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दिनांक
Date

(विलासराव देशमुख)
(VILASRAO DESHMUKH)
मन्त्री/Minister
भारी उद्योग एवं लोक उद्यम मंत्रालय
Minister of Heavy Industries & Public Enterprises

Performance Audit of
Activities of selected Public Sector Undertakings

Report of the
Comptroller and Auditor General
of India
for the year ended March 2009

Union Government (Commercial)
No. 10 of 2010-11
(Performance Audit)

CONTENTS

PREFACE

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

Name of the Ministry/ Department	Title of the Review
Ministry of Civil Aviation	Jet Engine Overhaul Shops- National Aviation Company of India Limited
Ministry of Communications and Information Technology	Functioning of Telecom Maintenance regions- Bharat Sanchar Nigam Limited
Ministry of Defence	Production and supply of Advanced Light Helicopter- Hindustan Aeronautics Limited
Ministry of Communications and Information Technology, Ministry of Petroleum and Natural Gas, Ministry of Heavy Industries and Public Enterprises, Ministry of Chemicals and Fertilizers, Ministry of Coal and Ministry of Defence	IT Audit of IT systems in selected Public Sector Undertakings
Ministry of Finance	Health Services Insurance- United India Insurance Company Limited, New India Assurance Company Limited, The Oriental Insurance Company Limited and National Insurance Company Limited
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	Exploration in shallow water blocks - Oil and Natural Gas Corporation Limited
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Ministry of Textiles	Fulfilment of socio economic objectives - Jute Corporation of India Limited

OVERVIEW

This volume of Audit Report contains reviews on 10 selected areas of operation involving 18 Public Sector Undertakings under 10 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. 6305.73 crore.

MINISTRY OF CIVIL AVIATION

National Aviation Company of India Limited

Jet Engine Overhaul Shops

National Aviation Company of India Limited (Company) was incorporated on 30th March 2007 under the scheme of amalgamation of Air India Limited and Indian Airlines Limited. Erstwhile Indian Airlines Limited established (1991) a Jet Engine Overhaul Complex in Delhi (JEOC) and Air India had set up (1962) an Engine Overhaul Department in Mumbai (EOD). The Shops were certified by the Federal Aviation Authority (FAA), USA which enabled the Company to undertake the repair works of engines of other operators.

The main function of shops was to conduct mandatory and preventive maintenance of jet engines.

The performance audit of these shops revealed the following:

- Against the capacity to overhaul 48 V2500 engines per annum, the JEOC could utilize its capacity between 67 *per cent* and 83 *per cent* only, during the period 2004-05 to 2008-09. Due to lower production of engines, aircraft ranging from one to eleven were on ground for 1370 days during the above period. Thus, the Company lost potential revenue of approximately Rs. 291 crore.
- JEOC was unable to produce engines as per requirement during the period September 2005 to December 2006. To overcome the shortage, the Company had to take engines on lease. The Company incurred an extra expenditure of Rs. 34.68 crore on hiring of engines.
- Despite having in-house capability, the Company sent 23 engines and 18 HPC modules from JEOC to outside agencies for repair and incurred an expenditure of Rs. 498.66 crore, including an avoidable expenditure of Rs. 45.95 crore towards labour, transportation, mark up on material and testing charges.
- The Company carried out phoenix modification introduced by engine manufacturer M/s IAE in all of its engines at JEOC at a cost of Rs. 67.31 crore. It was, however, observed that on-wing life of the engine did not increase to the assured level and the envisaged benefits of reduction in maintenance cost were also not reaped.
- EOD, by and large, utilised its capacity fully during 2004-09.

MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY

Bharat Sanchar Nigam Limited

Functioning of Telecom maintenance regions

With a turnover of more than Rs. 35,812 crore and net profit of Rs. 575 crore for the financial year 2008-09 Bharat Sanchar Nigam Limited is one of the largest telecom service providers in India. The Company maintains a large transmission network comprising optical fiber cables and microwave systems through which 602 districts and 5.6 lakh villages in the country are connected.

Telecom Maintenance Regions of BSNL are the divisions responsible for the maintenance of long distance transmission systems of the Company. The four maintenance regions viz., Eastern, Northern, Southern and Western control more than 19,100 route kilometers of optical fiber cable and microwave systems functioning in the country. With the entry of private service providers into the telecommunication sector all operators essentially require interconnection with BSNL network. Provisioning of Points of Interconnect (POIs) and monitoring the long distance traffic through these POIs for correct realisation of interconnection usage charges is also an important area of activity for the Maintenance Regions.

The major findings of the performance audit are:

- Microwave systems costing Rs. 36.84 crore were either used for a very short period or were not put to use at all rendering the investment unfruitful. This was partly due to commissioning of microwave systems in routes where more stable optical fibre systems were already in operation.
- Delay in commissioning of 'Lawful Interception and Monitoring' systems led to idling of investment of Rs. 5.84 crore besides delay in start of International Private Leased Line services.
- Delay in finalisation of tariffs for use of signaling through Stand Alone Signaling Transfer Point system deprived the BSNL of projected profit of Rs. 329.30 crore per annum.
- Records on receipt and issue of stores received against all 94 purchase orders released during 2004-05 to 2008-09 were not maintained in Eastern Telecom Region.

MINISTRY OF DEFENCE

Hindustan Aeronautics Limited

Production and Supply of Advanced Light Helicopter

The Advanced Light Helicopter (ALH) designed and developed by the Company is a light 5.5 tonne class, multi-role, multi-mission helicopter, fitted with two Turbomeca TM 333 2B2 engines. A sum of Rs. 1,541 crore (Rs. 960 crore by the defence customer and Rs. 581 crore by the Company) was spent till September 2009 on the ALH project. Audit observed the following:

- The design and development of ALH started in 1984. The collaboration agreement entered in 1984 was terminated in 1995 even though certain systems were yet to be developed, validated and integrated. As a result, five prototypes of the basic versions which were to be certified by 1994 were actually flight tested and certified in October 2003.
- Despite more than two decades, the technical requirements finalised in 1979 by Army and Air Force were not fully achieved resulting in flying of the 74 ALH supplied by the Company to defence customers with concessions.
- Taking up Limited Series Production (LSP) of ALH (2001-2003) even while the prototypes were being flight tested (1992-2003) and certified, was premature as large number of design problems were encountered during the manufacturing.
- By not freezing the design of ALH and keeping the development stage open the Company had to accommodate the increasing demand of the customer for latest and additional requirements. This led to 363 modifications in 34 helicopters (total 74 supplied to Defence customers).
- The ALH, which was to be successor to Cheetah/Chetak was found to be unsuitable for the intended multi-role requirements due to excess weight and limited power of the engine. ALH with 'Shakti' (higher-powered engine) which was planned to be certified in December 2006 is yet to be certified even after a delay of three years resulting in postponement of delivery schedule of 20 ALH with Shakti engine from 2008-09 to 2009-10.
- Weapon system integration (WSI) version of ALH has not been developed even after a lapse of 10 years (1998 to 2009). In the absence of clear understanding of the requirements between Navy and the Company, the amount of Rs. 138 crore spent on the project has not resulted in any tangible benefit to the customer.
- The Company could not penetrate into the international market in the absence of international certificate in spite of showcasing ALH in the air shows. The Company could not successfully execute even the orders received from civil market.
- As against the envisaged indigenisation level of 50 *per cent*, about 90 *per cent* of the value of material used in each helicopter is procured from foreign suppliers.

MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY, MINISTRY OF PETROLEUM AND NATURAL GAS, MINISTRY OF HEAVY INDUSTRIES AND PUBLIC ENTERPRISES, MINISTRY OF CHEMICALS AND FERTILIZERS, MINISTRY OF COAL AND MINISTRY OF DEFENCE

Information Technology Audit of the IT systems in selected Public Sector Undertakings

Information Technology (IT) systems bring about speed and efficiency in operations, but they also have risk relating to data integrity, data security, privacy etc. The IT systems, therefore, should have adequate safeguards to minimise the exposures to various risks. During the year IT audit of 13 computerised systems including Enterprise Resource Planning (ERP) used in different areas of activity of 12 Public Sector Undertakings (PSUs) was done, out of which results of audit of seven PSUs under six Ministries have been covered in this review.

Bharat Sanchar Nigam Limited

The decision to implement an ERP solution by Company was an attempt to re-engineer its IT efforts for enhancing its operational efficiency along with quality of service. Audit noticed absence of interface with existing software packages, deficient customisation of the system to the needs of the organization, weak input controls and validation checks, and deficient monitoring of the functioning of the system. This suggests that the ERP system has not been optimally utilised.

Oil India Limited

SAP R/3 was implemented by the Company with the objective of improving efficiency and effectiveness of business processes. However, it was seen in audit that SAP R/3 was not customised completely and the business rules were mapped inadequately. The difference between the legacy data and the data uploaded into SAP is yet to be fully reconciled thereby making the SAP data unreliable. SAP R/3 was not being utilised optimally for proper allocation of cost and accounting of financial transactions.

Hindustan Paper Corporation Limited

The Corporation decided to implement Oracle e-Business suite with the objective of achieving multiple benefits. It was, however, found that there were deficiencies in mapping the business processes into the system and inappropriate customisation in areas of sale of products, realisation against sale, purchase and receipt of materials. As a result of all these deficiencies, the system could not be utilised to its full potential and the benefits as envisaged could not be achieved fully.

Rashtriya Chemicals and Fertilisers Limited

One of the main objectives of implementation of SAP was availability of data on real time basis and elimination of inter-dependence on others in faster data access and collation for reporting and time sensitive decision-making. However, this objective was not achieved as inadequate customisation and mapping of business rules led to continued dependence on manual controls and also delays in procurement process. The Management did not succeed in customising all the features into the system and non utilisation of certain important features available in SAP resulted in deficient inventory management.

Indian Oil Corporation Limited

The Company implemented SAP ERP system with a view to standardise and streamline the day-to-day operations of all the units on a common IT platform. The Company has not yet formed an IT policy for its IT environment which includes its SAP system, to direct its actions and efforts. Lacunae were also found in Network Security and Disaster Recovery setup. The Finance Module has inter-linkages with all the modules in the ERP system and consolidates all the financial information to generate the financial statements of the Company. The observations brought out in the report indicate inadequacies of various controls in the system which have implications in the financial reports generated through the system.

Neyveli Lignite Corporation Limited

Online Integrated Material Management System was implemented with the primary objective of achieving reduction in lead time, automation of demand forecasting and scientific inventory control. The Company could not utilise the application for effective inventory control. Failure to import legacy data and non updation of required parameters in the system resulted in inadequacy of Decision Support System.

BEML Limited

The Company decided to implement SAP with the objective of Companywide networking and common integrated applications across the organisation, ensuring availability of centralised MIS data which would help in decision making. System is not on-line due to delay in capturing of transactions. Failure to design the required controls in the system, inappropriate customisation, lack of validation checks and inadequate controls during data migration resulted in non-utilisation of the SAP system to its full potential and the integrity and accuracy of the data could not be ensured.

MINISTRY OF FINANCE

Health Services Insurance

Insurance industry in India registered substantial growth after enactment of Insurance Regulatory Development Authority Act in 1999. This industry today functions in a highly competitive environment. The health services insurance is provided by 15 private insurance companies and four public sector undertakings viz., National Insurance Company Limited, The New India Assurance Company Limited, Oriental Insurance Company Limited and United India Insurance Company Limited. A performance audit of health insurance services by PSUs was conducted for the three years from 2006-07 to 2008-09. The performance audit revealed that:

- Proportion of premium from health insurance doubled from less than 10 per cent in 2004-05 to around 20 per cent in 2008-09. However, market share declined from 64 per cent in 2006-07 to 57 per cent in 2008-09.
- Four PSU insurers suffered a loss of Rs. 417 crore from individual portfolio, whereas group policies had contributed a loss of Rs. 622.49 crore during the three year period from 2006-07 to 2008-09. Despite these huge losses, it was seen in 115 out of 159 cases reviewed in audit that group policies were renewed without appropriate loading in violation of the rules for renewal of such policies. Further,

the group policies with high incurred claim ratio included a corporate house that is itself in the business of providing health insurance.

- The PSU insurers did not attempt to reduce their losses by reducing the cost of medical services through standardization of rates and codes for various clinical procedures despite introduction of TPA Regulations nine years ago.
- The cashless settlement has been achieved to the extent of 55 per cent only and cases of delay in issue of ID cards, and claim settlement beyond 7 working days were noticed in respect of 72 per cent of the cases. There were wide variations in the amount of claims for similar clinical procedures. The PSU insurers failed to monitor the performance parameters resulting in deficiency in services of the third party administrators to the insured with consequent impact on customer satisfaction.

MINISTRY OF HEAVY INDUSTRIES AND PUBLIC ENTERPRISES

Bharat Heavy Electricals Limited

Procurement System

Bharat Heavy Electricals Limited (BHEL) is one of the largest engineering and manufacturing enterprises catering to the core sectors of Indian Economy viz. Power Generation & Transmission, Industry, Transportation, Telecommunication, Renewable Energy, etc. During the year 2008-09 the Company registered gross sales of Rs. 28,033 crore and material cost of around Rs. 15,600 crore. The performance audit of the procurement system of the Company. disclosed that there was scope for further improvement in the following areas:

- The cost of material purchased by the Company as a percentage of turnover showed an increasing trend from 45.69 per cent in 2006-07 to 55.66 per cent in 2008-09. The Management was yet to formulate a plan of action to arrest the rise in material cost. Rising material cost was, among other things, partly attributable to majority purchases by the Company through limited tenders without establishing a solid vendor base. Only eight per cent of procurement was done by the Company through open tendering during the last three years ended March 2009 and the balance was through limited/single tenders. In Bhopal, Haridwar, Hyderabad, PEM, Noida and Trichy Units there was only a single vendor registered for 538, 286, 16, 302 and 8 material groups respectively. Many of the vendors registered with CII and CEA were not registered with the BHEL units.
- The Product Material Directories of units were not being updated continuously, giving a false assurance of existence of optimum number of vendors.
- The Purchase policy and procedures were not revised since October 1998 despite significant global changes affecting the business.
- In the absence of standard procedure for cost estimation, the units justified the price offers by applying escalation over the last purchase prices. In Haridwar, Hyderabad and Trichy units, this exercise was being done after opening of price bids.

- The PEM unit awarded 17 works (Rs. 26.80 crore) on a firm and its allied/sister concerns banned by Hyderabad unit.
- No norms for purchase lead time had been fixed by units except Trichy unit where targets of 60 days to 120 days for conversion of purchase requisitions into purchase orders had been fixed. Audit observed that during three years ended 31 March 2009 in 54 *per cent* cases the Company awarded contracts after 75 days and upto 300 days and in 13 *per cent* cases the time taken was more than 300 days.
- As per policy, repeat orders, without calling for fresh tenders could be placed provided there is no downward price trend. However, in Haridwar unit in four products (covering selected six purchase orders valuing Rs. 139.06 crore) the unit did not place repeat orders resulting in an extra expenditure of Rs. 29.09 crore.

Audit acknowledges that the Management has appreciated the audit inputs and intends to use them for improvement of the procurement process.

MINISTRY OF PETROLEUM AND NATURAL GAS

Indian Oil Corporation Limited

Efficiency of Panipat and Mathura Refineries

Indian Oil Corporation Limited is India's largest commercial enterprise with a turnover of Rs. 2,85,337 crore and a net profit of Rs. 2,950 crore in 2008-09. The Company has eight refineries with a total capacity of 49.70 Million Metric Tonne Per Annum (MMTPA). A performance audit conducted to assess the efficiency of the Mathura and Panipat refineries (with refining capacities of 8 MMTPA and 12 MMTPA respectively) located in northern India, for the three year period from 2006-07 to 2008-09 disclosed that both the Refineries achieved more than 100 per cent of their respective achievable targets during the period reviewed (except Panipat Refinery during 2006-07 due to stabilisation problem). There was scope for further improvement in capacity utilisation of processing units and improving yield by enhancing the middle and light distillates, which are more profitable. The major audit observations were:

- The Company could not install Delayed Coker unit at Mathura Refinery and, thus, was deprived of the benefits of higher distillate yield and enhanced Gross Refinery Margin of about Rs. 800 crore per annum.
- The Mathura Refinery produced Propylene more than its demand and had to blend back 16,665 MT of propylene with LPG resulting in loss of Rs. 11.38 crore.
- The Company revamped Continuous Catalytic Reforming Unit at Panipat Refinery at an expenditure of Rs. 61.77 crore but did not utilise its enhanced capacity rendering the investment on its revamping infructuous.
- Vis Breaker Unit of Panipat Refinery set up at a cost of Rs. 38.34 crore did not achieve designed yield resulting is loss of Rs. 27.22 crore.
- A PX-PTA project at Panipat Refinery set up at a cost of Rs. 2,630.11 crore did not produce the designed yield leading to loss of Rs. 69.93 crore.

- An investment of Rs. 81.67 crore on revamping of Reside Fluidised Catalytic Unit proved to be unproductive as LPG yield increased only marginally from 19 per cent to 20 per cent against the envisaged LPG yield of 29 per cent.
- On environment front Audit found that the Company did not achieve ILP targets in terms of Sulphur recovery, production of Euro III compliant MS and HSD in all the three years except production of MS in 2007-08. The short recovery of sulphur also resulted in loss of Rs. 108.66 crore during the above three year period besides polluting the environment.

Some of the important recommendations made by Audit deserve attention of the Management for further improving its performance by (a) optimum utilisation of the installed capacities, (b) achieving the designed yield in both the Refineries and (c) increasing distillate yield in respect of Mathura Refinery by Installing Delayed Coker Unit by perusing the most feasible option.

Oil and Natural Gas Corporation Limited

Exploration in shallow water blocks

Oil and Natural Gas Corporation Limited (Company) has been carrying out activities relating to exploration and production of hydrocarbon since 1956. The Company has offshore shallow water blocks (water depth upto 400 metres) in five sedimentary basins.

Upto 1998, the Company was offered exploratory blocks on 'nomination basis' (nomination blocks). The policy for nomination blocks was also amended in March 2002. In 1999, the MOPNG implemented the New Exploration Licensing Policy (NELP) through the Directorate General of Hydrocarbons.

The Performance Audit covered performance of the Company during 2004-08 in 37 shallow water blocks comprising of 21 nomination blocks and 16 NELP blocks. Performance Audit revealed systemic and compliance deficiencies mainly relating to absence of norms for key activities, delays/failures in carrying out acquisition, processing and interpretation (API) of seismic data, delayed tendering, mismatch in planning of exploration activities including drilling of wells which resulted in unfruitful expenditure (Rs. 2,136.45 crore) and avoidable expenditure (Rs. 94.67 crore) besides entailing liability for payment of liquidated damages (Rs. 252.20 crore).

- In 7 of the 16 NELP blocks, the Company took 8 to 12 months in completion of Environment Impact Assessment (EIA) studies which had adverse impact on timely API of seismic data. In the absence of norms, the reasonableness of time taken in completion of EIA studies and API could not be ascertained in audit.
- The pace of completion of API was also very slow in a number of blocks with the result that exploration commitments in the nomination as well as the NELP blocks could not be completed in time. The slow pace coupled with the mismatch between rig deployment plan and availability/deployment of rigs affected fulfilling of the drilling commitments. This had cascading adverse impact as exploration blocks had to be surrendered after incurring substantial expenditure.
- There was no reserve accretion in any of the 16 NELP blocks as all the wells drilled were found to be dry. The Company had surrendered/proposed to surrender 10 of the 16 NELP blocks after incurring substantial expenditure of Rs. 1,461.36

crore over the period 2004-08 though the Company had bid for the blocks after analyzing their prospectivity.

- Some of the important recommendations made by Audit in the Report deserve attention of the Management towards (a) completion of exploration activities in a time bound manner to avoid surrender of blocks; (b) prescribing norms for EIA and determining average API cycle time to ensure their timely completion; (c) initiation of tendering process well in advance so that survey vessels could be hired and deployed at the beginning of the fair weather season and; (d) ensuring availability of suitable rigs while finalising the rig deployment plan.

MINISTRY OF SHIPPING

Hindustan Shipyard Limited and Cochin Shipyard Limited

Ship Repair Activity in Indian Dockyards

Hindustan Shipyard Limited (Hindustan Shipyard), Visakhapatnam was set up in 1941 and it established ship repair unit in 1971. Turnover from the ship repair activity was varying from Rs. 87.90 crore to Rs. 144.13 crore against the total turnover of the Company which was ranging between Rs. 225.30 crore and Rs. 395.81 crore during 2004-05 to 2008-09.

Cochin Shipyard Limited (Cochin Shipyard) incorporated in March 1972 commenced ship repair operations in 1981. The ship repair turnover of the Company was varying from Rs. 148.02 crore to Rs. 270.06 crore against the total turnover which ranged between Rs. 276.48 crore and Rs. 1256.21 crore during 2004-05 to 2008-09.

The performance audit of ship repair activity of these companies for the period 2004-05 to 2008-09 was conducted to assess efficiency and economy of their ship repairs operations and their ability to expand the ship repair business in domestic as well as international markets. The deficiencies noticed in ship repair activities in these companies were as below:

- The turnover of Indian ship repair industry during the years 2004-05 to 2008-09 ranged between Rs. 316.07 crore and Rs. 490.38 crore. Though Hindustan Shipyard and Cochin Shipyard being the leading shipyards in the country had major share ranging between 73.74 per cent and 91.36 per cent, there was no defined action plan to capture market potential.
- Out of Rs. 970.67 crore of ship repair expenditure by Shipping Corporation of India during 2004-05 to 2008-09, Rs. 849.20 crore, i.e., 87.49 per cent was spent for repairs in foreign yards.
- Repair business of Hindustan Shipyard and Cochin Shipyard from foreign ships was Rs. 44.25 crore (31 ships) and Rs. 60.23 crore (5 ships) respectively during this period.
- Hindustan Shipyard and Cochin Shipyard did not revamp or modernise the infrastructure in tune with market potential.
- Hindustan Shipyard received Rs. 8.27 crore from the GoI for modernisation of ship repair facility against which it could utilise only Rs. 1.19 crore even after lapse of 5 to 46 months.

- No benchmarks were fixed for key activities such as steel renewal, sand/grit blasting, painting.
- In case of Hindustan Shipyard 77 orders were reviewed of which the Company executed 62 orders with time overrun ranging from 1 to 319 days which resulted in loss of Rs. 10.91 crore to the Company. In Cochin Shipyard out of 177 orders 98 orders were completed with time overrun leading to a loss of Rs. 2.73 crore.
- Realisation of the dues did not take place within the agreed credit period. In case of Hindustan Shipyard there were delays ranging between 6 and 882 days and in case of Cochin Shipyard it was up to 350 days after allowing the agreed credit period.

MINISTRY OF TEXTILES

Jute Corporation of India Limited

Fulfillment of socio-economic objectives

Jute Corporation of India (company) was set up in 1971 with the main aim of providing Minimum Support Price (MSP) to the jute farmers and to serve as a stabilizing agency in the raw jute sector. The company procures jute from the farmers at MSP and supplies to the jute mills. The performance audit, covering a period of six years (2003-2009), was conducted to assess whether the company implemented the price support operations effectively to ensure remunerative prices to the jute farmers. Audit sample covered 26 Departmental Purchase Centres (DPC) out of 171 DPCs in six major jute growing states. A number of deficiencies mentioned below were noticed in the functioning of the company:

- The company procured only 0.99 per cent to 10.4 per cent of available jute in India during the six years (2003-09). Thus, the company could not play any significant role in price stabilization and in ensuring remunerative prices to the jute farmers.
- The analysis regarding total estimated production and stock of the raw jute is made by the Jute Advisory Board in advance. The company, however, did not formulate any business plan, based on this information.
- Out of 500 centres where jute trading takes place, the company operates in 171 centres and has appointed co-operative societies in 40 centres for carrying out MSP operation on its behalf. Thus, total coverage by the company is only 43 per cent of the jute centres. Geographical location of some of the centres is not convenient to farmers resulting in long distance travel and extra cost to the farmers and even distress sale in the local markets.
- Due to the lack of storage facilities, some centres stopped procurement on several occasions which forced the farmers to go in for sale to the middlemen at lower prices.
- The Company could not enhance its turnover and suffered losses in all years from 2004-05 to 2007-08 excepting the year 2004-05. The company continued to depend on subsides. GOI reimbursed Rs. 36.59 crore for overhead costs for 2007-08 and regularized grants of Rs. 147.06 crore released from 2003-04 to 2007-08.

The per quintal operational expenses of the company are Rs. 409 which are higher than the operational expenses of Rs. 367 of private traders.

Though the Company's present price support operations cannot be called effective, there is tremendous scope to rectify deficiencies in its functioning.

MINISTRY OF CIVIL AVIATION

CHAPTER I

National Aviation Company of India Limited

Jet Engine Overhaul Shops

Executive Summary

National Aviation Company of India Limited (Company) was incorporated on 30th March 2007 under the scheme of amalgamation of Air India Limited and Indian Airlines Limited. Erstwhile Indian Airlines Limited established (1991) a Jet Engine Overhaul Complex in Delhi (JEOC) and Air India had set up (1962) an Engine Overhaul Department in Mumbai (EOD). The Shops were certified by the Federal Aviation Authority (FAA), USA which enabled the Company to undertake the repair works of engines of other operators.

The main function of shops was to conduct mandatory and preventive maintenance of jet engines.

The performance audit of these shops revealed the following:

- Against the capacity to overhaul 48 V2500 engines per annum, the JEOC could utilize its capacity between 67 *per cent* and 83 *per cent* only, during the period 2004-05 to 2008-09. Due to lower production of engines, aircraft ranging from one to eleven were on ground for 1370 days during the above period. Thus, the Company lost potential revenue of approximately Rs. 291 crore.
- JEOC was unable to produce engines as per requirement during the period September 2005 to December 2006. To overcome the shortage, the Company had to take engines on lease. The Company incurred an extra expenditure of Rs. 34.68 crore on hiring of engines.
- Despite having in-house capability, the Company sent 23 engines and 18 HPC modules from JEOC to outside agencies for repair and incurred an expenditure of Rs. 498.66 crore, including an avoidable expenditure of Rs. 45.95 crore towards labour, transportation, mark up on material and testing charges.
- The Company carried out phoenix modification introduced by engine manufacturer M/s IAE in all of its engines at JEOC at a cost of Rs. 67.31 crore. It was, however, observed that on-wing life of the engine did not increase to the assured level and the envisaged benefits of reduction in maintenance cost were also not reaped.
- EOD, by and large, utilised its capacity fully during 2004-09.

Summary of recommendations

The Company should:

(i) Ensure that the work is completed within the TAT for effective utilisation of capacity

(ii) Strictly enforce the terms of the lease agreement for repair of engines.

(iii) Ensure inclusion of suitable clause in the contract to safeguard its interest in case of failure to achieve the assured result offered by the engine manufacturer on the implementation of the modification.

(iv) Ensure timely realisation of dues from the customers.

(v) Ensure that the obsolete inventories are reviewed and segregated for appropriate disposal.

(vi) Take necessary action to lodge the warranty claims in time and obtain the claim amount at the earliest.

1.1 Introduction

National Aviation Company of India Limited (Company) was incorporated on 30 March 2007 under the scheme of amalgamation of Air India Limited and Indian Airlines Limited. Erstwhile Indian Airlines Limited established (1991) a Jet Engine Overhaul Complex in Delhi (JEOC) and Air India had set up (1962) an Engine Overhaul Department in Mumbai (EOD). The Shops were certified by the Federal Aviation Authority (FAA), USA which enabled the Company to undertake the repair works of engines of other operators.

