March 2005 and a comparative analysis of best practices followed by other similar Public Sector undertaking engaged in similar business like MMTC Limited (MMTC) and State Trading Corporation (STC).

11.6 Acknowledgement

For conducting this performance audit, the audit team visited the Corporate Office of the Company at Kolkata as well as the Southern Regional Office at Chennai. Audit acknowledges the co-operation and assistance extended by different levels of management at various stages of the Performance Audit.

11.7 Audit Findings

11.7.1 Achievement vis-a-vis corporate goals

11.7.1.1 The Strategic Plan (2003-07) while highlighting the areas of concern for the future as well as identification of new business areas, set out the objectives for the year 2002-03 also. The following activities, inter-alia, were envisaged to achieve the financial goals of the organisation.

i. drawing up of an operational plan by February each year

ii. development of risk management module to undertake trading in the true sense

iii. conducting market survey to assess customer satisfaction

The Company also entered into a Memorandum of Understanding (MOU) with the Ministry of Steel each year.

It was observed in audit that no operational plans were prepared by the Company. Documentation of the planning process to attain stated goals was not on record. The Management contended (October 2005) that no separate operational plan needed to be drawn up as MOU was signed with the Ministry of Steel based on the Strategic Plan (2003-07). However, while Strategic Plan/MOU indicated the larger objectives and strategy to be followed in a broader perspective, the detailed operational plan was required to further break down the major objectives/goals and specify the concrete measures/actions to be taken and quantify the levels of various activities required to achieve the MOU targets. Mere fulfillment of major MOU targets was not adequate as during 2002-03 the Company surpassed the targets of turnover and gross margin and was also rated 'Excellent' in terms of MOU; however, it failed to meet the strategic target of ensuring that at least 20 *per cent* of the imports were for non-captive buyers. The Management contended (December 2005) that the target of importing for non- captive buyers was considered keeping in view the proposed introduction of VAT which had not yet happened. The contention of the management is not tenable since this target was not related to introduction of VAT. The Company categorically stated in its strategic plan (2003-07) that the idea behind setting the target of at least 20 *per cent* of the import for non- captive buyers was basically to import without a back to back contract and undertake trade in the real sense. Failure to achieve this target reflected inability of the management to develop competence in the area of procurement at competitive cost which was also one of the strategic objectives.

11.7.1.2 While the Company's financial performance was 'excellent' vis-à-vis the MOU target during the period 2000-2001 to 2004-2005 as given at Table I below, the specific profit contribution of High Seas sale to the overall financial performance could not be ascertained as no separate cost records for or allocation of overheads made to High Seas sale transactions were maintained by the Company.

Table- I

(Rs. in crore)

Year	MOU Target	Achievement	
	Total Sales	Total Sales	High Seas sale
2000-01	220	324.19	324.03
2001-02	285	422.77	421.98
2002-03	400	2045.69	1468.68
2003-04	1835	3292.62	2566.75
2004-05	2645	4870.80	4611.08

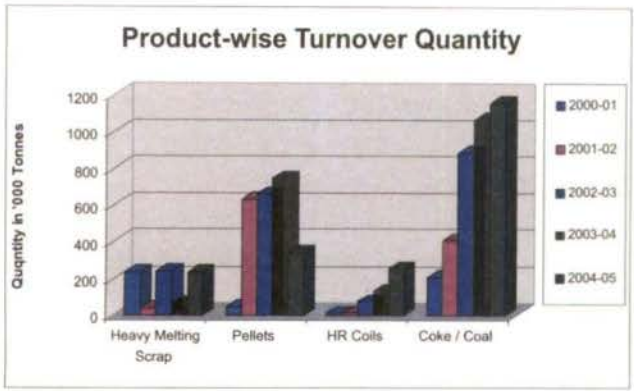
11.7.1.3 Analysis of Turnover

As shown in Table I, the year wise percentage of High Seas sale to total sales varied from 72 *per cent* to 100 *per cent* during the period April 2000 to March 2005. A review of the item-wise quantity sold during the last five years revealed that maximum business was derived from four to five items namely, Heavy Melting Scrap, Pellet, HR Coils, Coke/Coal and Naphtha. These contributed 78 *per cent* to 96 *per cent* of the total turnover during the period 2000-01 to 2004-05. Of the above five items, trading in Naphtha for Haldia Petrochemicals Limited (HPL) contributed 46 *per cent* to 55 *per cent* of the total turnover during the period 2002-03 to 2004-05. Factors contributing to increase in turnover are indicated in Table II below:

Table II

Year	Total Turnover (Rs. in crore)	Increase in Turnover (*per cent*)		
		Over previous year	Over previous year on account of HPL	Over previous year on account of other factors *
2000-01	324.19	-	-	-
2001-02	422.77	30.41	-	30.41
2002-03	2045.69	383.88	253.44	130.44
2003-04	3292.62	60.95	35.91	25.04
2004-05	4870.80	47.93	13.05	34.88

* Note: Other factors include increase in the international prices of heavy melting scrap, Pellets, Coke/Coal, and HR Coils.



Analysis of turnover of commodities other than Naphtha shows that huge surge in price of commodities and industrial raw materials during 2002-03 to 2004-05 (average price of coke/ coal increased by 24.30 *per cent* to 64.55 *per cent* over the preceding years while similar increase in case of HR coils was 24.25 *per cent* to 52.33 *per cent*) had resulted in this growth in the value. Volume of business in quantitative terms increased only in case of coke/

coal and HR coils while in case of Heavy Melting Scrap and Pellets there had been no steady growth in volume. Thus, growth in sales (excluding the sales made to HPL) had been basically price driven and not volume driven As the Company excessively relied on limited number of products and a single customer i.e. HPL there was attendant loss of flexibility and risk of sudden decline in volume of business in future and in the event of commodity market stabilizing at lower price levels, the existing volume (in value terms) would shrink drastically. The Management accepted the risk involved in banking on a few large customers but was silent on other issues viz. spreading of risk, growth in sales only due to price rise and lack of steady growth in volume of heavy melting scrap and pellets during the period 2000-01 to 2004-05. The Management also stated that the resource constraint primarily in terms of manpower was more acute for MSTC than it was for other trading concerns. The Management's contention of manpower constraint for High Seas Sale is not acceptable as the Management can always consider deployment of skilled personnel, if warranted by its business plan.

Recommendations

- Operational Plans need to be drawn up specifying the concrete measures/actions to be taken and quantifying the levels of various activities required to achieve the MOU targets.
- Management should develop competence in the area of procurement of materials at competitive prices to be able to carry out full-fledged trading activity as envisaged in the Strategic Plan
- Cost Records may be maintained so that product-wise, marketing/selling agency wise performance is ascertainable which will provide the Management with information for control and decision-making and help in developing Strategic Business Unit (SBU) concept.
- The Company needs to diversify its products basket and widen its customer base to spread risk.

11.7.2 Control Environment

11.7.2.1 Internal Audit Department

Although the company has been in existence since 1964, no Internal Audit manual, guidelines or standards had been prepared (August 2005). Internal audit for regional and branch offices was carried out departmentally but there was no full-fledged Internal Audit wing. Internal audit of International Marketing Division (IMD) was conducted by an external agency from 2002-03 onwards. The findings of Internal audit were discussed in Annual Regional Managers meeting. However, the Board was not apprised of the major findings. Further, no follow up action for remedying the weaknesses/deficiencies was on record till 2003-04. The Management (August 2005) stated that preparation of Internal Audit manual was in progress.

11.7.2.2 Delegation of Power

Activities of the IMD were mainly carried out by the Corporate Office situated at Kolkata with limited assistance for follow up action from the Regional Managers/ Branch Managers. All financial powers were vested in the CMD. The Company made no adequate and appropriate delegation to officials at different levels. This was contrary to

the fundamental rule of internal control that the work of one person should be independently checked and authorised by another. The Management stated (May 2005) that delegation of power of the Company was under revision.

11.7.2.3 Ascertainment of deal-wise Cost

In the absence of costing records the Company could not segregate costs incurred in respect of each consignment or compute profit/ loss on consignment-to-consignment basis. Proper consignment wise costing was necessary to exercise financial control over the various deals and to determine the profit trend, viability of a deal and scope for improvement. This could also facilitate future planning on a realistic basis. The Management stated (October 2005) that this was followed as cost of materials plus actual expenses other than overhead plus markup was the issue price for each consignment. However, in the absence of a system for ascertaining and allocating the incidence of actual overhead costs, budgetary control could not be made meaningful and control-oriented. The Management further stated (December 2005) that in view of the number of contracts executed annually, consignment wise apportionment of indirect costs like overheads including salary and wages might not be possible. The Management's reply is not acceptable as proper consignment wise costing is necessary to exercise financial control over the various deals and to determine the profit trend, viability of a deal and scope for improvement.

11.7.2.4 Non-maintenance of Order Book and quantity records

The Company did not maintain any records/statistics of total quantity of orders received, quantity of orders executed, quantity of orders not executed and the reasons thereof. The Management was also aware of the fact that the records were not readily available especially those pertaining to the earlier periods. As such MIS and maintenance of records was an area of weakness. This was important for analysing the performance on individual transaction. The Management stated (October 2005) that order book position was maintained customer wise in the form of a stock statement. A review in audit revealed that the order book quantity vis-à-vis orders executed was not maintained and the same was also confirmed by the Management (September 2005). The Management while reiterating its reply of October 2005 further stated (December 2005) the accounts department also maintained a customer ledger. The reply is not acceptable as the records maintained by the Company do not show the details of orders received but not executed.

Recommendations

- Delegation of powers should be so devised that a single authority cannot initiate, authorise and conclude a transaction.
- Costing system needs to be devised so that consignment-wise profitability is ascertainable.
- Data and records of orders received and executed may be compiled in a systematic manner for the information of the top management and for use in fixation of target, evaluation of performance of suppliers etc. Necessary format may be devised in consultation with peer organisations/outside consultant.

11.7.3 Market intelligence and awareness of environment

11.7.3.1 Selection of seller

As per the prescribed procedure tender inquiries were hosted on the Company's website for procurement of material. Scrutiny of records did not reveal existence of any process of verification of rates quoted by the suppliers with the prevailing market price to ensure acceptance of competitive rates. While the Management remained silent on the issue of methodology followed for ensuring competitive rates, it contended (October 2005/December 2005) that since the Company worked on the basis of cost plus mark up, the cost of materials would not affect the performance of the Company. Further, since the orders were placed after taking concurrence of the buyers to the rate quoted, it was reasonable to expect the buyer to negotiate the best price. The reply of the Management is not tenable as dependence on the buyer to negotiate the best price would hinder the capability of the Company to procure at competitive rates which is vital for its development as a direct trader. It was also observed that PSUs like the State Trading Corporation subscribed to Reuter Terminal, Coal portal etc. to obtain international prices of major commodities. Further, non-competitive procurement of material would make it difficult to find alternative buyer if the original buyer failed to lift the material.

11.7.3.2 Formation of Market Research Team

One of the objectives in the area of marketing as per the Strategic Plan (2003-07) was to do import trade in at least eight items which were to be chosen every year because demand supply equation and imported versus indigenous material price equation change very fast. Accordingly, it was envisaged in the strategic plan to further develop the market research function in order to compete, analyse real time information and select eight items for import. However, the company had not developed the market research function till October 2005. While indicating resource constraints in conducting market research the Management (December 2005) noted the audit views for compliance.

11.7.3.3 Non-maintenance of Customer database

The Company had not developed any customer database for sale of various products. In case of buyers failing to lift imported material, such a database would help the Company in identifying alternate buyers. Management contended (October 2005) that it was not always possible to find alternate buyers as the Company imported raw materials for industry and the specifications were often customized. The main strategy was to secure a deposit in advance to cover any possible consequence of variation in the market price in the short-run. The Management further stated (December 2005) that the information about customers was easily obtainable and the resources required to maintain and update an all India customer base might not be justified in view of its possible scant use. Management's reply is not tenable as MMTC, one of the Trading Houses in the Public Sector adopted (January 2005) a policy of conducting preliminary study of the mode of disposal to alternate buyers/ users in case the original buyer failed to lift the material within the prescribed period and incorporated the same in the purchase proposal while taking approval from competent authority. As the commodity market is volatile and procurement cost is not always competitive, booking customized materials without any alternative buyer involves an element of risk. Management while accepting the audit contention replied that the level of risk inherent in the business was acceptable to it.

Recommendations

- A Market Research Team needs to be formed for addition/deletion of items approved in the Import List keeping in view the changes in the business environment.
- A list of alternate customers should be prepared for products imported. Prior to dealing in new items the Company should develop knowledge base and ascertain availability of alternate customers.
- To obtain international prices of all major commodities, the Company may subscribe to Reuters Terminal, Coal portal etc. which is being done by the other PSUs like STC.
- Sound mechanism needs to be developed to have constant vigil on the movement of prices of materials in the market.

11.7.4 Contract Management

While reviewing the MOA's entered into by the Company the following deviations from best practice, prescribed manuals and the terms and conditions of the MOA's were observed in audit:

11.7.4.1 Delay in revalidation of MOA

The Company entered into MOA with buyers generally for one year and revalidated the same in the succeeding year, if the buyer so desired. It was noticed in seven cases[♣] is that the revalidation of MOA was not done in time which was an indication of lack of adequate follow up and control over documentation. Although as per Contract Act, continued performance by both the parties ipso facto connotes continuation of the contract, delaying the revalidation of MOA was not desirable as it did not conform to sound business practice.

11.7.4.2 Deficiency in Manual for Import

The practices for High Seas sale followed by the Company and the Manual for Import as adopted in January 2001 did not provide for:

i. Establishment of credentials of new buyers through a renowned credit rating agency before entering into any MOA with them.

ii. Checking of the credentials of the foreign sellers through independent rating agencies like Standard & Poor, Dunn & Bradstreet, etc.

iii. Manual did not specifically indicate occasions/ situations where issue of tender for procurement of materials from overseas was not to be resorted. Rather it left the decision to initiate action for procurement of the items from overseas sources for tendering or otherwise to be "mutually agreed" upon between the Management and the customer.

♣ *Usha Ispat, Balasore Industries, Haldia Petrochemicals Ltd, Uttam Galva, Ispat Industries, Maharashtra Steel Rolling Mills and Maheswari Brothers*

Although the necessity for revision of the Import Manual (2001) was felt in March 2003, revised manual became available only in September 2005. Even the revised marketing manual introduced was silent on the necessity for establishment of credentials of new buyers through a renowned credit rating agency, a practice that would reduce the transaction risk before entering into MOA with these organisations. MMTC adopted this practice in January 2005.

11.7.4.3 Audit observed that the Company frequently failed to ensure adherence to the condition of the MOA by the customers. The details of important cases in which such irregularities were noticed in audit are given in para 11.7.4.4 to 11.7.4.7. A summary of such deviation from MOA terms is given below -

i. As per MOA terms subsequent orders were to be placed only after regular lifting of goods received in current consignment. However subsequent order was placed in six cases♦ before regular lifting of current consignment.

ii. As per MOA the materials were to be warehoused in stockyards controlled by the company but the goods were kept at the buyer's premises in three cases♥

iii. No bank guarantee was taken in four cases♠ and in one case • it was not sufficient.

iv. No third party inspection of material was done leading to dispatch of wrong material in one case (RSIL).

v. As per the MOA, the goods were issued initially at a provisional price and the final price was decided taking in to consideration the actual cost of material overheads and margins. In two cases♦ it was observed that materials were issued at a price lower than the provisional issue price at the request of the buyers.

Further, the following irregularities were also observed in the execution of MOAs:

i. Post dated cheques received from buyer towards payment for goods bounced in four cases♥

ii. The Company did not obtain competitive price and placed contract on L-2 bidder at the instance of buyers in two cases⇔.

11.7.4.4 Important cases of individual irregularities in executing and implementing the MOA are detailed below.

11.7.4.5 Reliance Silicones (India) Pvt. Ltd. (RSIL) approached (May 2002) the Company to import Volatile Silicone Cyclic Mixture (Hyper pure) from RMSP (UK) Limited and MOA was signed in July 2002. The selection of RSMP (UK) and waiver of critical conditions of third party inspection and certificate of quality and quantity given by the seller were done at the instance of RSIL. Material worth Rs.5.97 crore imported in

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• *Reliance Silicones (RSIL), Shamon Ispat (SIL), Sarbati Steel Tubes Ltd (SSTL), Mukund Ltd (ML) and Marmagoa Steel Ltd (MSL), Yeses International Ltd (YIL)*

♥ *SSTL, YIL, Usha Ispat Limited (UIL)*

♠ *RSIL, SIL, Uttam Galva Steel Limited, YIL*

• *SSTL*

♦ SST*L and YIL*

♥ *RSIL, SIL, SSTL, YIL*

⇔ *RSIL and UGSL*

three shipments was cleared under advance license. The material was not lifted by the buyer. Subsequently, it was observed that the actual material dispatched was different from what was intended to be bought. In fact, in the petition filed in the High Court by the Company (May 2004) for recovery of outstanding dues, the Company stated that the material purchased was nothing but water. Consequently the Company failed to recover the dues and provided as bad and doubtful debts an amount of Rs.4.03 crore in the annual accounts of 2004-05. Deficiencies/lapses committed by the Company in this transaction were as follows:

i. No third party inspection was carried out leading to dispatch of wrong material.

ii. Credit report of RMSP (UK) Ltd. was not obtained through bank though the issue was raised internally.

iii. Although the material of first shipment was not lifted, second and third shipments were imported which was contrary to the provisions of MOA (clause 4.9).

iv. The Management relied entirely on the buyer in respect of the price of the imports.

This case is an example of managerial failure at the initial stage itself where the credentials of both the buyer and seller had not been checked prior to placement of purchase order.

The Management, inter alia, replied (December 2005) that the allegations regarding the quality of the cargo in the Affidavit were made as a part of legal strategy. This indicates lack of business ethics and absence of professionalism. Further, the Management's contention regarding acceptance of liability by RSIL is not tenable as the buyer (RSIL) had clearly denied the liability in its letter to Chairman cum Managing Director (June 2004).

11.7.4.6. An agreement was entered into with Shamon Ispat Limited (SIL), a 100 *per cent* Export Oriented Unit (EOU), for import of HR coils in December 2000. As per clause 2.2.2 of MOA quantity to be ordered and placement of subsequent orders would depend on regular lifting by SIL. However, the progress of lifting of the material by the customer was not satisfactory from third shipment onwards resulting in accumulation of HR coils. This aspect was not considered by the Company while placing further orders leading to further piling up of stock. The material could not be sold to alternative buyer as it was purchased for a 100 *per cent* EOU and was cleared under advance licence[♦]. This issue was not considered while entering into MOA with SIL. Post-dated cheques obtained from SIL bounced. The Bank Guarantee was encashed to cover material value and part of interest. The Company finally settled the case by waiver of interest of Rs.82.00 lakh. The Management's contention that there was no loss as principal together with interest had been recovered from SIL was not tenable as interest of Rs.82.00 lakh recoverable as per MOA had to be waived. The Management further stated (December 2005) that adjustment of interest was a common commercial practice to be adopted depending on the changing realities of the market situations. The Management did not however, give

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♦ ***Materials cleared against advance licence are to be used for production of items for export by the individual /organisation clearing the goods under such license***

any explanation for the lapse that occurred due to deviation from the lifting clause of the MOA and the remedial action being considered to put in place adequate safeguards required in dealing with EOU clients.