JEOC, Delhi undertakes repair/ overhaul works of JT8D and V2500 engines. The work load of JT8D engines has declined substantially since 2004-05 due to lower operation of Boeing Aircrafts and, therefore, the same has not been covered in the review. EOD, Mumbai carries out repair of PW 4000 series, GECF6-80C2/B1, GECF50C, CFM56-7B and limited repair works of GE-90 engines. The main function of the shops was to conduct mandatory and preventive maintenance of jet engines. The engine consists of several modules (sections) *viz.* Gear Box, Fan Module, Low Pressure Compressor (LPC), High Pressure Compressor (HPC), Diffuser, Combustor, High Pressure Turbine (HPT) and Low Pressure Turbine (LPT). The process involves disassembling the engine, cleaning of piece parts in the cleaning bay, detailed inspection, sending of parts to view room section for visual and dimensional inspection, sending of parts to repair section/outside agencies, final inspection after repair, and final assembly into modules/engine and testing of engine.

1.2 Scope of Audit

A performance audit of the Engine Overhaul Shops of the Company at Delhi and Mumbai was conducted covering the period of five years from 2004-05 to 2008-09 through test check of records maintained at these shops.

1.3 Audit objectives

The performance audit was conducted to assess:

- Utilisation of capacity for engine overhaul;

- Necessity for outsourcing of engines overhaul;
- Performance of overhauled engines;
- Utilisation of manpower; and
- Material management.

1.4 Audit criteria

The following criteria were adopted for assessing the performance of the shops:

- Annual capacity of Engine Production and achievement thereagainst;
- Agreements for hiring of engines on lease basis;
- Agenda and Minutes of Board of Directors;
- Agreements for outsourcing of repairs of company owned engines; and
- Norms fixed by the Company for completion of various maintenance activities.

1.5 Audit methodology

Records of Production Planning and Control Department, Production Department, Engineering Quality and Technical Services, Industrial Engineering Department and Material Management Department were examined. An entry conference with the Management was held on 4 August 2009. The field audit was done during the period from May 2009 to September 2009.

1.6 Audit findings

1.6.1 Capacity utilisation

1.6.1.1 JEOC, Delhi

The shop was capable to overhaul four V2500 engines every month besides carrying out rectification work. It was observed in audit that the shop achieved capacity utilisation between 67 *per cent* and 83 *per cent* during the period 2004-05 to 2008-09. As a result the Company was facing acute shortage of engines for its business operations and engines ranging from 6 to 16, in addition to 17 standby engines, were lying in the shop awaiting for overhaul during the period 2005-06 to 2008-09. The details of V2500 engines overhauled at JEOC against its capacity during the last five years are given in **Table 1.1** below:

Table 1.1

Year	Overhaul capacity	Engines removed for overhaul	Engines overhauled	Percentage of engines overhauled to capacity
2004-05	48	44	40	83.33
2005-06	48	44	34	70.83
2006-07	48	44	37	77.08
2007-08	48	41	32	66.67
2008-09	48	37	36	75.00
Total	**240**	**210**	**179**	

It was observed that the capacity utilisation of the shop was low during the period 2004-05 to 2008-09 and the shop could overhaul only 179 engines of 210 engines removed. Due to lower production of engines, the Company was unable to carry out its operation at optimum level and aircraft ranging from one to eleven were on ground for 1370 days during the period of review. Thus, due to failure of the shop to provide serviceable engines for business operations, the Company lost the potential revenue of approximately Rs. 291 crore.

1.6.1.2 EOD, Mumbai

The Management has considered the estimated production capacity of the EOD as 70 engines per year. The details of various types of engines (PW 4056, 4152 and 4090, GE 90, CFM 56 and CF6-80C2/B1) removed and produced during the last five years are given in **Table 1.2** below:-

Table 1.2

Year	Pending at the end of the previous year	Engines removed for repair/overhaul during the year	Engines produced during the year	Engines sent to outside parties for repair	Engines to be repaired at the end of the year
2004-05	Not Available	80	76	Not Available	Not Available
2005-06	Not Available	68	65	Not Available	16
2006-07	16	82	88	NIL	10
2007-08	10	60	54	3	13
2008-09	13	59	59	4	9
TOTAL		**349**	**342**	**7**	

1.6.2 Excess time taken in completion of jobs at JEOC Delhi

The Company had laid down standard hours required for various types of works *viz.* undress of engine, assembly/ disassembly of engines and L3 level maintenance (complete package of inspection and maintenance) for different modules. However, no standard hours have been fixed for L1 level maintenance (general visual inspection) and L2 level maintenance (repair of defects) of different modules. A review of 'Job Completed

Statement' of 730 work orders out of total 2,528 work orders during the period 2004-09 revealed that 4,36,043 man hours were taken to complete 730 work orders as against prescribed 2,81,185 standard man hours which were more than 55 *per cent* of the norm. Consequently, 1,54,858 hours were consumed in excess of the laid down norms, which were equivalent to production of 34 engines (assuming L3 level maintenance of all the modules). The excess time ranging from 10.58 *per cent* (2004-05) to 168.69 *per cent* (2005-06) was taken to complete the work orders. The Company incurred Rs. 10.92 crore towards excess labour cost on account of inefficiency of the shop. The reasons for excess time taken were not on record as the Company did not carry out any variance analysis during the period.

The standard Turn Around Time (TAT) fixed by JEOC, Delhi for engine was 110 days. Audit observed that the percentage of cases where the engines were repaired beyond standard TAT ranged from 33 *per cent* to 74 *per cent* during 2005-06 to 2008-09 due to backlog and shortage of spares. Audit also observed that 25 engines were overhauled with a delay of more than 150 days beyond prescribed TAT (110 days).

The Management stated (November 2009) that no standard hours were fixed for the engine/module refurbishment due to wide variations in work scopes based on life done, distress observed and past history. The reply of the Management is not acceptable as the Company itself was carrying out variance analysis based on the standard hours till 2003-04. The Company had even observed wide variation ranging from 17 *per cent* to 291 *per cent* in the variance analysis carried out in respect of work orders closed and reflected in the Job Completion statement of January 2004 to March 2004.

1.6.3 Impact of underutilisation of shop capacity

1.6.3.1 Extra expenditure on leasing of engines

Despite maintaining a float of about 17 V2500 engines the availability of engines was in the negative zone, adversely affecting the Company's operations. Engines ranging from three (October 2005) to 18 (May 2006) were lying at JEOC for repair during September, 2005 to December, 2006. In the wake of the continuous adverse situation, the Company took three engines from International Aero Engine (IAE) on short term lease of 90 days (two in September 2005 and one in November 2005) on payment of US $2500 per day in addition to hourly charges of US $209 to improve the negative status of engine availability. Even after expiry of the lease period the Company was struggling for serviceable engines for its aircraft and, therefore, decided to extend the lease period of these engines. The engines taken initially for a period of three months to meet immediate requirement could be returned to the lessor after 20 months to 25 months. It was seen in audit that the Company further took one more engine on one-year lease on payment of US $ 71,331 per month in December 2006 to ease the engine availability position. The Company incurred an extra expenditure of Rs. 34.68 crore on account of lease charges paid on four leased engines besides an expenditure of Rs. 0.28 crore on transportation thereof.

1.6.3.2 Swapping of engines

Due to acute shortage of V2500 engines for scheduled operations, the JEOC resorted to frequent swapping of engines between operating and non-operating aircraft. It was observed in audit that 131 engines were swapped due to non availability of serviceable

engines during the period 2004-05 to 2008-09. The shop incurred an extra expenditure on fuel required for testing the engine on swapping, besides expenditure on consumables and manpower, the amount of which was not ascertainable in audit.

The Management accepted the audit observation.

1.6.4 Shortfall in production due to shortage of spares

The Company was procuring spare parts of engines from International Aero Engines (IAE), the manufacturer of V2500 engines, on 60 days credit. Due to non payment of amounts payable by the Company within stipulated period, IAE imposed restrictions on supply of spares for a period of seven, four and three months during the year 2005-06, 2007-08 and 2008-09, respectively. Consequently, the engine production at JEOC was adversely affected. It was seen in audit that overdue amount payable to the supplier was merely one *per cent* to two *per cent* of the total expenditure of Company, but the same was paid after a delay of two to five months. This reflects inefficient procurement and financial planning. The Company did not take effective steps to rectify the situation despite an assurance given to the Parliament during 2006 that no payment issue shall be allowed to crop up to avoid interruption in supply of spares by IAE.

The Management stated that they could not hold inventory for two months requirement due to significant fund blockage. The reply is not convincing as 70 *per cent* to 76 *per cent* of average monthly stock held remained unutilised during the period 2006-07 to 2008-09 which was equivalent to production of five to six engines.

1.6.5 Sending of engines to outside repair agencies

The Company decided in May 2005 to outsource the repair of engines and sent 23 engines (V2500) from JEOC to foreign private agencies for repair to overcome the situation of non availability of serviceable engines. Consequently, the Company had to incur expenditure of Rs. 446.24 crore on overhaul of these engines. Out of this, an expenditure of Rs. 40.20 crore on labour, transportation, mark up on material and testing charges was avoidable had the Company repaired these engines in-house. Audit observed that considerable time was taken in obtaining approvals for repair and dispatch of the engines. The delay in sending the above engines for repair from 25 to 146 days after removal was mainly due to delayed approval of work scope. The repaired engines received back after further delay ranging from 25 days to 620 days beyond TAT due to delay in induction of engines in the shop, dispute in settlement of previous invoices and shortage of spare parts *etc.* Due to excessive delays in sending and getting back the engines, the Company failed to overcome non-availability of engines resulting in grounding of aircrafts.

The Management stated that the abnormally high removal of engines along with credit hold by IAE necessitated the outsourcing of engines for achieving normalisation of operation at the earliest. The fact remains that the total engines removal during any year under review did not exceed the shop capacity.

1.6.6 Sending of modules to outside agency despite having in house capability

It was observed in audit that despite having in house capability, JEOC got repaired 18 HPC modules from outside agencies during 2004-05 to 2007-08 at an expenditure of

Rs. 52.42 crore which included avoidable expenditure of Rs. 5.75 crore on labour, transportation and mark up on material.

1.6.7 Delay in setting up CFM 56-7b engine overhaul facility at old airport, Mumbai

The BOD of Company approved (December 2005) setting up of an overhaul facility for CFM 56-7B engine at Mumbai for providing total engine management and support to Air India Charters Limited (AICL), its subsidiary, as well as for attending third party works. The scheduled completion date of project was October 2007. The Project Report envisaged repair of 51 engines during the period ending 31 March 2009. The Company, however, commissioned the above facility at the cost of Rs. 27.33 crore in July 2008 with the delay of 8½ months. The delay was in arranging the required tools for the erection of facility and non completion of Air Conditioning and dust proofing of power plant.

Audit observed that the Company overhauled only 4 engines during the period July 2008 to March 2009 as against the projected repair of 51 engines for the period October 2007 to December 2009. The facility, thus, remained largely under-utilised.

Recommendation No. 1.1

The Company should:

(i) Ensure that the work is completed within the TAT for effective utilisation of capacity

(ii) Fix norms for L1 and L2 level of maintenance of engine modules so as to have effective control over the utilisation of manpower.

1.6.8 Repair of piece parts of engines

1.6.8.1 Failure to enhance capability augmentation of repair of piece parts

JEOC was set up with the objective of cost control and capability augmentation for repair of engine piece parts. It was observed in audit that the shop could not enhance enough facility to contain the repair of piece parts and continued to send items for repair to outside agency. During the period from 2004-09 it could enhance facility for repair of piece parts of V2500 engines (having 121 types of repairs of piece parts) from two to five of total piece parts. As on 31 October 2009, the number of in house repair of piece parts is four *per cent* of the total piece parts. The Company incurred an expenditure of Rs. 84.11 crore on outside repair of piece parts during 2006-09.

The Management stated that with the merger of Indian Airlines and Air India and consequential increase in the number of engines being handled, the increase in piece parts repair possibilities can be explored in the future.

1.6.8.2 Sending of irreparable components for repair to outside repair agency

The JEOC was sending engine parts without inspection to outside vendor for repair which was declared scrapped when found not repairable and returned to the Company. The to and fro transportation cost was borne by the Company. It was noticed in audit that during 2004-05 to 2008-09, 1,19,993 parts were sent to outside vendor for repair of which 47.68 *per cent* were declared scrapped. In view of the high percentage of scrap

rate, the shop should have identified the repairable parts before sending to repair agency. Thus, the expenditure incurred on transportation of these scrapped parts could have been avoided.

The Management stated that the parts are sent out despite their known to be rejected in order to explore the possibility of their retrieval. The reply is not acceptable as the Company has its own Retrieval Committee to identify the repairable parts.

1.6.9 Avoidable outsource repair of leased engines

As per the Lease Agreement entered by the Company with M/s Orix the overhaul of engines taken on lease was required to be performed by Approved Maintenance Performer and by qualified personnel acceptable to the FAA. The Company sought (August 2004) approval from the lessor to start work on the engines removed from aircraft at JEOC but the latter denied it on the pretext that JEOC was not approved by the manufacturer for warranty repairs. Consequently, the Company got repaired 23 engines, during the period 2004-09, from outside parties by incurring an expenditure of Rs. 414.39 crore which included an extra expenditure of Rs. 38.21 crore on account of labour, markup on material, transportation and testing charges. The decision of the Company to send the engines to outside parties was contrary to the agreement as it did not specify that the maintenance facility should be IAE approved warranty shop.

The Management stated that the words used in the agreement are 'Approved Maintenance Performer' which requires that the maintenance performer should be approved by the lessor. The reply is not acceptable as the agreement states that the maintenance should be performed by Approved Maintenance Performer and by qualified personnel acceptable to FAA. Thus, JEOC being FAA approved Shop was qualified for the maintenance work.

Recommendation No. 1.2

The Company should strictly enforce the terms of the lease agreement for repair of engines.

1.6.10 Performance of overhauled engines

1.6.10.1 Performance of V 2500 engines

V2500 engine consists of eight modules and are maintained on "On Condition" philosophy. Each module has specified soft life ranging from 10,000 to 24,000 flying hours at which time major refurbishment (L3 level) is done during shop visit for restoring the engine to its normal operating efficiency. A test check of the records of 266 modules removed at JEOC during the period 2005-09 for overhaul revealed that 49 modules achieved actual life ranging from 24 *per cent* to 50 *per cent* of certified soft life whereas 80 modules achieved life ranging from 50 *per cent* to 75 *per cent*. Consequently, the Company had to incur extra expenditure on the refurbishment of these modules. The extra expenditure could not be ascertained in audit as the Company was not maintaining the cost records for each overhauled module.

The Management has accepted that modules could not achieve their soft life because they were swapped frequently due to production constraints and unscheduled removals.

1.6.10.2 Early engine removal

It was seen in audit at JEOC that there was large number of unscheduled removal of engines during 2004-09 as shown below in **Table 1.3**:

Table 1.3

Particulars	2004-05	2005-06	2006-07	2007-08	2008-09
Total engine removals[1]	55	56	52	45	43
Scheduled engine removals	31	21	17	11	03
Unscheduled engine removals	23	30	34	33	34
Percentage of unscheduled removal to total removal	44	62	67	75	93
In-flight shutdown	01	05	01	01	06

From the above it is seen that percentage of unscheduled removal is on increase. It highlighted poor maintenance of engines and higher maintenance cost. Further, 14 cases of In-Flight Shut Down (IFSD), excluding five cases of IFSD due to Foreign Object Damage (FOD), during the last five years endangered the safety of passengers as well as aircraft.

The Management stated that the large number of unscheduled removals were primarily due to High Pressure Compressor related issues. The reply is not acceptable as the percentage of HPC failure to total unscheduled removals was 24 *per cent* during the period.

1.6.10.3 Wasteful expenditure on improvement of HPT module

The Company carried out phoenix modification introduced by engine manufacturer M/s IAE in all of its engines at JEOC at a cost of Rs. 67.31 crore with an anticipated increase of 25 *per cent* in on-wing life of V2500 A1 engines and corresponding decrease in hourly maintenance cost of the engines. During audit it was observed that on-wing life of the engine did not increase to the assured level as is evident from 34 unscheduled engine removals due to HPT failure during the period from 2004-05 to 2008-09. As the engines were removed at shorter intervals, the benefits of reduction in maintenance cost envisaged were also not reaped.

The Management stated that post phoenix life of Nozzle Guide Vanes being more than 9000 hours; the projected 25 *per cent* increase in on-wing life was, thus, achieved. The reply is not convincing as the post phoenix on-wing life of the entire engines, should have increased from 6000 hours to 7500 hours, as claimed by IAE, but average yield of on-wing life of engines remained around 6000 hours.

1.6.10.4 Wasteful expenditure on improvement of HPC module

JEOC removed 19 engines due to HPC related distress occurred during 2004 and 2005, of which 6 were IFSD. The matter was taken up (August 2005) with IAE who recommended certain modifications in the module. Accordingly, the Company carried out all the modifications suggested in the form of Service Bulletins (SB) at a cost of Rs. 10.30 crore on almost all the engines. Even after incorporating all the SBs recommended by the engine manufacturer, the Company experienced 22 engine failures

[1] ***Total engine removals include scheduled engine removals, unscheduled engine removals and in-flight shutdown***

during 2007 to 2009 due to distress in HPC module out of which two were IFSD. It was observed in audit that the Company did not safeguard its interest while accepting the proposed modification in case of failure of HPC Modules. Further, the Company also did not seek any support from IAE which the latter was ready to provide. The Company has further entered into an agreement with IAE in April 2007 for implementation of a 'keep the fleet flying' (KTFF) package to improve the life of HPC modules. HPC modules are now being built under this package which would cost approximately Rs. 162 crore over a period of first three years and Rs. 94.50 crore over the next seven years.

The Management stated that support to be provided by IAE was purely at their discretion. The reply is not acceptable as the engine manufacturer was ready to review the cases for support for failed engines but the Company did not pursue the matter with them.

Recommendation No. 1.3

The Company should:

(i) Formulate and implement a comprehensive Maintenance Policy for refurbishment of engines to achieve maximum on-wing life.

(ii) Ensure inclusion of suitable clause in the contract to safeguard its interest in case of failure to achieve the assured result offered by the engine manufacturer on the implementation of the modification.

(iii) Strengthen its Quality Control Mechanism.

1.6.11 Repairs of engines of outside parties

1.6.11.1 Delay in raising of bills

It was observed in audit that in 45 cases, JEOC raised bills on outside parties after lapse of 31 to 500 days since the closure of work order, resulting in blockage of funds. Consequently, Company suffered loss of Rs. 0.60 crore on account of interest, at the rate of eight *per cent* per annum.

1.6.11.2 Non maintenance of records of repairs

During the period 2004-05 to 2008-09, 79 engines, including Auxiliary Power Units, were repaired for outside parties. Audit observed that no records/ registers were maintained for recording actual utilisation of man / machine hours, *etc.* to carry out the repair/ overhaul of engines received from the customer. A proper control system was required to ensure that the outside jobs were carried out as per prescribed procedure and within specified time.

The Management, while admitting the audit observation, stated (November 2009) that EOD has complex operation involving 20,000 items per engine and without proper IT system, it was not possible to maintain actual utilisation of parts and manpower for carrying out shop activities.

Recommendation No. 1.4

The Company should:

(i) Improve the internal control system to ensure that the outside party job is carried out economically.

(ii) Ensure timely realisation of dues from the customers.

1.6.12 Inefficient utilisation of manpower

A review of the workshop labour hours utilisation at JEOC revealed that the Company paid overtime for 4,27,866 hours during the period April 2004 to March 2009. The overtime was to be allowed in exceptional cases, however, an analysis of overtime hours *vis-à-vis* number of engines produced during the period revealed that in spite of allowance of 4,27,866 overtime hours the JEOC never achieved its capacity of 48 V2500 engines in any of the years under review. It was observed that the overtime hours (1,44,861) taken to produce 40 engines in the year 2005-06 were higher by 1,223 *per cent* of the overtime hours (11,843) taken to produce almost equal number of engines (39) during the year 2008-09. It indicates that the Company was not able to utilise available labour hours efficiently.

Audit further observed that the objective of allowing overtime allowance was defeated as normal working hours to the extent of 1,38,459 were lost due to mandatory break of 11 hours[2] allowed to the concerned employees in terms of clause 11.4 of the Memorandum of Settlement signed (August 2002) by the Management with the Indian Aircraft Technician Association. Further, it was observed that a total of 42,516 idle hours were observed at JEOC during the period 2004-05 to 2008-09. Thus, the Company incurred an avoidable expenditure of Rs. 0.81 crore on overtime and lost 1,80,975 hours on account of night off and idle hours.

1.6.13 Non-moving and obsolete inventory

Non-moving inventory constitutes items which have not moved for a period ranging from two years to five years. As on July 2009, inventory valuing Rs. 8.65 crore was non moving at JEOC, of which inventory worth Rs. 0.40 crore constituted items not moved at all since their purchase.

In case of EOD, approximately 8000 spares pertaining to JT9D engines valuing to Rs. 70 crore were lying as obsolete items and 2394 items valuing Rs. 15.96 crore were identified as non moving engine spares as on 31 March 2009.

The Management stated (December 2009) that the list of above inventories was hosted on the Company's website for sale; however, there was no response to it.

Recommendation No. 1.5

The Company should ensure that the obsolete inventories are reviewed and segregated for appropriate disposal.

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[2] ***As per Memorandum of Settlement reached on 3 August 2002 between Indian Airlines Limited and Indian Aircraft Technicians' Association, the technicians were required to report for duty after availing 11 hours break.***

1.6.14 Blockage of funds due to delay in submission/late recovery of warranty claims

According to provisions of Service Policy of IAE, warranty claims for Life Limited Parts (LLP) fitted with V 2500 engines manufactured by it must be presented within 180 days after the removal of the engine or part for which warranty has been claimed.

A review of the warranty claims lodged by JEOC revealed that out of total warranty claims of Rs. 10.14 crore till September 2008, claims worth of Rs. 7.31 crore were not lodged within the stipulated period and the delay ranged from one month to 73 months over and above the stipulated period of 180 days. Failure of the Company to lodge warranty claims within the stipulated period resulted in loss of interest of Rs. 1.91 crore on delayed settlement of claims.

The Management accepted that due to infrastructural deficiencies there was delay in filing of claims.

Recommendation No. 1.6

The Company should take necessary action to lodge the warranty claims in time and obtain the claim amount at the earliest.

1.6.15 Conclusion

The capacity utilisation of JEOC was low during the period 2004 to 2009 resulting in low availability of engines for operation of aircrafts. On various occasions aircrafts had to be grounded. In order to improve the situation, the Company took engines on short term lease and also resorted to outsourcing of repair of engines. This did not help as considerable time was lost in dispatch of engines for repair and getting back overhauled engines. Further, the engines overhauled in the shop failed to give expected life in spite of implementing all the modifications recommended by the engine manufacturer. There was lack of efforts to upgrade facility to undertake in house repair of piece parts. The total financial implications amounted to Rs. 501.97 crore. Thus, the operations of JEOC, Delhi were not efficient, effective and economical.

The disposal of obsolete/non moving inventory was not done within reasonable time at EOD, Mumbai.

The matter was reported to the Ministry in February 2010; their reply was awaited (March 2010).

MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY

CHAPTER II

Bharat Sanchar Nigam Limited

Functioning of Telecom maintenance regions

Executive Summary

With a turnover of more than Rs. 35,812 crore and net profit of Rs. 575 crore for the financial year 2008-09 Bharat Sanchar Nigam Limited is one of the largest telecom service providers in India. The Company maintains a large transmission network comprising optical fiber cables and microwave systems through which 602 districts and 5.6 lakh villages in the country are connected.

Telecom Maintenance Regions of BSNL are the divisions responsible for the maintenance of long distance transmission systems of the Company. The four maintenance regions viz., Eastern, Northern, Southern and Western control more than 19,100 route kilometers of optical fiber cable and microwave systems functioning in the country. With the entry of private service providers into the telecommunication sector all operators essentially require interconnection with BSNL network. Provisioning of Points of Interconnect (POIs) and monitoring the long distance traffic through these POIs for correct realisation of interconnection usage charges is also an important area of activity for the Maintenance Regions.

The major findings of the performance audit are:

- Microwave systems costing Rs. 36.84 crore were either used for a very short period or were not put to use at all rendering the investment unfruitful. This was partly due to commissioning of microwave systems in routes where more stable optical fibre systems were already in operation.
- Delay in commissioning of 'Lawful Interception and Monitoring' systems led to idling of investment of Rs. 5.84 crore besides delay in start of International Private Leased Line services.
- Delay in finalisation of tariffs for use of signaling through Stand Alone Signaling Transfer Point system deprived the BSNL of projected profit of Rs. 329.30 crore per annum.
- Records on receipt and issue of stores received against all 94 purchase orders released during 2004-05 to 2008-09 were not maintained in Eastern Telecom Region.

Summary of recommendations

The Company may:

(i) ***Review and strengthen its planning and execution processes by authorising the Maintenance Regions to conduct mid course review of projects for reducing the long gestation periods of transmission projects.***

(ii) ***Strengthen the control and monitoring mechanism in relation to accounting of stores so as to improve its inventory management.***

(iii) ***Fix tariff and realise charges from private operators for use of CCS-7 signals as stipulated in the Interconnect Usage Charges agreements.***

(iv) ***Initiate urgent action to collect outstanding Interconnect Usage Charges from private operators by invoking relevant provisions of the Interconnect Usage Charges agreements.***

2.1 Introduction

Bharat Sanchar Nigam Limited (BSNL) with a turnover of more than Rs. 35,812 crore and net profit of Rs. 575 crore for the financial year 2008-09 is one of the largest telecom service providers in India. The Company has about 4.6 crore line basic telephone capacity, 0.8 crore Wireless in Local Loop and 5.2 crore Global System of Mobile communications capacity. The Company also maintains a large transmission network comprising optical fibre cables and microwave systems through which 7,330 cities/towns and 5.6 lakh villages in the country are connected.

Transmission systems form the backbone of the telecommunication network. 'Over head wires' used to be the transmission media in India which later gave way to co-axial/copper cables and was followed by Radio frequency based system. With the advent of Optical Fibre Cable (OFC), which works on digital technology, Bharat Sanchar Nigam Limited started using OFC for creating transmission network. Apart from these, BSNL also use Satellite Systems as a transmission medium.

Telecom Maintenance Regions of BSNL are responsible for the maintenance of long distance transmission systems in the country. The Telecom Projects Wing of BSNL, the agency responsible for execution of long distance media, after physical completion and Acceptance Testing (A/T) hands over routes/networks to the Maintenance Regions for utilisation and maintenance. The long distance network maintenance of BSNL is divided into four regions – Eastern Telecom Region (ETR), Northern Telecom Region (NTR), Southern Telecom Region (STR) and Western Telecom Region (WTR). Each Region is headed by a Chief General Manager (CGM). The four Maintenance Regions control more than 19,100 route kilometres of optical fibre cables and microwave systems functioning in the country. During the year 2008-09 the total expenditure on the upkeep and maintenance of the long distance transmission systems was Rs. 393.62 crore. With the entry of private service providers into the telecommunication sector all operators essentially required interconnection with BSNL network. Interconnection facilities for National Long Distance (NLD) and International Long Distance (ILD) to the operators are provided by BSNL at their Level I Trunk Automatic Exchanges (TAXs) through Points of Interconnect (POIs). Provisioning of POIs and monitoring the long distance traffic through these POIs for correct realisation of Interconnection Usage Charges (IUC) is also an important area of activity for the Maintenance Regions.