11.7.4.7 The Company processed (April 2003) an indent from Uttam Galva Steel Ltd (UGSL), requesting it to float a tender for 10000 Metric Tonne (MT) HR coils for supply in April/May, 2003. The tender was hosted on 4 April 2003 on the Company's website. Three parties participated and the bids were opened on 16 April 2003. The lowest price was quoted by Vinar Overseas Trading Pvt. Ltd at US $ 290 per MT CFRLO (Cost Freight Liner Order), Mumbai. However, UGSL advised acceptance of bid of Europa Import Export Ltd. who was L-2 with a bid price of US $ 360 per MT. Although the Company did not suffer any loss, this deal resulted in additional outgo of foreign exchange of US $ 690183. The Management, inter-alia, stated that Vinar Overseas did not agree to extend the validity of the offer and the same had expired before purchase order was placed in 3 May 2003. In this context, it may be stated that in the volatile commodity market no supplier keeps its offer open for long. Accordingly, Strategic Plan (2003-07) of the Company noted 'while floating the tender, give a definite commitment that the decision will be communicated within a certain date preferably within two days'. Despite that the Management took a lackadaisical approach and took one month in finalisation of the purchase order.

11.7.4.8 Modus operandi for High Seas sale provides that after effecting High Seas sale the materials are to be warehoused in stockyards controlled by Company authorised custodians. However, in case of Usha Ispat Ltd. (UIL), the material was shifted from dockyard into their plant directly instead of unloading and storing the same at the warehouse managed by Ferro Scrap Nigam Limited (FSNL), a subsidiary of the Company. Such deviations from contracts may complicate matters in case of default by the buyers when possession of goods is not with the Company. The Management contended (October 2005) that material was kept in the premises of UIL but under custody of FSNL. However, such custody may not be very effective as the Company was not in full control of the materials that might make it difficult to dispose of the materials to alternative buyers if the original buyer defaults. The Management further contended that no buyer might be willing to incur the additional transportation cost and rent involved in keeping the material out of premises of the buyer. In this regard it is stated that in terms of the MOA generally entered into by STC with its buyers, STC may keep pledged materials at a stockyard plot/godown nominated by the buyer and accepted by STC under physical control of Central Warehousing Corporation, State Warehousing Corporation or any other agency to be nominated by STC. The Management stated (December 2005) that as the Company received full payment from UIL, there was no issue. This undermines the need to frame a sound policy to avoid recurrence of such practices in future.

Recommendations

- The Company should be stringent in compliance of terms of MOA especially while dealing with new customers.
- The adherence to the lifting schedule as per the MOA should be strictly observed and a penal interest needs to be levied on expiry of the lifting schedule as per MOA.

- The Company should put in place a system for checking the credentials of new associates as well as the foreign sellers through renowned rating agencies.
- Performance Guarantee Bond as required to be obtained as per manual had not generally been obtained from foreign vendors, as the terms of Purchase Agreement did not provide for such requirement. As such bonds confirm the performance of contract the Company should strictly follow the manual in this regard.
- Suitable additional safeguards to protect the interest of the Company in case of failure to lift material may be incorporated in the MOA in the case of 100 *per cent* EOU clients.
- The option of paying the warehousing charges to the custodian of the goods from the Company's own corpus and recovering the same from the buyers to have a direct and better control over the activities of the custodian should be explored.
- Pledged material should not be stored at the customer's premises.
- Credibility of the buyer, their past track record, market share in the industry concerned and volatility of the commodity market determine the risk involved. The quantum of Bank Guarantee as security should be decided accordingly. Additional safeguard in the form of increasing the quantum of Bank Guarantee in case of decrease in price of material to cover the fall in price may be provided in the MOA

Conclusion

It was observed that the main function of IMD was facilitating import i.e. calling bids, placing orders, opening Foreign Letter of Credits, arrangement of Foreign Banks' Credit, etc. Excessive reliance on back to back sales in a few products and with limited customers was to the detriment of marketing activity like sourcing of product at internationally competitive rates and providing value added services like port clearance activities and stevedoring. The Company could find it difficult to maintain its volume of business/growth in the days to come unless it elevates itself from the role of an import facilitator to that of one carrying out marketing activities in the true sense. To ensure its emergence as a diversified trading house, the Company needs to actively identify buyers' needs and attune the activities of its Marketing Division to the market trends.

The review was issued to the Ministry in December 2005; its reply was awaited (February 2006).

CHAPTER: XII

Steel Authority of India Limited

Import of Coking Coal

Highlights

Due to the shortage of coking coal, there was a decline of 12 per cent (0.31 million tonnes) in SAIL's production of saleable steel for the first quarter of 2004-05.

(Para 12.3.2)

Between November 2000 and December 2004, SAIL floated 13 spot tenders for 3.625 million tonnes for different types of coal, but received only 45,000 tonnes of coal, which represented just one per cent of the tendered quantity.

(Paragraph 12.4.2.1)

Failure by SAIL to take adequate and timely action through properly planned purchase of hard coking coal resulted in avoidable expenditure of Rs. 344 crore.

(Para 12.4.3.2)

In view of SAIL's current time frame for spot tendering, its poor track record in tendering, and lack of adequate testing and quality assurance, it should consider spot tendering as the least preferred option for meeting its planned or urgent requirements of coking coal.

(Para 12.4.4.1)

SAIL incurred avoidable additional expenditure of Rs. 87 crore and Rs. 89 crore, by signing term agreements for hard and soft coking coal with Xstrata/ MIM and Xstrata/ Oceanic respectively, and simultaneously keeping deliveries under the Long Term agreements in abeyance.

(Para 12.5.1.2 and 12.5.2.4)

SAIL did not obtain adequate evidence to indicate that the impact of force majeure was borne proportionately by other customers of Xstrata/ MIM, and SAIL did not have to bear an undue burden.

(Para 12.6.2.4)

Failure by SAIL to exercise the mutual option quantity of 0.150 million tonnes in time in the LT agreement with Xstrata/ Oceanic for soft coking coal for 2003-04 resulted in a loss of Rs. 32 crore

(Para 12.6.3.4)

Failure by SAIL to take advantage of existing offers for hard coking coal at a low price, resulted in excess expenditure on spot purchases of hard coking coals of Rs.232 crore.

(Para 12.6.4.2)

Gist of Recommendations

- SAIL should take adequate and timely decisions to ensure adequate supply of coking coal as per the desired specifications in a cost-effective manner.
- The policy and associated procedures for import of coal should be reviewed in the light of the practicability of the alternative procurement options especially spot procurement.
- The use of term agreements to purchase coking coal from suppliers with existing LT agreements should be reviewed.
- All coking coal, irrespective of the mode of procurement, should be subjected to the same standards of industrial testing and quality assurance.

12.1 Background

12.1.1 Coke and Coking Coal

12.1.1.1 Blast Furnace (BF) based iron making, which is the technology used in SAIL's Integrated Steel Plants (ISPs), involves the conversion of iron oxides to iron in liquid form. This is achieved through the use of coke – a form of carbon – which serves two primary purposes:

(i) acts as a reducing agent for reduction of iron oxide to iron.

(ii) provides the heat for the reduction reaction.

12.1.1.2 Coke is created from coking coals, by heating suitable blends of such coals to a high temperature in a coke oven battery. SAIL produces almost all its requirements of coke internally[♣].

12.1.1.3 However, not all coals will form coke, which is suitable for iron-making purposes. The quality of coke is determined, among other things, by the quality of coals used. Very few individual coals possess all the required properties for making BF coke of the desired quality. Different coals are thus blended together in the desired proportion, formulated on the basis of the coke quality requirements. Depending on the strength of the coke produced, internationally, coking coals are broadly categorised into hard coking coals (which are crucial for producing high strength coke) and soft coking coals. Indian coking coals are broadly categorised into prime coking coals (equivalent to hard coking coals), medium coking coals and semi-coking or blendable coking coals.

12.1.2 SAIL's Requirements of Coking Coal

12.1.2.1 SAIL has no captive coking coal mines and is dependent on outside suppliers. While SAIL's main suppliers of indigenous coking coal are the subsidiaries of Coal India Limited (CIL), it has been importing hard coking coal since 1978-79. The import of hard coking coal serves two purposes:

(i) meeting the gap between actual requirement of coking coal and indigenous availability; and

(ii) improving the technical parameters of the coking coal blend.

12.1.2.2 The following table depicts the rising trend in consumption of imported coking coal by the four ISPs of SAIL over the period 2001-02 to 2004-05:

	2001-02	2002-03	2003-04	2004-05
Imported	5.89	6.83	7.16	7.06
Indigenous	4.85	4.38	4.77	4.15
Total Consumption	10.74	11.20	11.93	11.21
Imported -Percentage in Blend	55%	61%	60%	63%

12.1.3 Procurement Methods

12.1.3.1 SAIL procures imported coking coal using the following methods:

♣ *Except for Durgapur Steel Plant, which purchases limited quantities of coke from Durgapur Projects Limited (a West Bengal Government undertaking)*

(i) Long Term (LT) agreements– These are agreements with international suppliers for established brands of coal♦. The agreements are typically for three years, extendable for two more years, and renewed thereafter. While the agreements specify the annual delivery quantities♥, the prices are fixed on an annual basis through negotiations; no tendering is involved. The delivery period is from July to June of the next year.

(a) As of 2001, SAIL had six LT agreements for a total annual base quantity of 4.4 million tonnes and 0.54 million tonnes of hard and soft coking coal respectively.

(b) Subsequently, between October 2003 and March 2004, SAIL finalised three additional LT agreements♣, resulting in a total annual base quantity of 5.75 million tonnes and 0.84 million tonnes of hard and soft coking coal respectively.

(ii) Spot Tenders – These are short-term purchases of coking coal, which are procured through Global Tenders.

(iii) Term Agreements – This method of procurement covers supplies of imported coking coal for only one delivery period (i.e. one year) or for one trial shipment♠, with a view to broad-base supplies and/or meet urgent requirements. Term agreements do not involve tendering.

12.1.4 Organisational Structure

12.1.4.1 The Coal Import Group (CIG) of the SAIL Corporate Office is responsible for ensuring timely contracting of the required quantities of the materials, ensuring broad basing of supplies, and providing marketing information to assist in decision making.

12.1.4.2 However, actual decision-making powers vest in two Committees of Directors:

(i) Committee of SAIL Directors (SDC), which is responsible for Spot Tenders, Trial Shipments and Term Agreements; and

(ii) Empowered Joint Committee (EJC), which includes Directors of RINL⇔; this Committee is responsible for LT agreements of both SAIL and RINL.

12.1.5 Coal Import Policy

12.1.5.1 Prior to January 1999, SAIL did not have a prescribed policy for import of coking coal. The SAIL Board at its meeting held on 30 January 1999 approved a procurement policy for import of coking coal. This policy was reviewed and amended in October 2000 and August 2001. A comprehensive amendment of the policy for import of

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♦ *Established coals are those coals which have undergone industrial testing in SAIL (i.e. actually been used in live coke ovens in SAIL plants) and been found suitable. By contrast, pre-qualified coals are those coals, which have passed pilot coke oven testing with a quantity of 500 kgs.*

♥ *Base quantities are specified, generally with tolerance (i.e. quantity variation in percentage terms) at either the buyers' option or mutual option (agreement of both buyer and seller)*

♣ *One LT agreement for 0.15 million tonnes of hard coking coal had expired*

♠ *For a new or pre-qualified coal, the first shipment is to be treated as a trial shipment.*

⇔ *Rashtriya Ispat Nigam Limited, another PSU under the Ministry of Steel*

coal and coke took place in March 2004, with further changes taking place in December 2004 and January 2005.

12.1.5.2 The main features of the current policy for import of coal and coke are summarised below:

(i) Annual requirement of imported coal for the next financial year would be decided by Director (Technical), preferably by October of the current year.

(ii) SDC/EJC would decide the quantities to be procured under Long Term Agreements (with efforts to have optional quantities), with the balance to be procured through Spot Tenders and Term Agreements.[*]

(iii) SDC may decide to procure up to 15-20 per cent requirement in order to build up stocks and/or take care of contingent situations.

12.1.6 Audit Scope and Methodology

12.1.6.1 A field audit of the purchase of imported coal covering the period from April 2002 to October 2004 was conducted during November 2004. The objective of this audit was to verify whether SAIL's policies and procedures for import of coking coal ensured the following:

(i) Adequate supply of coking coal as per the desired specifications, with a view to maintaining continuity of production;

(ii) Broad basing the number of suppliers as well as coal brands;

(iii) Cost-effectiveness of coal supplies; and

(iv) Quick and timely response in cases of uneven supplies as well as disruption of supplies, with specified stock levels at ports and plants triggering corrective action e.g. emergency procurement, pressure on foreign suppliers, expediting local logistical issues

12.1.6.2 Preliminary audit findings were issued to Management on 17 December 2004, and the response was received on 24 March 2005. The draft audit report was issued to SAIL on 31 May 2005. An interactive meeting with SAIL top management was held on 20 July 2005, and a detailed response dated 8 August 2005 was received from SAIL.

12.1.6.3 The report was issued to the Ministry on 7 October 2005; their response was received on 14 February 2006. The responses of the Management and Ministry have been incorporated, as appropriate, in this report.

12.2 Chronology of Events

12.2.1 A brief chronology of selected events related to the import of coking coal during the period under review is as follows:

Date	Category	Coal Type	Event	Audit Findings Paragraph Reference
April/ May 2003	LT Agreement	Hard Coking Coal	Offers for hard coking coal received from RAG and BHP (Illawarra); no	12.6.4.1

[*] ***Prior to March 2004, the policy specified the ratio of LT Agreements to Spot Purchases as 80:20, with buyer's option of +/- 20 per cent in the LT Agreements.***

Date	Category	Coal Type	Event	Audit Findings Paragraph Reference
			action taken	
June/ July 2003	LT Agreement	Hard Coking Coal	First force majeure declared by Xstrata/ MIM	12.6.2.1
September 2003	LT Agreement	Soft Coking Coal	Internal approval for exercising mutual option with Xstrata/ Oceanic obtained, but not communicated	12.6.3.2
October 2003	Spot	Coke	Order placed on MMTC for 30,000 tonnes of coke	
	Term Agreement	Hard Coking Coal	Term agreements for 140,000 tonnes on RAG and BHP (Illawarra)	12.6.4.1
November 2003	LT Agreement	Hard Coking Coal	Second *force majeure* declared by Xstrata/ MIM	12.6.2.1
January 2004	LT Agreement	Soft Coking Coal	Mutual option with Xstrata/ Oceanic exercised; not successful	12.6.3.2
April 2004	Spot	Coke	Orders placed for 165,000 tonnes of coke	12.7
	Term Agreement	Soft Coking Coal	Term Agreement with Xstrata/ Oceanic for 130,000 tonnes	12.6.3.3
April – July 2004	12 per cent shortfall in production due to shortage of coal			12.3.2
April - September 2004	Spot	Hard Coking Coal	0.77 million tonnes purchased	12.4.3.1
June 2004	Term Agreement	Soft Coking Coal	Term agreement for 0.70 million tonnes with Xstrata/ Oceanic	12.5.2
July 2004	Term Agreement	Hard Coking Coal	Term agreement for 0.50 million tonnes with Xstrata/ MIM	12.5.1.2

12.3 Loss of Production due to Shortage of Coking Coal

12.3.1 The following table depicts the shortage of coking coal, arising out of the mismatch between requirement and actual import for the delivery period 2003-04:

(All figures in millions of tonnes)

	Annual Requirement	Receipt			Shortfall
		LT	Spot	Total	
Hard Coking Coal	7.00	5.31	0.36	5.67	1.33
Soft Coking Coal	1.00[2]	0.88		0.88	0.12

12.3.2 Due to shortage of coking coal, there was a decline of 12 per cent (0.31 million tonnes) in SAIL's production of saleable steel for the first quarter of 2004-05.

12.3.3 In response, Ministry/ Management stated that:

(i) Immediately after finalising LT deliveries for 2003-04 in September 2003, global tenders were issued in September 2003 itself.

[2] ***Including 0.195 million tonnes of CDI (Coal Dust Injection) coal***

(ii) Arising out of the second MIM force majeure, the coking coal situation was reviewed in the Chief Executives meeting held on 28 November 2003 and it was decided to make an action plan to improve availability of coking coal.

(iii) On 10 December 2003, the SAIL Board decided that the procedures for purchase of coal be reviewed to facilitate faster procurement, and a revised policy for import of coal and coke was approved on 17 March 2004.

(iv) A high level team visited Australia in February 2004 to explore the possibility of procurement of additional coal, but no firm commitments for supply of coal could be obtained.

(v) In view of the continuing shortage aggravated by force majeure, SAIL made all efforts to procure coal and coke on spot basis. Even then they were forced to curtail production.

12.3.4 This reply is not tenable. As evident from audit's comments in the subsequent paragraphs, SAIL did not take adequate and timely action after the declaration of the first force majeure by Xstrata/ MIM in June 2003 to counter the shortage of coking coal and suffered a substantial loss of production and profit margins, at a time of upswing in the iron and steel industry.

12.4 Spot Tendering for Coking Coal

12.4.1 Impracticable Timeframe

12.4.1.1 As per the experience of the Company, the likely time required by SAIL to move a trial shipment of coking coal to the plant, in the case of procurement through a spot tender is indicated in the following table:

Floating of global/ limited tender, receipt and opening of offers Bid evaluation and placement of orders	2-3 weeks 3-4 weeks
Submission of PG bond by Supplier	3 weeks
Making the ship available and loading of coal by the supplier	4 weeks
Time required for the ship to reach Indian ports from China/ Australia/ USA	2-5 weeks
Time required after ship discharge and for the wagon to reach the plant	1 week
Total	**15-20 weeks**

12.4.1.2 In its response, Ministry admitted (February, 2006) that even after compressing the schedule for all activities related to tendering, the minimum time required was 15 weeks for coal to reach SAIL plants from the issue of a tender enquiry.

12.4.1.3 In short, without considering additional delays in the procurement process, even an urgent procurement through tendering (without industrial testing) would take 105-140 days from start to finish. If testing was also included, the total period from start to finish would take 135-200 days.

12.4.2 Poor Record in Spot Tendering

12.4.2.1 Between November 2000 and December 2004, SAIL floated 13 spot tenders for 3.625 million tonnes[♣] for different types of coal, but received only 45,000 tonnes of CDI[♦] coal, which represented just one per cent of the tendered quantity.

12.4.2.2 Out of the 13 tenders (details available in **Annexure – 30**),

(i) no valid offers were received in four cases;

(ii) in one case, the offer was found to be technically unsuitable;

(iii) in two cases, offers were received, but management decided to re-tender

(iv) in four cases, offers were received, but orders were not placed;

(v) in one case, the order was placed for 50 per cent of the offered quantity.

12.4.2.3 In response, Ministry stated that:

(i) If the offers did not meet the coal specifications or other terms and conditions, SAIL had no option but to reject the offers and scrap the tender.

(ii) Further, if the prices offered were higher than the prevailing market prices, orders were not placed.