Geographical coverage of each of the Maintenance Region is as given below in **Table 2.1**:

Table 2.1

Sl. No.	Circle	Location of Head Office	States/Union Territories covered
1	WTR	Mumbai	Maharashtra, Madhya Pradesh, Chhattisgarh, Gujarat, Goa, Diu, Daman and Dadra and Nagar Haveli
2	ETR	Kolkata	Andaman and Nicobar Islands, Assam, Bihar, Jharkhand, Orissa, Sikkim, West Bengal, Arunachal Pradesh, Meghalaya, Mizoram, Tripura, Manipur and Nagaland
3	NTR	Delhi	Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan, Uttar Pradesh (East and West) and Uttarakhand
4	STR	Chennai	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and Pondicherry

2.2 Organisational Setup

The overall control over the functioning of the Telecom Regions rests with the Chairman and Managing Director (CMD) of BSNL. At the Corporate Office level, the Director (Operations) assists the CMD and at the Telecom Region level, the respective Chief General Managers (CGMs) and their General Managers (GMs) and Deputy General Managers (DGMs) assist the CMD.

2.3 Scope of Audit

Performance audit was conducted during May 2009 to August 2009 with a view to examine the functioning of the Telecom Maintenance Regions of BSNL covering the four regions *viz.*, NTR, ETR, WTR and STR with reference to documents maintained at the Corporate Office and Head offices of the Maintenance Regions along with their selected divisions and sub-divisions ***(Annexure I).*** The period covered in Performance Audit was from 2004-05 to 2008-09.

2.4 Audit objectives

The main audit objectives were to assess that:

- Requirements for loading transmission systems were planned as per the targets fixed by Corporate office and the demands of territorial circles;
- Projects completed by the Telecom Project wing were taken over in time, utilised optimally and their operation and maintenance were done economically, efficiently and effectively; and
- Leased line circuits, infrastructure and interconnection facilities were provided promptly to other telecom service providers as per their requirement, and the billing and collection of revenue from leased line circuits, Interconnect Usage Charges (IUC), infrastructure sharing charges *etc.*, were done timely.

2.5 Audit criteria

The following audit criteria were used:

- Codal provisions, instructions (of Telecom Regulatory Authority of India and BSNL Corporate office) and transmission media (Media) Guidelines for planning of projects;
- Operation and financial performance indicators and bench marks fixed by the BSNL for the Maintenance Regions;
- Monitoring and internal control mechanisms for taking over of completed projects, their utilisation, maintenance and upkeep, provision of services, billing and collection of revenue; and
- Terms and conditions of interconnect agreements.

2.6 Audit methodology

The Report was prepared based on review of relevant documents (both technical and accounts maintained by the sub-regional/circle offices), discussions with various levels of the Management and field visits with regard to maintenance of long distance media, Level I TAX, provision of Point of Interconnection (POI), IUC and infrastructure sharing charges *etc.* Entry and Exit meetings were also held in May 2009 and December 2009 respectively with the Management.

2.7 Acknowledgement

The co-operation and assistance extended by the Company Management and staff at all levels is acknowledged.

2.8 Audit findings

Telecom Maintenance Regions of BSNL, apart from the upkeep of the transmission networks, are also involved in the assessment of media requirements, monitoring the utilisation of existing media, provision of interconnection facilities to other telecom service providers and billing and collection of IUC charges from NLD and ILD operators. Maintenance Regions are also the custodian of the vast network assets of the Company. Hence, it is important that Maintenance Regions along with their technical efficiency should have a sound financial management system and a robust internal control system. Audit findings on the planning of media, maintenance of assets and collection of revenue from other operators are discussed below:

2.8.1 Long gestation period in completion of routes and systems

The Telecom Maintenance Regions take over transmission systems/routes from the Projects Circle[▾] after Acceptance Testing (A/T) for their utilisation and upkeep. Existing rules/instructions stipulate that areas to be covered under each route/scheme of the project should be identified in the co-ordination meetings held between the Territorial Circles,

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[▾] ***In the Company, local area network is established and maintained by Secondary Switching Areas (SSAs) under territorial circles whereas long distance media, i.e., transmission systems, mostly involving OFC, are established by the Telecom Project circles (TPCs).***

Maintenance and Project authorities. Departmental instructions stipulated that the views of the Maintenance Heads should be taken into account while finalising the schemes.

It was observed that requirement and planning of routes/systems projected by the Maintenance wings are incorporated in the five year plan and are considered for execution during the annual Regional Trunk Planning and Coordination (RTPC) meetings. But these proposals undergo changes on account of various reasons like delay in procurement of stores, delay in physical completion of works *etc.* In telecommunication sector where technological changes are rapid, long gestation period in the completion of systems and routes would lead to idling of investment due to technological obsolescence and delay in achieving planned objectives. Maintenance Regions, as an agency responsible for the upkeep of transmission network, should play an important role in monitoring the progress of works undertaken by the projects wing and if necessary cause mid course correction in respect of delayed schemes. This would not only ensure use of latest technology in the transmission network but also facilitates timely utilisation of planned schemes. Audit findings in this regard are discussed below.

2.8.1.1 Avoidable investment on microwave systems

Planning for new routes and systems invariably should take into account the capacity of the existing media and their technology. OFC media was inducted into the telecommunication network during the decade of 1990s and was considered as a reliable media compared to the Microwave (M/W) media.

It was observed that two M/W systems commissioned in Manoharpura-Ajmer and Bala and Kheladevgarh routes in Ajmer area under NTR in January/February 2004 at a cost of Rs. 5.11 crore were never loaded because OFC systems were already in existence in these routes. Similarly, in Gwalior-Jhansi, route M/W system was commissioned in November 2004 at a cost of Rs. 1.52 crore when the more stable Optical Fibre system was already in existence in the route since the year 2001.

Likewise it was seen in STR that Microwave Systems worth Rs. 30.21 crore commissioned during the years 2001-02, 2002-03 and 2003-04 were either used for a very short period or not put to use at all rendering the investment unfruitful.

When pointed out, office of the CGM STR replied that commissioning of the microwave systems was delayed because of delay in ensuring infrastructure like site, tower building *etc.* and also due to technological changes, microwave systems became the least choice of media solution. It was also stated that all these systems were planned during the erstwhile Department of Telecommunications (DoT) period.

The reply was not justified as BSNL, after its formation in the year 2000, had sufficient time at its disposal to review the progress of the projects which were conceived during DoT period and to identify routes where OFC were already commissioned and to take suitable remedial action instead of going ahead with technologically redundant projects.

Office of CGM NTR stated that M/W systems were installed as an alternate media.

2.8.1.2 Delay in installation of Lawful Interception and Monitoring and International Private Leased Circuits

Lawful Interception and Monitoring (LIM) systems are used to determine the type and contents of traffic passing through BSNL's own international gateway switches over the International Private Leased Circuits (IPLC). LIMs over IPLCs help in intercepting unlawful traffic. BSNL placed a purchase order in August 2004 for the supply of LIMs for installation in five international gateway switches at Delhi, Kolkata, Chennai, Mumbai and Ernakulam and another purchase order in August 2007 for installation of IPLC–LIM at five locations *viz.*, Chennai, Kolkota, Mumbai, Tuticorin and Ernakulam. The respective Maintenance Regions were the consignees for the equipment.

It was observed that equipment at Ernakulam costing Rs. 2.42 crore was not commissioned till August 2009. Similarly, the equipment at Chennai costing Rs. 3.42 crore which was received in December 2007 was commissioned only in March 2009. Delay in commissioning was attributed to the failure in clearing A/T. Though the bidder failed to demonstrate all the functionalities of the equipment, no action was taken against the vendor. Besides idling of equipment worth Rs. 5.84 crore, the delay in commissioning of IPLC-LIM led to postponement of the start of IPLC services in these stations. Similarly, in ETR also, the IPLC-LIM meant for Kolkota received in January 2008 has not started service yet.

On being pointed out, the Management of STR accepted (October 2009) that IPLC service from Ernakulam could not be started due to pending clarifications from BSNL Corporate office on certain issues. It was also informed that liquidated damages would be recovered from the vendor for delay in commissioning.

Recommendation No. 2.1

BSNL may review and strengthen its planning and execution processes by authorising the Maintenance Regions to conduct mid course review of projects for reducing the long gestation periods of transmission projects.

2.8.2 Weak controls in asset management

As the custodian of the transmission network it is important that Maintenance Regions should have strong internal systems in place to monitor the expenditure of network maintenance and to manage its assets.

As per Company rules all stores should be taken into stock immediately on its procurement and all the utilisation details should also be maintained. However, it was observed in Patna sub region of ETR that no records were maintained relating to receipt, stock and issue of ordered quantity of stores valuing Rs. 23.36 crore procured during 2004-05 to 2008-09 through 94 purchase orders. In the absence of stores records details of their utilisation also could not be ascertained.

On being pointed out, the local unit agreed to maintain the necessary records.

It was also noticed in ETR that in July 2007 and May 2008 ETR procured 45 OTDR[♦] equipment against the actual requirement of only nine equipment, resulting in excess procurement of 36 OTDR equipment worth Rs. 1.57 crore. The excess procurement was

[♦] ***Optical Time Domain Reflectometer***

justified by ETR unit as spares. But maintenance spares for three years were given by the suppliers free of cost in the purchase of optical testing instruments. As per BSNL's norms, the requirement of OTDR equipment was stipulated as one set for every 250 km and one set at the headquarters office in each sub-region.

On being pointed out in Audit, ETR Management admitted that the actual purchase was in excess of requirements.

Recommendation No. 2.2

BSNL may strengthen the control and monitoring mechanism in relation to accounting of stores so as to improve its inventory management.

2.8.3 Billing and collection of revenue

With the entry of private service providers in telecommunication sector it became important for all operators to have interconnection with each other and since BSNL being the major player in the telecom field, all other operators essentially required to use BSNL network for a variety of services. Maintenance Regions are responsible for giving connectivity through Level I TAX1 and providing Points of Interconnection (POIs) to the private operators and for billing and collection of revenue for service provided through it. Audit observations on the revenue related functions of the Maintenance Regions are discussed below:

2.8.4 Delay in finalisation of tariffs for use of signaling through Stand Alone Signaling Transfer Point system

BSNL decided (January 2004) to introduce Stand Alone Signaling Transfer Point (SSTP) systems into its network with a view to achieve better flexibility and transparency of its signaling networks and to facilitate introduction of new services in both wire line and Cellular services. The system was also targeted to help the BSNL to measure/record its signaling links which were used by private operators for their national and international roaming subscribers and to bill them accordingly. As per the terms and conditions of the Interconnect Agreements with the private service providers, all signaling links from the network of private operators should pass through the SSTP and the BSNL reserved the right to levy charges for use of the expensive CCS7[♠] signaling resources of BSNL. For value added services like auto roaming services, the charges to be levied were fixed as Rs. 25 and Rs. 50 per month per subscriber for national and international roamers respectively and for SMS services, charges were not finalised. The installation of SSTP systems in different Level I TAXs was planned to be completed in three phases and equipment was to be procured from M/s ITI Limited. As per the projections of the Company a system of 300 links was expected to earn a profit of Rs. 4.45 crore per year at 80 *per cent* capacity utilisation. BSNL incurred a total cost of Rs. 138.62 crore ***(Annexure II)*** on the SSTP equipment for all the three phases. Phase I of the project was completed in 2005 and Phase II in December 2007. Nailed up connectivity was also provided to private operators. Phase III which was for up gradation of the first two phases

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[♠] ***Common Channel Signaling- is a set of telephony signaling protocols used to set up telephone calls of public switched telephone network. Other uses include number translation, prepaid billing mechanism, short message service (SMS), etc.***

was not declared as commissioned as of August 2009. The Company had established 22,200 links spread over the country in different Level I TAX exchanges.

It was noticed (August 2009) in STR that the SSTP system was not capable of identifying the exact number of roamers for billing as the required fields for this feature were not incorporated by the vendor into the system and the billing functionality of the system was not made operational. On being pointed out, office of CGM STR replied (September 2009) that the vendor had rectified all the deficiencies and the billing would commence after finalisation of tariff by BSNL Corporate office. Thus, in the absence of appropriate charges for the use of CCS-7 signals by private operators for messaging, the Company could not earn any revenue from the investment on SSTP equipment despite acquiring the capability to measure and bill it. Based on BSNL's own projections, the investment had the potential of earning a profit of Rs. 329.30 crore per annum, and the failure in fixing tariffs had deprived the Company of the projected profit.

Recommendation No. 2.3

BSNL may fix tariff and realise charges from private operators for use of CCS-7 signals as stipulated in the Interconnect Usage Charges agreements.

2.8.4.1 Delay in provisioning of Point of Interconnection (POI) to private operators

Departmental instructions stipulate that Point of Intersection (POI) requested by other operators should be provided within a period of 30 days from the date of payment of provisional demand note towards rent. In cases where the E1 ports were ready but there was delay on the part of private operators in Acceptance Testing (A/T) or in commissioning, rent would start on expiry of said date without waiting for commissioning of ports.

Audit Scrutiny at NTR, ETR and WTR revealed that there were delays ranging up to 570 days on the part of the Maintenance Regions in providing POIs to different private operators denying Company the potential revenue of Rs. 3.06 crore ***(Annexure III).***

On being pointed out, the Management of NTR attributed the delay to late receipt of Advice notes and non-cooperation of private operators in the A/T processes. The Management of WTR (Rajkot) stated that supplementary bills for port charges amounting to Rs. 14.96 lakh were issued in August 2009. Reply from ETR was awaited (November 2009).

2.8.4.2 Outstanding Interconnect Usage Charges

Inter Operator Billing and Accounting System (IOBAS) Procedure Order (April 2005) and the Interconnect agreements with other licensed operators described the procedure for resolving disputes in the Interconnect Usage Charges (IUC). Maintenance Regions were responsible for the collection of IUC from National Long Distance (NLD) and International Long Distance (ILD) licencees.

It was seen in all the four Maintenance Regions that IUC bills amounting to Rs. 43.94 crore ***(Annexure IV)*** could not be collected due to disputes with the private operators. Of the total Rs. 43.94 crore, outstanding under ETR was Rs. 37.18 crore which constituted nearly 85 *per cent*. With the introduction of the computerised billing system of IOBAS in 2005 and clear dispute resolving mechanism in place, outstanding IUC bills should have been reduced to the minimum.

On being pointed out the Management of ETR replied that action was being taken to realise the outstanding dues.

Recommendation No. 2.4

BSNL may initiate urgent action to collect outstanding Interconnect Usage Charges from private operators by invoking relevant provisions of the Interconnect Usage Charges agreements.

2.9. Conclusion

Maintenance Regions, being the custodian of the transmission network of the BSNL, play a vital role of ensuring trouble free transmission. BSNL being the owner of the largest transmission network in the country has the advantage of offering bandwidth on demand to all prospective users. Thus, the contribution of the Maintenance Regions in the revenue generation process of the Company is crucial. Use of the best technology in the industry, keeping the assets trim through timely disposal of obsolete goods, billing and collection of revenue from all sources and effective marketing strategies are important activities for optimising the network efficiency and thereby enhancing revenue. Even though the Maintenance Regions were keeping interruptions within the acceptable limits, Audit findings as brought out in the report revealed that a more pro active role in the planning and execution of transmission projects, tighter control mechanism and better marketing initiatives in providing bandwidth would help the BSNL in maximising the investments in the transmission segment.

The matter was reported to the Ministry in February 2010; their reply was awaited (March 2010).

MINISTRY OF DEFENCE

CHAPTER III

Hindustan Aeronautics Limited

Production and supply of Advanced Light Helicopter

Executive Summary

The Advanced Light Helicopter (ALH) designed and developed by the Company is a light 5.5 tonne class, multi-role, multi-mission helicopter, fitted with two Turbomeca TM 333 2B2 engines. A sum of Rs. 1,541 crore (Rs. 960 crore by the defence customer and Rs. 581 crore by the Company) was spent till September 2009 on the ALH project. Audit observed the following:

- The design and development of ALH started in 1984. The collaboration agreement entered in 1984 was terminated in 1995 even though certain systems were yet to be developed, validated and integrated. As a result, five prototypes of the basic versions which were to be certified by 1994 were actually flight tested and certified in October 2003.
- Despite more than two decades, the technical requirements finalised in 1979 by Army and Air Force were not fully achieved resulting in flying of the 74 ALH supplied by the Company to defence customers with concessions.
- Taking up Limited Series Production (LSP) of ALH (2001-2003) even while the prototypes were being flight tested (1992-2003) and certified, was premature as large number of design problems were encountered during the manufacturing.
- By not freezing the design of ALH and keeping the development stage open the Company had to accommodate the increasing demand of the customer for latest and additional requirements. This led to 363 modifications in 34 helicopters (total 74 supplied to Defence customers).
- The ALH, which was to be successor to Cheetah/Chetak was found to be unsuitable for the intended multi-role requirements due to excess weight and limited power of the engine. ALH with 'Shakti' (higher-powered engine) which was planned to be certified in December 2006 is yet to be certified even after a delay of three years resulting in postponement of delivery schedule of 20 ALH with Shakti engine from 2008-09 to 2009-10.
- Weapon system integration (WSI) version of ALH has not been developed even after a lapse of 10 years (1998 to 2009). In the absence of clear understanding of the requirements between Navy and the Company, the amount of Rs. 138 crore spent on the project has not resulted in any tangible benefit to the customer.

- The Company could not penetrate into the international market in the absence of international certificate in spite of showcasing ALH in the air shows. The Company could not successfully execute even the orders received from civil market.
- As against the envisaged indigenisation level of 50 per cent, about 90 per cent of the value of material used in each helicopter is procured from foreign suppliers.

Summary of recommendations

(i) Series production should be taken up only after prototypes are approved/ certified and accepted by the customer.

(ii) Modifications desired by the customer should be with reference to a time frame and technical competency of the Company.

(iii) The capacity should be ramped up as to peak up production as planned.

(iv) The Company should quicken the process of submitting the documents and obtain the certifications early.

(v) As the Company has entered the highly competitive civilian/ export markets the design/quality issues need to be resolved early to gain the confidence of the customers to remain in the market.

(vi) The Company should expedite efforts to get International certificate on priority to be a global player. The Company should exploit civil market by executing the orders successfully and consider options of sale technique through leasing of ALH.

(vii) Concerted efforts are needed to achieve the desired (50 per cent) level of indigenisation.

3.1 Introduction

Hindustan Aeronautics Limited (Company) a 'Navratna' Public Sector Undertaking under the Ministry of Defence, is engaged in design, development, manufacture, repair and overhaul of aircraft and helicopters. The production of helicopters is undertaken at the unified Helicopter Complex (HC) at Bangalore. The organisation structure of the HC is given in ***Annexure-V.***

The Company designed and developed the Advanced Light Helicopter[1] (ALH), named as 'DHRUV'. It is a light 5.5 tonne class, multi-role, multi-mission helicopter, fitted with two Turbomeca TM 333 2B2 engines. The design and development of ALH started in 1984 and the first prototype of the ALH was flown in 1992. The Company has so far (December 2009) delivered 90 ALH to customers. The total sanctioned cost of ALH project was Rs. 2,103 crore (Rs. 1,136 crore by the defence customers and Rs. 967 crore by the Company). A sum of Rs. 1,541 crore was spent till September 2009 (by defence customer Rs. 960 crore and by the Company Rs. 581 crore- ***Annexure-VI***) in this project.

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[1] ***The advanced technologies incorporated in the ALH design include automatic flight control, Anti-Resonance Vibration Isolation System (ARIS), Full Authority Digital Electronic Control (FADEC), hinge less main rotor and bearing less tail rotor and Integrated Dynamic System (IDS).***

3.2 Scope of audit

The performance audit on production and supply of ALH covers the design, development, production and supply of ALH during 2001-02[2] to 2008-09.

3.3 Audit objectives

The performance audit was conducted to assess whether:

- the production plan for optimum utilisation of available/planned capacity was realistic and achieved;
- the design and development with reference to customers' requirements was achieved on time and in synchronisation with the planned production;
- planning and establishment/augmentation of adequate infrastructure facilities for production was timely and effective with reference to cost and achievement of objectives; and
- the marketing performance was efficient and effective.

3.4 Audit Criteria

The Performance Audit is based on the following criteria:

- Government sanctions, Perspective, Production and Sales plans of the Company and policies framed by the Board of Directors (Board);
- Project reports/Consultant's reports;
- Regulatory documents issued by the Ministry of Defence (MoD) and Internal control procedures; and
- Feedback from the defence customers.

3.5 Audit methodology

Audit commenced after holding Entry conference with the Management in July 2009. Desk review of records was supplemented by field visits to selected customer base. Audit findings were discussed with the Management in the exit conference (November 2009).

3.6 Acknowledgement

Audit is thankful for the cooperation received from the Management of the Company which facilitated the conduct of the Performance Audit of ALH.

3.7 Audit findings

3.7.1 Production performance and capacity utilisation

The Company has so far (December 2009) delivered 90 ALH, out of which 74 ALH were delivered to defence customers and 16 ALH to other customers. The Company has orders on hand for 159 ALH from defence customers and 6 ALH from other customers to be delivered by 2015-16. The weaponised version of ALH is still under development. A

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[2] ***Period from 2001-02 was covered as actual production of ALH started from 2001-02***

statement showing the capacity utilisation of ALH with reference to confirmed orders during the period 2001-02 to 2008-09 is indicated below in **Table 3.1**:

Table 3.1

(In numbers)

Year	Envisaged produc-tion plan	Available capacity	Orders on hand as per delivery schedule	Cumul-ative orders on hand	Production targets BE	Production targets RE	Actual produ-ction	Cumul-ative actual produc-tion	Back log in product-ion (5)-(8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1997-98 to 2000-01	48	-	-	-	-	-	-		-
2001-02	24	12	8	8	8	7	7	7	-1
2002-03	32	12	3	11	10	11	11	18	+7
2003-04	32	24	18	29	18	13	13	31	+2
2004-05	32	24	14	43	18	18	14	45	+2
2005-06	32	24	25	68	20	18	18	63	-5
2006-07	32	24	10	78	24	15	14	77	-1
2007-08	32	24	1	79	24	4	4	81	+2
2008-09	32	24	31	110	24	18	15	96	-14
Total upto 31 March 2009	**296**	--	**110**		**146**	**104**	**96**		**20***
Future orders 2009-10 to 2015-16			**139** (defence)[3] **+ 6 (from others)**						

It can be seen that as against envisaged and approved production of 296 ALH by Board upto 2008-09, target set was for 104 ALH while actual production was only 96 ALH.

On a review of actual production *vis-a vis* production plan, it was observed that though a peak production of 32 ALH was planned from 2002-03, the present available capacity was only 24, due to non-availability of dedicated jigs for 32 ALH at the critical assembly stage. Production and delivery of 20 utility version of ALH due in 2008-09, was shifted to 2009-10 since the Company was addressing the problems on Integration of Shakti Engine, interchangeable parts, Active Vibration Control system and Communication system. Further, the budget estimates were revised every year to bring them in line with the actual production. The Company had paid Rs. 43 crore liquidated damages and is further liable to pay Rs. 21 crore for delay in supplies up to 2008-09.

The following paragraphs highlight various issues leading to failure on part of the Company to achieve its expected goals/production in the ALH project.

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* ***Out of 96 helicopters produced, 03 were in WIP, 02 met with an accident and 01 on lease to Israel was returned. Thus, the backlog worked out to 20.***

[3] ***Total future orders = 159 (139 + 20 backlog of previous years).***

3.7.1.1 Non-extension of collaboration agreement

The Government of India entered into a collaboration agreement[4] with Messerschmitt Bolkow Blohm (MBB) - West Germany, (presently ECD[5]) in July 1984 for design, development and establishment of production facilities of ALH and entrusted the same to the Company. The Collaboration agreement provided for achievement of 13 prescribed milestones ***(Annexure VII)*** within seven years *i.e.* by 1991. Subsequently, the Company prepared (July 1992) Preliminary Project Report (PPR) for ALH, which indicated development of ALH including first flight and type certification of basic version before end of 1994. The PPR also revised the schedule for design freeze of utility version of ALH to December 1993 and completion of prototypes by 1994. This resulted in extension of collaboration agreement by four years up to 1995.

Audit observed that the collaboration agreement was not extended beyond 1995. At that time, certain systems like Anti Resonance vibration Isolation System (ARIS), Automatic flight Control system (AFCS), Retractable Landing Gear, *etc.*, were yet to be developed, validated and integrated. This resulted in postponement of the plan to establish production facilities. As a result, five prototypes of the basic versions which were to be certified by 1994 as per PPR were actually flight tested and certified for Military version[6] in March 2002 and for Civil version[7] in October 2003.

Audit also observed that even as the five prototypes were still under certification process beyond the target date of 1994, the Company sought (April 1999) approval from MOD to produce 300 ALH for Defence forces. The MoD, however, released orders for 10 Limited series production (LSP) only during 2001-2003 and the feedback received on 10 LSP delivered indicated need for improvements in ground handling, rain proofing, accessibility and door operation *etc.*

Thus, the decision not to extend the collaboration agreement beyond 1995 and going for LSP, even while the prototypes were being flight tested (1992-2003) and certified, were premature as large number of design problems were encountered during the manufacturing as admitted by the Management (December 2009).

3.7.1.2. Freezing of final design

The Global Helicopter Technology Inc (GHT) appointed (January 1996) as a consultant by the Company (at a cost of Rs. 1.88 crore) for the ALH project submitted its final report in June 1997. The consultant's report considered *inter alia* the freezing of final design as a pre-production activity for successful implementation of the project. However, the Company failed to freeze the design though it was aware of the defence customer's stipulated[8] quality requirements. The non-freezing of the design led to 363

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[4] ***The collaboration agreement was necessitated as the Company was developing the helicopter for the first time with no prior experience, to develop the helicopter with contemporary technologies available only with selected OEMs and to develop new technologies like Rotor, Transmission, Vibration Isolation Systems, etc. in-house instead of borrowing the technologies and systems.***

[5] ***Eurocopter***

[6] ***by the Centre for Military Airworthiness Certification (CEMILAC) at a cost of Rs.536 crore***

[7] ***by the Directorate General of Civil Aviation (DGCA) at a cost of Rs.89 crore***

[8] ***The defence forces had indicated their quality requirement of ALH in their Air Staff Requirement (ASR). ASR-2/79 of ALH for IAF and Army was finalised in 1979 and the requirements of Navy (NSR AO/4721/1978) in 1985.***

modifications[9] carried out in 34 helicopters till date (November 2009). The Company claimed Rs. 12.11 crore and realised only Rs. 6.51 crore against Rs. 15.10 crore incurred on modifications, as there was no clarity regarding cost sharing.

The Management stated (December 2009) that for ALH it followed concurrent engineering philosophy which is in line with the present trends and due to concurrent development, large number of design related problems have been encountered during the manufacturing.

The Management's reply is to be read with the consultant's recommendation on design freezing. If the adoption of the concurrent technology concept were to be an existing trend, the consultant would not have suggested the freezing of the design. Further, freezing of the design in line with the stipulated quality requirements of its major defence customers would have facilitated immediate availability of utility version of the ALH to the defence forces. The subsequent requirements of the customers could have been accommodated in the subsequent versions of the ALH.

3.7.1.3 Creation/construction of facility

The consultant's report noted that the Company had identified the following components as critical and will produce them in the ALH production facilities when possible:

- Composite parts including rotors and composite dynamic components;
- Transmission gears and pinions; and
- Sub-assembly/final assembly operations

Despite identification of above critical components, it was observed that the Company failed to create early in-house facilities for composite parts. The Company is still dependent on a single source for composite parts and is yet to develop an alternate source.

For transmission gears/sub-assemblies, the Company delayed the decision of procurement of a Vertical Lathe Machine (Rs. 6.58 crore) for the initial grinding operation. Due to this, grinding operations were outsourced at a cost of Rs. 4.52 crore. Complete-machining operations of critical gears were also outsourced at a cost of Rs. 2.74 crore despite in-house facility.

Further, there was an inordinate delay in the creation of required infrastructure facilities for critical components/conversion of tools and jigs to numerical geometric tooling standards to meet the interchangeability requirement. This resulted in delay in creation of envisaged production capacity of 32 ALH per annum. An amount of Rs. 105 crore for tools and jigs and Rs. 40 crore for achieving interchangeability requirement was spent till September 2009. Likewise installation/commissioning of five machines (Rs. 34.12 crore) procured during 2004 was delayed by 12 to 29 months.

The Management attributed (December 2009) delay in commissioning to cycle time for proving of the machine and interchangeability to finalisation of Standard of Equipment. It further stated that infrastructure investments were not made to enhance the capacity as

[9] ***(i) to overcome the design weakness, structural defects, manufacturing faults (ii) to introduce new equipment (iii) to replace existing component with new components and (iv) to increase the operational capability by utilizing the potential growth of the existing system.***

orders were obtained on piecemeal basis and letters of intent issued by the customer has no legal binding.

The reply is not convincing as the Company took more time in developmental aspects under its concept of 'concurrent technology' and failed to consider the infrastructure imbalances for a prestigious indigenous project taken up by it.

3.7.1.4 Problems with Anti Resonance vibration Isolation System

The Anti Resonance vibration Isolation System (ARIS) developed in-house did not meet the defence customer's desired level of vibration control. The Company tried (2003 to 2007) to address this problem through a secondary device (cost Rs. 42.86 crore), but failed to address the defence customer's requirement. Subsequently, (May-June 2009), the Company placed two development and supply orders for Second Generation Active Vibration Control System (AVCS) and Vibration Monitoring System (VMS) at a cost of Rs. 65.07 crore which were still under development and validation stage (December 2009).

The Management stated (December 2009) that since the contract with collaborator Messerschmitt Bolkow Blohm (MBB) - West Germany, ended at a point of time which was the very beginning of ARIS integration and testing, the Company re-developed the ARIS which fulfilled the basic vibratory requirements and during the process mastered the technology involved in vibration control.

The reply underscores Audit's contention that the decision to end MBB's collaboration was premature as the Company could not bind the collaborator for the systems' failure on integration and testing.

3.7.1.5 Control saturation

An ALH (J-4062) ferried out of the Company's premises on 1 February 2007 crashed during a practice at Bangalore on 2 February 2007 for display at an Air show. The cause of the accident was attributed to right cyclic saturation resulting from design deficiency[10]. The cost of the damage was estimated at Rs. 33.42 crore. Similarly one ALH delivered to Ecuador Airforce (FAE) in March 2009 crashed in October 2009. While the domestic customer's (IAF) reaction to the design deficiency was serious[11] and questioned the Company's capabilities, reaction of FAE was awaited (December 2009). The very limitation of control saturation of ALH led to non-receipt (July 2007) of a potential export order from Chile though Rs. 10 crore was spent for demonstration and certification of ALH at Chile.

The Management stated (April 2009 and December 2009) that the complete rework of design during prototype stage was not carried out as the collaborator did not consider it

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[10] ***Loss of control, caused by the aerodynamic environment that resulted due to the combination of control inputs leading to the air crew running out of right cyclic to roll out of the left turn. This behavior of ALH is generic to type, and not a specific case attributable only to this accident.***

[11] ***IAF observed that (i) Company has referred to this problem in the flight manual which is brief and lacks clarity; (ii) Company has been reluctant to address this problem in totality as it feared disruption of ALH production process; (iii) This approach of Company to safeguard its business even at the cost of a professional approach to solving the problem has serious flight safety and operational implications for the Indian Air Force (v) Company, as an industry, has rarely looked to exploiting its aircraft. It has always focused on the captive Indian Air Force for its assured market.***

necessary from the safety point of view. Control saturation is not a design deficiency but is a phenomenon that can occur during extreme manoeuvres. The precautionary notes and adequate cautions are part of the flight manual. It is in the process of incorporating control saturation warning system. The Company further accepted that the necessity for increased control margin has been discussed with Air Force and it was decided that considering the predominantly Nap of Earth (NOE) flying of light combat helicopter (LCH), it is necessary to incorporate increased right control margin on LCH.

The Company's reply leaves a doubt about the effective measures it has taken on the control saturation issue and the reaction of the customers will be known only on the field experience of the ALH to be supplied from the pending orders.

3.7.1.6 Weight of ALH

The collaboration agreement envisaged the gross weight of basic version to be four tons with Basic empty weight (BEW) of 2.240 tons. Later (1999) it was expected that TM333 2B2 engines fitted in ALH would meet a requirement of BEW of 2.550 tons. However, when pressed to field service in March 2002, ALH weighed 5.5 tons with BEW of 2.650 tons. Due to excess weight and limited power of the engine, the utility mission of 200 kg payload at six KM altitude was not achieved. Hence, the ALH which was to be successor to Cheetah/Chetak[12], was found to be unsuitable for the intended multi role requirements due to excess weight. Thus, the utility version of the ALH was developed initially.

The Management stated (December 2009) that despite the deep background and experience of helicopters by MBB, the collaborator could not achieve the guaranteed parameter of BEW which is still an open point. Shakti engine (higher-powered engine) adequately meets the requisite payload with margins as demonstrated during the hot and high trials in August 2009.

The reply is, however, silent about the reasons for terminating collaboration agreement despite non-achievement of guaranteed parameter.

3.7.1.7 Integrated Architecture Display System

A contract (December 2003/January 2004-costing Rs. 23.27 crore) was entered with Israel Aircraft Industries (IAI) for development and production of Integrated Architecture Display System (IADS)[13] which provided for freezing of the design and development after the Critical Design Review (CDR) by August 2004. However, the CDR was held only in March 2005 and the integration started in November 2005. The certification of IADS for utility version to be completed by August 2005 was completed only in April 2009, *i.e.,* after delay of 44 months. The integration of IADS with Shakti Engine is still in progress (September 2009). Against the MoD approved cost of Rs. 31.02 crore (December 2003) for IADS, Rs. 46.46 crore were spent rendering the recoverability of additional cost of Rs. 15.44 crore doubtful.

The Management stated (December 2009) that IADS is a complex system interfacing with almost all helicopter systems on-board. There were also differences in perception of

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[12] ***Earlier make of helicopter***

[13] ***The IADS was established to replace the ALH conventional architecture with a new integrated architecture and display system to provide an effective modern avionics system with a view to reduce crew work load, and improve safety, reliability and maintainability.***

the scope of implementation, which got evolved during detailed definition of systems post PDR resulting in incorrect assessment of work content by IAI.

The reply is not convincing as non freezing of design of ALH and non clarity over the requirements between the Company and the customers resulted in delay in development of IADS with additional cost.

3.7.1.8 Shakti engines

IAF and Army projected (1999) additional performance requirements to meet the operational needs and weaponised version of ALH. Based on this, a co-operation agreement was signed in January 2003 with Turbomeca (TM) for development of higher-powered engine Shakti, planned to be certified in December 2006 in France (at an approved cost of Rs. 110 crore of which Rs. 105 crore spent till date). Indigenous production of 320 engines was planned with the Company's work share from 16.7 *per cent* in phase-0 in 2009-10 to increase to 73 *per cent* in phase-4 by 2013. Due to its failure to set up in-house facilities for manufacture of gear boxes for the Shakti engines, the Company outsourced its requirements to TM. They were procured at a higher cost than what the Company had agreed with the customer. This will result in non recovery of differential cost of Rs. 5.50 crore.

The whole programme of development of Shakti engine has been delayed. Shakti Engine planned to be certified in December 2006 is yet to be certified even after a delay of three years resulting in postponement of delivery schedule of 20 ALH with Shakti engine from 2008-09 to 2009-10.

The Management stated (December 2009) that considering the risk and time constraint to meet the schedule; it was decided to procure gear boxes from TM. The under recovery of Rs. 5.50 crore will be made good by reducing the in-house fabrication hours after establishing the facilities.

The reply is futuristic and would be applicable for the actual gear boxes manufactured by the Company in phase I and beyond.

3.7.1.9 Certification for ALH

The Design, Development and Production of Military Aircraft and Airborne Stores-2002 (DDPMAS), provides for concurrent certification of the newly developed aircraft/equipment/store to induct it at an early date to the services. Despite more than two decades into the development and production of ALH, the technical requirements [14] of defence services could not be met by the Company and all the 74 helicopters supplied to defence customers were flying with concessions. The acceptance of ALH by defence services with the concessions could be a contributing factor for the slow pace in achieving the standards by the Company and delay in overcoming the operational deficiencies.

The 20 ALH-IADS delivered to army during the period 2006-09 have been awarded only Initial Operation Clearance (IOC). Similarly, the 54 ALH with conventional cockpit

[14] ***Status of compliance as at December 2009-IAF- out of 30 concessions allowed, 24 complied with between April 2002 and August 2009 and 6 were pending; Navy- out of 26 concessions 20 were cleared from May 2002 to June 2004 and 6 concessions were pending including more significant like- Role clearance for Search and Rescue (SAR), Fitment of 360 degree Homer and automatic blade folding***

delivered during the period from 2001-02 to 2006-07 are also flying with Provisional Release to Service document (RSD) awarded in September 2007.

The Management stated (December 2009) that as per DDPMAS, RSD is a formal notification that the helicopter is technically cleared for service use and permits delivery to services. Obtaining type approval involving submission of large number technical documents is under progress.

Even after delivering 74 helicopter during 2001-2009, the Company has not been able to complete the technical documentation to get the type approval.

3.7.1.10 Delay in development of Weapon System Integration (WSI) versions

Defence customers observed (1986) that the ALH under development would be unsuitable in the attack role because of its weight and volume. MoD authorised (December 1998) the Company to undertake design and development of ALH- Weapon system integration (WSI) to be completed by January 2003. The development is still in progress and Company had spent an amount of Rs. 424 crore (September 2009). It was observed that issues like selection of weapons, selection of vendor *etc.*, were not addressed for timely completion of WSI integration project. Out of the pending order for delivery of 159 ALH to Army and IAF, 76 have to be delivered with WSI version. The delay in delivery has serious impact on the defence preparedness of the country.

Further, the Navy required integration of Tactical Missile System (TMS) and Anti Submarine Warfare (ASW) into ALH. For the purpose, Navy released Rs. 139.92 crore. However, it decided (September 2006) not to accept ALH in ASW role as it did not meet its requirement of Time on Task (TOT) of 2.20 hrs at 20 nautical miles. Despite this decision the project was allowed to continue and Rs. 138 crore were spent till September 2009. Thus, besides taking up valuable time and resources, it did not prove fruitful as the Company is not able to show case its competency.

The Management stated (December 2009) that operational clearance for the WSI variant has been scheduled for July 2010 and the required TOT was not achieved as Navy revised their operational and mission equipment weight and requirement of dunking cycle, crew weight *etc.*, which adversely affected the achievable TOT.

In the absence of clear understanding of the requirements, the amount of Rs. 138 crore spent on the project has not resulted in any tangible benefit to the customer as the end result is uncertain.

Recommendation No. 3.1

(i)	***Series production should be taken up only after prototypes are approved /certified and accepted by the customer.***
(ii)	***Modifications desired by the customer should be with reference to a time frame and technical competency of the Company.***
(iii)	***The capacity should be ramped up as to peak up production as planned.***
(iv)	***Dependable alternative sources for machining operations should be explored.***
(v)	***Clarity of all customer requirements should be ensured before placement of development order on foreign source to avoid delay and additional cost.***
(vi)	***The Company should quicken the process of submitting the documents and obtain the certifications early.***
(vii)	***MoD needs to review the whole process of weaponisation in the Navy duly considering the progress made by the Company till date as huge public money has already been spent on this project.***

3.7.2 Labour utilisation

The labour hours booking is done manually through job cards although ERP system has been implemented in the Helicopter division. GHT consultant recommended (1997) labour hours for manufacture of different versions of helicopter which were revised by a MoD nominated Committee (July 2003). The actual hours booked *vis-à-vis* the norms were as under:

Labour hours prescribed by the consultant	Labour hours fixed by the committee	Average hours booked by the Helicopter division
(a) 38,500 for the 1st ALH (b) 30,000 from 50th ALH	(a) Skid version- 99,500 (b) Wheeled version-1,11,500	LSP* version[15] -88,768 SP** version –58,367

***LSP-Limited Series Production; **SP-Series Production**

The Company was, thus, not able to achieve the consultant prescribed hours till date. Despite delivery of 90 ALH upto 2008-09, the Company has not gained the experience and benefit of learning curve to achieve reduction in labour hours/cost.

The Management stated (December 2009) that experience has been gained now which will benefit for 159 ALH orders and future contracts. Optimisation of labour hours will be realised in next two years.

In the light of average hours booked, the labour hour requirement needs to be reviewed *denovo*. Further, efficiency of labour can be better monitored through ERP system.

3.7.3 Pricing and profitability analysis of ALH

Pricing of ALH is based on recommendations (July 2003) of the Price Negotiation Committee (PNC)[16] meeting held by the Company with IAF, Army, Navy and Coast Guard. The contract is finalised based on mutually agreed terms in the PNC. Pricing for

[15] ***the Company has not compiled separately the hours booked for Skid and Wheeled version under LSP and SP.***

[16] ***PNC comprises of Company, customer and representative of MOD.***

the civil customers is based on the market conditions. A detailed statement showing sale value, cost of sales and profit for the last five years from 2004-05 to 2008-09 is enclosed in the ***Annexure VIII***.

The Audit analysis indicated that there was low margin/loss during 2007-08 and 2008-09 though there was savings in the material cost; it was offset by the increase in labour cost, reducing the profit margin. Further, the Company could not get any margin on sale to non defence customers.

The Management attributed the labour cost increase to wage revision from 1 January 2007.

3.7.4 Quality Issues

Through out the development and supply of ALH large number of quality issues like Tail Rotor blade (TRB) de-lamination, Main Rotor blade (MRB) de-lamination, frequent failure of Integrated Dynamic System (IDS), poor performance of TM 333 2B2 Engine and failure of Line replaceable Units (LRUs) were encountered and the ALH had been withdrawn for repair/modifications. For its delay in addressing the TRB issues the Company had to forego expected revenue of Rs. 16.32 crore on the lease of two helicopters to Israel and the Government of Karnataka which were not used. The Company had so far (December 2009) spent Rs. 44.08 crore to address these quality problems.

The Management accepted (December 2009) audit findings on the failure of engines as factual while for the LRUs it was stated that modifications/improvements have been implemented by respective vendors on all LRUs.

The Company should investigate into the reasons for high failures of the engines as it had to withdraw them before the original equipment supplier suggested time between overhaul of 2,000 hours.

Recommendation No. 3.2

As the Company has entered the highly competitive civilian/ export markets the design/quality issues need to be resolved early to gain the confidence of the customers to remain in the market.

3.7.5 Marketing of ALH

3.7.5.1 International Certification Process

To establish the Company as a legitimate manufacturer of aircraft for worldwide consumption, the manufacturing facilities and procedures need to be certified by international agencies. Over three fourths of all operators and almost one half of non-US operators demand Federal Aviation Administration (FAA) certification.

GHT, the consultant in its report (June 1997) opined that the lead time for certification was around three to five years. The consultant had also suggested that since the Company was not recognised as an established helicopter manufacturer, a Joint Venture alignment with a strong reputable international manufacturer to provide improved product credibility is necessary.

Board had sanctioned Rs. 28 crore in January 2009 to comply with various certification processes. The Company initiated action in February 2009 towards European Aviation Safety Agency (EASA) certification by incurring a sum of Rs. 4.26 crore. The target date of certification of the project is March 2012. Due to non availability of EASA, the Company could not get the orders from Turkey for two ALH on lease though the Memorandum of Understanding (MOU) was signed in October 2008. No action has been initiated by the Company regarding Joint Venture arrangement as suggested by the consultant (December 2009).

Even though, the Company delivered the first ALH in 2001-02 and has been showcasing them in the Air shows since 2003 (total cost on air shows- Rs. 59 crore till March 2009), in the absence of international certificates, the Company could not penetrate the international market.

3.7.5.2 Penetration into civil/non-defence market

Despite getting type certification of DGCA in October 2003 for the civil variant of ALH, the Company could sell only 16 ALH in the domestic civil market and with orders for another 6 on hand towards civil/export order. The recommendation of the consultant 'for an aggressive programme to develop not only domestic but also opportunities beyond India' has not been taken seriously by the Company despite the ALH project equipped with a dedicated Marketing wing. A separate marketing budget and specific targets for the marketing wing on commercial market penetration are needed to effectively penetrate the domestic market. The Company could not successfully execute even the orders received from civil market as indicated in the ***Annexure-IX***.

Further though the lease option of ALH was considered advantageous, the Company could not capitalise on the lease transactions it ventured with the Government of Karnataka and Israel Aircraft Industries, Israel (between November 2004 and May 2005) due to problems with Tail Rotor Blade (TRB). The inability of the Company to address the issues had dampened the confidence in the market which is evident from the fact that there is no lease agreement with the Company subsequently.

Recommendation No. 3.3

The Company should expedite efforts to get International certificate on priority to be a global player. The Company should exploit civil market by executing the orders successfully and consider options of sale technique through leasing of ALH.

3.7.6 Inventory Management and Indigenisation

3.7.6.1 Dependence on Imports

The consultant recommended for indigenisation level of fifty *per cent* of purchases of raw material and bought out items by the year 2008. However, 90 *per cent* of the value of material used in each helicopter is still imported from foreign suppliers. Even though ALH is in production for 10 years, the Company has not been able to identify alternative indigenous suppliers.

The Management stated (December 2009) that (i) after the certification process, the development of alternate sources was not feasible, but is making efforts to get best prices;

(ii) long term agreements are being entered into for new bulk orders and (iii) indigenisation would be completed and implemented by 2011-12.

3.7.6.2 Lack of proper control of inventory

Inventory control in Helicopter division was found to be lax. A task force constituted to make a comprehensive critical review of the inventory, based on an observation on the accounts of the Company for the year 2008-09 observed (September 2009) that (i) items valued at Rs. 7 crore in the shipping location (out of Rs. 11 crore analysed), though already been dispatched continued to be shown as part of the inventory, (ii) items valued at Rs. 2.0 crore (out of rejected items valued at Rs. 11 crore) were found to be shelf expired /duplicate entries and (iii) items valued at Rs. 9 crore (out of items valued at Rs. 12 crore) shown as lying with OEM though received back.

The Management assured in December 2009, that corrective action would be taken after receipt of the final report.

Recommendation No. 3.4

Concerted efforts are needed to achieve the desired (50 per cent) level of indigenisation.

3.7.7 Facility for Maintenance Repair and Overhaul

Against the approved cost of Rs. 54 crore (April 2006) for creation of Maintenance Repair and Overhaul (MRO) facility till date (December 2009) only Rs. 16 crore were spent indicating that necessary attention was not given to this issue. It was observed that there was delay in repair/overhaul of ALH ranging between 7 and 25 months. The customers have noted (June/August 2008) that poor serviceability has affected the availability of ALH for operational use. Although the products/services delivered to IAF/Army are governed by Fixed Price Quotation Policy (FPQ), the FPQ price and the cycle time for repair/overhaul are yet to be finalised. Against a claim of Rs. 103 crore (on 41 ALH), the Company had realised Rs. 64 crore only.

3.8 Conclusion

The collaboration agreement was closed/terminated prematurely. Non-freezing of design of ALH kept the development stage open. Despite getting the first prototype of ALH utility version in 1992, till date the Company did not meet the technical requirements of defence services, which changed too often impacting the development process necessitating large number of modifications. 74 helicopters supplied to defence customers are flying with concessions. Under its concept of 'concurrent technology' the Company failed to consider the infrastructure imbalances. Development of high-powered Shakti engine is delayed. Defective quality issues resulted in grounding and un-serviceability of helicopters for long period affecting the operational necessities of the customer. In the absence of international certification the Company could not establish its product in international market. The envisaged indigenisation level of 50 *per cent*, is yet to be achieved.

The matter was reported to the Ministry in February 2010; their reply was awaited (March 2010).

MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY, MINISTRY OF PETROLEUM AND NATURAL GAS, MINISTRY OF HEAVY INDUSTRIES AND PUBLIC ENTERPRISES, MINISTRY OF CHEMICALS AND FERTILIZERS, MINISTRY OF COAL AND MINISTRY OF DEFENCE

CHAPTER IV

Information Technology Audit of IT systems in selected Public Sector Undertakings

Executive Summary

Information Technology (IT) systems bring about speed and efficiency in operations, but they also have risk relating to data integrity, data security, privacy etc. The IT systems, therefore, should have adequate safeguards to minimise the exposures to various risks. During the year IT audit of 13 computerised systems including Enterprise Resource Planning (ERP) used in different areas of activity of 12 Public Sector Undertakings (PSUs) was done, out of which results of audit of seven PSUs under six Ministries have been covered in this review.

Bharat Sanchar Nigam Limited

The decision to implement an ERP solution by Company was an attempt to re-engineer its IT efforts for enhancing its operational efficiency along with quality of service. Audit noticed absence of interface with existing software packages, deficient customisation of the system to the needs of the organization, weak input controls and validation checks, and deficient monitoring of the functioning of the system. This suggests that the ERP system has not been optimally utilised.

Oil India Limited

SAP R/3 was implemented by the Company with the objective of improving efficiency and effectiveness of business processes. However, it was seen in audit that SAP R/3 was not customised completely and the business rules were mapped inadequately. The difference between the legacy data and the data uploaded into SAP is yet to be fully reconciled thereby making the SAP data unreliable. SAP R/3 was not being utilised optimally for proper allocation of cost and accounting of financial transactions.

Hindustan Paper Corporation Limited

The Corporation decided to implement Oracle e-Business suite with the objective of achieving multiple benefits. It was, however, found that there were deficiencies in mapping the business processes into the system and inappropriate customisation in areas of sale of products, realisation against sale, purchase and receipt of materials. As a result of all these deficiencies, the system could not be utilised to its full potential and the benefits as envisaged could not be achieved fully.

Rashtriya Chemicals and Fertilisers Limited

One of the main objectives of implementation of SAP was availability of data on real time basis and elimination of inter-dependence on others in faster data access and collation for reporting and time sensitive decision-making. However, this objective was not achieved as inadequate customisation and mapping of business rules led to continued dependence on manual controls and also delays in procurement process. The Management did not succeed in customising all the features into the system and non utilisation of certain important features available in SAP resulted in deficient inventory management.

Indian Oil Corporation Limited

The Company implemented SAP ERP system with a view to standardise and streamline the day-to-day operations of all the units on a common IT platform. The Company has not yet formed an IT policy for its IT environment which includes its SAP system, to direct its actions and efforts. Lacunae were also found in Network Security and Disaster Recovery setup. The Finance Module has inter-linkages with all the modules in the ERP system and consolidates all the financial information to generate the financial statements of the Company. The observations brought out in the report indicate inadequacies of various controls in the system which have implications in the financial reports generated through the system.

Neyveli Lignite Corporation Limited

Online Integrated Material Management System was implemented with the primary objective of achieving reduction in lead time, automation of demand forecasting and scientific inventory control. The Company could not utilise the application for effective inventory control. Failure to import legacy data and non updation of required parameters in the system resulted in inadequacy of Decision Support System.

BEML Limited

The Company decided to implement SAP with the objective of Companywide networking and common integrated applications across the organisation, ensuring availability of centralised MIS data which would help in decision making. System is not on-line due to delay in capturing of transactions. Failure to design the required controls in the system, inappropriate customisation, lack of validation checks and inadequate controls during data migration resulted in non-utilisation of the SAP system to its full potential and the integrity and accuracy of the data could not be ensured.

4.1 Introduction

Information Technology (IT) is a broad subject which deals with technology and other aspects of managing and processing information, especially in large organisations. Particularly, IT deals with the use of computers and computer software to convert, store, protect, process, transmit, and retrieve information. While IT systems bring about speed and efficiency in operations, they also have risk relating to data integrity, data security, privacy *etc.* The IT systems, therefore, should have adequate safeguards to minimise the exposures to various risks.

During the year IT audit of 13 computerised systems including Enterprise Resource Planning (ERP) used in different areas of activity of 12 Public Sector Undertakings

(PSUs) was done, out of which results of audit of seven PSUs under six Ministries have been covered in this review.

4.1.1 Audit objectives

The following were the broad audit objectives:

- To review controls of IT systems to gain assurance about their adequacy and effectiveness;
- To ascertain correctness of mapping of various business rules and policies;
- To evaluate performance of a system;
- To ascertain adequacy of security of the IT systems; and
- To evaluate the achievement of objectives of IT systems.

4.1.2 Audit criteria

The following constituted the audit criteria:

- Objectives set by the Company at the time of conceptualisation;
- Business rules, manuals, delegation of powers and procedures followed by the Company;
- Accounting policy adopted by the Company; and
- Control and Security parameters keeping in view the best IT practices.

4.2. Audit findings

4.2.1 Bharat Sanchar Nigam Limited

Bharat Sanchar Nigam Limited introduced SAP R/3 version 4.7 in Gujarat Telecom Circle (GTC). The SAP-ERP server is installed at ERP Data Centre at Ahmedabad and LAN (Local Area Network) / WAN (Wide Area Network) were used for connecting R/3 environment to the nodes at Secondary Switching Areas (SSAs). The work of implementation of ERP in GTC was awarded to Siemens Information Systems Limited (SISL), Mumbai at a cost of Rs. 20.14 crore. The objectives of implementation of ERP were to: (i) Improve the information flow to facilitate better decision making leading to overall improvement in the performance of the organisation by way of improvements in productivity, cycle time, financial performance and information transparency, (ii) Convert GTC into a paperless working environment and (iii) Reduce manpower requirement. However, it was observed that the desired objectives did not accrue to the Company as detailed below:

4.2.1.1 Business Process Re-engineering (BPR)

Business Process Re-engineering (BPR) is one of the fundamental steps undertaken prior to ERP implementation. While according sanction for implementation of ERP in Gujarat

Telecom Circle, BSNL Corporate Office in August 2003 had approved implementation of ERP in one SSA and implementation in entire Circle was to be done after finalizing business processes. Against the instructions of the Corporate Office, GTC went ahead with implementation of ERP in all SSAs without finalising BPR which resulted in manual intervention and deprived the Company of advantages of ERP. For instance, In the manual system, for sale of top-up and recharge coupons the Marketing wing issues delivery note to the franchisee for the quantity of top-up and recharge coupons and the Cash section receives the payments against the quantity authorised by the Marketing wing. The products are then issued by the Marketing wing after production of cash receipts. In an ERP environment all the above functions could be carried out through a single window. It was noticed that all the activities related to the sale of top-up and recharge coupons of GTC were being carried out in the traditional way despite operating in a computerised environment. The total value of sales of these coupons in the two years of 2007-08 and 2008-09 was Rs. 470.50 crore out of which 79 *per cent* amounting to Rs. 372 crore was through franchisees. On being pointed out by Audit (Aug 2009), it was replied that the issues would be taken up with the Management for implementation of single window concept.

4.2.1.2 Interface with the telephone revenue billing packages

There are two billing packages used in GTC for billing. One of the important conditions of the agreement with SISL for implementation of ERP was to provide interface with the existing billing packages. It was observed that no interface was provided with the revenue billing packages and the revenue from them are accounted in ERP through Journal Vouchers. In the absence of interface bank reconciliation of collection accounts is done manually depriving GTC of the advantages of efficient fund management.

4.2.1.3 Digitisation of service details and records

Agreement with M/s SISL stipulated that service records, personal details, watching of crucial dates in service, Career Planning, Appraisal System, Pay Roll, terminal benefits *etc* for approximately 28,000 employees were to be digitised. But it was observed that the vendor did not comply with contractual agreement with the result that service related activities like leave account of employees, pay fixation, grant of increment *etc* are done manually in the Circle defeating one of the major objectives of ERP implementation which was to reduce human intervention in various administrative works.