(iii) Poor response against SAIL tenders had nothing to do with SAIL but was due to the prevailing market conditions.

12.4.2.4 The reply of the SAIL Management is not tenable, since repeated tendering without finalisation of orders clearly indicated failure of the procurement processes. By contrast, other Central PSUs like MMTC and STC were able to act as trading agents for supply of coking coal, and, in fact, supplied coking coal to SAIL, when SAIL failed to procure coking coal on its own through spot tenders.

12.4.3 Avoidable Expenditure of Rs.344 crore

12.4.3.1 The spot purchases of hard coking coal made from April 2004 were as follows:

Supplier	Country of Origin of Coal	Shipment Period	Quantity (MT)[♦]	CIF Rate (US$)/ MT	Total Amount
MMTC	USA	Apr-Aug 04	228,211	$198.85	$45,379,909
AMCI	USA	Aug-Sep 04	126,471	$160.00	$20,235,360
STC	Poland/ USA	Apr-04 onwards	345,667	$200.01	$69,135,360
Logan	USA	Aug-04	71,217	$160.00	$11,394,720
Total			**771,566**	**$189.41**	**$146,145,349**

12.4.3.2 In contrast, the highest rate for 2004/05 deliveries under LT agreements did not exceed US$ 60.00/MT FOB i.e. US$ 88/MT CIF[▲]. Thus, failure by SAIL to take

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[♣] *This quantity excludes one tender with open quantity option, and one tender with variable quantity.*

[♦] *CDI coal is non-coking coal meant for Coal Dust Injection in Blast Furnaces.*

[♦] *MT stands for Metric Tonnes*

[▲] *An average difference of US$28/tonne between CIF and FOB prices has been uniformly assumed throughout the review.*

adequate and timely action of entering into LT agreements through properly planned purchase of hard coking coal resulted in avoidable expenditure of Rs. 344 crore.*

12.4.3.3 In response, Ministry/ Management stated that

(i) There was a sudden global shortage of coking coal, and comparison of LT prices settled in January – February 2004 with spot market prices settled later in a rising market would not be correct.

(ii) The C&F prices of US origin coals should not be compared with Australian origin coals, as the freight rate from USA to India was about US$ 20-25 higher than freight rate from Australia to India. Hence, the loss worked out by Audit was notional.

(iii) These quantities were tied up when other measures failed to improve the coal availability and the safety of plant and equipment was at stake; further, the Ministry of Steel had, in April 2004, approved the decision to go ahead for spot purchases at prevailing rates.

12.4.3.4 The reply is not tenable for the following reasons:

(i) The fact that in October 2003 RAG and BHP were willing to supply only 0.14 million tonnes against their original offer of 0.60 million tonnes shows that the Ministry's claim of sudden global shortage after Jan- Feb 2004 is incorrect. Clearly, SAIL failed to take adequate and timely decisions to counter the shortage of coking coal.

(ii) SAIL actually purchased US origin coals and paid the higher freight rates; hence the calculation of losses by audit is not notional.

12.4.4 Conclusion

12.4.4.1 In view of SAIL's current time frame for spot tendering (105-140 days), its poor past record in tendering, and lack of adequate testing and quality assurance, spot tendering has to be the least preferred option for SAIL for meeting its planned or urgent requirements of coking coal. The policy and associated procedures for import of coal should be reviewed in the light of the suitability and economics of the alternative procurement options to LT agreements.

12.4.4.2 In response, Ministry appreciated the suggestions given by audit and agreed that spot tendering was not a practicable choice for meeting SAIL's planned requirements. Substantive action by Management on this issue is awaited (January 2006).

12.5 Term Agreements

12.5.1 Term Agreements with Xstrata/ MIM[3] for Hard Coking Coal

12.5.1.1 As part of the annual negotiations for 2004-05 under LT agreements, in January 2004, Xstrata/ MIM offered to supply 0.50 million tonnes of Oaky Creek brand of hard coking coal at an FOB price of US$ 65.65/MT. Further, it confirmed its offer on 22 March 2004, with validity up to end-March 2004. However, the EJC considered the price too high, and no agreement could be reached.

** An exchange rate of Rs.44 / US$ has been uniformly assumed throughout the review.*

[3] Mount Isa Mines Ltd., subsequently acquired by Xstrata Plc, an international mining group.

12.5.1.2 In July 2004, SAIL signed a term agreement with Xstrata/ MIM for the same quantity of 0.50 million tonnes of the same brand @ US$105/MT FOB, keeping deliveries under the LT agreement in abeyance, reasons for which were not on record. Had deliveries under the LT agreement been finalised @ US$ 65.65/MT FOB, additional expenditure of US$ 19.68 million (Rs. 87 crore) could have been avoided.

12.5.1.3 In their response, Ministry/ Management stated that the price indicated by Xstrata/ MIM was much higher than the FOB price of US$ 57.00-57.75/MT settled with the other two LT suppliers and had the higher price of Xstrata/ MIM been agreed to in the same EJC meeting for delivery during the same year, it would have jeopardised settlements under the LT. Shortage of coking coal forced SAIL to conclude a separate Term Agreement with MIM outside the LT framework, as the final price of US$ 105/MT FOB was not in line with the LT prices settled with other suppliers.

12.5.1.4 The response is not tenable, since effectively, the term agreement with Xstrata/ MIM was in complete substitution of deliveries under the LT agreement. If the signing of the Term Agreement with the same supplier for the same quantity and for the same delivery period at a price nearly double that of the deliveries under LT agreement with other suppliers, could have no impact, Management did not make it clear how agreeing to a rate of US$ 65.65/MT under the LT agreement would have jeopardized negotiations with other LT suppliers.

12.5.2 Term Agreements with Xstrata/ Oceanic[4] for Soft Coking Coal

12.5.2.1 Discussions were held with Xstrata/Oceanic on 15 March 2004 to finalise quantities and prices for deliveries during 2004/05 under the LT agreement. The minutes of the EJC meeting indicated that the supplier had mentioned a rising trend in the price of soft coking coal and offered a price before the EJC, which considered it too high and requested the supplier to bring down the offered price. In its letter dated 22 March 2004, Xstrata/ Oceanic reiterated the prevailing tight market condition and again requested SAIL to consider the offered price, which was however again not considered by the EJC.

12.5.2.2 However, the minutes of the EJC meeting were silent about the specific price offered by Xstrata/ Oceanic. This lack of transparency in documentation was not an isolated case. Even in the case of the minutes of the EJC Meeting of 14, 15 and 22 January 2004, the price offered by Xstrata/ MIM for hard coking coal had not been documented in the final minutes although a draft copy of the minutes mentioned a specific offer of US$ 65.65/tonne.

12.5.2.3 In response, Ministry/ Management indicated that the supplier did not indicate a firm price or a price band during the meeting, and only maintained its stand of seeking a high price. This was not documented in the EJC meeting as no firm price or price band was indicated in the EJC meetings by the supplier. Audit however noted that the minutes of the meeting stated that "... M/s Xstrata indicated a price for soft coking coal which was also considered by the Committee to be very high and falling in the spot market price range..." clearly indicating that a price was mentioned, but for reasons not on record, the fact was not documented.

12.5.2.4 This lack of transparency in negotiation and documentation assumes further significance in view of subsequent events as follows:

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[4] *Oceanic Coal Australia Ltd., subsequently acquired by Xstrata*

(i) Two Term Agreements were signed by SAIL with Xstrata/ Oceanic in April and September 2004, keeping 2004/05 LT deliveries in abeyance. These agreements were for 0.13 and 0.70 million tonnes at the considerably higher FOB prices of US$ 102/MT and US$ 81/MT respectively, as against the price of US$ 33/MT FOB for 2003/04 deliveries under the LT agreement kept in abeyance.

(ii) Even for 2004/05 deliveries under the LT agreement signed with another supplier (BHP) in July 2004, the rate was only US$60/MT FOB. Vis-à-vis the actual BHP prices of $60/MT, the additional price paid for the term agreements with Xstrata/ Oceanic worked out to US$ 20.16 million (Rs. 89 crore). Clearly, there was no logic in signing a term agreement for a total quantity of 0.83 million tonnes of soft coking coal, keeping in abeyance 2004/05 LT deliveries of a nearly equal amount.

12.5.2.5 In response, Ministry indicated that the logic of signing a term agreement was a commercial decision, keeping in view the overall interest of SAIL. In case, no settlement had been reached with MIM/ Oceanic/ Xstrata, SAIL would have been forced to buy these required quantities at still higher prices. Consequently, the loss worked out by audit was notional.

12.5.2.6 The reply is not tenable for the following reasons:

(i) The loss worked out by audit is not notional, but was calculated on the basis of the high prices actually paid under the Term Agreement with Xstrata/ Oceanic.

(ii) The calculations were on the basis of actual payment and no further comparison with higher prices that may have been paid was made by audit.

(iii) The benefit to the overall interest of SAIL of such a commercial decision was not clearly spelt out by Management/ Ministry.

12.5.3 Conclusion

12.5.3.1 In effect, SAIL purchased coking coal under term agreements from the existing LT suppliers for 2004-05 at higher prices (closely linked to spot prices) for the same delivery, but without resorting to tendering, by keeping in abeyance equivalent deliveries under the LT agreement.

12.5.3.2 Management/ Ministry stated that these quantities were tied up to meet emergent requirements due to disruption in supplies; at that stage, running of the plants and health of the equipment was of more importance than the ruling market price. The responses indicated SAIL's failure to take planned, adequate and timely action to counter the shortage of coking coal.

12.6 Long Term Agreements

12.6.1 Background

12.6.1.1 As of July 2004, SAIL had eight LT agreements in place:

Supplier	Coal Type	Base Quantity (MT)
BHP Billiton, Australia	Hard Coking Coal (Goonyella B, Malvern and Barwon)	2.50
BHP Billiton – Illawarra Coal	Hard Coking Coal (Illawarra A)	0.50
Anglo Coal Australia Pty Ltd	Hard Coking Coal (German Creek/ Isaac)	1.50

Xstrata/ MIM	Hard Coking Coal (Oaky Creek)	0.50
RAG Australia Coal Pty. Ltd.	Hard Coking Coal (Red Hill)	0.50
Solid Energy New Zealand Ltd.	Hard Coking Coal (New Zealand Coking Coal)	0.25
Xstrata/ Oceanic	Soft Coking Coal (Teralba Premium)	0.54
BHP Billiton	Soft Coking Coal (Blackwater)	0.30

12.6.2 Force Majeure by Xstrata/MIM for Hard Coking Coal

12.6.2.1 In respect of its LT Agreement of May 2003 valid from 2003-04 to 2005-06, Xstrata/ MIM declared force majeure on account of natural clamity in respect of its Oaky Creek mine from 26 June 2003 to 21 July 2003 and again from 8 November 2003 to 19 December 2003. As per the LT Agreement, Xstrata/ MIM was required to supply

(i) 1.5 million tonnes in the first delivery period (July 2003 to June 2004), and

(ii) 0.5 million tonnes in the second and subsequent delivery periods, subject to a purchaser's option of 20 *per cent*.

12.6.2.2 As a result of the force majeure declaration, the contracted quantity of 1.5 million tonnes was not evenly supplied during the first delivery period. At the end of the first delivery period, there was a backlog quantity of 0.55 million tonnes.

12.6.2.3 Audit observed the following:

(i) Despite the outstanding quantity on account of the force majeure, Xstrata/ MIM offered to make supplies of 0.5 million tonne under a term agreement, which was entered into in July 2004 for the delivery period July 2004 to June 2005.

(ii) As per the detailed tour report of the visit of the high-level SAIL team to Australia in February 2004, the likely shortage during the contractual period from July 2003 to June 2004 would be approximately 0.4 million tonnes. No further force majeure declarations took place; yet SAIL ended with a backlog of 0.55 million tonnes as of end-June 2004, amounting to 37 per cent of the LT agreement quantity.

12.6.2.4 The extent of force majeure declared by Xstrata/ MIM was thus not proportionate to the suspension of deliveries by Xstrata/ MIM to SAIL. Further, SAIL did not obtain adequate evidence to indicate that the impact of force majeure was borne proportionately by other customers of Xstrata/ MIM and it was not passed on disproportionately to SAIL.

12.6.2.5 In response, Ministry/ Management stated that

(i) The high level team was informed that the total shortfall in production during the period July 2003 to January 2004 was 40 per cent; also operations would not show a significant improvement till the panel change in April/ May 2004.

(ii) Against the production shortfall of 40 per cent, the shortfall in supply to SAIL during the period July 2003 to June 2004 was 37 per cent, which indicated that the reduction in supply to SAIL was less as compared to their proportionate loss of production.

(iii) Several letters were written to the suppliers, including some letters wherein SAIL indicated its rights under the agreement.

(iv) The high level team noted that the impact of force majeure had affected supplies to all customers. Further, the contract did not provide any right to obtain evidence of equitable treatment from the supplier as long as the supplier fulfilled its contractual obligations. It was not commercially prudent to take legal action as the supplier was honouring the contract. Any legal action at that stage would have jeopardized the supply of backlog quantities at the old rate of US$ 46.19 deliveries, and settlement could also not have been reached with them for 2004-05 deliveries.

12.6.2.6 The responses of Ministry/ Management are not tenable for the following reasons:

(i) The force majeure duration was for a total of just 72 days between June 2003 and December 2004.

(ii) The shortfall of 40 per cent in production for the period July 2003 to January 2004 indicated by the supplier to the high level team was for a period of seven months, as compared to the shortfall in supplies to SAIL of 37 percent for the entire delivery period of twelve months from July 2003 to June 2004

(iii) As regards 2004-05 deliveries, in fact, no settlement took place against the LT agreement, and SAIL ended up with a term agreement @ US$ 105/ MT – a price based on spot market prices rather than LT prices.

(iv) Supply of balance quantity of 0.55 million tonne at the old rate by the supplier was only a fulfilment of the contractual obligation and not a concession to SAIL by the supplier.

(v) The fact remains that SAIL did not ask Xstrata/ MIM for details of proportionality of impact on other customers. Further, SAIL's action on Xstrata/ MIM's force majeure was grossly delayed (February 2004). In fact, the short duration of the force majeure periods– 26 days and 46 days, as indicated by SAIL, was not commensurate with the impact by Xstrata/ MIM on its deliveries to SAIL.

12.6.3 Delay in exercising Mutual Option for Soft Coking Coal

12.6.3.1 In pursuance of the LT Agreement with Xstrata/Oceanic for soft coking coal, a total quantity of 0.75 million MT at an FOB rate of US$ 33/MT was finalized for the delivery period 2003-04, with an additional mutual option quantity of 0.150 million tonnes.

12.6.3.2 Although internal approval within SAIL for exercising the mutual option quantity for the 2003-04 delivery period was obtained in September 2003, the option was communicated to the supplier only in January 2004 (after more than four months). Xstrata/ Oceanic turned down (February 2004) SAIL's request for exercise of the mutual option quantity on the following grounds:

(i) SAIL had failed to respond to their requests during September and October 2003 to exercise the mutual option;

(ii) Since the market had become tight and the quantity had already been placed at higher rates, it would not be possible for them to supply the mutual option quantity to SAIL.

12.6.3.3 Subsequently, SAIL signed two term agreements for 0.130 and 0.70 million tonnes at FOB rates of $102/MT and $81/MT in April and September 2004 respectively. Of this, a quantity of 0.130 million tonnes @ $102/MT FOB was actually shipped in May 2004, i.e. during the 2003/04 delivery period itself.

12.6.3.4 Thus, failure to exercise the mutual option quantity of 0.150 million tonnes by SAIL resulted in an estimated loss of Rs.32 crore[*].

12.6.3.5 In response, Ministry stated that it was decided that the option would be exercised after assessing the responses against the global tender on soft coking coal. The tender was issued on 17 September 2003; the techno-commercial bids were opened on 5 November 2003 and assessment of the offers was completed on 9 January 2004, and it was noticed that no responsive offer was received. Thereafter, approval was obtained on 19 January 2004 and the option was exercised. In view of the prevailing easy market conditions, it was a prudent commercial decision to see the outcome of global tender before exercising the mutual option.

12.6.3.6 The reply of the Ministry is not tenable for the following reasons:

(i) The fact that it took SAIL nearly four months after the issue of a global tender to conclude that no responsive offers were received to the tender indicates SAIL's failure to take quick and timely decisions.

(ii) As explained in paragraph 12.6.4.4, the prevailing market conditions at that time were no longer easy. Despite that, SAIL showed no urgency to settle the issue.

12.6.4 Delay in taking advantage of available offers for hard coking coal

12.6.4.1 In April/May 2003, two offers for hard coking coal were received from RAG (Red Hill) and BHP (Illawarra) for a total quantity of 0.04 million tonnes in 2002-03 and 0.60 million tonnes in 2003-04. These two brands were also found to be suitable for SAIL plants, with BHP's Illawarra – A already being an established coal.

(i) No action was taken on these offers till September 2003.

(ii) After failing to receive any response to its global tender (September 2003) for procurement of hard coking coal, SAIL called RAG and BHP for negotiations, and signed term agreements for delivery of 0.09 (with RAG) and 0.05 million tonnes (with BHP) up to June 2004 at the rate of US$ 46.30/ tonne FOB, which, according to SAIL Management, was the maximum quantity offered during negotiations.

12.6.4.2 Thus SAIL lost an opportunity to acquire 0.46 million tonnes of hard coking coal in 2003-04 at a low price of US$ 46.30/ tonne FOB. Compared with the average price of US$ 189/MT CIF[5] which SAIL subsequently paid for spot purchases of hard coking coals, the estimated loss worked out to Rs. 232 crore.

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[*] *This calculation is conservative and is based on the lower rate of US$ 81/MT rather than $ 102/MT.*

[5] *Assuming a difference between CIF and FOB rates of US$ 28/ tonne, the comparable FOB rate works out to US$ 161/tonne.*

12.6.4.3 In response, Ministry stated that immediately after settlement of LT deliveries for 2003-04 in September 2003, a global tender was issued, against which no offer was received. Thereafter in October 2003, contracts were negotiated with RAG and BHP. The response is not tenable, since 94 per cent of LT deliveries for 2003-04 were finalised on 3 April 2003 itself and particularly in view of the declaration of the first force majeure by Xstrata/ MIM in June 2003, SAIL failed to take adequate and timely action on these offers

12.6.4.4 Ministry also stated that the supplies from RAG and BHP were contracted at the same prices as those settled in March 2003 with BHP, indicating that there was no shortage of coking coal in October 2003. The response is not tenable, since the fact that the quantity of 0.60 million tonnes offered in April/ May 2003 came down to only 0.14 million tonnes by October 2003 indicates that there was indeed a shortage of coking coal at that time.

12.7 Spot Purchase of Coke

12.7.1 During the period from October 2003 to September 2004, SAIL purchased from MMTC and China Coal and Coke Holdings Limited a total of 0.158 million tonnes of Chinese metallurgical grade coke at an average CIF price of US$ 386.61/MT. However, this coke was not tested by SAIL, before procurement/supply. The multiple handling of coke at the coke oven, ship, ports, railways and plant was likely to result in creation of additional coke breeze from coke, and consequent deterioration of coke. The entire quantity of imported coke, after having been procured at very high costs, was neither dispatched nor used within a reasonable period of time for iron-making, as detailed in **Annexure -31**.