4.2.1.4 Declaration of 'Go Live' status even before achieving online status in various modules

As per terms of the agreement with M/s SISL, ERP was to be commissioned by March 2005. It was observed (October 2009) that 'Go live' was declared in the year 2007, even though online status was not achieved in many modules and transactions. The activities like processing of Performance Bank Guarantees, posting of leave entries, settlement of temporary advances, Leave Travel Concession (LTC) and Medical claims were processed offline. Moreover, on review of the Trial Balance and other accounting statements prepared from ERP it was noticed that in the two years after declaring 'Go Live' more than 65,000 JVs (document created in ERP for accounting transaction carried out in legacy system) were prepared during the preparation of final accounts of the Company. It is expected that there should be minimum possible manual intervention after declaring

'Go Live'. But absence of interface with other software packages and continuance of manual system contributed to the preparation of large number of JVs. On this being pointed out the Management replied that the work of creation of interface for other packages was in the pipeline.

4.2.1.5 Customisation and mapping of rules on delegation of financial powers

Customising the ERP package to the requirements of the Company and mapping the business rules of the Company completely to it was an important stage in the project implementation. As per Company's accounting policy, sanction from the appropriate level of Management is a must for incurring any expenditure. It was seen that while implementing ERP the practice of preparing estimates for maintenance work was replaced with a system of 'maintenance orders' and no monetary limit was prescribed for 'maintenance orders' in the Plant Maintenance (PM) module. A review of the expenditure in PM module for 2007-08 and 2008-09 showed that expenditures of more than Rs. One lakh in each case aggregating Rs. 44.21 crore were incurred without the cases being approved through workflow of ERP. This expenditure on maintenance should have been linked with the workflow so that a watch on such expenditure could be monitored by top level Management to ensure only expenditures of maintenance nature are processed thorough Plant Maintenance module. This led to inflated per line maintenance cost for GTC besides depriving it of the benefits of depreciation which otherwise would have accrued on the capital assets booked in PM module. On being pointed out, the Management confirming that no financial limit has been set for bookings under maintenance orders stated that though the system has facility to control maintenance expenditure errors due to non-creation or ignorance of planning wing of SSAs, the expenditure had been booked under maintenance order. It was further replied that instructions were being issued for strict compliance of orders as pointed out by Audit.

4.2.1.6 Monitoring of functioning of ERP

For efficient functioning of an IT system, it is important that the Management put in place effective monitoring mechanism which would facilitate early detection and rectification of deficiencies. Audit observed the following deficiencies due to lack of effective monitoring of the functioning of ERP:

- In Vadodara SSA it was seen that equipment costing Rs. 1.45 crore received in August 2007 was taken into stock only in Jan 2008. Though the equipment was put to use, it neither formed part of Work in Progress (WIP) nor the Fixed Assets of the SSA for the financial year 2007-08. On being pointed out by audit, it was replied that the consignment was directly received by the sub-division and only on receipt of bill for payment the omission was noticed.
- In the Company, transfer of stores between different units is frequent and processing of Advice of Transfer Debits (ATD) is an important activity in stores transactions. Test check of ATD transactions in Surat SSA revealed that an ATD for Rs. 43.6 lakh which was supported with invoices was shown in the system as Rs. 20.07 lakh.
- As per the Company policy, assets costing less than Rs. 5,000 should be depreciated fully. It was seen from the data in FICO module that in 792 cases

assets valuing less than Rs. 5,000 were not depreciated fully. On being pointed out it was replied that the matter would be taken up with ERP core team for necessary action.

4.2.1.7 Data validation

Efficient data validation procedures are important to ensure the reliability of output from the system. Audit observed the following deficiencies in the functioning of ERP due to weak validation of data.

(a) As per existing rules the minimum subscription to GPF should be six *per cent* of the pay. However, it was noticed that the system was accepting subscriptions below six *per cent* of pay also. On this being pointed out, the Management replied that validation for GPF subscription would be restored from April 2010.

(b) As per accepted accounting principles, depreciation of an asset should commence from date of its capitalisation. However, it was observed that date of capitalisation and date of commencement of depreciation were different in many cases. Moreover, life of assets was not matched properly and in many cases it was shown as 999 years.

(c) The currency of assets of Vadodara SSA in "depreciation posted" sub-module in FICO was seen as US Dollars (USD) instead of Indian Rupee (INR).

4.2.1.8 Utilisation of ERP

In order to achieve all the objectives envisaged in the implementation of ERP system it was imperative that capabilities of the system were utilised optimally by making use of all the modules. It was seen that the Material Management wing continued the traditional manual system in handling important activities like registration of purchase requisition from field units, Notice Inviting Tender (NIT), Evaluation and Finalisation of Tender, collection of Bank Guarantee and Security Deposits and processing for payment for goods delivered despite implementation of ERP. Vendor rating and vendor blacklisting which were possible with the creation of vendor master were not done through ERP. On being pointed out, the Management confirmed the facts.

4.2.1.9 User account management

Review of the user account management of ERP revealed that multiple user accounts existed for the same officer in different capacities within the same SSA or in two different SSAs and user once created was not being cancelled or deleted on transfer or retirement of the official. It was also noticed in Surat SSA that bills pertaining to Civil Division were accepted and passed by logging in as Accounts Officer, Telecom Electrical Division.

4.2.1.10 Business continuity and disaster recovery

No documented business continuity and disaster recovery plan had been formulated by GTC. Though the Company was handling sensitive information and had computerised all aspects of its business, the Company had not yet formulated IT policy including IT

security policy. Further risk assessment also had not been conducted and documented to identify threat perception and safety measures for IT Department.

4.2.1.11 Conclusion

The decision to implement an ERP solution was an attempt to reengineer its IT efforts for enhancing its operational efficiency along with quality of service. But absence of interface with existing software packages, deficient customisation of the system to the needs of the organisation, weak input controls and validation checks, and deficient monitoring of the functioning of the system, as brought out in the report suggest that the ERP system could not be optimally utilised. The flaws of the system brought out in the report, which has a bearing on the financial statements of the Company, needed urgent attention, before being rolled out further in BSNL.

4.2.2 Oil India Limited

Oil India Limited (OIL) adopted SAP R/3 (version 4.7) as its Enterprise Resource Planning (ERP) software to enable it to integrate its business processes across the value chain. The total project cost was Rs. 45.04 crore. The ERP system went live in December 2005. At the time of implementing the system, the Company had carried out a detailed cost benefit analysis incorporating all tangible benefits that would accrue by implementing SAP R/3 and projected a benefit of Rs. 14.67 crore per annum. The benefit, inter alia, was expected to flow mainly from control of inventory carrying cost, overtime expenditure, fuel oil consumption, repair and maintenance cost, decrease in surface equipment shutdown time in drilling operations, transport and other contract cost, *etc.* Audit scrutiny, however, revealed that the Company could not get the above benefits entirely, due to inadequate End User Training and underutilisation of ERP as detailed below:

- There is no effective Information Security policy in the Company.

- Corporate Financial Management (CFM) module is not being utilised and the server purchased for CFM is kept under shutdown. The other modules *viz.* Plant Maintenance (PM), Human Resource (HR) and Project System (PS) are also underutilised. Plant Maintenance activities are not being adequately monitored through PM module due to non updation of Maintenance history, Breakdown details, job completion status, *etc.* Manpower Planning is not being carried out in HR module. Further, HR data is not being updated regularly especially for separation cases, loan data and new recruits. Daily Progress Report (DPR) for Drilling/ workover and survey activities are not being regularly captured in the PS Module.

Audit reviewed the general performance of two modules of SAP R/3 namely Financial Accounting and Controlling (FICO) and Project System (PS) which revealed the following:

4.2.2.1 Financial Accounting and Controlling (FICO)

Financial Accounting and Controlling (FICO) module of SAP R/3 is envisaged to cater to all the accounting, financial and informational / reporting needs of the Finance and Accounts Department of the Company. However, the following deficiencies were observed in the FICO module:

a) Single invoice can be processed for payment more than once in the Cash journal. The Management agreed (August 2009) that same invoice can be processed for payment more than once in cash journal and there is scope for double payment.

b) Revenue budget has not been configured in SAP R/3 and, thus, budgetary controls on the revenue expenditure could not be exercised. The Management stated (August 2009) that Fund management module will help in exercising budgetary controls and the same has been proposed to be implemented during up-gradation of SAP R/3.

c) General Ledger Accounts, which are supposed to take automatic direct posting from other modules (such as Materials Management, Sales and Distribution *etc.*), have not been marked for such automatic posting. The Management stated (August 2009) that, to minimise manual intervention, steps are being taken to include as many accounts as possible for automatic posting.

d) SAP has not been configured for preventing the use of wrong cost centres. The Management stated (August 2009) that creating owners for cost centres/ WBS etc is difficult and cumbersome.

e) Depletion[1] calculation has not been properly mapped. In SAP R/3, depletion is being calculated on monthly basis, whereas the business process of the Company requires depletion to be calculated on quarterly basis. The Management accepted (August 2009) the issue and agreed to look into the matter for possible remedies.

f) The system of allocation of cost to oil wells has not been properly mapped in SAP R/3. So, the cost of departmental drilling manpower could not be allocated correctly to oil wells as the allocation cycle could not differentiate between departmentally operated oil wells and contractually operated oil wells. The wrong allocation of costs is adversely affecting the well costs and leading to generation of wrong Management Information System Reports. The Management accepted (August 2009) the issue and agreed to look into the matter.

g) In cash contra account the original document number is not properly linked with the assignment field of the document being generated at the time of cash disbursement. Due to such improper configuration of SAP R/3, cash contra entries could not be reconciled automatically. The Management stated (October 2009) that they would look into the feasibility of modifying business process so as to channelise the cash contra accounts.

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[1] ***Depletion is a method of recording the gradual expense or use of natural resources over time. Thus, depletion is analogous to ordinary depreciation.***

h) SAP R/3 has not been configured to generate Cash flow Statement, Segment Reporting, *etc.* The Management stated (October 2009) that for generating Segment reporting from SAP, will require certain change in Profit Centres. The same has been planned for during the upgrade of SAP R/3.

i) Materials, which have already been consumed, are not being booked into SAP R/3 and are reflected in the inventory. The actual status of consumption of material(s), worth Rs. 91.65 crore (as on 31 March 2009), at various storage locations could not be ascertained. According to the Management (August 2009), this issue is related to lack of user discipline and has been taken up by the Management with utmost priority.

j) Statistical Key Figures (SKFs) are not being updated by the respective departments. So, SAP R/3 could not automatically determine the Statistical Key Figures (SKFs) for allocating the indirect costs. According to the Management, the ignorance of respective users in updating the SKFs is the reason for above anomaly. The Management stated (October 2009) that users would be re-educated.

k) The records of physical verification of assets are not being updated regularly in SAP R/3 and the physical existence of assets, valued at Rs. 116.24 crore, could not be confirmed. The Management could not monitor the physical existence of assets of the Company through SAP R/3. According to the Management this is an uploading issue and the same would be addressed.

l) Input controls are not sufficient to prevent the payments of regular nature being made under the facility of 'one time vendor' payments. Using the 'One Time Vendor' facility for making payments of regular nature increases the risk of payment frauds. The Management stated (October 2009) that this issue would be flagged to concerned authorities so as to minimise one time vendor facility.

4.2.2.2 Migration of data from legacy system

The data uploading into SAP R/3 was done without proper reconciliation and cleaning. There was around Rs. 247 crore difference between legacy data and the data migrated to SAP R/3. This fact was noticed by SAP itself, in course of Quality Review Program after post Go Live Phase. The Management was requested to provide detailed Action Taken Report for the reconciliation done, but no such report was produced to Audit. The Management stated (October 2009) that the issue would be looked into.

4.2.2.3 Project System

Project System (PS) module of SAP R/3 ERP system provides the framework for mapping and processing of project tasks, planning, execution and monitoring of projects in a targeted and cost-effective way. PS is linked to the SAP R/3 Financial Accounting, Sales and Distribution, Materials Management, Production Planning, and Plant Maintenance modules. The following issues were noticed during the course of audit of Project System module of SAP R/3:-

a) Budgetary checks are not operating at the time of raising Purchase Requisitions (PR) for contractual services. Audit noticed that Purchase Orders, valuing

Rs. 12.30 crore were raised against PRs without reflecting commitment value, during the period from 2006 to 2009.

b) Contract Work Order (CWO) can be created in SAP R/3 with 'unknown' account assignment bypassing budgetary controls. Audit noticed that sixty seven (67) work orders valuing Rs. 11.09 crore were issued with unknown account assignment during the period from 6 December 2005 to 30 April 2009.

c) Cost planning of the Work Break-Down Structures (WBS[2]), except the material cost, through network is not being done. Hence, the actual versus plan cost against WBS does not reflect the correct scenario.

The Management accepted (August 2009) the above three issues and agreed to resolve them.

a) Though networks are configured in the project system module for time line monitoring, confirmation of the activities is not being updated into SAP R/3 and, thus, scheduling of project(s) could not be done through SAP R/3. The Management stated (August 2009) that departments would be further trained to utilise the functionality during up gradation of SAP R/3 to get better results.

b) When a project is completed, commissioned and capitalised the status of Work Break-Down Structure (WBS) should be set as 'closed' to avoid raising of Purchase Requisitions (PRs) against such completed and commissioned projects. The input controls were inadequate and could not prevent the raising of Purchase Requisitions (PRs) against completed and commissioned projects. The Management stated (October 2009) that the business process for this already existed and the issue would be taken up with respective Business Process Committee to streamline the system usage.

c) Audit noticed that the break-up of the revised cost estimate was not uploaded in SAP R/3, still, the supplementary budget requests were approved. Similarly, the replacement budget was approved without uploading the asset(s) to be replaced. The Management stated (October 2009) that the anomaly would be looked into and suitable configuration would be done in the system to avoid such recurrence.

4.2.2.4 Conclusion

SAP R/3 was implemented by the Company with the objective of improving efficiency and effectiveness of all business processes. However, it was seen in audit that SAP R/3 was not customised completely and the business rules were mapped inadequately. SAP R/3 did not have adequate data input controls and validation checks. Further, deficient internal control procedure failed to ensure accurate and timely capture of data. The difference between the legacy data and the data uploaded into SAP is yet to be fully reconciled thereby making the SAP data unreliable. SAP R/3 was not being utilised optimally for proper allocation of cost and proper accounting of financial transactions. Moreover, resource planning and scheduling of projects was not being done through SAP R/3 resulting in time and cost overrun in capital intensive projects. Thus, inadequate controls and under-utilisation of SAP R/3 undermined its effectiveness and efficiency.

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[2] ***A work breakdown structure (WBS) in project system module is a tool used to define and group a project's discrete work elements (or tasks) for detailed cost estimation and control.***

4.2.3 Hindustan Paper Corporation Limited

Hindustan Paper Corporation Limited (Company) was using Integrated Business Information System (IBIS) for invoicing, sales and purchase accounting purposes. In 2003, the Company decided to implement the ERP solution for its various activities and accordingly, Oracle e-Business Suite, an ERP solution by Oracle Corporation, was selected through a global tendering process. Tata Consultancy Services Limited was the implementation partner and WIPRO was the vendor for supply of the production server. The ERP system, installed in Nagaon Paper Mill (NPM), Assam of the Company, was made operational in April 2006 at the cost of Rs. 7.70 crore. As per Memorandum of Understanding (MOU) (2002-03) with the Government of India, implementation of ERP was to be completed by March 2003. However, it was noticed that the order for implementation was issued only in January 2005 and the ERP system went live in April 2006, with a delay of three years. The delay was primarily due to procedural delays attributable to the Management.

4.2.3.1 Anticipated benefits of ERP

The anticipated financial benefits of implementing ERP worked out to Rs. 13.07 crore over five years period mainly by way of savings in inventory carrying cost through reduction of procurement cycle. Intangible benefits such as accuracy of payment against material receipt, online availability of cost sheet integrated with production/ sales data, accurate information of real-time customer balance helping faster and error-free invoice-processing and dispatch operations were also expected. The following tangible benefits as envisaged could not be achieved:

a) Against anticipated reduction of average procurement cycle time from 18 weeks (2003) to 10.8 weeks, actual average procurement cycle time for the period 2006-09 was found to be more than 28 weeks.

b) 20 *per cent* reduction in inventory holding was also envisaged during post implementation period. This could not be achieved as with similar levels of turnover, the inventory levels remained almost same during 2006-2009.

The Management stated (September 2009) that in the current year the procurement cycle time has improved to 22 weeks and the value of inventory is gradually decreasing. However, the envisaged limits were yet to be achieved.

4.2.3.2 General controls

Following deficiencies in general controls were noticed:

- There was no documented 'Information Technology Policy'.

- Some of the security parameters as recommended by ORACLE were not configured but retained as default values. The Management stated (September 2009) that these discrepancies would be taken care of during finalisation of the IT Policy of the Company.

- The user management was deficient which exposed the system to the risk of unauthorised use and loss of audit trail and difficulty in tracing the identity of the

unsuccessful login. The Management stated (September 2009) that the issues would be reviewed and monitored regularly in future.

4.2.3.3 Input control and validation checks

The following deficiencies were noticed in this regard:

- Changes in price of finished products were not immediately uploaded in the system. Consequently, sale of products in the intervening period was made at old rates necessitating manual corrections by way of raising debit/credit notes. Analysis revealed that on 81 occasions, the delay in changing price list ranged between 1 to 48 days. This increased the risk of errors and omission. The Management accepted the delay and attributed (September 2009) the same to lack of training and delay in finalisation of price lists.

- 215 codes had been allotted to 78 customers indicating that customers were allocated more than one code and the customer names were almost similar but their Customer ids were different and goods were sold to the same customers under different customer IDs. The existence of duplicate customer IDs may lead to the risk of extending additional credit facilities to a single customer. The Management stated (September 2009) that separate IDs were allotted to the same customer based on category like third party, stockist etc and operation at multi-locations. The reply of the Management is not acceptable since duplicate customer IDs were allotted to the same customers belonging to the same category and located at the same addresses.

- Analysis revealed that 1,090 inventory items were allotted more than one code and separate stocks exist for 51 duplicate items. In case of 223 items, material descriptions were not available in the system. The Management stated (September 2009) that these were under review.

- Though the quantity ordered for 3,663 items against 488 purchase orders had been fully delivered, the purchase orders remained open. The Management stated (September 2009) that the Purchase Orders would be reviewed regularly and necessary action to close the Purchase Orders would be taken.

4.2.3.4 Business Process Mapping

Due to improper mapping of business rules the manual intervention was required which resulted in non achievement of the intangible benefits as envisaged. In this regard the following was observed:

- Sale of finished product can be made either on credit or against cash/advance payment. For cash payments, the customer is entitled to get a cash discount based on the payment terms. In this connection, it is observed that for cash sale, payment received from the customers is to be attached to the delivery orders generated. It was, however, noticed that system permitted generation of delivery orders without entering such payment details. Hence, there is a risk of delivery of finished goods without payments and since cash discount is automatically calculated in the

system, there is a risk of incorrect billing also. The Management stated (September 2009) that the Company would devise suitable preventive controls.

- The system accepted the entry of same cheque/DD numbers against different sales invoices. This may lead to the risk of incorrect adjustment of credits against the sales, which necessitated further supervisory controls. The Management accepted (September 2009) the deficiencies in this regard.

- In the case of credit sale, deliveries were made against receipt of post-dated cheques. It was, however, observed that system has not been customised to accept post-dated cheques against credit sales which resulted in monitoring of such sales through manual registers. The Management stated (September 2009) that it was being planned to address the issue.

- There is no provision in the system to levy penalty for quality and quantity shortage and to calculate the Liquidated Damages for delay in supply of materials though details relating to quality were available in the system. These were calculated and fed in the system manually thereby increasing the risk of inaccurate calculation besides underutilizing the system. The Management accepted the facts (September 2009) and stated that necessary provisions would be incorporated in the system.

- In case of rejection of goods by the customer, neither the returned items could be taken in the stock nor could the accounting entry be passed immediately leading to overstatement of sales and sundry debtors. This indicated that the system is deficient in accounting the material return against direct sale. The Management stated (September 2009) that the adjustments were effected in the system finally after entry was passed in the books of depot and the fate of persuasion to accept the rejected materials was decided.

- Reports like Monthly Segment Report, Monthly Stockist Off Take Report *etc.*, required for MIS purpose continued to be maintained separately for want of customisation of the same in the system. The Management stated (September 2009) that based on the users' requirement many reports were under customisation.

The above indicates that the user requirements have not been assessed properly before customisation of the system.

4.2.3.5 Conclusion

The Company decided to implement Oracle e-Business Suite with the objective of achieving multiple benefits. It was, however, found that there were deficiencies in mapping the business processes into the system and inappropriate customisation in areas of sale of products, realisation against sale, purchase and receipt of materials. Input controls and validation checks were also weak. This resulted in manual intervention at each stage which rendered the system vulnerable to the risk of incorrect generation of data. Further, deficient logical access controls made the system vulnerable to

unauthorised access. As a result of all these deficiencies, the system could not be utilised to its full potential and the benefits as envisaged could not be achieved fully.

4.2.4 Rashtriya Chemicals and Fertilizers Limited

Rashtriya Chemicals and Fertilizers Limited (Company) issued (November 2004) a work order for implementation of mySAP ERP with SAP R/3 Enterprise Version 4.7 on turnkey basis to Siemens Information Systems Limited, Mumbai at a lump sum price of Rs. 3.47 crore. This included Rs. 1.72 crore towards 250 user licences of mySAP ERP and Rs. 1.75 crore towards design, configuration, installation and implementation of selected core modules. The Company incurred an expenditure of Rs. 1.67 crore for procurement of hardware. The project went "Go live" on 1 January 2006. The benefit envisaged by the Company were (i) Elimination of inherent limitations of the legacy system, (ii) Availability of data on real time basis (iii) Integration across units and elimination of duplication of work and records, (iv) Ensuring faster accounts closing and declaration of financial results with reduced efforts, (v) Expected reduction in manpower requirement and (vi) Steps towards a paperless environment. Audit scrutiny, however, revealed that these benefits could not be achieved fully due to inadequate customisation and mapping of business rules and non utilisation of certain important features available in SAP which led to continued dependence on manual controls.

Audit assessed the implementation and usage of the Material Management Module controls and the security of the system which revealed the following deficiencies:

4.2.4.1 Business Process Mapping

Implementation of an ERP solution across the Company is to ensure integration of various business processes as far as possible. However, following deficiencies in mapping of business rules were noticed:

(i) Logically, "Purchase Requisition" date should precede "Purchase Order" date. It was observed that in 51 cases the "Purchase Requisition" dates were after "Purchase Order" dates.

(ii) There was no online system of creation, approval and release of both Purchase Requisitions and Purchase Orders. In case of raw materials the system was not configured for release of Purchase Requisitions. The system followed by the Company was to obtain approval on the file manually and input the data into the system later.

(iii) Purchase Requisitions were created and released in the system for procurement action. It was observed that in respect of 4,464 cases even though quotations were invited, no further action was taken. Similarly, in 4,113 cases, no procurement action was taken. There was also no provision in the system to capture the reasons for pending "Purchase Requisitions".

(iv) As per the delegation of powers, Deputy General Manager has powers to release Purchase Orders upto Rs. 5 lakh only. The powers to be exercised by General Manager and above were exercised by Deputy General Managers and officers

below the rank of Deputy General Managers which indicated absence of participation and commitment.

(v) In respect of 146 cases, Purchase Orders released during the period from 1 April 2006 to 31 March 2008, valuing Rs. 5.13 crore where delivery was completed and in 1,342 cases valuing Rs. 1,390.68 crore where partial delivery was completed, the Purchase Orders were still open (August 2009).

The Company accepted the audit findings and stated (September 2009) that the cases would be reviewed and closed wherever necessary.

(vi) There was no provision in the system to generate MIS Reports of pending Purchase Requisitions. The system was also not configured to indicate reasons for delay.

(vii) In 7,974 cases, valuing Rs. 51.57 crore, the time gap for converting Purchase Requisitions to Purchase Orders ranged from 90 days to more than 540 days. The Company had not fixed any time schedule for issue of Purchase Orders from the date of release of Purchase Requisitions in the system. The Company stated (September 2009) that efforts would be made to reduce lead time for converting Purchase Requisitions into Purchase Orders and in case of abnormal delays reasons for the same would be indicated in the system.

(viii) In 22,051 cases the Purchase Orders were issued on the same day or after the "expected delivery date" specified by the requisitioner.

The Management accepted the facts and stated (September 2009) that these features would be studied and wherever possible would be incorporated at the time of upgradation of SAP.

4.2.4.2 Non-utilisation of SAP

The data relating to availability and consumption pattern of materials available in the SAP system was not utilised for decision-making as detailed below:

(i) The Company after implementation of SAP procured materials worth Rs. 1.23 crore between 1 April 2006 and 31 March 2009 in spite of non-moving stock of the same materials worth Rs. 0.91 crore as on 1 April 2006.

(ii) After implementation of ERP, there should have been reduction in the inventory holding. It was, however, observed that the inventory of non-insurance domestic and imported spares increased by Rs. 18.42 crore from Rs. 129.94 crore as on 1 April 2006 to Rs. 148.36 crore as on 31 March 2009. The inventory as on 31 March 2009 included unmoved items worth Rs. 68.25 crore (46 *per cent*) during the period from 1 April 2006 to 31 March 2009.

(iii) Material Requirement Planning (MRP) facility to monitor and maintain minimum and reorder stock levels for critical materials has not been utilised.

(iv) The SAP system has provision for capturing data relating to delivery schedule of materials ordered and levy liquidated damages wherever necessary. However, the

enforcement of liquidated damages clause as per agreement in respect of late/undelivered Purchase Orders was not built into the system. During the year 2008-09, the Company recovered liquidated damages amounting to Rs. 2.12 crore based on manual calculation.

(v) There were 2,075 cases (Rs. 2,240.51 crore) of partly delivered Purchase Orders issued upto 31 March 2009 for which reminders were not generated through the system and were issued manually despite reminder feature available in SAP.

(vi) The vendor-wise and material-wise lead-time details were not captured in the system. In the absence of which the delays in delivery of materials could not be monitored through the system.

(vii) There was no provision to capture and track shelf life and the expiry date of the inventory. In the absence of such provision, the system could not prompt the users for impending obsolescence and the risk of belated decisions for procurement, replacement and disposal of obsolete inventory continued.

(viii) The system was not configured to capture inventory of repaired/repairable items and the spares used for their repair/overhauling. Due to non-maintenance of these details, inventory control could not be exercised over such items besides analysis of frequency of repair and economies of repairs over new purchases was not possible.

(ix) The provision to capture information relating to warranty/guarantee terms of the materials procured was not available in the system. Absence of this provision posed the risk of failure to use/test the usability of the equipment within the warranty/guarantee periods and to invoke the same wherever the situation warranted.

The Company stated (September 2009) that the cases required further study after which a report would be submitted and it has planned for comprehensive study of inventory during 2009-10.

4.2.4.3 Security controls

Following weaknesses and deficiencies were observed in the security controls:

- Ten user identities and related passwords with different roles remained unused from the date of creation and were not deactivated / locked.

- It was observed that Purchase Requisition and Purchase Order creation and release were being performed in the system by the same employee resulting in conflict of roles, which indicated weak internal control.

- A review of the users indicated that the users were not employee specific but based on the functions by the employees within a department/section of the Company. Therefore, more than one employee could log in with the same user identity and as such fixing of individual responsibility for commission/omission was not possible.

It was noticed that 385 users had not changed their passwords for the last one-year as on 24 August 2009. In the interest of better security management, Company should have a policy for password management.

The Company stated (August 2009) that all issues relating to effective management of data integrity, information security risks and vulnerability would be appropriately addressed and properly resolved after implementation of Information Security Management System (ISMS) by December 2009.

4.2.4.4 Conclusion

One of the main objectives of implementation of SAP was availability of data on real time basis and elimination of inter-dependence on others in faster data access and collation for reporting and time sensitive decision-making. However, this objective was not achieved as inadequate customisation and mapping of business rules led to continued dependence on manual controls and also delays in procurement process. Basic functions of Material Management module were to maintain details regarding Materials and Vendors/Suppliers and to aid the Company in monitoring the material planning, material procurement, inventory management and valuation thereon. Deficiencies in the input controls and validation checks were noticed in the system. Such deficiencies ran the risk of making the data incomplete and unreliable. It was also seen that the Management had not succeeded in customising all the features in the system. Non utilisation of certain important features available in SAP resulted in deficient inventory management.

4.2.5 Indian Oil Corporation Limited

Indian Oil Corporation Limited undertook an IT re-engineering project named 'Manthan' in 1997 and selected SAP R/3, ERP package with IS-OIL (specific ERP solution that caters to the needs of SAP R/3 users amongst the oil industry). The project was implemented in April 2004. The Company has around 10,000 users and 700 sites spread across the country working on SAP. Users from distant parts of the country are able to access and make transactions in SAP on a real-time basis.

The Company has kept its Database and Application servers at the corporate data centre, Gurgaon and they are accessible through leased line and / or VSAT[3] from all State Offices, Refineries and Pipeline Unit Networks. Other units such as Terminals, Depots and Bottling Plants *etc.*, are connected to SAP through the nearest State Office / Refinery. Along with the e-security audit of the system the finance module of SAP was also selected for audit.

4.2.5.1 e-security

The IT security review broadly covered the IT security environment in the Company and Roles and Authorisation in SAP system to conform to the Company's requirements. It was observed that the IT environment of the Company was not adequately secured as detailed below:

- A Corporate IT Security Policy defining logical access and physical access controls was yet to be framed. The Management in its reply stated (September

[3] ***Very Small Aperture Terminal and is used for network connectivity.***

2009) that an Integrated IT policy for the Company, covering IT Security Policies and Procedures was being finalised.

- Rationalisation of Users' roles and authorisation and segregation of duties was deficient. It was noticed that 29 combinations of two or more conflicting critical transaction codes involving processing sale orders / invoices / deliveries, payments, creation, settlement, change, deletion *etc* were extended to many users ranging from 18 to 4,808. The Management in its reply stated (September 2009) that roles and authorisation have to be attached to a number of employees to fulfil and meet our minimum operation, supply and distribution and logistic requirements. However, the Management did not assess the risk involved while extending a critical combination of authorisations to various users in the system.

- 88 users other than the BASIS team[4] was given access to the sensitive Transaction Codes[5].

- There was laxity in the password policy of the Company which allowed simple, trivial and non-alphanumeric passwords to be entered which made the system vulnerable to security threats internally. The Management stated (September 2009) that considering the size and level of the user base and optimal operational convenience, security measures were being implemented in a phased manner.

- The user's profile was not properly defined to which the Management replied (September 2009) that updating user groups and other details was a continuous process and concerned groups were taking action from time to time.

- Out of 13,451 user IDs, 955 user IDs were common *i.e.* used by more than one user. The Management in its reply stated (September 2009) that common users had display authorisation only for reporting purposes. The Management's reply is not factually correct as on verification it was found that Common User IDs were still carrying create / change / cancel / delete authorisations.

- In the absence of corporate IT policy, different virus, malware, spyware protection softwares being used at different offices and sites. Further, internet content could not be filtered through a uniform firewall policy. At Company's Information Hub, it was observed that (a) although a fire wall was in place at the premises, the firewall rules to censor the web content and monitoring were yet to be framed and (b) the firewall in place was not enough to maintain a log of instances of attempts and instances of actual breach into the Company's Network / firewall internally or externally. The Management accepted the observation (September 2009) and informed that they were trying to ensure Network Security through a policy which was being finalised.

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[4] ***User Administrator Group in a SAP environment.***
[5] ***A command in the system to carry out a transaction.***

- There are two Disaster Recovery Sites: one at Gurgaon, which is the Near Recovery Site (NRS) and second is the Disaster Recovery Centre (DRC) at Sanganer, Jaipur. It was observed that the Company was only carrying out a communication drill to check the functionality of the DRC and no operational drill was carried out to ensure restarting of complete and accurate operations in the event of an incident. The Management stated (September 2009) that the DRC at Jaipur was used for reporting purposes daily. Incidentally, the DRC was completely damaged (October 2009) during a fire at Sanganer Oil Terminal, Jaipur and became non-operational and the Company is using the NRS at Gurgaon for its backup requirement. The Management has not yet decided on a new DRC. The Management stated (February 2010) that it has planned to put in place a new remote DRC by March 2012.

4.2.5.2 Finance module

Finance Module (FI) is designed for management of the processes involved in preparation of the accounts. The FI Module has inter-linkages with all the modules in the ERP system and consolidates all the financial information to generate the financial statement of the Company. The IT audit has been conducted keeping in view the importance and criticality of the efficacy of FI module in the preparation and generation of the accounts of the Company. The following deficiencies were observed in the finance module due to which the reports generated from the system could not be relied upon:

- The date of commencement of depreciation was 3 to 14 months prior to the date of capitalisation in respect of 15,805 assets and it was 1 to 15 months after the date of capitalisation in respect of 4,391 assets.

- Depreciation rates as per Schedule XIV of the Companies Act were not adopted in respect of 2,550 assets.

- The quantity was indicated as zero in 27,011 assets worth Rs. 652 crore and, thus, the correctness of depreciation provided could not be ensured.

- Analysis of purchase orders/Work orders released through the system showed that in respect of service contracts, POs/WOs were created (19,406 in 2007-08 and 12,705 in 2008-09) in the system only at the time or after the receipt of goods/invoices for the services rendered (details given to the Company).

- GR/IR is an intermediary account used for payments against goods received. Analysis showed that more than three lakh entries amounting to Rs. 2091.12 crore were pending clearance ranging from one to four years indicating lack of proper monitoring by the Company.

- It was observed that, though the stock balances are maintained in the system the valuation of stocks is done outside the system which defeated the purpose of the ERP system.

- The Company decides and assigns credit limits to various categories of customers which are accordingly entered into the system. Analysis of data on credit limit

extended to customers showed that, there were inadequate validation checks with the credit limits maintained in the system that resulted in overdue amount of Rs. 294.89 crore in respect of 293 customers who had exceeded their credit limit.

- Each customer is allotted a unique code. However, there was more than one customer code assigned to the same customer in 1,552 cases in the customer master.

The Management accepted the observations made by audit and stated that the rectification process had been initiated.

4.2.5.3 Conclusion

The Company implemented SAP ERP system with the view to standardise and streamline the day-to-day operations of all the units on a common IT platform. For this objective to be fulfilled it is imperative that the confidentiality, availability and integrity of business information is beyond doubt. Information of such a nature can only be secured through a secure and impenetrable IT environment. The Company has not yet formed an IT policy for its IT environment which includes its SAP system, to direct its actions and efforts. Different security measures were in place at different offices of the Company signifying inconsistency. Lacunas were also found in Network Security and Disaster Recovery set-up. The FI module was implemented to consolidate and generate the financial statements of the Company and also to generate various MIS reports to facilitate decision-making. The observations brought out in the report indicate inadequacies of various controls in the system which have implications in the financial reports generated through the system.

4.2.6 Neyveli Lignite Corporation Limited

Neyveli Lignite Corporation Limited has an integrated power generating facility consisting of lignite mines and Thermal Power Stations. The Material Management (MM) Department of the Company centrally controls the inventory management of the Company catering to the needs of all units through sub stores attached to the respective units. The Company was using a COBOL based batch processing system for its inventory management. In March 2002, the Company placed an order on the Indian Institute of Technology (IIT), Kharagpur for development and implementation of Online Integrated Material Management System (OLIMMS) at a cost of Rs. 2.05 crore with the objective of re-engineering the existing legacy system to make it more responsive to reduce ordering costs by at least 40 *per cent* and lead time by at least 50 *per cent* and automation of demand forecasting and scientific inventory control for all items including slow moving spares *etc.* The Company implemented OLIMMS in October 2006. However, it was observed that the desired benefits were not accrued to the Company as detailed below:

- Better Inventory control could be achieved through well defined Decision Support System (DSS) comprising of Economic Ordering Quantity (EOQ), Re-order Quantity (ROQ), Re-order Level (ROL), Safety stock, Minimum Level, Maximum Level *etc.* This would require data on procurement and consumption for three to five years which could lead to reduction in ordering cost, optimal inventory holding and minimum inventory carrying cost. The Company is having a system generated DSS for economic indenting purpose. The system generates an economic quantity for each and every material based on past consumption pattern, whenever an indent is raised. However, during

implementation of OLIMMS, the Company could not import the legacy data and, hence, could not use the data available for effective inventory management as per the above said inventory levels. The Management stated (October 2009) that as other stores were not computerised at the time of introduction of OLIMMS all legacy data could not be imported for DSS purpose and after getting required data over years, the same could be utilised for effective DSS.

- The indented quantity in respect of 5,979 out of 33,787 material codes was in excess of system calculated economic quantity up to 100 times. This indicated non observance of control over the system as per the system generated economic quantity. It was further observed that though OLIMMS provided for recording the reasons thereon, in majority of the cases (4,823 cases) no reasons were found recorded. While accepting the observation, Management stated (June 2009) that providing suitable reasons would be made mandatory during restructuring of OLIMMS.
- The closing stock value of stores and spares as at the year end exhibited in the financial reports comprised of stock balance generated from OLIMMS and the value of materials lying at site as reported by respective units through the reports prepared manually. Manual intervention in this regard affected the true and fair view of financial reports. The Management agreed (October 2009) to take care of this during restructuring of OLIMMS.
- The delivery status, in respect of 498 Purchase Orders against which more than 90 per cent of the ordered quantity was received, was still indicated as partial supply instead of treating them as completed. In respect of 37 purchase orders against which the ordered quantity was received in full, the delivery status still indicated as partial supply. The Management stated (October 2009) that detailed review would be done and issue would be taken up with IIT Kharagpur for necessary action/correction.

4.2.6.1 Security controls

Following weaknesses and deficiencies were observed in the security controls:

- The MM Department did not have an approved/documented IT Security policy.
- Data analysis showed that users have been allowed to have many IDs (2 to 29 IDs). Multiple user IDs would result in weak monitoring practice.
- The Company did not have a documented/approved password policy. Data analysis showed that same password is being used by many users. For example out of 6,426 active User IDs available, 4,503 users (70 *per cent* of the users) including many senior level officers having approval authority in the work flow hierarchy, use the same password. As the Company has a customary practice of using a particular employee related information as user ID, risk of unauthorised access to the system was large, since common passwords were used and the user IDs were easily predictable.

The Management stated (October 2009) that the employees were required to be identified in more than one location and, hence, many IDs were given. The password change policy was framed and design changes were done in accordance with the framed policy.

4.2.6.2 Conclusion

OLIMMS was implemented with the primary objective of achieving reduction in lead time, automation of demand forecasting and scientific inventory control. The Company could not utilise the application for effective inventory control. Failure to import legacy data and non updation of required parameters in the system resulted in inadequate Decision Support System. The input controls were deficient and the integrity of data could not be assured due to deficiencies in access controls.

4.2.7 BEML Limited

BEML Limited was earlier using various in house developed applications for finance, planning, purchase and inventory. In order to ensure effective utilisation of the Company resources and also to ensure connectivity among various divisions, corporate office, marketing division including its regional and district offices, the Management decided (August 2004) to implement companywide Enterprise Resource Planning (ERP). The Company selected SAP-ERP (mySAP ERP) software for implementation covering basic modules. SAP system was implemented (October 2007) by Siemens Information Systems Limited (SISL) at a cost of Rs. 6.80 crore. Later, in order to strengthen the Business operations, the Company procured and implemented SAP-Supply Chain Management software through SISL at a cost of Rs. 6.00 crore. Audit scrutiny revealed that the Company could not realise the above benefits entirely, due to the following:

- SAP system allowed posting of the transactions relating to two months at any given point of time *i.e.* previous month and current month. Normally if the system was an on-line one, the data entry on the respective months would be allowed on the first of every month, so that the transactions can be captured as it happens. However, opening of the periods got delayed (up to 87 days) due to back log of data entry indicating system has not been made on line even though the system was made 'Go Live' in October 2007.

- Though SAP provided for mapping of various delegations of powers for release of purchase orders, sale orders, *etc.*, the same were not mapped into the system. The Management stated (October 2009) that the release of purchase orders through ERP would be explored.

- The Company continued uploading the materials balances even after the system went (October 2007) 'Go live' indicating incomplete migration of data into the system. As uploading of materials has one sided influence on inventories and its values in the financial accounts, these transactions should be avoided after 'Go live' of the system. The Management stated (October 2009) that these transactions were related to marketing divisions which had 'gone live' from 1 April 2008. The reply is not acceptable since these type of transactions were effected after 1 April 2008.

Audit also reviewed the general performance of two modules of SAP, *i.e.*, production planning and materials management modules, which revealed the following:

4.2.7.1 Production planning

Due to the back log of data entry the validation checks built in SAP system were not enabled and the system accepted:

- the dates of delivery of finished goods prior to the date of opening of the production orders;
- drawal of material even before opening of the respective production order and after the completion of such manufacturing activity;
- closing of production orders and delivery of goods even when there were incomplete drawal of materials required for production;
- the dates of invoice/billing prior to date of opening of respective production orders;
- issue of materials even before receipt of materials from the suppliers resulting in issue of 1,323 materials valuing Rs. 185.50 crore during March 2009; and
- 676 purchase requisitions with the requirement dates prior to the request date.

From the above, it may be observed that there were inconsistencies in the dates relating to various stages of the production orders; purchase requisition dates and drawl of materials for the production. Hence, the data relating to the production planning available in the system was not reliable and dependable. The Management stated (October 2009) that as the ERP was in the initial stage of stabilisation, all the checks could not be introduced and efforts would be made to enforce controls in the system upon stabilisation of system.

4.2.7.2 Materials management

The following discrepancies were noticed in the material management module:

- It was observed that system accounted the materials and delivered the materials without the quality inspection checks due to deficient validation checks. The Management accepted (October 2009) this deficiency and agreed to address the issue in future.
- On test check of some of the materials in the inventory, the system permitted the issue of materials by adopting other than the then existing weighted average rates. The Management stated (October 2009) that the discrepancy observed was due to considering the transaction date for calculation of moving average price instead of following the entry date. The reply is not acceptable since the system recognises the transaction date only in the financial accounts.
- The system released payment of Rs. 18.10 crore due to one vendor/supplier through another vendor indicating that the controls for effecting payments to relevant vendor through Company account were absent. Similarly, system accepted payment related to a sale of equipment from the customer other than the customer invoiced. The Management stated (October 2009), that due to tripartite agreement, payment was released to another vendor.

- In the year 2008-09, while accounting the transfer of materials valued at Rs. 4.01 crore from manufacturing divisions to marketing divisions, instead of reducing inventory account, the same has been accounted as expenditure in Profit and Loss account. The Management stated (July 2009) that corrective action would be taken during 2009-10.

4.2.7.3 Conclusion

The Company decided to implement SAP with the objective of Companywide networking and common integrated applications across the organisation, ensuring availability of centralised MIS data which would help in decision making. System is not on-line due to delay in capturing of transactions. Failure to design the required controls in the system, inappropriate customisation, lack of validation checks and inadequate controls during data migration resulted in non-utilisation of the SAP system to its full potential and the integrity and accuracy of the data could not be ensured. Thus, the attempt made by the Company to have centralised MIS data could not yield the desired results.

The matter was reported to the Ministries in February 2010; their replies were awaited (March 2010).

MINISTRY OF FINANCE

CHAPTER V

United India Insurance Company Limited, The New India Assurance Company Limited, The Oriental Insurance Company Limited and National Insurance Company Limited

Health Services Insurance

Executive Summary

Insurance industry in India registered substantial growth after enactment of Insurance Regulatory Development Authority Act in 1999. This industry today functions in a highly competitive environment. The health services insurance is provided by 15 private insurance companies and four public sector undertakings viz., National Insurance Company Limited, The New India Assurance Company Limited, Oriental Insurance Company Limited and United India Insurance Company Limited. A performance audit of health insurance services by PSUs was conducted for the three years from 2006-07 to 2008-09. The performance audit revealed that:

- Proportion of premium from health insurance doubled from less than 10 per cent in 2004-05 to around 20 per cent in 2008-09. However, market share declined from 64 per cent in 2006-07 to 57 per cent in 2008-09.
- Four PSU insurers suffered a loss of Rs. 417 crore from individual portfolio, whereas group policies had contributed a loss of Rs. 622.49 crore during the three year period from 2006-07 to 2008-09. Despite these huge losses, it was seen in 115 out of 159 cases reviewed in audit that group policies were renewed without appropriate loading in violation of the rules for renewal of such policies. Further, the group policies with high incurred claim ratio included a corporate house that is itself in the business of providing health insurance.
- The PSU insurers did not attempt to reduce their losses by reducing the cost of medical services through standardization of rates and codes for various clinical procedures despite introduction of TPA Regulations nine years ago.
- The cashless settlement has been achieved to the extent of 55 per cent only and cases of delay in issue of ID cards, and claim settlement beyond 7 working days were noticed in respect of 72 per cent of the cases. There were wide variations in the amount of claims for similar clinical procedures. The PSU insurers failed to monitor the performance parameters resulting in deficiency in services of the third

party administrators to the insured with consequent impact on customer satisfaction.

Summary of recommendations

The PSU insurers may:

(i) Create a data bank on morbidity, claims, inflationary trend and age/gender/disease wise claim analysis to initiate a system to ensure charging of prescribed premium

(ii) Increase the volume of business to achieve break-even in the health portfolio.

(iii) Take initiative to standardise the terms and conditions of mediclaim policies to achieve the goal of portability.

(iv) Review and introduce a system of payment of service fee with suitable incentive/disincentive differentiating between group and individual policies.

(v) Develop a mechanism to evaluate the performance of TPAs on issue of identity cards, settlement of claims on cashless treatment/reimbursement;

(vi) Ensure that the policy conditions are embedded in the system with provision for audit and complied with by the TPAs while settling the claims;

(vii) Strive to achieve standardisation of the hospital charges and clinical procedures through negotiation with the service providers to contain cost.

(viii) Prescribe quantum of checks to be applied by Internal Audit to reduce the risk in the context of outsourcing of settlement of claims.

5.1.1 Introduction

Health insurance is an insurance coverage purchased in advance by an individual or a group after paying a fee called '*premium*'. It is a complimentary financing mechanism for enhancing access to quality health. Health insurance is one of the products offered by the general insurance companies as well as by life insurance companies in India. Health indicators of a nation are assessed through parameters like infant mortality, maternal mortality rate, life expectancy, birth and death rate. India recorded notable achievement in all the parameters since independence. The improvement achieved by India in various parameters *vis-à-vis* other Asian countries is depicted in the **Table 5.1** below:

Table 5.1

Sl. No	Parameter	India			China	Japan	Sri Lanka
		1991	2001	2006	2006		
1	Infant mortality rate (IMR) per 1,000 live births	80.0	66.0	54.0	32.0	3.0	15.0
2	Maternal mortality ratio (MMR) per 1,00,000 live births	437	407	254	56	10	92

3	Life expectancy at birth Male	59.7	62.4	63.9	70.6	78.9	72.2
	Female	60.9	63.4	66.9	74.2	86.1	77.7
4	Birth rate per 1,000	29.50	24.80	22.10	13.25	9.37	15.50
5	Death rate per 1,000	9.80	8.90	8.18	6.97	9.16	6.52

Source: Ministry of Health and Family Welfare - Eleventh five year plan documents (2007-2012)

It can be seen from the table that despite achievements India still was far behind the other Asian countries in health.

The Eleventh Plan observed that the cost of health care services in the country was higher in the private sector in comparison with the public sector. The Planning Commission estimated that the total health expenditure in the country was Rs. 1,05,734 crore in 2001-02 which was equivalent to 4.6 *per cent* of the Gross Domestic Product (GDP), of which the public sector expenditure was only 0.94 *per cent* of GDP. The households spent Rs. 76,094 crore out of their own savings and borrowings which accounted for 72 *per cent* of the total health expenditure of Rs. 1,05,734 crore. A study group appointed by the Ministry of Health and Family Welfare suggested (August 2005) to explore a risk pooling system with a view to reduce the burden of the poor.

5.1.2 Industry profile

Health insurance in India covered around 11 *per cent* of the population (August 2005) provided through voluntary (two *per cent*) and mandatory[1] (nine *per cent*) health insurance schemes. The voluntary health insurance schemes include various medi-claim policies issued by 19 general insurance companies which include two stand alone[2] health insurance companies and four public sector undertaking (PSU) insurers *viz.*, National Insurance Company Limited (NIC), The New India Assurance Company Limited (NIA), The Oriental Insurance Company Limited (OIC) and United India Insurance Company Limited (UIIC).

Gross health insurance premium earned by these insurance companies in India during the past five years is given below in **Table 5.2**:

Table 5.2 ***(Rs. in crore)***

Company	2004-05	2005-06	2006-07	2007-08	2008-09
NIC	364.07	398.86	466.75	669.92	801.88
NIA	455.39	590.83	748.42	1139.29	1337.67
OIC	249.62	334.00	427.61	508.37	703.26
UIIC	252.08	310.73	393.62	562.43	853.20
PSU Total	**1321.16**	**1634.42**	**2036.40**	**2880.01**	**3696.01**
Private sector	NA	NA	1165.53	1855.56	2801.42
Market share -PSU	NA	NA	64	61	57
Market share-Private Sector	NA	NA	36	39	43

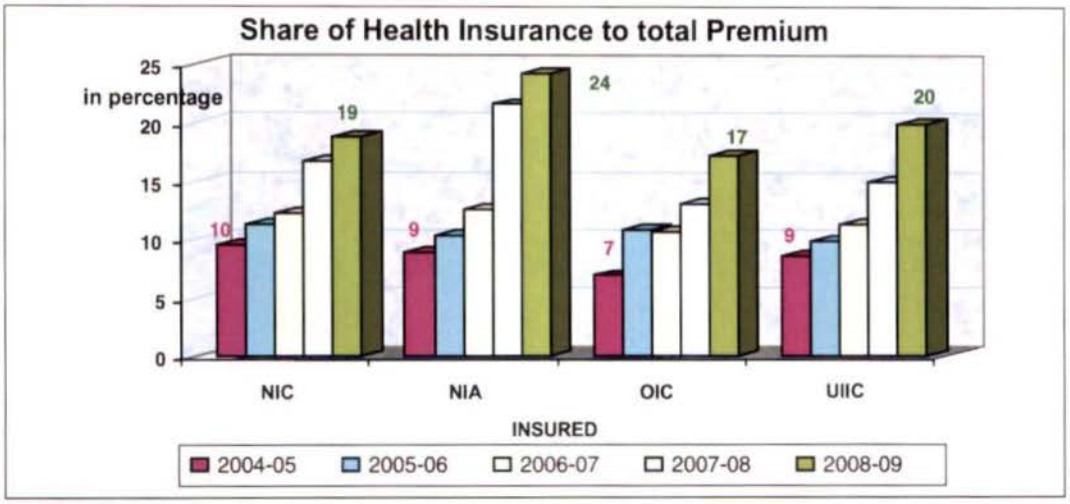
NA-Not Available

[1] ***Mandatory health insurance includes Employee State Insurance Scheme, Central Government Health Scheme, Ex-servicemen Contributory Health Scheme***

[2] ***Star Health and Allied Insurance Company Limited and Apollo DKV Insurance Company Limited, offering Health services insurance only.***

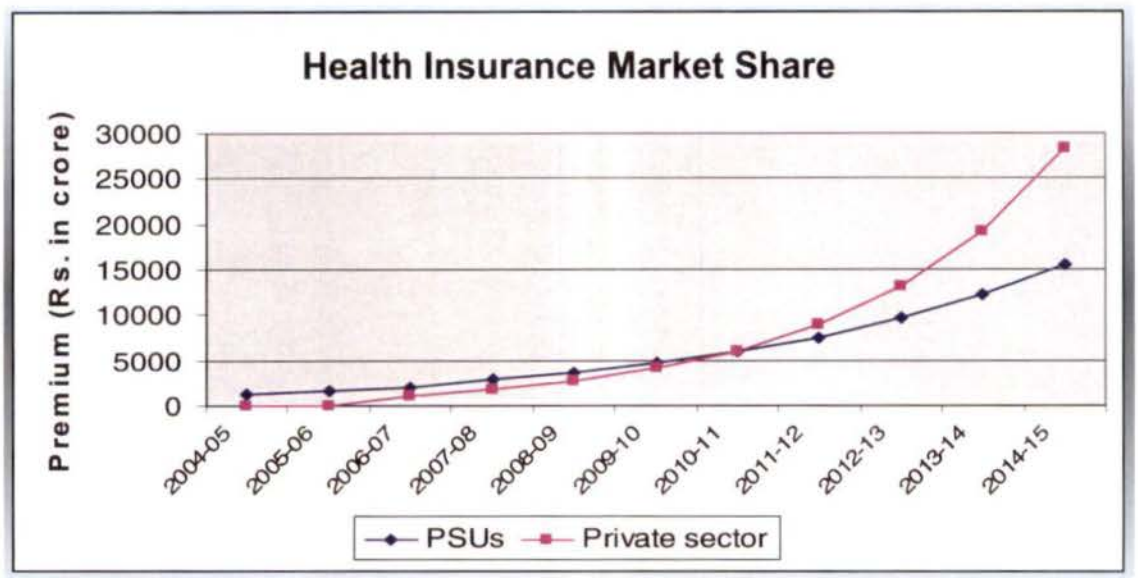
The premium earned by the PSU insurers from the health insurance ranged between 7 and 10 *per cent* in 2004-05 of the Gross Direct Premium (GDP) of the PSU insurers and increased during last five years and ranged between 17 and 24 *per cent* in 2008-09 as given in the **Chart 5.1** below:

Chart 5.1



The health insurance is the most sought after portfolio next to motor insurance. The market share of PSU insurers in health insurance decreased from 64 *per cent* in 2006-07 to 57 *per cent* in 2008-09. The average annual premium growth in private sector was 47 *per cent* as against the PSU insurers' growth rate of 27 *per cent* for the period 2006-07 to 2008-09 which indicates growing presence of private insurance in India as shown in **Chart 5.2**:

Chart 5.2



Source: ***Projections are based on present annual average premium growth rate of PSU and Private insurers***

The incurred claims[3] and incurred claim ratio (ICR) for the PSU and private insurers during 2004-05 to 2008-09 was as given in **Table 5.3**:

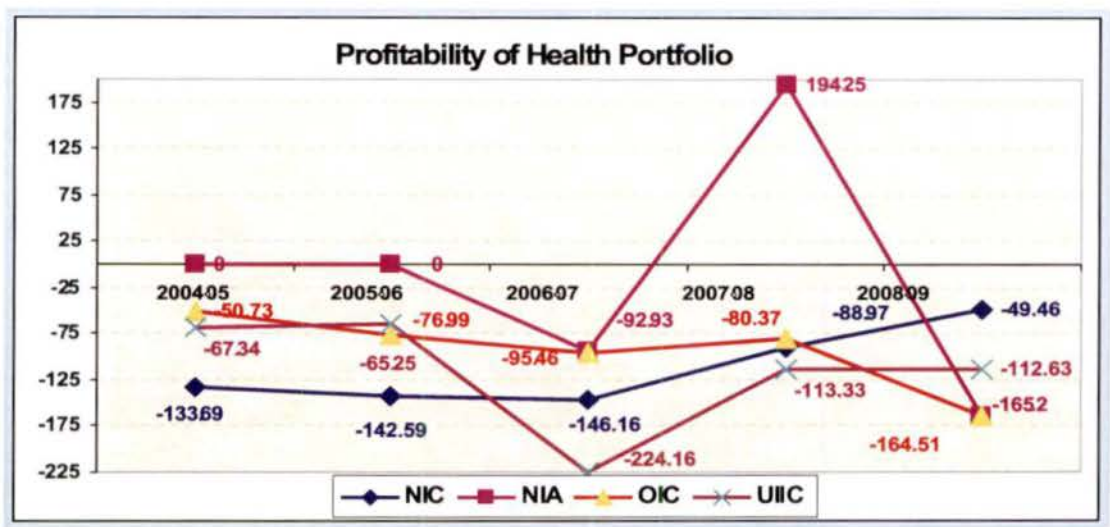
Table 5.3 *(Rs in crore)*

COMPANY	2004-05	2005-06	2006-07	2007-08	2008-09
NIC	491.54 (135.01)	513.37 (128.71)	550.57 (117.96)	676.62 (101)	729.71 (91)
NIA	489.82 (107.56)	703.74 (119.11)	741.08 (99.02)	932.01 (81.82)	1325.63 (99.10)
OIC	294.05 (117.80)	400.96 (120.05)	526.14 (123.04)	557.31 (109.63)	771.03 (109.64)
UIIC	344.05 (136.48)	361.02 (116.19)	471.61 (119.82)	610.40 (108.53)	994.05 (110.00)
PSU Total	**1619.46**	**1979.09**	**2289.40**	**2776.34**	**3821.32**
Private –total	NA	NA	1205.39	1759.86	NA
ICR- PSU (%)	122.58	121.09	112.42	96.40	103.39
ICR–Private (%)	NA	NA	103.42	94.81	NA

(figures in brackets represent ICR percentage) *NA-Not available*

OIC revised the premium upwards in September 2006 and other three PSU insurers revised the premium during 2007. From the Table 5.3 it is evident that the incurred claim ratio (ICR) of the PSU insurers during 2004-05 to 2008-09 remained above 100 *per cent,* except for NIA during 2006-07 to 2008-09 and NIC in 2008-09. The Profit (+)/loss (-) as reported by the PSU insurers in their accounts for health portfolio after netting the commission paid and re-insurance recoveries from the General Insurance Corporation of India (GIC) towards obligatory cession were as given in **Chart 5.3**:

Chart 5.3



[3] ***Claims paid + claims outstanding at the year end – claims outstanding at the beginning of the year.***

From the above, it may be seen that all PSU insurers incurred losses in almost all the years except NIA which earned profit of Rs. 194.25 crore in 2007-08.