12.7.2 In response, Management/ Ministry stated that:

(i) Availability of coke for uninterrupted Blast Furnace operation was more important than hypothetical comparison of prices.

(ii) The coke received was dispatched and consumed at SAIL plants in the normal manner.

12.7.3 The reply is not tenable since the occurrence of handling loss has been confirmed in the Ministry's response.

12.8 Other Issues

12.8.1 Broad basing of Suppliers

12.8.1.1 In October 2001, the Committee of Directors (COD) decided to further broad-base the number of suppliers, in view of the gradual increase in the requirement of coking coal. However, SAIL failed to act at a time when the coking coal market was soft and only in October 2003 did it finalise two new LT agreements.

12.8.1.2 In response, Management/ Ministry stated that development of vendors and broad-basing of suppliers was a continuous process and took time. SAIL had been making efforts through various means to broad base suppliers, which yielded results in due course. As a result, new LT agreements were finalised in 2003-04 for three brands, besides trial orders for two brands.

12.8.1.3 The response is not tenable since SAIL's lack of efficiency in broad basing is borne out by the delay of more than two years in developing new sources.

12.8.1.4 SAIL needed to substantially improve its processes for broad-basing of suppliers in a time-bound manner, without compromising on testing, trial shipments and quality requirements. In response, management stated that while all out efforts were made to broaden the supplier base, the suggestions given by audit were appreciated. Substantive action by Management on this issue is awaited.

12.8.2 Internal Controls

12.8.2.1 Audit had pointed out that the Coal Information Group (CIG) of SAIL did not have processes and systems to ensure co-ordinated availability of current and updated information on all coking coal related aspects. In response, SAIL Management appreciated the suggestions of audit, and stated that they had started preparing a comprehensive monthly report, after collecting information from other Departments.

12.8.2.2 Audit also observed that minimum and optimum stock levels at different plants and ports had not been fixed. Subsequently, SAIL management stated (August 2005) that they had fixed the minimum and optimum stock levels of coking coal to be maintained at plants and ports.

12.9 Conclusions

12.9.1 Due to its failure to take adequate and timely decisions, SAIL suffered an estimated loss of Rs. 858 crore, on account of loss of production, spot purchases of hard coking coal at higher rates, failure to exercise mutual option for soft coking coal, and take advantage of available offers for hard coking coal.

12.9.2 SAIL suffered a further loss of Rs. 176 crore through signing term agreements at higher prices, by keeping the corresponding LT agreements in abeyance.

MINISTRY OF TEXTILES

CHAPTER XIII

Cotton Corporation of India Limited

Trading activities

Highlights

The National Commission of Agriculture recommended (1975) that the Corporation should endeavour to purchase about 25 to 30 *per cent* of the total production of the country by strengthening its network of offices. However, the Corporation's market share during the six years ending March 2005 ranged from 4.31 to 11.91 *per cent*.

(Paras 13.6.1 and 13.6.1.1)

Forty nine and 58 per cent of the cotton produced during the five years ended March 2004 remained outside the purchase purview of the Corporation, as it never reached the regulated markets where the Corporation undertook its commercial activities.

(Para 13.6.1.2)

During the years 2001-02 and 2002-03, though the Corporation resorted to MSP operations, it purchased only nine lakh bales (8.51 lakh bales in financial year 2001-02 and 0.49 lakh bales in the financial year 2002-03) as against the total reported figure of 109 lakh bales (excluding Punjab, Haryana and Maharashtra where there were no MSP operations) thus limiting the coverage of the MSP operations.

(Para 13.6.2.2)

During the six years ended March 2005 the Corporation paid commission of Rs.35.89 crore to the agents in the regulated market in the procurement from the cotton growers thereby increasing the cost of procurement.

(Para 13.6.3)

In the procurement of cotton, the Corporation had not considered the marginal contributions/profit of each variety to enhance profitability through product-mix. The Corporation suffered a loss of Rs.0.87 crore during 2002-03 due to non-procurement of varieties where marginal contribution was higher.

(Para No. 13.6.4)

In the event of the failure of a party to lift the cotton bales within the period agreed in the contract of sale, the Corporation pursued a policy of reselling the contracted bales to a third party at the risk and cost of the failed party. The losses so recoverable from the parties accumulated to Rs.111.53 crore at the end of March 2004.

(Para No. 13.7.1.2)

Gist of recommendations

- Market share of the Corporation needs to be increased to 25 to 30 *per cent* of the indigenous crop as recommended by the National Commission of Agriculture. This would help the growers to get remunerative price as well as quality supply at

reasonable prices to the user mills.

- The local APMCs and State governments should ensure through further spread of regulated markets or if necessary through legislation, that all cotton produced in the country is traded in regulated markets.
- The Corporation may review the policy for setting up of the procurement centres with a view to optimise its market share
- The Corporation should explore the possibility of enrolling themselves as agents in the regulated market yards for dealing with Cotton growers directly and avoiding payment of commission.
- The Corporation for maximising its profits should ensure selection of an optimal product mix based on mid term or monthly review of profitability, cost-wise and variety wise breakeven analysis of each variety of cotton in which it deals.
- During the periods of MSP operations, the Management should ensure maximisation of procurement activity in order to achieve the objective of extending remunerative prices to the largest possible population of effected cotton growers.
- When sales are made under GSF scheme, it should be ensured that adequate Bank Guarantees are taken to cover the financial risk of the Corporation.
- The Corporation should strive to achieve more exports, as its exports are a major tool for stabilisation of prices.

13.1 Introduction

The Agricultural Price Commission considering the erratic fluctuations in the prices of cotton recommended (May, 1969) the setting up of an agency in the public sector charged with the responsibility of ensuring equitable distribution of cotton among the different constituents of the industry and also for purchasing and selling domestic cotton for disciplining the prices. The Government of India accepted the recommendations and constituted (October, 1969) a Committee to prepare a detailed scheme for establishment of such a public sector agency. The Committee recommended (February 1970) the establishment of a full-fledged independent Corporation, which was to develop necessary skill and operational expertise to enable it to progressively replace the cotton traders in course of time. The Government accepted the Committee's recommendations and set up Cotton Corporation of India Limited (Corporation) in July 1970.

The administrative control of the Corporation vests with the Ministry of Textiles. The Corporation functions through its Head office and twenty branch offices located all over India. The Branch Offices with purchase centres under their control are responsible for purchasing, arranging for ginning, pressing, storage and delivery of cotton to customers under the overall control of the Head Office. The Chairman-cum-Managing Director is assisted by two functional Directors, heading Finance and Purchase and Sales activities respectively.

13.2. Scope of Audit

During the course of the performance audit of the trading activities of the Corporation, test check of records relating to the procurement and marketing of cotton of six out of the

15 major branches of the Corporation covering a period of six years from 1999-2000 to 2004-05 was conducted with a view to assess the efficiency, economy and effectiveness of these operations.

13.3 Audit Objectives

Performance audit of the trading activities during the review period covered the commercial operations of purchase and sale of cotton undertaken by the Corporation and a critical review of Minimum Support Price (MSP) operations undertaken on behalf of the Government of India (GOI) with a view to assess whether :

- Targets fixed were realistic and in tune with the role envisaged in the textile policies of the Government of stabilising the prices and of increasing its market share.
- The Corporation effectively implemented price support operations on behalf of the Government;
- Cotton growers could get remunerative prices for their produce. Cotton was made available at reasonable prices to the textile mills and other end users; and
- Purchase and sales operations were taken up ensuring commercial viability both in domestic and international market as contemplated in the Memorandum of Understanding (MOU).

13.4. Audit Criteria

Performance of the Corporation's trading activities was assessed vis a vis internal targets for procurement of cotton, the share of the Corporation in procurement of cotton in the total production of cotton, its export performance in terms of its share in the total cotton export of the country. Evaluation of the achievements of MSP operations was also done vis a vis the directives of the GOI in this regard

13.5 Audit Methodology

Files relating to purchase/sales activities with reference to purchase and sales policies approved by the Corporation from time to time were reviewed. Besides, statistics from independent sources relating to textiles industry were collected and analysed.

13.6. Audit findings:

13.6.1 Procurement Activity

The National Commission on Agriculture recommended (1975) that the Corporation should endeavour to purchase about 25 to 30 *per cent* of the total cotton production in the country, if necessary by strengthening the network of its offices. The Corporation through its 20 branch offices controlling 244 procurement centres (March 2005) in various agricultural markets undertook the procurement of cotton. A review of the performance of the procurement activity revealed the following:

13.6.1.1 Performance vis a vis purchase targets.

The Corporate Office fixed purchase targets every year based on an in-depth interaction with all the Branch Heads in the form of an annual Branch Managers' (BMs) conference wherein likely cotton scenario in the country as well as at global level were discussed in detail. These deliberations were mainly on crop prospects, anticipated price behaviour,

demand for cotton from the mill sector and likely imports and exports. Based on these deliberations and availability of infrastructure in different branches, tentative purchase targets were fixed for each branch. Depending upon crop estimates, arrival patterns, price behaviour, demand etc. these targets were also revised if necessary during the course of the season. Table I below indicates the total production of cotton, procurement projections as per corporate plan, revised target and actual purchase of cotton there against during the six cotton seasons ended 2004-05.

Table I

(Quantity in lakh bales)

Year	Total Production	Projections as per corporate plan	Target fixed for purchases in BM Conference	Actual Purchases	CCI's Market Share (In Percentage)
1.	2.	3.	4	5.	6
1999-00	118.00*	4.88	7.00	5.08	4.31
2000-01	109.23*	8.50	-- #	6.03	5.52
2001-02	124.50*	10.00	8.50	9.67	7.76
2002-03	136.00	9.00	8.35	5.99	4.40
2003-04	167.50	9.00	12.00	9.00	5.37
2004-05	232.00	9.50#	--#	27.63	11.91

(Source: Branch Manager's Meeting & Corporate Plans of respective Years)

* Excluding production of Maharashtra State where Maharashtra Cotton Marketing Federation was the monopoly procurement agency up to the cotton season 2002-03

\# No target as there was Minimum Support Price (MSP) operation

Table I reveals that against the recommendation of the National Commission on Agriculture that the Corporation should endeavour to purchase about 25 to 30 *per cent* of the total cotton production in the country, the targets fixed by the Corporation and its market share in the procurement of cotton during the six years ended 2004-05 ranged between 4.31 and 11.91 *per cent*. Further, the actual procurement of cotton during all the four years excluding two years[*] in which MSP operations were undertaken was below the targets fixed in the corporate plan and revised in the BMs conference.

The Management stated (August 2005) that depending upon the cotton production, expected price behaviour, performance of the textile mills and expected demand in any crop year, the Corporation decided on procurement targets. It further added that due to adverse market conditions the Corporation could not enhance the target but continued its operations depending on commercial viability and expected demand from the mill sector.

The above contention of the Management was not tenable as the Corporation had fixed its targets keeping all the factors listed in the reply and also revised them concurrently. Hence, the shortfall in achieving them indicated either the targets were unrealistic or the implementation was faulty. A possible reason was creation of insufficient number of centres due to which coverage of the market yards where cotton was traded was inadequate (refer para 13.6.1.3)

[*] ***2001-02 and 2004-05***

Recommendation

Effective measures should be taken by the Corporation to increase its share in the purchase of indigenous cotton.

13.6.1.2 The Corporation's access to the cotton production of the country

The Agriculture Produce Marketing Committees (APMC), which are bodies constituted under the APMC Act of the respective State Governments, regulate marketing of cotton in the markets authorised by it. While many traders in the private sector resort to village buying or buying outside the market yards and pay lower prices as well as avoid levy of cess or market fees payable to APMC, the Corporation had to make purchases of cotton in the regulated markets. The cotton is sold in the regulated markets either in an open auction or by way of inviting open tenders. The total production of cotton in the country and quantity received in the regulated markets where the Corporation operates its centre were as under:

Table 2

(Quantity in lakh bales)

Particulars	1999-00	2000-01	2001-02	2002-03	2003-04
Total production in the Country	156.00	140.00	158.00	136.00	167.50
Total arrivals in regulated markets	65.04	71.82	71.75	58.37	78.90
Percentage of arrival in regulated markets to total production.	42.00	51.00	45.00	43.00	47.00

Table 2 above shows that out of the total production of the country, the arrivals in regulated markets ranged from 42 to 51 *per cent* during the last five years ended March 2004. The remaining produce ranging between 49 to 58 *per cent* was sold by the growers mainly through unregulated markets.

The Management while accepting the facts stated (August 2005) that the Corporation as a policy carried out its purchase operations only in the regulated market yards in the presence of APMC officials and was rather deprived of a large part of the crop production, from its purchase purview, which was sold directly at village levels or out side the market yards.

Recommendation

The local APMCs and State governments should ensure through further spread of regulated markets or if necessary through legislation, that all cotton produced in the country is traded in regulated markets

13.6.1.3 Trading Infrastructure

The trading (i.e., purchase and sale) activities of the Corporation are carried out through 244 purchase centres under the administrative control of the 20 branches of the Corporation. The main function of the purchase centres is to participate in the auction of cotton conducted in the regulated market yards set up by the respective State Governments to purchase cotton from the cotton growers. The table given in **Annexure-32** contains statewise data of the purchase centres, the total production of cotton and the cotton procured by the Corporation in each state during the three years ending 2004-05.

Scrutiny of the data given in **Annexure-32** revealed the following:

i. The National Commission on Agriculture recommended that the Corporation should strengthen its network of offices with a view to achieve procurement of 25 to 30 per cent of the total production of the cotton in the country,. The procurement centres in only two states[♣] could procure more than 25 per cent of the cotton produed during the year 2004-05. During the years 2002-03 and 2003-04, in none of the states the Corporation run centers could achieve this level.

ii. Against the 400 regulated markets trading in cotton situated throughout India, the Corporation had set up only 244 centres up to March 2005.

iii. The wide variations in the ratio of cotton produced to the number of centres in each state (ranging from 185714 bales of cotton per centre in Orissa to 45652 per centre in Rajasthan for the year 2004-05) indicated that the opening of purchase centres by the Corporation in various states was not in proportion to the total production of the cotton in the respective States.

iv. Further, variations in the ratio of procurement of cotton and the number of centres in each State ranged from 2857 bales per centre in Orissa to 17420 bales per centre in Andhra Pradesh in the year 2004-05 indicating a need to rationalise the spread and operations of the centres.

In the absence of any laid down criteria for the opening of purchase centres and wide variations in procurement of cotton by each centre the viability of the opening of the purchase centre could not be analysed in Audit.

The Management stated (August 2005) that besides the total production, factors like availability of market yards, warehousing facilities, ginning and pressing factories etc were also considered in determining the location of the purchase centres and accordingly numbers of centres were established.

The Management's reply was not acceptable because if the Corporation were to optimise its market share and to serve the farmers by ensuring remunerative prices for cotton produced by them, the network of procurement centres had to be comprehensive and rationally created which could not be done without a laid out policy of opening centres and reviewing their performance and impact.

Recommendation

The Corporation may review the policy for setting up of the procurement centres with a view to optimise its market share.

13.6.2 Remunerative prices to the farmers

13.6.2.1 While endorsing the recommendations of National Commission on Agriculture mentioned in para 13.6.1, the Committee On Public Undertakings (COPU) in its 93 report submitted to the Seventh Lok Sabha on 27 April 1984 recommended that by endeavouring to purchase about 25 to 30 *per cent* of the cotton produced through a large network of procurement centres, the Corporation would also ensure remunerative prices to the farmers and stabilisation of the cotton prices for general welfare of consumers.

[♣] *Rajasthan and Andhra Pradesh*

This should also be the objective of the Corporation though not explicitly laid down in its Memorandum of Association.

As the market share of the Corporation during the last six years ending March 2005 ranged from 4.31 to 11.91 *per cent* only, the Corporation could not have played any significant role in the stabilisation of prices and in ensuring remunerative prices to the cotton growers. One of the reasons for non-achievement could be attributed to not creating a network of centers to actively participate in all the markets created by the State Governments under the APMC Act.

In reply, the Management stated (August 2005) that the Corporation conducted its operations only through its continuous presence in the regulated market yards and not in the yards which were non functional and where infrastructure facilities were not available. It further stated that the regular presence of the Corporation in the market yards helped the cotton growers to get competitive and remunerative prices.

Even if the contention of the Management was accepted, the Corporation's success in ensuring remunerative prices would be limited only to the markets in which it had its centres i.e. only in 244 centres in 400 markets. Hence, the Corporation was not in a position to ensure remunerative prices to large numbers of cotton producers who sold their produce either in irregular markets or in markets where the Corporation did not have a presence.

Recommendation

The Corporation in order to ensure remunerative prices to the cotton growers should take the initiative to strengthen its network of purchase centres.

13.6.2.2 Minimum Support Price Operations (MSP)

The Corporation under the Textile Policy of June 1985 was required to undertake price support operations without any quantitative limit, whenever the market prices of cotton touched the support prices announced by the Government of India. Accordingly, the Corporation undertook Minimum Support Price Operations in the crop year 2001-02 and purchased nine lakh bales (8.51 lakh bales in financial year 2001-02 and 0.49 lakh bales in the financial year 2002-03) as against the total reported production of 109 lakh bales (excluding production of Punjab, Haryana and Maharashtra), representing 8.2 *per cent* of total production. Thus, the remaining quantity of 100 lakh bales remained outside the purview of the Minimum Support operations of the Corporation. Due to non-receipt of remunerative prices for their produce during the year 2001-02, the cotton growers diversified to other crops. This resulted in reduction in area under cultivation for cotton crop. The Cotton Advisory Board attributed the reason for fall in area under cotton cultivation from 87.30 lakh hectares in 2001-02 to 74 lakh hectares in 2002-03 due to non-receipt of remunerative prices in the MSP year 2001-02.

13.6.3 Purchase through commission agents in regulated markets

In the National Textile Policies of 1985 and 2000, while ensuring remunerative prices to the cotton growers, making available cotton at reasonable prices to the textile mills and other end users was also stipulated as an objective. The Corporation participated in the auctions conducted at the APMC markets throughout the season and thereby ensured remunerative and competitive prices to the cotton growers by eliminating formation of cartels by traders. Its participation in the auctions also ensured non-exploitation of mill

owners by the traders. While certain states like Punjab, Haryana and Rajasthan, the APMC Act provided for purchases through commission agents against payment of commission/dami by the buyers, in other states like Gujarat, Andhra Pradesh and Karnataka the practice of direct purchases from the farmers and through commission agents prevailed. In states like Maharashtra and Madhya Pradesh there was no system of payment of commission and purchases were done directly from the farmers, which reduced the cost of purchase to the extent of commission and increased volumes of purchase.

During the last six years ended 2004-05, the Corporation paid commission of Rs.35.89 crore as Commission/dami to the agents and traders on the purchase of cotton in the regulated markets thereby increasing the cost of procurement.

In reply the Management stated (August 2005) that the commission agents were the license holders under the APMC Act authorised to transact business on behalf of the cotton growers and hence the Corporation had no option other than to procure through them and pay commission.