Audit further observed actual losses of PSU insurers were much more than what is shown above as the PSU insurers except NIA did not provide the data of actual losses after accounting for operating expenses and allocated investment income. In case of NIA, the actual loss after consideration of the operating expenses and allocated investment income amounted to Rs. 210.71 crore, net profit of Rs. 99.34 crore and net loss of Rs. 355.30 crore during the three years 2006-07, 2007-08 and 2008-09 respectively.

5.2 Scope of audit

The analysis of the data on the financial performance of the PSU insurers was conducted for five years from 2004-05 to 2008-09. However, the Performance Audit (PA) focused on the performance of Health portfolio of the four PSU insurers, NIC, NIA, OIC and UIIC over the past three years from 2006-07 to 2008-09 due to large volume of the transactions involved. The study covered individual and Tailor-Made Group mediclaim Policies[4] (TMGP) issued in India directly and serviced by Third Party Administrators[5] (TPA) except Overseas Mediclaim Policies and policies sponsored by Central/State Governments.

5.3 Audit objectives

The audit objectives were to examine and assess the effectiveness of the system established by the PSU insurers for:

- fixation of the premium rates to ensure profitability of the porfolio;
- adequacy of controls and criteria used in underwriting;
- assessing whether the TPAs contribute to the effective administration of the health portfolio; and
- adherence to the Insurance Regulatory and Development Authority norms/guidelines and circulars issued by respective PSU insurers.

5.4 Audit criteria

Following criteria were used for assessing/evaluating the achievement of the audit objectives:

- Premium rates, underwriting guidelines, various policies issued by the PSU insurers, policy conditions;
- Manuals and guidelines of the companies on health insurance;
- MoUs, Service Level Agreements entered into by the PSU insurers with TPAs; and
- Regulations, guidelines and circulars issued by the Insurance Regulatory and Development Authority and circulars issued by the PSU insurers.

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[4] ***A set of administrative conditions and claim procedures for various group plans.***

[5] ***Third Party Administrator is one licensed by the IRDA, and is engaged, for a fee or remuneration as may be specified in the agreement with an insurance company, for the provision of health services.***

5.5 Audit Methodology

The performance audit was conducted during June-September 2009. Records and compilation of data relating to health policies underwritten by the selected units including the data provided by the TPAs were examined focusing on computation of rates, underwriting of policies, role of TPAs, control mechanism to monitor the activities of the TPAs and claim settlement by them. Sampling techniques adopted for selection of units and data analysis are given in ***Annexure X***. Entry conferences were held with the respective Managements of the four PSU insurers in July 2009. Exit conference with Oriental Insurance Company Limited was held in December 2009 and with other three PSU insurers in January 2010.

5.6 Acknowledgement

Audit acknowledges the active cooperation and assistance provided by four PSU Insurers at all levels of the Management.

5.7 Audit findings

Audit observed deficiencies in underwriting, selection and appointment of TPAs, their performance and claim settlement. The insurers need to address these deficiencies to improve the quality of service in view of competition from the private sector. These deficiencies are discussed in the succeeding paragraphs.

5.7.1 Underwriting

5.7.1.1 Fixation of Premium

The PSU insurers had adopted mediclaim policies designed by the GIC till 2002, the then holding company. The health insurance was not under the tariff regime and companies were free to fix their premium duly approved by IRDA. Consequent to introduction of TPAs, the PSU insurers revised (2002) the premium rates taking into account service fee payable to TPAs. Health portfolio premium was revised upwards by OIC during September 2006 and by other three PSU insurers during 2007. A scrutiny of the data relating to average premium collected and average claim paid per life indicates deficits in the premium collection as given in **Table 5.4** below:

Table 5.4 **(Rs. in thousands)**

Company	Average	2004-05	2005-06	2006-07	2007-08	2008-09
NIC	Premium	0.48	1.35	0.85	1.21	1.23
	Claim	0.65	1.74	1.01	1.22	1.12
NIA	Premium	1.26	1.03	1.20	1.33	2.24
	Claim	1.35	1.23	1.19	1.09	2.22
OIC	Premium	0.87	1.04	1.38	1.55	2.06
	Claim	1.03	1.25	1.70	1.70	2.26
UIIC	Premium	2.75	1.25	1.25	1.42	1.61
	Claim	3.75	1.45	1.50	1.55	1.88

PSU insurers reported loss in the health portfolio from the next year of premium revision in 2006 and 2007. There was no policy for assessing risk while underwriting business and there was no system to review the portfolio periodically and compare the price of similar products in the private sector. The PSU insurers did not collect vital data on morbidity[6], claims settled disease-wise, age-wise, gender-wise analysis and inflationary trend. The risk cost[7] or the burning cost[8] of the policies for assessing the risk to be underwritten was also not worked out. The Committee on Public Undertakings (COPU), in their Eleventh Report on Health insurance submitted to the Fourteenth Lok Sabha, observed (March 2006) that lack of adequate data on morbidity, demographic groups and diseases was a major hindrance in formulating and designing new products in health insurance and this affected the development and progress of health insurance in the country.

The consultants engaged by the UIIC for importing best business practices of the world to meet customer expectations and detailed strategic initiatives on the key issues of health product development and pricing reported (April 2008) that:

- ✓ pricing of products was primarily based on what competition was offering;
- ✓ except age, no other factor was considered to assess the rating; and
- ✓ no profitability analysis was done.

NIA agreed (December 2009) to frame a policy for assessing risk and take necessary action shortly. OIC agreed (December 2009) that exhaustive data was not available at the time of revision of premium during 2006 and assured to consider the inflationary aspect. UIIC stated (December 2009) that age-wise premium and claim data were collected while reviewing the premium in 2007, but lack of adequate data on morbidity, demographic groups and diseases was a major hindrance in formulating and designing new products in health insurance.

5.7.1.2 Targets

The PSU insurers, except OIC, had not fixed target for health department till 2008-09. NIA fixed targets from 2009-10 and specified a performance matrix for reduction of 10 *per cent* in cost per claim through empanelled TPA. Fixing targets for different products based on profitability would improve performance of the portfolio.

5.7.1.3 Individual and Group policies

The individual mediclaim policies cover hospitalisation expenditure with a minimum stay exceeding 24 hours, with exclusions such as 30 days pre-hospitalisation, pre-existing diseases for three/five years, lock-in period for certain diseases, maternity benefits, day one baby care. Group Policies are issued in respect of group of persons. Tailor made Group Policies (TMGPs) are issued to corporate house employees and their families covering pre-existing diseases, maternity and baby day one care, family floater[9] and corporate buffer.[10] These benefits are extended at the option of the insured by suitably

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[6] ***Morbidity is the percentage of people in a population that gets sick of a particular disease.***

[7] ***Risk cost-the incurred claims related to the premium for each risk***

[8] ***The premium needed to cover losses based on historical experience for a proposed re-insurance agreement.***

[9] ***the sum insured floats among the family members.***

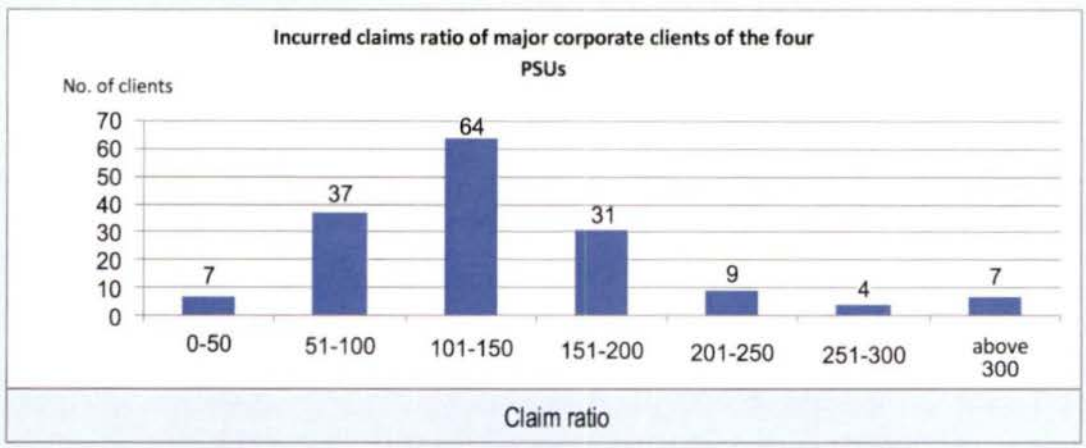
[10] ***to avail benefit over and above sum insured.***

loading the premium at specified rates. Further, in case of adverse claim ratio in the previous years, appropriate loading at the prescribed rates is made at the time of renewal to contain losses.

Audit observed that the four PSU insurers suffered a loss of Rs. 417 crore from individual portfolio, whereas group policies had contributed a loss of Rs. 622.49 crore during the three year period from 2006-07 to 2008-09 indicating that additional benefits of maternity, baby day one care, pre-existing diseases available only to TMGP were augmenting the loss as discussed in subsequent paragraphs. The TMGPs contributed loss even during the year 2007-08 when premium rates were revised. The premium rates charged for both the TMGPs and individual policy holders were the same, though the former were extended additional benefits.

To see the trend of ICR and loading on renewal a test check of top five corporate clients of each selected RO was made which revealed that PSU insurers had incurred a loss of Rs. 227.19 crore during the three year period 2006-07 to 2008-09 in 115 cases out of the 159 cases test checked. A graphical representation of the ICR is given in **Chart 5.4** below:

Chart 5.4



In 72 *per cent* of the cases test checked the ICR was more than 100 *per cent* with highest claim ratio of 433 *per cent*. A list of these corporate clients is placed at ***Annexure XI***. A scrutiny of these cases revealed that in spite of repeated high adverse claim ratio, TMGPs were renewed without appropriate loading in violation of the PSU insurers' rules for renewal of such policies. Further, the list included a corporate house that is itself in the business of providing health insurance.

Audit also noted that even after high adverse claim ratio, no mechanism was developed to monitor these TMGPs to ensure compliance of loading instructions to contain losses.

Prior approval of the competent authority at Head Office (HO) was required before issue of TMGP. No records were maintained at HO of PSU insurers in respect of these approvals. On a test check of 354 selected cases at ROs it was observed that approvals were delayed or not obtained in 297 cases of TMGP. In 36 cases, approval was taken after the currency of the policy periods and in 261 cases (NIC-73, NIA-71, UIIC-117)

there was no recorded approval. The UIIC in their exit conference stated that such approvals were given over telephone and subsequently through e-mail.

IRDA guidelines prohibit the formation of group with the main purpose of availing insurance. A multi-level agency[11] issued an advertisement inviting membership for the group with the sole purpose of availing insurance. NIA Mumbai DO issued group policies to this multi-level agency in April 2007 and renewed it in April 2008 and incurred total loss of Rs. 7.28 crore during this period. DO also paid a total of Rs. 51 lakh as commission for procuring this business. As it was in violation of IRDA guidelines the HO advised (May 2008) the DO subsequently, on receiving a complaint, to cancel the policy which was not complied with. NIA stated (August 2009) that disciplinary action was initiated against the erring official for not canceling the policy and renewing it without approval. This indicated lack of control at HO level over the issue of TMGPs.

5.7.1.4 Loading

The PSU insurers collect the basic premium approved by IRDA and additional premium called '*malus*' considering the ICR of previous three expired policy periods as per guideline. The premium is further loaded[12] under TMGP at a fixed percentage for other criteria such as coverage of pre-existing diseases, maternity benefit, 30 days waiting period and lock-in period of one year for certain specified diseases, *viz.*, cataract, hernia and other ailments. The PSU insurers, except NIC, did not examine the data on premium and claim in respect of such additional benefits. NIC collected additional premium of Rs. 150 crore but the claim outgo for the period 2006-07 to 2008-09 was Rs. 171.20 crore. It was also seen that the PSU insurers continued to extend the benefit to corporate clients despite losses. The operating offices did not comply with the guidelines on basic premium and malus resulting in loss of premium of Rs. 329.68 crore for three years ended 31 March 2009 as given in ***Annexure XII***. The consultants engaged by UIIC also reported (April 2008) that loading factor for dependents was adopted as a percentage on premium without considering the age and other factors especially in group mediclaim policies.

UIIC stated (December 2009) that the general guidelines on malus and loading for other criteria like exclusion of pre-existing diseases clause and inclusion of maternity benefit at fixed percentages were for the guidance of the operating offices and contended that for major policies these guidelines were not applicable. UIIC further stated (January 2010) that the premium of TMGP was being charged based on the individual claim experience and other business from the client as a whole. The UIIC's guidelines to operating offices did not provide for exemptions for any of the policies and there was no classification like major policy. The underwriting guidelines approved by the Board of Directors of the PSU insurer and filed with the IRDA also prescribed that there should not be any cross subsidy between different products.

In another case, Mumbai RO of NIA issued TMGPs to Life Insurance Corporation of India for the period 2006-07 to 2009-10 and suffered a loss of Rs. 48.81 crore due to high ICR (146 *per cent*). In spite of this, the RO failed to load the premium adequately during

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[11] ***Network of agents selling various products who are not covered by IRDA's definition of a Group.***

[12] ***The amount included in the premiums to meet liabilities beyond anticipated claims payments to provide administrative costs and contributions to reserve funds and to cover contingencies such as unexpected loss or adverse fluctuation.***

the renewal for 2008-09, resulting in short collection of premium amounting to Rs. 11.89 crore. NIA agreed (December 2009) that there was no provision in their system to generate a report for the cost and additional benefits provided to the groups and was considering installing such provision shortly.

OIC stated (December 2009) that, henceforth underwriting of TMGPs would be centralised at HO level.

The PSU insurers in reply to a question by the COPU (March 2006) as to whether the existing health policies cover maternity and out patient care for individual policy holders stated that this facility was not extended to them because the cover would be expensive and unaffordable for the public at large.

On a test check of selected TMGPs issued during the period 2006-07 to 2008-09 by the NIC, Bengaluru RO it was, however, observed that insurance cover for maternity and out patient care was extended to corporate clients as detailed in **Table 5.5** below:

Table 5.5 *(Rs. in crore)*

Facility	No. of corporates involved	Premium loaded	Claims paid	Deficit
Maternity	5	1.90.	4.79	2.89
Family floater	4	2.94	16.92	13.98
Corporate buffer	2	0.04	0.23	0.19
Total		**4.88**	**21.94**	**17.06**

Thus, NIC extended these additional benefits to eleven corporate clients and incurred a loss of Rs. 17.06 crore.

Recommendation No. 5.1

The PSU insurers may:

(i) create a data bank on morbidity, claims, inflationary trend and age/gender/disease wise claim analysis to initiate a system to ensure charging of prescribed premium; and

(ii) ***increase the volume of business to achieve break-even in the health portfolio.***

5.7.2 Domiciliary hospitalisation benefits

Mumbai RO of NIA issued a policy to Tata Consultancy Services Limited covering 81,491, 1,05,303 and 1,22,886 employees during 2006-07, 2007-08 and 2008-09 respectively, which included reimbursement of domiciliary hospitalisation [13] expenses up to Rs. 5,000 per employee. Audit observed that the reimbursement towards domiciliary hospitalisation for the years 2006-07 to 2008-09 amounted to Rs. 71.64 crore as against the premium of Rs. 11.74 crore and, thus, resulted in a total loss of Rs. 68.03 crore

[13] ***Domiciliary Hospitalisation is a state where a person/patient is unwell that he/she requires medical attention at home itself because he/she is not in a position to go to the hospital or there is no Place in the Hospital. Upon Doctor's Certification stating the patient's position, the Patient becomes eligible for a claim under Mediclaim for Treatment at home.***

including loss of Rs. 59.90 crore on account of domiciliary claim outgo during the three years ended March 2009.

5.7.3 Product variety

The COPU in their Eleventh Report submitted to the Fourteenth Lok Sabha expressed (March 2006) concern over lack of product variety to meet the specific health requirements of various strata of population such as aged, youth, pre-existing diseases. The COPU desired that in addition to the existing range of standard health insurance schemes, the Government and PSU insurers should introduce a host of flexible and client oriented health insurance schemes such as long term health insurance products, maternity and out-patient covers, schemes for widows, physically handicapped. The Government in their reply stated (September 2006) that the companies were alive to the need for long-term health insurance products with coverage starting at a younger age, products covering critical illnesses and special schemes for the vulnerable sections.

Some of the State Governments have since introduced health care schemes to cover Below Poverty Line families. NIC covered critical illness through *Varishta mediclaim* for Senior citizens and Parivar mediclaim policy for family. UIIC introduced family floater policy, top-up and super top-up policies during 2008-09 and critical illness policy, available only for corporate bodies having more than 100 employees. NIA replied (December 2009) that they would consider launching a separate product for critical illness.

None of the PSU insurers have however brought out any scheme covering widows and physically and mentally challenged persons or policies coverings AIDS, organ transplant or for the benefit of vulnerable sections of the society.

5.7.4 Portability

Present healthcare policies prohibit an insured from availing the benefits of a product continuously if the insured migrates from insurance scheme of one insurer to another, while such facilities are available for motor vehicle insurance policies. As a pre-requisite, the benefits of cover should be standardised across the insurers. IRDA in consultation with General Insurance Council initiated (March 2008) a move to bring such portability of health policies, but PSU insurers have not introduced the same so far (December 2009).

Recommendation No. 5.2

The PSU insurers may take initiative to standardise the terms and conditions of mediclaim policies to achieve the goal of portability.

5.7.5 Third Party Administrators

5.7.5.1 Introduction of Third Party Administrators

The Insurance Regulatory and Development Authority (Third Party Administrators-Health Services) Regulations, 2001 promulgated in September 2001 introduced Third Party Administrators (TPAs) in the health insurance business. Main objectives of introduction of the TPAs were to ensure higher efficiency, standardisation, cashless health care services to the policy holders and increasing penetration of health insurance in

the country. The TPAs are licensed by the IRDA to act as intermediaries between insurance companies and insured for servicing healthcare policies. There were twenty-seven TPAs as of 31 March 2009. The salient features of the TPA Regulations 2001 are given in **Box 1:**

Box 1

- *Minimum paid up capital should be Rs. one crore.*
- *To carry on business in India as a TPA in health services and should not engage itself in any other business.*
- *At least one of the Directors of the TPA should be a medical doctor registered with the Medical Council of India.*
- *More than one TPA may be engaged by an insurance company and a TPA can serve more than one insurance company.*
- *There should be an agreement between the TPA and the insurance company.*
- *TPA may also agree on the fee payable by the insurance company.*

5.7.5.2 Selection of TPAs

The Government of India advised (July 2002) PSU insurers to appoint TPAs to meet their requirements and finalise service level agreement (SLA) with not more than five TPAs for each company with a maximum of two TPAs per zone for enabling the TPAs to make a long term commitment by investing in infrastructure development. The PSU insurers, however, had entered into (NIC-19, NIA-18, OIC-18 and UIIC-16) SLA with more than five TPAs as of March 2009.

UIIC stated (December 2009) that the decision of engaging not more than five TPAs by each company was an industry decision and not a Government directive. OIC stated (December 2009) that they were making serious efforts to bring down the number of TPAs to a maximum of 10 during 2010.

The reply is not acceptable as GOI directed the PSU insurers to conclude SLA with five TPAs only.

5.7.5.3 Payment of service fee to TPAs

The General Insurers' (Public Sector) Association of India (GIPSA) after negotiation with TPAs communicated (July 2002) the fees payable to TPAs for the service rendered as detailed below:

- for North and South zone at 5.5 *per cent* and East and West zone at 5.4 *per cent* of net premium; and
- an incentive of 10 to 20 *per cent* of the amount by which the incurred claim was reduced against last financial year for a range of ICR 60 to 90 *per cent* and 30 to 60 *per cent* respectively.

The PSU Insurers did not maintain TPA wise premium underwritten and the service fees paid to each of them. UIIC started (September 2009) capturing the data in their system while OIC admitted that no such data was available with them in this regard. In its absence the capability of undertaking work by the TPAs could not be assessed.

The health premium underwritten by PSU insurers rose from Rs. 990 crore in 2002-03 to Rs. 3,696 crore in 2008-09, an increase of 273 *per cent* over the period. Similarly the

number of licensed TPAs increased from 13 in March 2002 to 27 in March 2009. The GIPSA/PSU insurers, except NIA, did not initiate steps to obtain competitive quotes from the TPAs to reduce the cost. By calling for quotations, NIA fixed (May 2009) the service charges at Rs. 75 per life in respect of individual mediclaim policies and at the rate of 4.5 *per cent* on premium for TMGP. NIA expected to save more than Rs. 25 crore by reduction in TPA charges in the current fiscal. In the above context, there is a need for review of service fee in the industry.

UIIC stated (December 2009) that their endeavour was to enhance the quality of service rendered by the TPAs and they were in the process of revising the SLA requiring them to deliver better service thereby getting better value for the fees paid to them.

5.7.5.4 Payment of service fee on malus

The TPAs were required to bring down the claim ratio to less than 70 *per cent* as per SLA. The PSU insurers, however, collect additional premium while renewing the TMGPs, to mitigate the loss arising out of adverse claims ratio. The service fee to the TPAs was, however, paid on the gross premium which includes malus loading. A test check of such service fee paid by two ROs of UIIC amounted to Rs. 3.12 crore in respect of malus loading in 95 cases for the period from 2006-07 to 2008-09. Thus, additional premium was discounted towards the payment of service fee. Hence, there is a need to devise a mechanism in the SLA restricting the service fee on premium excluding malus loadings so as to act as the disincentive for higher claim ratio.

UIIC replied (December 2009) that extension of this logic would result in payment of service charges on the gross premium in case discounts were allowed.

The reply is not tenable as the discount would be based on the claim experience or risk perception of the client and it was the prerogative of the PSU insurers to extend discount to the clients.

Recommendation No. 5.3

The PSU insurers may review and introduce a system of payment of service fee with suitable incentive/disincentive differentiating between group and individual policies.

5.7.5.5 Engagement of a TPA by the insured

Bangalore RO of UIIC issued a group mediclaim policy for 2008-09 covering the employees of IBM India Private Limited (IBM) with a rebate of 5.5 *per cent* on the basic premium for not availing TPA services. IBM, however, entered into a separate agreement to engage a licensed TPA by paying Rs. 75 per life for servicing their employees. Instead of paying the claims settlement amount directly to IBM, UIIC passed payments through TPA engaged by IBM (including service charge of TPA). The agreement between IBM and TPA was against the provisions of Regulation 2(e) of the IRDA, which states that TPAs licensed by IRDA could enter into an agreement only with insurance company(s), for provision of health services. The engagement of TPA by the insured was associated with the risk of leakage of vulnerable business data/information against the interest of the PSU insurers.

UIIC's response was awaited (December 2009).

5.7.6 Service Level Agreement (SLA)

The companies entered into identical SLA with each of the TPAs and the salient features are detailed in the following **Box 2**.

Box 2

- *Enrolment of members.*
- *Provide 24x7 hour call service help to the members.*
- *Issue Identity Card to the members.*
- *Enter agreements with network hospitals.*
- *Settle the claims of the hospitals and reimburse claims to members.*
- *Provide data to insurers for appropriate underwriting and premium fixation.*
- *Provide data for standardisation of rates and cost control to the insurer.*
- *Provide the insurer schedule /rates of charges, of the network hospitals.*
- *Ensure facility of cashless treatment/reimbursement to all the members.*
- *Introduce diagnosis codes and procedure codes in a phased manner in association with the network hoispitals within a period of one year from the date of agreement.*
- *Provide the data to the insurer for actuarial pricing and product development like age group wise/disease wise, number of persons covered, number of claims made, average amount per claim, average stay in hospital, average cost per day.*

5.7.6.1 Performance of TPAs

TPAs are the interface between the insured and the insurer. The delivery of service by them in respect of turn around time for issue of Identity cards (ID cards), reimbursement is to improve the ultimate customer satisfaction. In terms of the SLA the TPAs have to issue the identity (ID) cards, facilitate cashless treatment and reimburse the claim within seven working days. A scrutiny of records at the selected operating offices revealed following deficiencies:

- There were delays in issue of ID cards in respect of all PSU insurers beyond seven working days in 13.39 lakh cases (72 *per cent)* out of 18.62 lakh cases.
- One of the objectives of introduction of TPAs was to facilitate cashless treatment/speedy settlement of the claims. It was, however, observed from the data furnished by the PSU insurers in respect of selected ROs that the TPAs could not settle on an average 45 *per cent* of the claims through cashless treatment defeating one of the purposes of introduction of TPAs to the industry.
- The details of group/individual wise cashless settlement data were not made available and in its absence the satisfaction level/ interface of individuals with TPA could not be assessed.
- TPAs were required to settle all eligible claims (other than cashless facilities) of the insured within seven working days of receipt. Delays were, however, noticed in 4,96,675 cases out of 7,16,726 cases (69 *per cent*), which indicate PSU insurers' failure in implementing the conditions of the SLA entered into with the TPAs.

NIA replied (December 2009) that they had already implemented evaluation and empanelment process for TPA restricting the number to ten on the basis of performance

parameters like percentage of settlement of cashless claims, number of networked hospitals. They further stated that they were streamlining the system of furnishing underwriting details by the operating offices to cut delays in issue of ID cards.