The above contention of the Management was not tenable because the Corporation should have explored the possibility of enrolling itself as agents in the regulated market yards dealing with purchase/sale of cotton if so mandated in order to procure directly from the growers and avoid payment of commission. This would have also helped the Corporation to compete effectively with the traders in the regulated markets.

Recommendation

If mandated by the APMC Act in the State, the Corporation should explore the possibility of enrolling itself as agents in the regulated market for procuring cotton directly from the growers at reasonable prices.

13.6.4 Maximization of Profitability of product mix

A review of the cost sheets prepared by the Ahmedabad branch of the Corporation during the last five years ending March 2004 revealed that the branch was purchasing S-6 super, S-6 A, S-6 GA and S-6 GAB varieties of cotton. Table 3 below summarizes the quantities purchased and profit made thereon as depicted in the said cost sheet: -

Table 3

	S-6 Super	S-6 A	S-6 GA	S-6 GAB
Staple Length	**28 mm**	**27mm**	**26 mm**	**25 mm**
PURCHASES (Qty in lakh bales*)				
1999-2000	0.92	1.25	0.24	0.06
2000-2001	0.91	2.29	0.41	0.34
2001-2002	0.20	1.68	2.91	1.00
2002-2003	1.00	2.94	0.83	0.21
2003-2004	2.90	1.95	1.21	0.31

PROFIT/CONTRIBUTION (Rs. Per candy**)				
1999-2000	1034	738	610	880
2000-2001	745	751	(-) 131	845
2001-2002#	NA	NA	NA	NA
2002-2003	1231.15	921.09	1370	2390.77
2003-2004	975	592	193	984

Source : Cost sheet

*One cotton bale= A lint of 170 Kgs.

** One candy= 355.62 Kgs.

During 2001-02, MSP operations were taken up

It would be seen that the Corporation did not emphasise purchase of varieties with higher contributions. While S-6 A generally contributed less, it was purchased in higher quantities as compared with S-6 Super and S-6 GAB. For instance, the Corporation by making lesser purchase of S-6 Super variety (which had a higher contribution) as compared to S-6 A variety during 2002-2003, had to forgo an opportunity of earning a higher contribution of Rs.0.87 crore.

In reply the Management stated (August 2005) that the volume of purchases under particular grade depended upon the quality of arrival in various markets, demand for cotton and market sentiments and that simply for higher margins in particular varieties/grade purchases of other grade could not be restricted.

The reply was not acceptable, as the Corporation should have explored the possibility of changing the product mix of cotton to increase its profitability. It was noticed in Rajkot Branch of the Corporation that on 26 February 2004 that out of total arrival of 6.66 lakh bales of S-6 super variety of cotton, which had a higher contribution, the Corporation purchased only 1.94 lakh bales.

Recommendation

The Management should undertake mid term or monthly reviews of profitability, cost wise and variety wise breakeven analysis.

The Management accepted audit's suggestion.

13.7. Sales

13.7.1 Domestic sales operation

The following are the salient features of the Corporation's objectives in carrying out marketing operations:

i. Domestic sales operations at negligible margin in order to pass on larger benefit to cotton growers.

ii. Increase supplies of contamination free cotton in a phased manner to meet the growing demand of textile mills, especially the 100 *per cent* Export Oriented Units (EOUs), and

iii. Supply cotton to textile industries and other users at reasonable prices.

With a view to accomplish the marketing objectives, the Corporation undertakes the sales operations under the following three heads:

i. Spot sales: Buyers are allowed to lift the pressed bales against 100 per cent payment.

ii. Godown Storage Facility (GSF) Scheme: Started in 1985-86, the Corporation under this scheme enters into sales contracts after collecting five to ten per cent of the value of cotton as earnest money from the buyers.

The sale price of the cotton bales and the terms and conditions of sale were fixed by the purchase and sales (P&S) committee constituted at the Corporate Head Office.

13.7.1.1 Sales Targets and Achievements

The sales targets were initially decided in the Corporate plan keeping in view the cotton scenario envisaged by the Cotton Advisory Board and subsequently revised and re revised in the BMs conference. Table 4 summarizes the target so fixed and the achievements there against during the last six years ending 2004-05: -

Table 4

(Qty. in lakh bales)

Years	As per Corporate Plan	As per BMs Conference		Achievement	Percentage of Achievement to corporate plan Target	Percentage of Achievement to Re-revised Target
	Original	Revised	Re-revised			
1999-00	6.00	08.00	9.23	4.95	82.50	53.62
2000-01	7.00	10.45	9.60	5.65	80.71	58.85
2001-02	8.00	8.50	9.50	9.63*	120.37	101.36
2002-03	11.30	12.50	8.10	5.96	52.74	73.58
2003-04	9.00	15.60	12.25	8.37	93.00	68.32
2004-05	10.00*	--	--	10.57*	105.70	--

*This figure included MSP Operations therefore target is irrelevant.

Except during the year 2001-02 and 2004-05, in which MSP operations were carried out, the achievement with reference to sales targets fixed under corporate plan ranged from 52.74 to 93 *per cent*. With reference to the revised targets fixed under BMs conference, the achievement ranged from 53.62 to 73.58 *per cent*.

In reply, the Management stated (August 2005) that the achievement in each year was increasing as compared to the previous year therefore the performance of the Corporation was rated as Very Good in terms of MOU targets.

The above contention of the Management was not tenable as the targets set were never achieved indicating more concerted efforts were necessary in this direction.

Recommendation

Though the growth in sales over the years is commendable but the Corporation needs to make further concerted efforts in its sales function so that the targets set can be achieved.

13.7.1.2 Losses on resale of un-lifted bales

If the parties which agreed to lift the cotton bales within a stipulated time period, backed out for reasons of lower market prices, the Corporation as per terms and conditions of the sale contract could resort to resale of the un-lifted bales at the risk and cost of the original

buyer. Table 5 below indicates the sector-wise details of the parties which defaulted in lifting the contracted quantities of cotton bales sold to them and the differential amount and carrying charges etc., recoverable from them as at the close of 31 March 2004.

Table 5

(Rs. in crore)

Sr. No	Sector	Price Difference	Carrying Charges	Other Expenses	Interest	Total
1.	Cotton Seed Parties	0.23	0.20	-	0.11	0.54
2.	NTC Subsidiaries	2.15	2.48	0.01	23.48	28.12
3.	Private Mills	5.65	14.50	0.22	17.79	38.16
4.	Export	5.73	4.31	-	8.99	19.03
5.	Institutional Buyers	2.94.	4.41	0.01	18.32	25.68
	TOTAL	16.70	25.90	0.24	68.69	111.53

Source : Branch summary of Resale losses furnished by the Management

The lapse on the part of the Corporation to include a suitable clause in the sale contract for obtaining adequate security in the form of bank guarantee, letter of credit etc., in the event the original buyer backed out resulted in non recovery of Rs.111.53 on accounts of loss sustained by it in the disposal of unlifted bales at the risk and cost of the original buyers. The Corporation had initiated litigation/arbitration proceedings against the concerned parties. Further, developments in the matter were awaited (December 2005).

Recommendation

When sales are made under GSF scheme, it should be ensured that adequate Bank Guarantees are taken to cover the financial risk of the Corporation.

13.7.1.3 Cotton seed sales

Cotton purchased is ginned to remove seeds and other impurities and the lint obtained is pressed into bales. The cotton seeds so obtained in the course of ginning are sold in the market by the BMs depending upon the demand and the supply position. The BM of each centre decides the price of the cotton seeds sold but the methodology of determining the price is not recorded.

Sale proceeds realised from the disposal of cotton seeds during the six years ended March 2005 were Rs.118.16 crore, Rs.161.03 crore, Rs.189.53 crore, Rs.200.25 crore, Rs.255.98 crore and Rs.486.33 crore respectively and ranged between 21 and 33.24 *per cent* of the total turnover of the Company. Despite the high volume of cotton seed sale, no methodology was adopted for fixing the selling prices for proper transparency of transactions, especially in cases of finalisation of sales offers telephonically by the centre in charge.

Recommendation

A clear cut policy for determination and documentation of the procedure for fixing the sale price of cotton seeds should be implemented.

13.7.2 Export sales

Prior to July 2001 export of cotton from the country was based on export quotas released by the Government at the beginning of cotton season to various Central/State Government institutions as well as private traders. With the opening of the export window in July 2001, the Corporation had to compete with the local agents in the open market. The table given below summarises the export sales executed by the Corporation vis-à-vis total export of raw cotton during the five years ending 2003-2004.

Table 6

EXPORT	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Target fixed (in lakh bales)	1.25	2.50	2.00	1.00	1.00	1.20
Achievements (in lakh bales)	0.07	0.06	0.23	0.04	0.65	0.27
Shortfall (per cent)	94.40	97.60	88.50	96	35	77.50
Total Export of Cotton-Including waste (Rs. In crores)	77.07	224.13	42.69	50.49	65.76	NA
Total Export turnover by CCI (Rs. in crores)	7.22	7.82	13.76	14.36	23.48	10.52
Percentage of CCI Export to total Export	9.37	3.49	32.23	28.44	35.70	NA
Profit / Loss in Export (Rs. In crores)	0.23	0.25	-0.93	-0.18	1.82	NA

Source: Monthly statistics of Foreign Trade of India DG&S, Kolkata Branch Manager's conference and Annual Budgets of the Corporation

Note: From 1999-00 to 2000-01, Export quota allotted

It would be seen from the above tables that the Corporation could not achieve its export targets in quantitative terms in any of the six years ending March 2005 and the shortfall in the exports during the six years ended March 2005 ranged from 35 *per cent* to 97.60 per cent. The export turnover of the Company which gradually increased from Rs.7.22 crore in 1999-2000 to 23.48 crore in 2003-04 came down to Rs.10.52 crore in 2004-05.

In its reply the Management stated (August 2005) that reasons for not achieving the export targets were attributable to the following factors:

i. Disparity in prices of the Indian cotton vis-a vis comparable foreign growth in the international market;
ii. Fluctuations in exchange rates, at times making the Indian cotton more expensive in international market;
iii. Better price realisation in the domestic market; and
iv. Indian cotton is considered more contaminated as compared to international cotton.

The above contention of the Management was not acceptable as targets were fixed only after considering these factors.

Recommendation

Since export is a major tool for stabilisation of prices, the Corporation should strive to achieve more exports and make all out efforts to improve the quality of cotton at the time of its processing.

Conclusions

- Against the recommendation of the National Commission of Agriculture in 1975 that the Corporation should buy 25 to 30 *per cent* of the indigenous crop, the actual purchases were less than eleven *per cent* of the national production, showing under performance of the Corporation in the field of procurement activity.
- Purchase network was created to cover only up to 51 *per cent* of the national production of cotton which arrived in regulated markets. The Corporation could not thus, ensure remunerative prices to 49 *per cent* farmers whose produce was mainly marketed through cotton traders. Further, against the 400 regulated markets trading in cotton situated through out India, the Corporation had set up only 244 procurement centres up to March 2005.
- An amount of Rs.111.53 crore was locked up in litigation being the amount of loss on resale including interest and carrying costs under the GSF scheme. The Corporation did not protect its financial interest by taking bank guarantee, letter of credit etc., from the original buyers.
- Under export activity, no significant achievements were made during the period under review although exports were a major tool for stabilization of prices.

The review was issued to the Ministry in December 2005; its reply was awaited (February 2006).

(A. BASU)
Deputy Comptroller and Auditor General
cum Chairperson, Audit Board

New Delhi
The 1 MAY 2006

Countersigned

(VIJAYENDRA N. KAUL)
Comptroller and Auditor General of India

New Delhi
The 2 MAY 2006

Annexures

Annexure-1

(Referred to in para 2.1.1)

Financial Performance during 2002-03 to 2004-05

(Rs. in crore)

		2002-03	2003-04	2004-05
I	Revenue:			
	i) Operating	5275.91	5987.98	7588.17
	ii) Non-operating	381.96	255.01	41.82
	Total Revenue	5657.87	6242.99	7629.99
II	Expenses:			
	i) Operating	5465.63	6104.24	7538.88
	ii) Non-operating	80.24	124.36	40.97
	Total Expenses	5545.87	6228.60	7579.85
III	**Operating Profit/(Loss)**	(189.72)	(116.26)	49.29
IV	**Non-Operating Profit/(Loss)**	301.72	130.65	0.85
V	**Profit before tax**	112.00	14.39	50.14
VI	**Profit after tax**	133.86*	92.33#	96.36@

* Profit Before Tax less Provision of Taxation for Current year (Rs.10.00 crore) and for earlier year (Rs.0.15 crore) Plus Deferred Tax Benefit (Rs.32.01 crore)

\# Profit Before Tax less Provision of Taxation for Current year (Rs. 1.14 crore) Plus Deferred Tax Benefit (Rs.79.08 crore)

@ Profit Before Tax less Provision of Taxation for Current year (Rs.0.18 crore) Plus Deferred Tax Benefit (Rs.46.40 crore)

Annexure-2

(Referred to in para 2.3.1)

List of records examined

(A) Following records of Planning and International Department, Scheduling, Marketing, Market Research Sections of Commercial Department and Revenue Budget Section of Finance Department for the period 2002-03 to 2004-05 were examined:

- Correspondence files with the Ministry of Civil Aviation regarding purchase of aircraft and Project Reports of aircraft acquisition proposals.
- Draft schedules prepared by Commercial Department, feedback received from Engineering, Operations, In-flight Services and Ground Services Departments as well as the minutes of Scheduling Committee Meetings and the Final Flying Schedules.
- Market Survey Reports for operation on new routes.
- Monthly Reports regarding cancellation/rescheduling of flights.
- Route wise profitability statements containing item wise information regarding cost of operation and revenue generated.
- Statements of schedule-wise frequencies operated on various routes and information regarding schedule wise planned utilisation of various types of aircraft.

(B) Following records of Engineering Department and Engine Overhaul Department for the period 2002-03 to 2004-05 were examined:

- Details of periodic maintenance plan periodic inspections carried out by the Company and DGCA to ensure compliance and quality.
- Details of actual maintenance carried out *vis-à-vis* planned and the reasons for deviations.
- Manpower required *vis-à-vis* actual availability. Effect on maintenance schedule/required checks due to shortage of manpower of maintenance staff.
- Details of outsourcing of maintenance works and reasons for outsourcing.
- Statistical data published by manufacturers of the aircraft regarding utilisation of different types of aircraft.
- Fleet Performance and Engineering Statistics Reports.
- Safety instructions issued by DGCA/Ministry of Civil Aviation.
- Minutes of Safety Committee meeting.
- Safety Audit Reports and their compliance.

Annexure-3

(Referred to in para 2.4.3.1)

Number of Flights Scheduled, cancelled and rescheduled during 2002-03 to 2004-05

	Reasons for cancellation/ rescheduling	Comm-ercial	Operat-ional	Engineering	VVIP	Misc	Total	Percentage of cancellation/reschedulement to total flights scheduled
Summer 2002	Total flights Scheduled (International flights only)			**7056**				
	No. of flights Cancelled	6	0	120	4	8	**138**	**1.95**
	No. of flights Rescheduled	77	9	381	28	126	**619**	**8.77**
Winter 2002	Total flights Scheduled (International flights only)			**5280**				
	No. of flights Cancelled	14	0	2	4	42	**62**	**1.18**
	No. of flights Rescheduled	45	22	95	4	321	**487**	**9.22**
Summer 2003	Total flights scheduled (International flights only)			**8232**				
	No of flights Cancelled	119	0	2	0	31	**152**	**1.85**
	No. of flights Rescheduled	98	87	163	7	484	**839**	**10.19**
Winter 2003	Total flights schedule (International flights only)			**6160**				
	No of flights Cancelled	0	16	5	0	0	**21**	**0.34**
	No. of flights Rescheduled	43	3	116	3	291	**456**	**7.41**
Summer 2004	Total flights scheduled (International flights only)			**9072**				
	No of flights Cancelled	44	0	2	0	2	**48**	**0.53**
	No. of flights Rescheduled	97	19	109	0	110	**335**	**3.70**

Winter 2004	Total flights scheduled (International flights only)	**6680**						
	No of flights Cancelled	0	0	2	0	0	**2**	**0.029**
	No. of flights Rescheduled	18	4	32	1	147	**202**	**3.02**

Annexure-4

(Referred to in para 2.4.3.2)

Flights delays by more than 20 minutes during 2002-03 to 2004-05

Reasons for delay		Commercial	Ground Service	Operational	Engineering	Misc.	Total	Percentage of flights delays to total flights operated
Summer 2002	Total flights Operated #				**14225**			
	No of flights Delayed	654	39	20	113	2286	**3112**	21.87
Winter 2002	Total flights Operated				**10855**			
	No. of flights Delayed	411	34	17	93	1797	**2352**	21.66
Summer 2003	Total flights Operated				**15780**			
	No. of flights Delayed	416	31	31	103	2157	**2738**	17.35
Winter 2003	Total flights Operated				**11920**			
	No. of flights Delayed	381	25	10	91	1631	**2138**	17.93
Summer 2004	Total flights Operated				**18636**			
	No. of flights Delayed	536	50	21	164	2664	**3435**	18.43
Winter 2004	Total flights Operated				**13787**			
	No. of flights Delayed	449	74	27	119	1945	**2614**	18.96

includes all departures, at originating and intermediatary stop-overs also.

Annexure-5

(Referred to in para 2.5.3.2)

Statement showing loss of contribution 2002-03

Aircraft Type	Revenue per block hour (Rs.)	Variable Cost per block hour (Rs.)	Contribution per block hour (A) (Rs.)	Excess grounding days (B) (Nos.)	Avg. utilization per day (Block hrs.) (C)	Excess hrs. (D) (B*C) (Nos.)	Loss of contribution (A*D) (Rs.)
B747-200	6,18,004	4,88,227	1,29,777	20	4.72	94.4	1,22,50,948
B747-300	6,28,037	4,31,635	1,96,402	70	6.55	458.5	9,00,50,317
B747-400	5,96,540	4,30,998	1,65,542	42	11.55	485.1	8,03,04,424
A310	3,83,889	2,40,999	1,42,890	225	9.33	2099.25	29,99,61,833
						Total	**48,25,67,522**

2003-04

B747-200	5,87,929	5,16,275	71,654	25	5.80	145	1,03,89,830
B747-300	6,11,507	4,41,072	1,70,435	32	8.36	267.52	4,55,94,771
B747-400	5,92,479	4,59,958	1,32,521	54	12.03	649.62	8,60,88,292
A310	3,67,296	2,45,874	1,21,422	274	9.19	2518.06	30,57,47,881
						Total	**44,78,20,774**

Total (2003-04 and 2004-05) = Rs.48,25,67,522+ Rs.44,78,20,774 = Rs.93,03,88,296

Say =Rs.93.04 crore

Annexure-6

(Referred to in para 3.5.1)

Records examined in Audit

- Annual Reports of MCL, CIL and other CIL subsidiaries, MIS report, MCL/CIL Board papers, papers relating to CMD's meet in CIL.
- Records of the projects / mines, along with annual plan/long term plan, status of projects,. Log books, plants records, performance records of HEMM. Cost sheets,financial records, internal audit reports of the projects.
- Assessment reports of outside agency like Coal Controller Organisation Report 2003-04, CMPDIL journals, KPMG (CIL consultants) Report on CIL in 2002.
- Preliminary replies of the management to audit questionnaires issued in course of audit.

Annexure-7

(Referred to in Para 4.4)

List of BWEs deployed in Mine I and Mine II

BWE No	Capacity in Litre	Date of Commissioning	Make	Location
Mine I				
1447	1400	10.06.2000	KRUPP, GERMANY	NEW SURFACE BENCH
1448	1400	10.07.2000	KRUPP, GERMANY	NEW SURFACE BENCH
1440	1400	31.05.1995	O & K, GERMANY	FLOAT / SPARE
1355	1400	28.08.1978	O & K, GERMANY	SURFACE BENCH
1356	1400	01.05.1979	O & K, GERMANY	TOP BENCH
1357	1400	28.12.1979	O & K, GERMANY	MIDDLE BENCH
1193	700	09.02.1966	LMG, GERMANY	LIGNITE BENCH
1145	700	19.05.1961	LMG, GERMANY	LIGNITE BENCH
1144	700	18.10.1960	LMG, GERMANY	BOTTOM BENCH
1574	700	05.05.1989	BUCKAU WOLF, GERMANY	LIGNITE BENCH
1573	700	15.06.2002	BUCKAU WOLF, GERMANY	BOTTOM BENCH
Mine II				
MAN I	1400	14.04.1983	MANTAKRAF, GERMANY	TOP BENCH
MAN II	1400	24.03.1984	MANTAKRAF, GERMANY	MIDDLE BENCH
1420	1400	09.05.1990	O & K GERMANY	SURFACE AND TOP BENCH
1421	1400	20.07.1991	O & K, GERMANY	SURFACE AND TOP BENCH
1422	1400	15.01.1992	O & K, GERMANY	SURFACE, TOP AND MIDDLE BENCH
1571	700	26.12.1990	KRUPP, GERMANY	LIGNITE
1572	700	21.12.1990	KRUPP, GERMANY	LIGNITE
1145	700	19.05.1961	LMG, GERMANY	BOTTOM/MIDDLE BENCH
1193	700	02.02.1966	LMG, GERMANY	BOTTOM/MIDDLE BENCH
146	700	07.05.1983	BUCKAU WOLF, GERMANY	BOTTOM BENCH
147	700	01.12.1983	BUCKAU WOLF	MIDDLE BENCH

Annexure-8

(Referred to in Para 4.6.3.1)

MINE I including expansion

Table 1. Shortfall in OB Removal

Year	Total Hours worked for OB removal		OB removed-Actual (Mm^3)		Achievable capacity for the actual hours (Mm^3)		Shortfall (Mm^3)		
	1400 litre	700 litre	1400 litre	700 litre	1400 litre	700 litre	1400 litre	700 litre	Total
2000-01	24298	9857	47.00	7.96	54.67	8.25	7.67	0.29	7.96
2001-02	29212	9960	57.04	9.06	65.72	12.38	8.68	3.32	12.00
2002-03	28991	4162	45.93	3.07	60.64	3.57	14.71	0.50	15.21
2003-04	24898	5481	42.78	4.25	53.25	5.80	10.47	1.55	12.02
2004-05	23101	7781	41.20	5.76	51.75	5.99	10.55	0.23	10.78
Total									57.97
			Annual Average				11.59 Mm^3		
Short exposure of lignite (OB-Lignite ratio of 5.5:1)							2.11 MT		

Achievable capacity of a 1400 BWE is 2250 m^3 per hour and 700 BWE is 739 m^3 per hour.

Table 2. Shortfall in lignite production

Year	Total Hours worked for Lignite excavation			Actual output (MT)			Achievable output (MT)			Short fall (MT)			
	1400 BWE	700 BWE	350 BWE	1400 BWE	700 BWE	350 BWE	1400 BWE	700 BWE	350 BWE	1400 BWE	700 BWE	350 BWE	Total
2000-01	-	7203	25	-	6.94	0.01	-	10.26	0.02	-	3.32	0.01	3.33
2001-02	101	9312	-	0.15	7.30	-	0.23	13.12	-	0.08	5.82	-	5.90
2002-03	-	7786	-	-	7.95	-	-	11.42	-	-	3.47	-	3.47
2003-04	3	10695	-	-	10.21	-	-	15.26	-	-	5.05	-	5.05
2004-05	3404	7302	-	3.68	6.69	-	7.73	10.40	-	4.05	3.71	-	7.76
Total (MT)				42.93			68.44						25.51
Annual Average(MT)				8.59			13.69			5.10			

Annexure-9

(Referred to in Para 4.6.3.2)

Table 1. Shortfall in OB Removal (Mine II)

Year	Total Effective hours worked for OB removal		Actual OB removed (Mm^3)		OB Removal for actual hours at achievable capacity		Shortfall in Mm^3	
	1400 litre	700 litre	1400 litre	700 litre	1400 litre	700 litre	1400 litre	700 litre
2000-01	21905	13243	40.92	11.78	49.28	11.69	8.36	-0.09
2001-02	24771	10072	44.79	9.66	55.74	8.49	10.95	-1.17
2002-03	20284	12509	34.07	10.25	45.64	11.02	11.57	0.77
2003-04	18810	18577	33.74	15.16	42.33	16.99	8.59	1.83
2004-05	19171	17824	35.69	14.92	43.14	16.46	7.45	1.54
					Average		9.38	0.58
					Total		9.96	
Short exposure of lignite (OB:lignite ratio 5.25:1)							1.90	

Table 2. Shortfall in Lignite Production (Mine II)

Year	Total effective hours BWEs 700 for lignite production	Actual lignite produced (MT)	Production for the actual hours worked (@ 1486 t/hr) achievable capacity	Shortfall in lignite Production (MT)
2000-01	11529	10.70	17.13	6.43
2001-02	11239	10.25	16.69	6.44
2002-03	10414	9.80	15.47	5.67
2003-04	7867	7.95	11.69	3.74
2004-05	7388	7.68	10.98	3.30
Total		46.38	71.96	25.58
Annual Average		9.28	14.39	5.12

Annexure-10

(Referred to in Paras 4.7.1.1 and 4.7.1.2)

Excess Consumption of Power and Teeth

Year	Mine I - Power			Mine I - Teeth		
	Excess Consumption (MU)	Unit Rate Rs.	Extra Expenditure Rs. in crore	Excess Consumption Nos.	Unit Rate (Rs)	Extra Expenditure Rs. in crore
2000-01	21.88	1.6642	3.64	1605	3071	0.49
2001-02	19.46	1.8586	3.62	3205	3122	1.00
2002-03	52.69	1.8205	9.59	5637	3722	2.10
2003-04	-	1.8205	-	4071	4398	1.79
2004-05	-	1.8205	-	3657	5074	1.85
			16.85			**7.23**
Year	Mine II- Power			Mine II - Teeth		
	Excess Consumption (MU)	Unit Rate Rs.	Extra Expenditure Rs. in crore	Excess Consumption Nos.	Unit Rate	Extra Expenditure Rs. in crore
2000-01	-	1.36	-	904	3157	0.29
2001-02	6.46	1.41	0.91	---	3369	---
2002-03	28.91	1.41	4.08	1528	2763	0.42
2003-04	82.31	1.52	12.51	2474	3807	0.94
2004-05	113.84	1.52	17.30	3594	4318	1.55
		Total	34.80			**3.20**

Mine I					
Years	Excess consumption (MU)	Energy Percentage in OB & LIG benches	Share of excess consumption	Unit rate	Excess expenditure (Rs. in crore)
2000-01	21.88	65.72	14.38	1.6642	2.39
2001-02	19.46	59.72	11.62	1.8586	2.16
2002-03	52.69	62.02	32.68	1.8205	5.95
Total					**10.50**

Mine II					
Years	Excess consumption (MU)	Energy Percentage in OB & LIG benches	Share of excess consumption	Unit rate	Excess expenditure (Rs. in crore)
2001-02	6.46	61.04	3.94	1.41	0.56
2002-03	28.91	63.76	18.43	1.41	2.60
2003-04	82.31	65.41	53.84	1.52	8.18
2004-05	113.84	60.42	68.78	1.52	10.45
Total					**21.79**

Annexure-11

(Referred to in Para 4.8.1)

Excess Hours consumed over norms

Year	Mine I		Mine II	
	1400 BWE	700 BWE	1400 BWE	700 BWE
2000-01	2788	14091	850	-
2001-02	4080	6524	850	3173
2002-03	3746	2622	3743	6650
2003-04	8902	1838	3857	7410
2004-05	8464	3255	3775	7059
Total Hours	27980	28330	13075	24292
OB that could have been removed	62.96	20.94	29.42	17.95
Total OB	83.90 Mm^3		47.37 Mm^3	
Lignite that could have been excavated	15.25 MT		9.02 MT	

Annexure-12
(Referred to in Para 4.8.2)

Stoppages of BWEs

MINE II						
1420	Sep 2002	240	Rotary Plate Diverter and Wall Plate work and bearing changing.	Dec 2002	124	Changing of Rotary Plate Gear Box
1421	Jul 2003	96	Rotary Ball race inspection/ changing	Aug 2003 Nov 2003 Feb 2004	48 48 91	--do-- --do-- --do--
MAN-I	May - Sep 2000 May-Jul 2002 Mar/Apr 2004	2988 1092 1296	Overhaul Overhaul Overhaul and Boom Modification	Oct /Nov 2000 Dec-2002- Jan- Feb 2003 Apr-May 2004	296 141 518 183	BW & Gear Box Trouble Discharge Belt Pivot Bearing Inspection/ changing. Discharging Boom Ball Race changing. Rotary Plate Ball Race changing.
MAN II	Jun-Oct 1998 Jun 2002 Oct 2002-Nov 2003	2877 206 9504	Overhaul Hollow Shaft changing. Boom Modification work and OH	Apr 1999 Aug 2002 Jan 2004 Mar-May 2004	326 218 171 1430	Discharging Boom Ball Race changing BW Bearing Sleeve dislocated. Rotary Plate changing. Loading/discharge Boom slewing Ball race changing.

146	Sep 2001 Sep-Nov 2002	235 1360	Hollow Shaft Bearing/ Inspection changing Overhaul	Oct 2001 Jul 2003	147 108	Hollow Shaft Bearing/ Inspection changing --do--
147	Dec 1998-Apr 1999	2424	Overhaul	Jun-Jul 1999	320	Rotary Plate Diverter Wall Plate work
1571	Sep-Oct 2001	944	Overhaul	Dec 2001 Apr – May 2002	113 148	BW GB Unusual sound/overhaul inspection BW Fork/Free end Bearing changing.

1572	May-. Aug 1999	2400	Overhaul	Aug-Sep 1999	113	BW GB Unusual sound/overhaul inspection
1193	Jul-Sep 2004	1200	Overhaul	Jan 2004	299	Hollow Shaft Bearing changing
				Jun-Jul 2004	198	Loading/Discharge Boom Slewing Gear Box removal and changing.
1145	Jan 2005	173	Rotary Plate bearing changing	May-June 2003	729	BW fork/Free end bearing changing Main Slew/Bull Gear
				Jul-Aug 2003	1064	Ball race changing.
				Sep-Oct 2003	379	Rotary Plate Diverter Wall Plate and Bearing changing.
				Nov-Dec 2003	629	Loading/Discharge Boom works.
				Feb 2005	156	Rotary Plate bearing changing
		6067	**Total hours**		**5997**	

Annexure-13

(Referred to in Para 4.8.3)

Overhaul Stoppages

BWE	Date of commissioning	Overhaul completion date	Total working hours logged after OH (upto 31-03-2005)	Actual Working Hours		Forced Stoppages	
1420	09-05-1990	29.05.1995	51755	2000-01	5253	2000-01	1451
				2001-02	4334	2001-02	1806
				2002-03	4671	2002-03	2031
				2003-04	4632	2003-04	1666
				2004-05	4886	2004-05	1665
1421	20-07-1991	30-01-1995	46895 (from 30.01.1995 to 8.6.2004)	2000-01	5274	2000-01	1379
				2001-02	4637	2001-02	1745
				2002-03	4714	2002-03	1850
		30-09-2004	2478 (from 1.10.2004 to 31-03-2005)	2003-04	4864	2003-04	2368
				2004-05	3132	2004-05	1428

Annexure–14

(Referred to in para 5.3.1.9)

Market Share

Year	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Sales of Tractor (in Nos)						
Industry	2,54,900	2,49,566	2,15,025	1,60,969	1,91,141	2,46,596
Company	15,488	13,001	10,467	6,802	5,563	7,032
Market share (per cent)	6.1	5.2	4.9	4.2	2.9	2.9

Annexure-15

(Referred to in para 5.6.1)

List of Schemes introduced with of CMD's sanction

Sl. No.	PROPOSAL	CMD'S SANCTION NO.
1.	Incentive scheme for customers for increasing Tractor retail sales during festive period	S/20/99 dated 16.10.1999
2.	Implementation of Quantity Linked Scheme for increasing offtake during February./March 2001	S/9/00 dated 15.02.2001
3.	Implementation HMT Watch Incentive Scheme for increasing sales of Tractors Under Government. Subsidy Scheme during 2001-02	S/5/01 dated 19.07.2001
4.	Proposal for payment mobilization scheme	S/11/02 dated 30.01.2002
5.	Proposal for credit period for Tractors sales and modifications of incentive scheme already approved vide Sanction No.5/78/01 dt. 28.09.01.	S/18/01 dated 16.03.2002
6.	Proposal for mobilising payment collection	2/15/02 dated 18.01.2003
7.	Proposal for streamlining of receivables from the dealers of Tractor Business Group to enhance collection	S/1/03 dated 25.04.2003
8.	Proposal for Incentive Scheme.	S/2/03 dated 14.05.2003
9.	Proposal for incentive scheme (1st August to 31st October 2003)	Sanction dated 30.07.2003
10.	Proposal for payment mobilisation Scheme	S/30/03 dated 18.03.2004
11.	Incentive Scheme to improve collection of dues and achievement of sales targets	S/8/01 dated 28.09.2001
12.	Amendment of Incentive scheme to improve collection of dues and achievement of sales targets of earlier schemes dated 02.09.2001	S/9/01 dated 12.12.2001
13.	Proposal for incentive scheme to improve collection of dues from dealers and Performance Linked Incentive Scheme (Interest waiver scheme)	S/13/02 dated 03.12.2002

Annexure-16

(Referred to in para 7.1.1)

Statement of commencement of production in oil fields

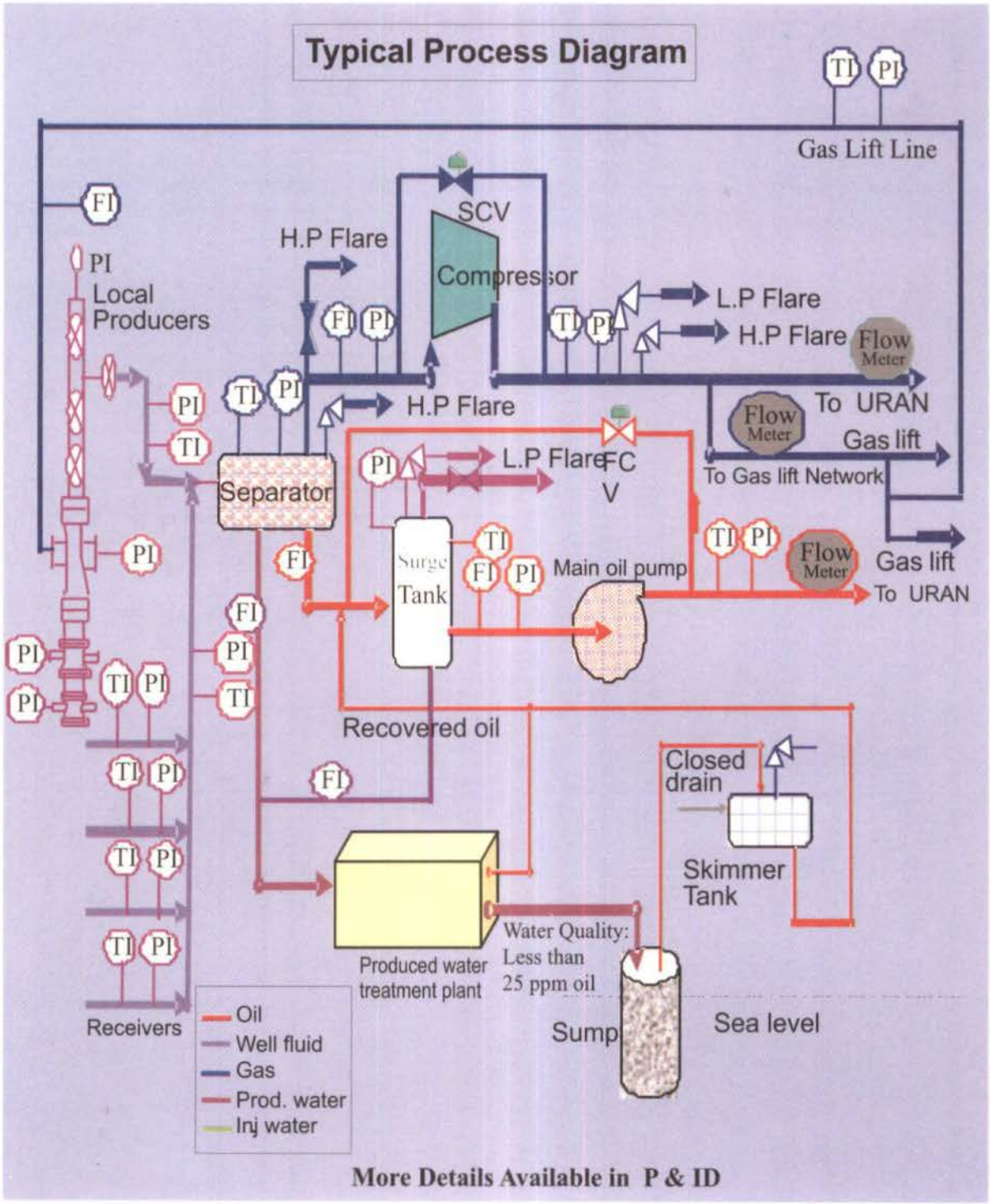
Field	Production started
Mumbai High	1976
Ratna#	1983
Heera	1984
Panna*	1986
Bassein (Vasai Gas)	1988
Neelam	1990
Mukta*	1990
S-1 Gas^	1992
South Heera	1995
B 121/119^	1997
B 173 A^^	1998
B 55^	1999

 # Awarded for Joint Venture Operation, Contract yet to be signed

*** Presently under Joint Venture Operation since 22nd December 1994**

^ Small satellite Field hooked up to Mumbai High, ^^ Small satellite Field hooked up to Neelam Field

Annexure-17
(Referred to in para 7.1.3)



FI: Flow Indicator, TI : Temperature Indicator, PI: Pressure Indicator, FCV: Flow Control Valve, SVC: Steam Control Valve

Source: data provided by ONGC

Annexure-18

(Referred to in para 7.7.1.1)

Mumbai High

	2003-04				2004-05			
Critical equipment	Total hours	Minimum operating run hours	Actual run hours	Percentage of actual utilisation to minimum operating hours	Total hours	Minimum operating run hours	Actual run hours	Percentage of actual utilisation to minimum operating hours
TG	217591	137002	145287	106.05	236213	148726	151824	102
PGC	201634	159627	146232	91.61	210232	166433	157001	94
MOLP	258074	172049	107415	62.43	258984	172656	99689	56
MIP	174816	131112	90576	69.08	201972	168777	94425	56
SWLP	104639	69759	62792	90.01	120484	80322	64755	81
Bassein and Satellite								
TG	70272	43920	42369	96.47	70080	43806	42030	95.95
BCP	52704	35136	16245	46.23	52560	35040	29074	82.97
CP	79056	43920	24566	55.93	78840	43800	32672	74.59
SWLP	52704	35136	24617	70.06	52560	35040	19934	56.89
Neelam Field								
TG	26346	17564	17489	99.57	26208	17472	17296	98.99
PGC	26390	17593	25671	145.91	26208	17472	24000	137.36
MOLP	26379	17586	8813	50.11	26208	17472	8675	49.65
MIP	43869	17548	24508	139.67	43680	17472	18765	107.40
SWLP	26352	17568	16867	96.01	26208	17472	10345	59.21
Heera field								
TG	35040	17520	16922	96.59	35016	17508	17648	100.80
PGC	44649	35719	34949	97.84	43774	35019	35085	100.19
MOLP	35040	17520	17503	99.90	35040	17520	17434	99.51
MIP	35034	17517	17792	101.57	35040	17520	17427	99.47
SWLP	26280	17520	13842	79.01	25610	17073	16135	94.50

Annexure-19

(Referred to in para 7.7.1.2)

Utilisation of Turbine Generators during 2004-05

Name of Platform	Equipment Name	Design Capacity MW	Actual Power Generation/Gas-MW	% utilisation	% redundancy
BHN	TG-G770	2.4	1.3	54.17	45.83
BHN	TG-G775	2.4	1.2	50.00	50.00
MNW	TG A	8.4	1.9	22.62	77.38
MNW	TG B	8.4	1.9	22.62	77.38
MNW	TG C	8.4	1.9	22.62	77.38
NQ	TG – 1810	2.75	1.7	61.82	38.18
NQ	TG - 1820	2.75	1.5	54.55	45.45
NQ	TG - 1830	2.75	1.6	58.18	41.82
NQ	TG - 1840	2.75	1.3	47.27	52.73
WIN	TG-5120	10	7	70.00	30.00
WIN	TG-5130	10	7	70.00	30.00
WIN	TG-5140	10	7	70.00	30.00
BHS	TG-1610	15	9	60.00	40.00
BHS	TG-1620	15	9	60.00	40.00
BHS	TG-1630	15	9	60.00	40.00
IC	TG-2710	10.8	5.5	50.93	49.07
IC	TG-2720	10.8	5.5	50.93	49.07
IC	TG-2730	10.8	5.5	50.93	49.07
SHQ	TG-1610	2.75	1.7	61.82	38.18
SHQ	TG-1620	2.75	1.5	54.55	45.45
SHQ	TG-1630	2.75	1.5	54.55	45.45
SHQ	TG-1640	2.75	1.7	61.82	38.18
SHG	TG- 5010	12.5	6.9	55.20	44.80
SHG	TG- 5020	12.5	6.8	54.40	45.60
SHG	TG- 5030	12.5	6.8	54.40	45.60
NEELAM	TG - 5010	12.3	4	32.52	67.48
NEELAM	TG - 5020	12.3	4	32.52	67.48
NEELAM	TG - 5030	12.3	1	8.13	91.87
HEERA	TG G-8160	8.32	5	60.10	39.90
HEERA	TG G-8170	8.32	5	60.10	39.90
HEERA	TG G-8180	8.32	5	60.10	39.90
HEERA	TG G-8190	8.32	5	60.10	39.90
BPA	BPA TG A	2.4	1.5	62.5	37.5
BPA	BPA TG B	2.4	1.5	62.5	37.5
BPA	BPA TG C	2.4	1.5	62.5	37.5
BPA	BCPA TG	2.4	1.5	62.5	37.5
BPB	TG G-1170	2.7	1.5	55.55	44.45
BPB	TG G-1170	2.7	1.5	55.55	44.45
BPB	TG G-1170	2.7	1.5	55.55	44.45
BPB	TG G-1170	2.7	1.5	55.55	44.45

Annexure-20

(Referred to para 8.7.3)

Details of gas based power plants commissioned by the Company

Sl. No.	Name of gas plant (Installed Capacity in MW)	Location (State)	Initial approved cost as per Feasibility Report (Rs. in crore)	Date of sanction by GOI	Year of commence ment	Beneficiaries (State Elect. Boards, etc.)
1	Anta **(419.33)**	Rajasthan	265.03	21 October 1986	1989	Uttar Pradesh, Uttaranchal, Chandigarh, Rajasthan, Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir and Delhi
2	Auraiya **(663.36)**	Uttar Pradesh	371.37	21 October 1986	1989	Uttar Pradesh, Uttarancha, Chandigarh, Rajasthan, Haryana, Punjab.,Himachal Pradesh, Jammu & Kashmir, Railways and Delhi
3	Kawas **(656.20)**	Gujarat	373.98	21 October 1986	1992	Gujarat, Maharashtra, Goa, Daman &Diu, Dadra & Nagar Haveli, Madhya Pradesh and Chhatisgarh
4	Dadri **(829.78)**	Uttar Pradesh	783.44	30 June 1989	1992	Uttar Pradesh, Uttaranchal, Chandigarh, Rajasthan, Haryana, Punjab, Delhi, Himachal Pradesh, Jammu & Kashmir and Railways
5	Jhanor-Gandhar **(657.39)**	Gujarat	1656.30	13 Feberuary 1992	1994	Gujarat, Goa, Daman & Diu, Dadra & Nagar Haveli, Madhya Pradesh, Maharashtra and Chhatisgarh
6	Kayamkulam **(359.56)**	Kerala	1310.58	18 September 1996	1998	Kerala and Tamil Nadu
7	Faridabad **(431.59)**	Haryana	1163.60	25 July 1997	1999	Haryana
Total Installed Capacity 4017.21 MW						

Annexure-21

(Referred to in paras 8.8.2 and 8.9.2.1)

Plant-wise position of requirement, availability and shortage of gas

Sl. No.	Particulars	Gas supply position							
		Period	Anta	Auraiya	Dadri	Gandhar	Kawas	Faridabad	Kayamkulam
1	Installed capacity (MW)	1999-2004	419.33	663.36	829.78	657.39	656.2	431.59	359.56
2	Quantity of gas required per day (in million cubic metres i.e.MCM) to run the plant at 100 per cent PLF as intimated by the Management	1999-2004	2.21	3.50	4.38	3.47	3.46	2.27	NA
3.	Quantity of gas required per day MCM) to run the plant at utilization factor of 73.5 per cent	1999-2004	1.62	2.57	3.22	2.55	2.54	1.67	NA
4	Quantity of gas supply per day committed by GAIL (MCM)	1999-2004	1.75	2.49	3.00	1.5	2.19	2.00	NA
5	Quantity of gas supplied by GAIL (MCM) during the year	1999-2000	696.59	982.34	949.4	462.29	757.83	239.90	NA
		2000-01	621.53	870.79	991.1	560.35	534.68	593.03	NA
		2001-02	655.94	875.51	986.6	712.71	284.6	585.05	NA
		2002-03	567.03	814.22	953.5	705.14	274.64	570.35	NA
		2003-04	541.19	762.67	898.19	660.52	233.93	559.30	NA
6	Average Quantity (MCM) of gas supplied by GAIL per day during the year	1999-00	1.90	2.68	2.59	1.26	2.07	0.66	NA
		2000-01	1.70	2.39	2.72	1.54	1.46	1.62	NA
		2001-02	1.80	2.40	2.70	1.95	0.78	1.60	NA
		2002-03	1.55	2.23	2.61	1.93	0.75	1.56	NA
		2003-04	1.48	2.08	2.45	1.80	0.64	1.53	NA

7	Shortfall (per cent) in availability of gas (MCM) during the year w.r.t. 73.5 per cent PLF utilisation	1999-2000	No shortage	No shortage	19	50	19	61	NA
		2000-01	No shortage	7	16	40	42	3	NA
		2001-02	No shortage	7	16	23	69	4	NA
		2002-03	4	13	19	24	70	6	NA
		2003-04	9	19	24	29	75	8	NA
8	Per cent shortfall of actual supply w.r.t. commitment	1999-2000	No shortage	No shortage	14	16	5	67	NA
		2000-01	3	4	9	No shortage	33	19	NA
		2001-02	No shortage	4	10	No shortage	64	20	NA
		2002-03	11	10	13	No shortage	66	22	NA
		2003-04	16	16	18	No shortage	71	24	NA
9	Loss of generation due to shortage of gas (MUs) i.e. inherent loss of generation during the period the plant was operated on alternate fuel	1999-2000	45.74	612.74	33.72	*	92	29.61	NA
		2000-01	42.99	727.2	4.28	*	84.08	45.58	NA
		2001-02	202.54	703.67	324.37	*	213.87	211.8	NA
		2002-03	172.12	568.48	34.01	*	190.06	211.8	NA
		2003-04	27.15	781.6	103.41	*	365.98	12.1	NA
10	Loss of generation (MUs) due to grid restriction i.e. generation for which no demand was received though offered to beneficiaries.	1999-2000	119.84	286.82	535.59	22.22	349.98	33.15	173.58
		2000-01	127.61	357.76	414.58	0.31	307.28	132.89	624.81
		2001-02	144.86	439.31	399.42	29.15	447.88	169.1	557.23
		2002-03	211.40	870.23	577.97	8.55	507.34	234.9	446.36
		2003-04	426.24	962.12	1336.57	80.23	1110.2	716.1	425.27

Annexure-22

(Referred to in para 8.10.1.1)

Station	Capacity	Total PLF Achieved					Average PLF(per cent) per year	Average under-utilisation of capacity (per cent) per year	Capacity under-utilised (MW) on an average per year	Cost (Rs. in crore) as per latest estimates	Capacity (in MW) as per FR	Average estimated cost in Rs.crore per MW
		1999-2000	2000-01	2001-02	2002-03	2003-04						
Anta	419.33	86.3	78.3	83.3	75.1	75.3	79.66	0.34	1.43	418.97	413	1.01
Auraiya	663.36	87.1	80.6	80.6	73.5	72.9	78.94	1.06	7.03	678.77	652	1.04
Dadri	829.78	70.2	77.6	78.8	71.7	69.4	73.54	6.46	53.60	960.35	815	1.18
Gandhar	657.39	39.5	48.5	62.8	68.5	65.8	57.02	22.98	151.07	2500	650	3.85
Kawas	656.2	76.5	81.7	65.3	73.1	67.5	72.82	7.18	47.12	1599.57	656	2.44
Faridabad	431.58	Not considered (32.9)	60.6	75.7	71.5	73.6	70.35	9.65	41.65	1048.17	432	2.43
Kayamkulam	359.56	Not considered (50)	61.7	41.8	67.3	67.1	59.48	20.52	73.78	1189.94	360	3.31
Total:								9.74	375.68			

Annexure-23

(Referred to in para 8.10.3.1)

Variable cost (in paise) per unit of power generated on gas and alternate fuel

Station	1999-2000		2000-01		2001-02		2002-03		2003-04	
	Gas	AF	Gas	AF	Gas	AF	Gas	AF	Gas	AF
Anta	81.87	318.59	87.38	326.21	86.55	316.77	86.93	307.84	90.35	329.07
Auraiya	82.00	249.00	91.00	301.00	89.00	288.00	91.00	268.00	93.00	310.00
Dadri	80.00	245.00	86.00	317.00	86.00	327.00	87.00	360.00	88.00	410.00
Gandhar	72.43	-	92.40	-	96.61	-	99.92	-	99.05	-
Kawas	101.28	234.12	99.79	330.12	97.88	283.68	100.65	293.83	102.60	306.10
Faridabad	117.00	NA	115.00	NA	81.00	NA	83.00	355.00	82.00	333.00
Kayamkulam	-	228.93	-	296.85	-	269.64	-	266.66	-	261.16

AF> Alternate Fuel
NA> Data not available

Annexure-24

(Referred to in para 8.10.3.2)

Declared Capacity and Schedule of Generation

Station	Installed Capacity (MW)	2003-04						
		Mode of operation	Declared Capacity (DC) in MUs	per cent of DC w.r.t. Instd. Capacity	Generation Schedule (GS) in MUs	per cent of GS w.r.t .Instd Capacity	Actual Generation (AG) in MUs	per cent of AG w.r.t. Instd. Capacity
Anta	419.33	Gas	2272	62	2163	59	2348	64
		AF	826	22	405	11	424	12
		Total	**3098**	**84**	**2568**	**70**	**2772**	**75**
Auraiya	663.36	Gas	3250	56	3107	53	3383	58
		AF	1788	31	985	17	866	15
		Total	**5038**	**86**	**4092**	**70**	**4249**	**73**
Dadri	829.78	Gas	4021	55	3784	52	4064	56
		AF	2175	30	999	14	996	14
		Total	**6196**	**85**	**4783**	**66**	**5060**	**69**
Gandhar	657.39	Gas	3228	56	0	0	3220	56
		AF	0	0	0	0	0	0
		Total	**3228**	**56**	**0**	**0**	**3220**	**56**
Kawas	656.2	Gas	1153	20	1144	20	1127	20
		AF	3752	65	2695	47	2762	48
		Total	**4905**	**85**	**3839**	**67**	**3889**	**67**

AF stands for alternate fuel

Annexure-25

(Referred to in paras 8.10.3.4 and 8.10.4.3)

Achievement of lower PLF in 2003-04 as compared to the declared capacity for recovery of fixed charges

Station	Installed Capacity (MW)	Mode of operation	Declared Capacity (DC) in MUs	per cent of DC w.r.t. Instd. Capacity	Fixed charges (Rs. In crore) recovered on the basis of DC	Actual Generation (AG) in MUs	per cent of AG w.r.t. Instd. Capacity	Fixed cost per Unit (in Paise) on the basis of DC	Fixed cost (in Paise) per Unit based on Actual PLF	Increase in Fixed cost per Unit in paise due to lower PLF than DC		Total Higher cost borne by beneficiaries on lower generation than DC (Rs. In crore)
										Paise	per cent	
		Gas	2272	62		2348	64					
		AF	826	22		424	12					
Anta	419.33	**Total**	**3098**	**84**	79.49	**2772**	**75**	25.66	28.68	3.02	11.76	8.36
		Gas	3250	56		3383	58					
		AF	1788	31		866	15					
Auraiya	663.36	**Total**	**5038**	**86**	145.11	**4249**	**73**	28.80	34.15	5.35	18.57	22.73
		Gas	4021	55		4064	56					
		AF	2175	30		996	14					
Dadri	829.78	**Total**	**6196**	**85**	210.96	**5060**	**69**	34.05	41.69	7.64	22.45	38.68
		Gas	3228	56		3220	56					
		AF	0	0		0	0					
Gandhar	657.39	**Total**	**3228**	**56**	478.93	**3220**	**56**	148.37	148.74	0.37	0.25	1.19
		Gas	1153	20		1127	20					
		AF	3752	65		2762	48					
Kawas	656.2	**Total**	**4905**	**85**	253.41	**3889**	**67**	51.66	65.16	13.50	26.12	52.49
Grand Total												123.45

AF stands for alternate fuel

Annexure-26
(Referred to in Para 8.11.1)

Comparison of variable cost

Station	Price of naphtha per tonne (Rs.)	Anticipated variable cost of energy on naphtha as reported to Board (Paise/Kwh)	Variable cost of energy on gas during 1996-97 (Paise/Kwh)	Ratio of variable cost on naphtha to variable cost on gas
Anta	9765.59*	179.78	68.96	2.60:1
Auraiya	10245.59*	188.62	70.00	2.69:1
Gandhar	8938.59**	164.55	60.97	2.70:1
Kawas	8870.59**	163.30	78.78	2.07:1

***Ex-Kandla** ****Ex Mumbai**

Annexure-27

(Referred to in Para No.8.12.2)

Status of completion of equivalent operating hours

Sl No	Plant	Date of completion (likely completion) of 80000 EOH by any of the unit	EOH completed as on 31 March 2004				R&M due to be initiated	R&M proposal initiated in
			GT-1	GT-2	GT-3	GT-4		
1	Anta	December 1999	1,14,883	1,13,474	1,10,053	-	May 1996	May 2002
2	Auraiya	December 2000	1,04,532	1,03,946	96,018	99,529	April 1997	March 1999 and finally in November 2002
3	Dadri	November 2002	NA	NA	NA	-	May 1997	July 2004
4	Gandhar	April 2008	44275	36932	40574	-	-	-
5	Kawas	June 2004	**GT-1A** 77300	**GT-1B** 78409	**GT-2A** 77800	**GT-2B** 76300	November 2000	May 2002
6	Faridabad	August 2010	43157	40706	-	-	-	-
7	Kayamkulam	January 2005	49156	53162	-	-	-March 2004	-NA

Annexure–28

(Referred to in para 9.6.2)

Performance indicators (Installed capacity, gross energy generation and Auxiliary energy consumption) of gas-based power plants

ITEMS	2000-01		2001-02		2002-03		2003-04 [4]		2004-05	
	AGBPP	**AGTP**	**AGBPP**	**AGTP**	**AGBPP**	**AGTP**	AGBPP	AGTP	AGBPP	AGTP
Installed Capacity (MW)	291	84	291	84	291	84	291	84	291	84
Design Energy [1] (MU)	1746	504	1746	504	1746	504	1746	504	1746	504
Machine Availability (Percent)										
As per GOI/CERC[7] norms [2]	NA [3]	NA [3]	NA [3]	NA [3]	NA [3]	NA [3]	80	80	80	80
Actual achievement	77.40	86.30	84.90	91.10	79.38	98.66	79.60 [5]	90.33 [5]	77.46 [5]	89.82 [5]
Under-recovery of Fixed Charges (Rs. Crore)	NA	NA	NA	NA	NA	NA	0.74	Nil	9.20	Nil
Plant Load Factor (Percent)										
As per GOI/CERC norms [6]	NA [3]	NA [3]	NA [3]	NA [3]	NA [3]	NA [3]	77	77	80	80
Actual achievement	48.38	58.28	51.93	75.30	39.66	76.79	62.43	76.60	63.47	77.73
MOU Generation Target (MU)	1346	360	1400	450	1425	575	1550	510	1550	510
Actual Generation (MU)	1233.44	428.83	1323.71	554.11	1010.95	565.06	1591.00	565.00	1617.00	572.00
Short fall in Generation (MU)										
With reference to Design Energy	512.57	75.17	422.29	Nil	735.05	Nil	155.00	Nil	129.00	Nil
With reference to MOU Target	112.57	Nil	76.29	Nil	414.05	9.94	Nil	Nil	Nil	Nil

Note: 1. a) Design Energy = Design Energy of the power plants is based on 6000 hours of operation (i.e. at 68.49 percent PLF) in a year as envisaged in the DPR.

b) Design Energy in MU = Installed Capacity (in MW) X 6000 hours / 1000.

2. a) Norm of Target availability = 80 percent for recovery of full fixed charges. For lower actual availability than normative, pro-rata fixed charges shall be deducted from total fixed charges. [As per CERC notification dated 26.03.2001(for 01.04.00-31.03.04) & notification dated 26.03.2004 (for 01.04.04 -31.03.09)].

3. NA = Not Applicable as norms for availability was not applicable before introduction of ABT.

4. ABT (Availability Based Tariff) was introduced in NER w.e.f. 01.11.2003.

5. CERC availability.

6. Incentive is receivable provided PLF, based on scheduled generation, exceeds the normative levels [77 percent (for 2003-04) or 80 percent (2004-05 onwards)] and up to a maximum PLF of 100 percent as per CERC notification mentioned above.

7. CERC = Central Electricity Regulatory Commission, authorised to fix tariff of Central Sector Power Stations.

Annexure–29

(Referred to in paras 9.6.2 and 9.6.7)

Items	Performance indicators of gas based power plants									
	2000-01		2001-02		2002-03		2003-04		2004-05	
	AGBPP	AGTP	AGBPP	AGTP	AGBPP	AGTP	AGBPP	AGTP	AGBPP	AGTP
Installed Capacity (MW)	291	84	291	84	291	84	291	84	291	84
Gross energy Generation at generator terminal.(MU)	1233.44	428.83	1323.71	554.11	1010.95	565.06	1591.00	565.00	1617.00	572.00
Energy sent out ex-bus at switchyard (MU)	1185.90	421.01	1278.70	544.94	970.00	553.35	1544.33	555.48	1549.06	565.12
Auxiliary Energy Consumption										
Norm (MU) [1]	37.0032	4.2883	39.7113	5.5411	30.3285	5.6506	47.7300	5.6500	48.5100	5.7200
Actual (MU) [1]	47.5400	7.8200	45.0100	9.1700	40.9500	11.7100	46.67	9.5200	67.9400	6.8800
Excess (MU)	10.5368	3.5317	5.2987	3.6289	10.5215	6.0594	Nil	3.8700	19.4300	1.1600
Gross Station Heat Rate (Kcal/Kwh) [3]										
Norm [4]	2250	3580	2250	3580	2250	3580	2250	3580	2250	3580
Actual	3174.65	4305.56	3009.38	3956.48 [4]	3286.22	3815.96 [4]	2806.08	4036.19 [4]	2797.33	4022.19 [4]
Excess	924.65	725.56	759.38	376.48	1036.22	235.96	556.08	456.19	547.33	442.19
Cost of generation (Paisa/kwh)	269.00	209.00	249.00	171.00	301.00	157.00	154.00	180.00	174.00	159.00
Tariff (Paisa/kwh)	225.00	190.00	225.00	190.00	225.00	190.00	206.00 [5]	185.00 [5]	222.00 [5]	176.00 [5]
Manpower										
Sanctioned	**Manpower for O & M stage not sanctioned**									
Actual [6]	385	168	388	160	377	167	364	142	348	142
89 day basis	01	34	01	34	Nil	34	Nil	35	Nil	36
Man/MW ratio (Norm).	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Man/MW ratio (Actual) [6]	1.32	2.00	1.33	1.90	1.30	1.99	1.25	1.69	1.20	1.69

Operation & Maintenance Expenditure (Rs. crore)										
Norms [2]	NA	NA	NA	NA	NA	NA	25.20	10.35	27.53	7.95
Actual	27.846	11.101	31.253	11.893	36.952	16.323	53.595	15.959	46.809	13.658
Excess	-	-	-	-	-	-	28.395	5.609	19.279	5.708

Note. 1. a) Aux. Consumption = Energy generated at Generator terminal minus energy delivered at switchyard (Ex-Bus) vide CERC order dated 26.03.2001

b) Normative Aux Consumption = 1percent (Open Cycle)/ 3 percent (Combined Cycle) percentage of Gross Generation at Generator terminal.

2. Normative O & M expenditure is as per CERC order dated 26.03.2004 (2004-05) and order dated 22.08.2005 (2003-04) for AGBPP and order dated 09.09.2005 (2003-04) for AGTP.

3. Gross Station Heat Rate.= Gross heat consumed (in Kcal) for generation of one unit (in Kwh) of Electricity.

4. Normative Gross Station Heat Rate (GSHR) –Norm fixed by CERC vide notification dated 05.02.2003 for the year 2003-04 onwards has been considered as the benchmark for earlier years also.

The heat rate figure furnished for AGTP was based on 'Net Calorific Value' except for 2000-01. Net Heat Rate as furnished has been multiplied by conversion factor 1.103 to arrive at the GSHR except for 2000-01. (Refer to para 20 of CERC order dated 25.09.2002)

5. Based on two part tariff rate.

6. Actual manpower showing regular employees only. Man /MW ratio has been calculated based on regular employees only.

Annexure-30

(Referred to in para 12.4.2.2)

Global Coal Tenders by SAIL from November 2000 to December 2004

S. No.	Tender Date	Coal Type	Quantity (MT)	Outcome
1.	08.11.2000	Hard	10,00,000	No offer was received
2.	08.11.2000	Soft	8,00,000	No offer was received
	No global tender issued during 2001-02			
3.	4.12.02	CDI	1,00,000	Offer received but management decided to re-tender
4.	14.02.03	CDI	90,000	Offer received but management decided to re-tender
5.	9.04.03	Anthracite	45,000	Offer received but not found technically suitable.
6.	10.09.03	CDI	90,000	Order placed only for one shipment (45,000 MT) against offered quantity of 90,000 MT.
7.	10.09.03	Anthracite	45,000	Offer received but no order placed
8.	11.09.03	Hard	8,70,000	No offer received
9.	17.09.03	Soft	1,35,000	No valid offer received
10.	28.05.04	Hard	Qty. Option Open	Offer received but no order placed since price (US$ 184.50 /MT CIF) was considered high by SDC in its meeting of. 05.07.04. The average cost of procurement was US$ 198.85 /MT CIF during April-Sept.04 in spot.
11.	06.07.04	CDI	1,00,000	Offers received but price quoted (US$ 76.50 /MT FOB) was considered to be high as against term agreement finalised at the same time at US$ 81 PMT FOB.
12.	28.10.04	CDI	100,000 – 150,000	No order was placed since L1 price (US$ 90 /MT FOB) was found to be higher.
13.	29.12.04	Hard	3,50,000	Orders were placed for full quantity, but suppliers failed to supply the coal, and the orders were finally terminated.

Annexure-31

(Referred to in para 12.7.1)

Position of Receipt, Despatch and Utilisation of Imported Coke

Supplier	Contract no & Date	Quantity Receipt	Date of receipt	Date by which entire material dispatched to plant	Delay in days	Monthly consumption
MMTC	601/3 dt.22.10.03	31,320	31.10.03	25.11.03	25	Not furnished
MMTC	603/04 dt.30.4.04	33,000	09.05.04	31.05.04	22	May 04 - 16,364
MMTC	604/04 dt.30.4.04	33,000	06.06.04	08.09.04	92	June 04 - 29,536
MMTC	605/04 dt.30.4.04	30,823	02.06.04	30.06.04	28	July 04 - 49,467 Aug. 04- 2,833
CC&CH	606/04 dt.24.8.04	31,371	24.09.04	12.12.04	78	Not furnished

Annexure-32

(Referred to in para 13.6.1.3)

Statement showing the details the purchase centres operated in each state, the total production of cotton in the country, the cotton available for procurement by each centre and the cotton actually procured there against by each centre of the Corporation state-wise during the three years ending 2004-05.

(Quantity in lakh bales)

State	Total Production			No. of Branches	Total Purchase by CCI			No. of Centres			Average cotton available in each centre in the state (bales in number)			Average cotton purchased by each centre (bales in number)			Percentage of cotton purchase by CCI to cotton available in the state		
	02-03	03-04	04-05		02-03	03-04	04-05	02-03	03-04	04-05	02-03	03-04	04-05	02-03	03-04	04-05	02-03	03-04	04-05
Punjab	8.00	10.50	16.50	1	0.09	0.24	1.51	08	11	14	100000	95455	117857	1125	2182	10785	1.12	2.29	9.15
Haryana	8.50	11.00	15.00	1	0.03	0.11	1.66	05	05	11	170000	220000	136363	600	2200	15090	0.35	1.00	11.07
Rajasthan	4.50	7.50	10.50	2	0.26	0.84	2.82	16	20	23	28125	37500	45652	1625	4200	11391	5.78	11.20	26.85
Gujarat	30.50	46.00	62.00	2	1.63	2.30	4.68	29	28	46	105172	164286	134782	5621	8214	10173	5.34	5.00	7.55
Maharashtra	24.00	31.00	52.00	2	2.03	3.28	1.70	48	82	38	50000	37805	136842	4229	4000	4473	8.46	10.58	3.27
Madhya Pradesh	18.00	16.00	16.00	1	0.39	0.26	1.54	16	15	17	112500	106667	94117	2438	1733	9058	2.16	1.62	9.62
Andhra Pradesh	20.00	26.00	32.50	3	1.29	1.82	12.02	39	46	69	51282	56522	47101	3308	3957	17420	6.45	7.00	36.98
Karnataka	6.00	4.00	9.00	3**	0.22	0.11	1.46	16	17	19	37500	23529	47368	1375	647	7684	3.67	2.75	16.22
Tamilnadu	4.00	3.50	5.50	2*	0.00	0.00		00	00		00	00	00	00	00		00	00	
West Bengal			0.86	1*	0.002	0.00		00	00		00	00	00	00	00		00	00	
Orissa	12.50	12.00	13.00	1	0.05	0.04	0.24	04	03	7	312500	400000	185714	1250	1334	2857	0.40	0.33	1.84
TOTAL	136.00	167.50	232.00	19	5.992	9.00	27.63	181	227	244									

Source Indian Cotton Profile 2003-04 Published by CCI and information furnished by the corporation.

\# Delhi is a liaison office is not included in above

* Only sales made through these branches.

** In one out of these three branches only sale transactions take place.

GLOSSARY OF ABBREVIATIONS

AAP	Advance Action Plan
ABT	Availability Based Tariff system
ACM	Air cycle machine
AGTP	Agartala Gas Turbine Project
AOD	Accessories Overhaul Division
ASEB	Assam State Electricity Board
B & S	Bassein & Satellite
Bas	Business Associates
BCP	Booster Compressor Pumps
BDPS	Bureau of Data Processing Systems
BF	Blast Furnace
BHRP	Bhandaridah Refractories Plant
BOF	Basic Oxygen Furnace
BOSP	Bokaro Steel Plant
BP	Booster Pumps
BRP	Bhilai Refractories Plant
BSD	Business Systems Division
BSP	Bhilai Steel Plant
CAAT	Computer Aided Audit Technique
CCEA	Cabinet Committee on Economic Affairs
CEA	Central Electricity Authority
CED	Computer Education Division
CERC	Central Electricity Regulatory Commission
CHP	Coal Handling Plant
CIG	Coal Import Group
CIL	Coal India Limited
CMPDIL	Central Mine Planning and Design Institute Limited
COPU	Committee on Public Undertakings
CP	Condensate Pumps
DGCA	Director General Civil Aviation
DHEP	Doyang Hydro Electric Project
DM	De-mineralised
DPR	Detailed Project Report
DSP	Durgapur Steel Plant
DWDM	Dense Wavelength Division Multiplexing
EJC	Empowered Joint Committee
EMC	Equipment Management Cell
EMP	Environment Management Plan

EOH	Equivalent Operating Hours
EOU	Export Oriented Unit
ER	Eastern Region
ESC	Empowered Sub Committee
FSNL	Full Speed No Load
GBPS	Giga Bytes Per Second
GCV	Gross Calorific Value
GREP	Gas Rehabilitation and Expansion Project
GTG	Gas Turbine Generator
HBJ	Hazira-Bijaipur-Jagdishpur
HDPE	High Density Poly-Ethylene
HEMM	Heavy Earth Moving Machinery
HGPI	Hot Gas Path Inspection
HP	Hoarse Power
HPI	Hot Parts Inspection
ICE	Information Consolidation for Efficiency
ICT	Inter-Connecting Transformer
IED	Industrial Engineering Department
IFICROP	India Firebricks and Insulation Co. Refractories Plant
IIE	India Industrial Enterprises
IMPETUS	Implementing Maintenance & Procurement Efforts Through Upgraded System
ISPs	Integrated Steel Plants
Kcal	Kilo Calorie
KV	Kilo Volt
Kwh	Kilowatt Hours 1 Unit.
LC	Letter of Credit
LDO	Light Diesel Oil
LOI	Letter of Intent
LSPs	Local Service Providers
LTGP	Long Term Gas Production
LTOP	Long Term Oil Production
MBPS	Mega Bytes Per Second
MCB	Magnesia Carbon Bricks
MCMD	Million Cubic Meters Per Day
MGO	Minimum Guaranteed Off-Take
MH	Mumbai High
MIP	Main (Water) Injection Pump
MIS	Management Information System
MMSCMD	Million Metric Standard Cubic Meter per day
MOA	Memorandum of Agreement

MOLP/CTP	Main Oil Pump/Crude Transfer Pump
MOU	Memorandum of Understanding
MT	Million Tonnes
MTY	Million Tonne per Year
MU	Million Unit
MW	Mega Watt
NCWA	National Coal Wage Agreement
NEC	North Eastern Council
NER	North Eastern Region
NEREB	North Eastern Regional Electricity Board
NERLDC	North Eastern Regional Load Dispatch Centre
NH	Neelam & Heera
NOX	Nitrogen Oxide
O&M	Operation & Maintenance
OB	Over Burden
OCC	Operation Co-ordination Committee
OCP	Open Cast Projects
OEM	Original Equipment Manufacturer
OFC	Optical Fibre Cable
OMS	Output Per Man Shift
PGC	Process Gas Compressor
PGP	Producer Gas Plant
PLF	Plant Load Factor
PMS	Preventive Maintenance Schedule
POL	Petrol Oil and Lubricant
PPA	Power Purchase Agreement
PPD	Production Planning Division
PR	Project Report
R&M	Renovation and Modernisation
RCE	Revised Cost Estimate
RHEP	Ranganadi Hydro–Electric Power Project
RISL	Reliance Silicones (India) Pvt. Limited
ROU	Right of Use
RRRP	Ranchi Road Refractories Plant
RSP	Rourkela Steel Plant
SARS	Severe Acute Respiratory Syndrome
SBU	Strategic Business Unit
SG	Slide Gate
SMS	Steel Melting Shop
SRC	Shinagawa Refractories Company
STMs	Synchronous Transport Modules

STU	Software Training Unit
SWLP	Sea Water Lift Pump
TAP	Turnaround Plan
TCC	Technical Co-ordination Committee
TCS	Tata Consultancy Services
TEV	Techno-economic Viability
TGBPP	Tripura Gas Based Power Project
TML	Tata Metalliks Limited
UG	Under Ground
UHV	Useful Heat Value
UI	Unscheduled Interchange
UTLS	Unit Train Load System

GLOSSARY OF TECHNICAL TERMS

Term	Description
AC	Alternating Current (AC) is electric current that alternates between a positive maximum value and a negative maximum value at a characteristic frequency, usually 50 or 60 cycles per second (Hertz).
Auxiliary energy consumption (AUX)	In relation to any period, means the ratio, expressed as a percentage of energy in kwh generated at Generator terminals minus energy in kwh delivered at the Generating Station Switchyard to gross energy in kwh generated at the Generator terminals.
Availability	Availability of thermal generating station for any period shall be the percentage ratio of average Sent Out Capability (SOC) for all the time blocks during that period and rated SOC of the generating station
Backfill	Material used to replace soil and earth removed during mining operations, and generally to fill a mined out slope
Base load	The minimum amount of electric power delivered or required over a given period of time at a steady rate.
Base load Capacity	The generating equipment normally operated to serve loads on a round-the-clock basis.
Bus Bars	Bus Bars are rectangular copper or aluminium bars that connect the output of the generator set circuit breakers to the transfer switches, circuit breakers, or fusible switches that transfer power to the load.
Combined Cycle	An electric generating technology in which electricity is produced from otherwise lost waste heat exiting from one or more gas (combustion) turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam generator for utilization by a steam turbine in the production of electricity. This process increases the efficiency of the electric generating unit.
Current	Current is the flow of electric charge. Its unit of measure is the ampere.
Cycle	A cycle is one complete reversal of an alternating current or voltage from zero to a positive maximum to zero again and then from zero to a negative maximum to zero again. The number of cycles per second is the frequency.
Declared Capacity (DC)	In relation to any period or time block means the capability of the generating Station to deliver ex-bus Mwh declared by the generating company. (The DC shall not exceed installed capacity).
Frequency	Frequency is the number of complete cycles per unit of time of

	any periodically varying quantity, such as alternating voltage or current. It is usually expressed as (Hz) Hertz or CPS (cycles per second).
FSNL	Full Speed No Load – During FSNL condition no electricity is generated but gas is consumed.
Grade	The relative quality or percentage of metal content
Gross Calorific Value (GCV)	The heat produced in KCal by complete combustion of one kg. of solid fuel or liquid fuel or one standard cubic meter of gaseous fuel, as the case may be.
Gross Station Heat Rate (GSHR)	The heat energy in KCal input required to generate one KWh of electric energy at Generator Terminals.
Indicated reserve	A mineral resource sampled by drill holes, underground openings, or other sampling procedures, at locations too widely spaced to ensure continuity, but close enough to give a reasonable indication of continuity and where geo-scientific data are known with a reasonable level of reliability.
Inferred reserve	An estimate inferred from geo-scientific evidence, drill holes, underground opening or other sampling procedures, and before testing and sampling information is sufficient to allow a more reliable and systematic estimation.
Installed Capacity (IC)	In relation to a Generating Station means Rated Capacity or the contracted capacity as the case may be.
Least Cost Merit Order	State power utilities work out their demand for power from the generating stations on the basis of least cost merit order.
Mineable Reserves	Reserves which can be technically extracted after providing for reserves blocked up due to surface constraints viz township villages, etc. and sub surface constraints i.e. abandoned water logged working, mine fires etc.
Operation and Maintenance (O&M) Expenses	In relation to a period means the expenditure incurred in operation and maintenance of the generating station including manpower, spares, consumables, insurance and overheads.
Outage	The period during which a generating unit, transmission line, or other facility is out of service.
Overburden	Wastes sitting above mineral body
Plant Load Factor	In relation to a given period, is expressed as the percentage of total Kwh generated at generator terminals to Installed Capacity, expressed in kilowatts (Kw) multiplied by number of hours in that period.
Proved reserve	Those measured mineral resources of which detailed technical and economic studies have demonstrated that extraction can be justified at the time of determination and under specific conditions.

Scheduled Generation	Means schedule of generation (in MW) ex-bus given by the Regional Load Despatch Centre to a generating station for any period or time block.
Sent Out Capability (SOC)	Sent Out Capability of a Generating Station means the capability to deliver ex-bus Mwh based on which 'availability' shall be worked out.
Stripping ratio	The ratio of overburden and waste to ore/mineral in an open pit/cast operation.
Unschedule Interchange (UI)	UI for Generating Station shall be equal to its actual generation minus its scheduled generation. UI for beneficiary shall be equal to its total actual drawal minus its total scheduled drawal.