5.7.6.2 Excess settlement of claims by TPAs

PSU insurers had prescribed caps for various ailments. Some of the cases of the claims settled by TPAs during to 2006-07 to 2008-09 are given below:

a) OIC, NIC and NIA revised the terms of individual and group mediclaim policies with effect from September 2006, April 2007 and August 2007 respectively to restrict the payment of room rent at one *per cent* of sum insured subject to a maximum of Rs. 5,000 per day and at two *per cent* of the sum insured if admitted to Intensive Care Unit. NIC put an overall cap of 25 *per cent* of the sum insured per illness under this head. Cap on room rent was introduced in UIIC only from April 2009. These conditions were, however, not enforced by TPAs in 25,856 cases out of 2,13,404 cases in selected ROs resulting in excess payment of Rs. 8.43 crore (NIC-Rs. 18.07 lakh, NIA-Rs. 632.14 lakh and OIC-Rs. 192.62 lakh).

b) Chennai and Bangalore ROs of NIC did not observe the policy conditions such as cap on illness, corporate buffer, specialist fee, X-ray, dialysis fee leading to excess payment of Rs. 97.60 lakh in 443 cases out of 12,476 cases.

c) TMGPs issued by PSU insurers had a clause restricting the payment of claim for maternity. The TPAs had, however, not enforced the cap in 1,353 cases out of 1,80,328 cases, resulting in excess payment of Rs. 1.36 crore (NIC Rs. 8.59 lakh, NIA Rs. 123.57 lakh, OIC Rs. 2.05 lakh and UIIC Rs. 1.59 lakh).

d) The TPAs did not enforce special conditions regarding ceilings in 1,182 out of 10,981 cataract claim cases settled in Chennai and Bangaluru ROs of NIC and UIIC resulting in excess settlement of claims by Rs. 1.19 crore (NIC Rs. 1.25 lakh and UIIC Rs. 117.88 lakh).

e) While settling appendicitis and hernia claims of ROs of NIC and UIIC at Chennai and Bangalore, the TPAs did not enforce caps in 162 out of 4,827 cases resulting in excess payment of Rs. 41.84 lakh (NIC Rs. 1.42 lakh and UIIC Rs. 40.42 lakh).

f) While settling the claims in respect of UIIC of Chennai and Bangalore ROs, the claims were not limited to the sum insured by TPAs resulting in excess payment of Rs. 2.34 crore (1,470 cases out of 85,472 cases).

Non provision of various caps/ceilings in the IT Systems used by the TPAs resulted in excess payment of Rs. 14.71 crore.

NIA stated (December 2009) that many of the TPAs had already embedded caps, conditions and such other limits in their IT systems and had initiated remedial action to recover the excess payment.

5.7.6.3 Standardisation of rates and clinical protocol[14]

As per SLA the TPAs should strive to introduce the diagnostic and procedure codes in the billing service in a phased manner within a period of one year from the date of entering into the agreement. It was, however, observed that the TPAs had neither initiated any step towards standardisation of various clinical procedures nor produced the database to the PSU insurers to analyse variation in the rates charged by different hospitals. An analysis of the data for the period 2006-07 to 2008-09 indicated the following:

- the claim paid by the TPAs varied widely for the same disease for the same period; and
- the TPAs failed to bring about standardisation with the result the hospitals were claiming widely different rates for the same disease during same period and the PSU insurers were forced to accept the rates settled by the TPAs. Illustrative cases of claims paid in respect of select two diseases are given in ***Annexure XIII***.

NIA stated (December 2009) that the industry portfolio of around Rs. 6,000 crore as against the total spending on patient treatment of approximately Rs. 70,000 crore put them in an disadvantageous position in any negotiation with the health care providers. They further stated that as an initial measure they were formulating a policy with specified caps on a number of procedures and filing the product with IRDA.

The reply is not acceptable as the introduction of new product with caps would not be a substitute to the standardisation. The standardisation of rates and clinical procedures through negotiation is essential to contain cost and make the portfolio profitable.

OIC stated (December 2009) that exercise for standardisation of rates had since been initiated and all the PSUs were making joint efforts in this regard.

The COPU in their eleventh Report on health insurance to the Fourteenth Lok Sabha desired (March 2006) that adequate steps be taken for evolving comprehensive and stringent regulatory framework to prevent unregulated mushrooming of health service, undependable and deteriorating quality of health care and rampant instances of under-treatment and over-treatment by doctors and hospitals/nursing homes. The COPU recommended: (i) mandatory registration of hospitals; (ii) standard clinical protocol; and (iii) standardised and graded pricing for medical procedures with a provision to bring violations under criminal offences. The Government in their reply (September 2006) to the COPU stated that they were considering to bring a bill *viz.* Clinical Establishments (Registration and Regulation) Bill for compulsory registration of various healthcare service providers. Though the Bill was introduced in 2007, it was yet to be passed by Parliament (December 2009).

Recommendation No. 5.4

The PSU insurers may:

(i) develop a mechanism to evaluate the performance of TPAs on issue of identity cards, settlement of claims on cashless treatment/reimbursement;

[14] ***A medical guideline (also called a clinical guideline, clinical protocol or clinical practice guideline) is a document with the aim of guiding decisions and criteria regarding diagnosis, management, and treatment in specific areas of healthcare.***

(ii) ensure that the policy conditions are embedded in the system with provision for audit and complied with by the TPAs while settling the claims;

(iii) strive to achieve standardisation of the hospital charges and clinical procedures through negotiation with the service providers to contain cost.

5.7.7 Float fund

The Star Health and Allied Insurance Company Limited (Star Health) issued in June 2008 a policy covering employees (7,68,432) of the Government of Tamil Nadu and their families for a period of four years. The maximum claim for hospitalisation per family for the four years would be Rs. two lakh on floater basis. The premium was worked out at the rate of Rs. 495 per employee per annum. All the four PSU insurers participated in the above policy as a co-insurer taking 15 *per cent* each. In terms of the Memorandum of Understanding (MOU) with the Star Health, the PSU insurers paid Rs. 50.00 lakh each towards float fund for meeting the claims. As per provisions of the PSU insurers' Manual, the lead insurer should advise the co-insurers immediately after payment of claim for reimbursement of the same which has to be settled within 30 days. Thus, the payment of float fund to the lead insurer was not justified. The PSU insurers had so far (June 2009) received a premium of Rs. 8.41 crore and incurred a claim of Rs. 13.31 crore each for 2008-09.

In another case OIC provided a float fund to the TPAs for settlement of claims before introduction of single window system (November 2008) which remained unadjusted to the extent of Rs. 5.86 crore as on 31 March 2009. This was an undue advantage to TPAs besides loss of income from investment to OIC. OIC assured (December 2009) that adjustment of the float fund would be sorted out by March 2010.

5.7.8 Internal Audit

The TPAs were required to return the paid vouchers to the operating offices in terms of provisions of the SLA. It was, however, noticed that the vouchers were not received back in the ROs. The Internal audit in NIC and UIIC test checked the claim records randomly and in OIC no internal audit had taken place. In NIA only five *per cent* vouchers were checked. Though, the health portfolio is a major segment, the PSU insurers had not specified quantum of checks to be exercised especially in the context of outsourcing of the services to TPA.

NIA stated (December 2009) that they were examining the option of outsourcing the audit of the claim settlements. OIC assured (December 2009) to undertake at least five *per cent* audit check by internal audit and the results would be reviewed periodically for taking appropriate decision. UIIC agreed (December 2009) to prescribe quantum of check by the internal audit.

Recommendation No. 5.5

The PSU insurers should prescribe quantum of checks to be applied by Internal Audit to reduce the risk in the context of outsourcing of settlement of claims.

5.8 Other Topics of Interest: Re-insurance

The COPU in their eleventh report to the Fourteenth Lok Sabha observed (March 2006) that the health insurance companies were incurring losses primarily due to their inability to insure young people who were relatively free from diseases and absence of proper re-insurance facility for health insurance. It further noted that the absence of such re-insurance adversely affected the confidence of the insurance companies to underwrite health covers on a large scale. The COPU recommended (March 2006) that the Government would give special attention and take time bound action to set up a viable re-insurance mechanism for health insurance. The PSU insurers, however, had (December 2009) not attempted to have any re-insurance arrangement except the obligatory cover provided by the GIC.

5.9 Conclusion

Though the health portfolio was growing at a phenomenal rate, the PSU insurers were losing their market share to private sector companies. Despite growth in the volume of business PSUs continued to incur losses. The underwriting losses were incurred especially in respect of Group medi-claim policies due to lack of monitoring and control of TMGPs which repeatedly recorded high adverse claim ratio. Initiative (March 2008) to introduce portability in health services was yet to be introduced (December 2009) and the main objective of introduction of TPAs for providing cashless services to the policy holders, remained largely unfulfilled. PSUs insurers had not made efforts for negotiating with the network hospitals for standardisation of rates and clinical procedures to reduce the cost of health care services to the Insured. The delays in issue of identity cards, settlement of reimbursement claims and failure of PSU insurers to monitor the performance parameters indicate deficiency in service of the third party administrators to the insured.

The matter was reported to the Ministry in February 2010; their reply was awaited (March 2010).

MINISTRY OF HEAVY INDUSTRIES AND PUBLIC ENTERPRISES

CHAPTER VI

Bharat Heavy Electricals Limited

Procurement System

Bharat Heavy Electricals Limited (BHEL) is one of the largest engineering and manufacturing enterprises catering to the core sectors of Indian Economy *viz.* Power Generation & Transmission, Industry, Transportation, Telecommunication, Renewable Energy, *etc.* During the year 2008-09 the Company registered gross sales of Rs.28,033 crore and material cost of around Rs.15,600 crore. The performance audit of the procurement system of the Company. disclosed that there was scope for further improvement in the following areas:

- The cost of material purchased by the Company as a percentage of turnover showed an increasing trend from 45.69 per cent in 2006-07 to 55.66 per cent in 2008-09. The Management was yet to formulate a plan of action to arrest the rise in material cost. Rising material cost was, among other things, partly attributable to majority purchases by the Company through limited tenders without establishing a solid vendor base. Only eight per cent of procurement was done by the Company through open tendering during the last three years ended March 2009 and the balance was through limited/single tenders. In Bhopal, Haridwar, Hyderabad, PEM, Noida and Trichy Units there was only a single vendor registered for 538, 286, 16, 302 and 8 material groups respectively. Many of the vendors registered with CII and CEA were not registered with the BHEL units.
- The Product Material Directories of units were not being updated continuously, giving a false assurance of existence of optimum number of vendors.
- The Purchase policy and procedures were not revised since October 1998 despite significant global changes affecting the business.
- In the absence of standard procedure for cost estimation, the units justified the price offers by applying escalation over the last purchase prices. In Haridwar, Hyderabad and Trichy units, this exercise was being done after opening of price bids.
- The PEM unit awarded 17 works (Rs. 26.80 crore) on a firm and its allied/sister concerns banned by Hyderabad unit.
- No norms for purchase lead time had been fixed by units except Trichy unit where targets of 60 days to 120 days for conversion of purchase requisitions into purchase orders had been fixed. Audit observed that during three years ended 31

March 2009 in 54 *per cent* cases the Company awarded contracts after 75 days and upto 300 days and in 13 *per cent* cases the time taken was more than 300 days.

- As per policy, repeat orders, without calling for fresh tenders could be placed provided there is no downward price trend. However, in Haridwar unit in four products (covering selected six purchase orders valuing Rs. 139.06 crore) the unit did not place repeat orders resulting in an extra expenditure of Rs. 29.09 crore.

Summary of recommendations

(i) The Company needs to develop comprehensive guidelines/policies on procurement to be followed uniformly by the units.

(ii) The Company needs to visit its limited tendering Policy in view of its thin vendor base and also to bring in more competition.

(iii) Conscious efforts have to be made towards vendor development by appropriate market research which would help in identifying efficient, economical and reliable sources of supply.

(iv) The centralised vendor database should be made more comprehensive and integrated so as to enable monitoring of vendors' performance at corporate level.

(v) Procurement through reverse auction, as per the decided policy may help the Company to reap the benefits of competitive prices.

6.1 Company profile

The Bharat Heavy Electricals Limited (BHEL) is the largest engineering and manufacturing enterprise in India in the energy-related/infrastructure sectors. It manufactures over 180 products and caters to the core sectors of Indian Economy *viz.* Power Generation and Transmission, Industry, Transportation, Telecommunication, Renewable Energy, *etc.* BHEL has 14 manufacturing units, 4 Power Sector Regional Centres, 8 Service Centres and 18 Regional Offices. The Company is headed by a Chairman cum Managing Director. The Organisation Structure of Company and its units and their locations are indicated in ***Annexure-XIV***. During 2008-09, the Company registered gross sales of Rs. 28,033 crore and earned a net profit of Rs. 3,138 crore.

6.2 Scope of Audit and Audit Methodology

The performance audit covered the procurement policies, guidelines and directives framed and issued by the Corporate office and implementation thereof by five selected manufacturing units located at Bhopal, Haridwar, Hyderabad, Ranipet and Trichy. Besides, two Power Sector Regions *viz* Southern and Northern located at Chennai and Nagpur, which mainly coordinate erection, testing and commissioning activities at sites of power projects, PEM[15] Noida responsible for procuring Balance of Plant[16] and one Transmission unit (TBG[17] New Delhi) were also selected. The functions of these units are given in ***Annexure-XV***.

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[15] ***Project Engineering Management***

[16] ***Plant and equipment which are not manufactured by the Company but are supplied to the customers after purchasing from outside vendors***

[17] ***Transmission Business Group***

The audit examination was restricted to a sample of 2,042 purchase orders placed between April 2006 to March 2009 valuing Rs. 14,422 crore drawn by using 'Stratified Random Sampling Method' which constituted about 35 *per cent* of the value of total purchases during the period. The details of sample are indicated in ***Annexure-XVI***.

The audit commenced with an Entry conference (31 March 2009) with the Management wherein the scope, objectives and criteria of the audit were discussed. This was followed by collection of data, issuance of audit observations and discussions with the unit Management. The audit was concluded with an Exit conference (27th January 2010) with the Top Management of the Company wherein the results of audit and the audit recommendations were discussed. The replies of the Management have been suitably incorporated in this report.

6.3 Audit objectives

The objectives of the Performance Audit were to assess whether:

a) the procurement process was fair and just, ensuring efficiency, economy and accountability;

b) the system of vendor selection, development and review of their performance was effective; and

c) there existed an effective mechanism for reviewing the outcome of contracts to implement the lessons learnt in future contracts.

6.4 Audit criteria

The performance of the Company was assessed mainly against the following criteria:

a) Purchase Policy, Supplier Evaluation and Review Procedure, Departmental Procedures, Systems and Methods Instructions (SMIs), Operations and Methods Instructions (OMs) and Delegation of Powers;

b) Instructions and recommendations on various aspects of material procurement;

c) Decisions of the Board of Directors and internal guidelines issued from time to time;

d) Approved procedure for registration of vendors and approved vendor list; and

e) Best practices prevalent in the Industry.

6.5 Acknowledgement

The audit acknowledges the co-operation extended by the Management at all levels in production of records and information, clarifications of issues and furnishing of replies. The audit also acknowledges that the Management has appreciated the audit inputs and intends to use these for the improvement of the process and has framed a plan of action for addressing the issues raised in Audit.

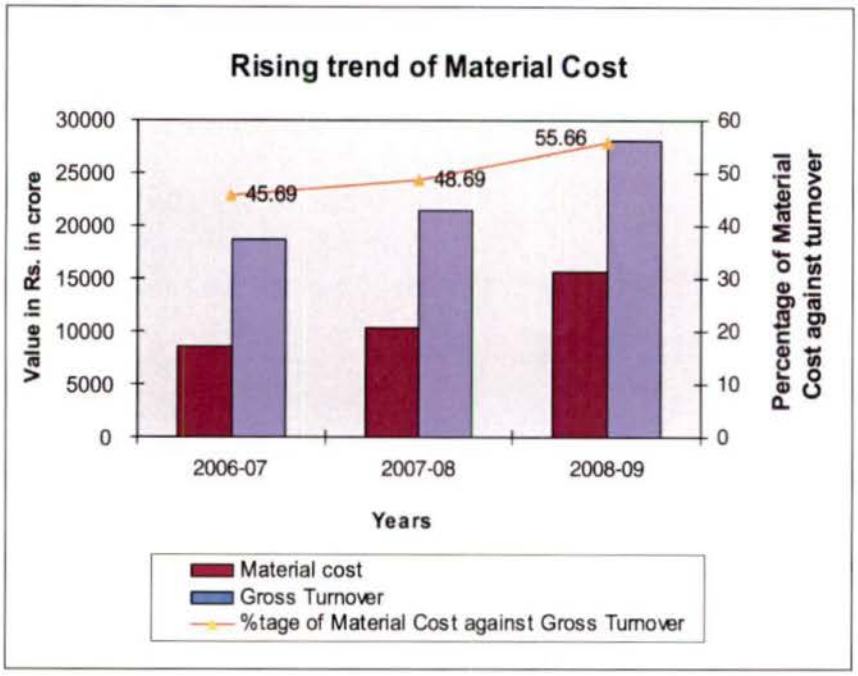
6.6 Audit findings

6.6.1 Rising trend of material cost

An analysis of the cost of material *vis-à-vis* turnover **(Chart 6.1)** indicated that the cost

of material as a percentage of turnover increased from 45.69 *per cent* in 2006-07 to 55.66 *per cent* in 2008-09 over the last three years.

Chart 6.1



Though the issue was being discussed in the Management Committee meetings of the Company, the Management was yet to formulate a plan of action to arrest the rise in material cost. Audit analysis of the rising material cost indicated majority purchases by the Company through limited tender route without establishing a solid vendor base. The extent of limited tendering, low competition arising out of weaknesses in the vendor base and deficiencies in the procurement practices as noticed in audit are brought out in the succeeding paragraphs.

The Management attributed (January 2010) the rising trend in prices to the sharp increase in prices of inputs and change in product mix from standard lower size rating sets to higher size rating sets (more of 500 MW) and large size gas turbines having higher inputs from collaborators and higher import contents.

The fact remains that the Management is yet to devise a strategy to overcome the effect of rising trend of the material cost *vis a vis* turnover so that the margin does not get reduced substantially.

6.6.2 Purchase Policy and Purchase Procedures

The Corporate Office has framed a Purchase Policy (Policy) laying down the broad directions and guidelines to be followed by all the units as well as delegation of financial powers for procurement of materials/equipment and related services. The units have also formulated their Organisation and Methods Instructions (OMIs) and/or Departmental Procedures for various purchase activities, defining the duties and responsibilities of executives of various groups. The review of Corporate Purchase Policy and Procedures adopted by units revealed the following deficiencies:

(i) The Policy was last revised in October 1998. Despite significant global changes affecting the business as well as capacity addition requirements, the Policy has not been comprehensively reviewed to keep abreast of changing market scenario and new processes of procurement. Similarly, the Delegation of Powers relating to purchases are based on the price index as of January 1997 and despite significant increase in both volume and value of procurements in the past 11 years, these were not reviewed /amended. The Management stated (January 2010) that a task Force had been constituted to review /update and re-issue the policy.

(ii) As per the best public procurement practices, a financial limit is prescribed for adopting various modes of procurement *viz.* open, limited and single tendering. Audit observed that no such limit was prescribed by the Company. In the selected sample, only eight *per cent* of procurement (Rs. 1,186 crore) was made through open tenders. The Management stated (January 2010) that formulation of financial limits for resorting to open tenders was under consideration.

(iii) The Policy (Clause 9.1) stipulates that purchase committee consisting of representatives from Indenting, Purchase and Finance department (nominated by Head of Finance) may be constituted for effecting purchases and the recommendations of the Committee shall be submitted for the approval of the competent authority.

Audit observed that only Power sector region, Nagpur was processing procurement through Purchase Committees. No formal Purchase Committees in remaining units *viz.* Bhopal, Haridwar, Hyderabad, New Delhi (except for Capital Procurement), PEM Noida, Transmission Business Group (TBG) and Trichy were constituted.

The Management while agreeing (January 2010) to review its purchase policy, assured that the constitution of Purchase Committees would be made mandatory for all procurements exceeding Rs. Five crore.

Recommendation No. 6.1

The Company needs to develop comprehensive guidelines/policies on procurement to be followed uniformly by the units.

6.6.3 Tendering system

The Policy stipulates three types of tendering *viz.* open, limited and single for procurement of material and equipment. As per clause 3.1 of the Policy "Open tender shall be resorted to in such cases where adequate number of approved vendors are not listed and/or procurement from limited tender is considered not desirable. For this purpose, all known sources shall be addressed and/or press advertisement shall be resorted to. Enquiry shall be treated as an open tender if it is addressed to all approved vendors, not less than six. In case of response from two/three vendors, the open tender shall be treated as limited tender".

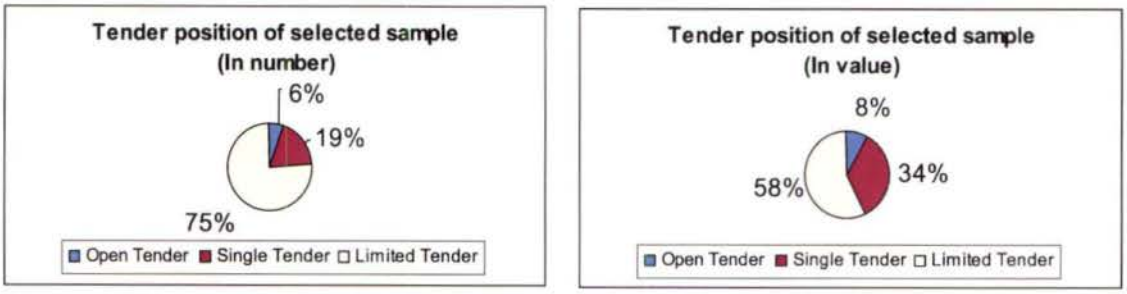
In response to Audit query questioning the rationale of treating enquiry to six vendors as open tender, the Management clarified that the distinction between open tender and limited tender was only for the purpose of delegation of powers. Though the Management was unable to justify as to how the tenders issued to a few selected vendors without press

advertisement qualified as open tenders, it stated (January 2010) that the issue was being addressed in the draft purchase policy and the tenders issued to limited set of vendors (registered with BHEL) shall be treated as limited tender only.

6.6.3.1 Procurement by Limited/Single tenders

Audit analysis of sample purchase orders in the selected units revealed that these units had resorted to mainly limited or single tenders. The percentage of orders placed through open tenders to the total orders in the selected nine units in terms of numbers and value was only six *per cent* and eight *per cent* respectively and similar percentages of limited tender and single tenders put together to the total orders in these selected nine units in terms of numbers and value was 94 *per cent* and 92 *per cent* respectively, as indicated in the **Chart 6.2** given below:

Chart 6.2



6.6.3.2 Inconsistencies in loading for deviations in tender evaluation

Audit observed that in Hyderabad and Trichy units, the terms and conditions annexed to the purchase enquiries were silent on the element of interest to be loaded in case of deviations in prescribed payment terms. Loading for deviation in the delivery terms for arriving at the L1 price was also not being done in Haridwar and Trichy units or was done in a non-uniform manner in Hyderabad unit. In contrast, the tender enquiries at Haridwar unit clearly indicated the loading pattern alongwith the interest rates for deviations sought by the vendors for payment terms and for non acceptance of liquidated damages.

The Management stated (January 2010) that uniform evaluation criteria/loading guidelines for major deviations were under finalisation.

6.6.3.3 Cost estimates

(i) Audit observed absence of laid down procedure for cost estimation in the units. The units justified the price offers by applying escalation over the last purchase prices. In Haridwar, Hyderabad and Trichy units this exercise was being done after opening of price bids. The shortcomings noticed in the audit of estimation procedure adopted by the units are discussed below:

(a) In TBG unit, out of 90 sampled cases reviewed in audit, the estimates of 13 cases were based on the budgetary quote of a vendor/last purchase price. In remaining cases, no basis of estimation was provided to Audit. Similarly, in case of PLCC equipment for Mathana, Lohara and Salempur cost estimate was prepared after opening of price bid and negotiations with L1 bidder.

(b) For Bellary –II cooling tower, the PEM unit had estimated the cost at Rs. 64.50 crore based on the cost of Mejia Station-B cooling tower (instead of Bellary I cooling tower which was of similar specifications and was executed at a cost of Rs. 30.07 crore) and justified the bid of Rs. 66.16 crore. The estimated cost for Bellary-II cooling tower after applying escalation factors to Bellary-I cost worked out to Rs. 41.86 crore. Further, in case of Ukai VI cooling tower, the unit estimated Rs. 60.00 crore on accepted rates for Bellary II for justifying the bid of Rs. 64.94 crore, despite the fact that estimates of Bellary II were on higher side as stated above.

The unit stated (August 2009) that the price estimates of Bellary II if worked out on the basis of Bellary –I with escalation as per RBI indices would not have been realistic due to a long time gap. The reply is not convincing as the escalation factors (27.63 *per cent* to 52.97 *per cent*) included in the worked out cost of Rs. 41.86 crore were more than the escalation indicated by the Management (20 *per cent* to 50 *per cent*) in their reply.

(ii) Audit examined cost estimation in 12 cases of LV switch gear in PEM Unit for value of Rs. 111.62 crore and observed that the estimated cost varied between (-) 39.56 *per cent* and 20.90 *per cent* from the actual cost. The detailed study revealed that the estimates were based on vendors' quotes without taking into account 'Standard Bill of Quantity' or conducting independent Market Surveys.

The Management stated (January 2010) that in view of audit observations, guidelines on preparation of estimates would be issued.

6.6.4 Vendors Registration and Development Process

As per the instructions of the Company (August 2005), the supplier performance and rating system of the units was to be audited every year for compliance by units and was to be reviewed once in two years by corporate office for effectiveness. However, nothing was on record to confirm that such audit/review was conducted.

6.6.4.1 Deficiencies in functioning of MISCC and Unit Supplier Review Committee

As per Policy (Clause 3.0 of chapter-I), for the purpose of identification and categorisation of materials, recommendation for registration of suppliers and other related activities, a cross function team termed as Material Identification and Supplier Control Committee (MISCC) is to be constituted. Further, (as per clause 4.01 of Policy) a Unit Supplier Review Committee (USRC), an apex body with Material Management Head as Chairman including members from sub-contracting, Quality, Engineering/Technology/ Indenter, Finance and Supplier Development Cell is to be constituted. It was observed that these committees played a limited role as stated below:

(i) In TBG unit, MISCC held only three meetings. No meeting was held between December 2003 and May 2008. There were no records to indicate that any USRC meeting was held after December 2007. The Management stated (January 2010) that due to shifting of unit from Bhopal, this issue was not given emphasis.

(ii) In PEM, MISCC/USRC, constituted in January 2008, focused only on adding new vendors and reviewed/reassessed the existing vendors only in exceptional cases.

(iii) In Haridwar and Hyderabad Units, information relating to the frequency and decisions taken in meetings of MISCCs were not made available to Audit.

(iv) In Bhopal, MISCC held 39 monthly meetings, against the requirement of 108

monthly meetings for three products and USRC conducted only 12 meetings during the years 2006-07 to 2008-09.

The Management stated (January 2010) that the Company was introducing quarterly Management Information System for monitoring the functioning of MISCC.

6.6.4.2 Limited vendor base

Though more than 50 *per cent* of procurement was through limited tenders, Audit observed that Units had very limited vendor base. In Bhopal, Haridwar, Hyderabad, Noida, PEM and Trichy units there was only a single vendor registered for 538, 286, 16, 302 and 8 material groups respectively. In Bhopal, Haridwar, Hyderabad, PEM and Trichy units, for a large number of products, the number of registered vendors ranged from two to three only, as may be seen in the ***Annexure-XVII***.

The Management stated (January 2010) that efforts had been made/were being made through press tenders/expression of interest/hosting on BHEL intranet, for inviting new vendors.

6.6.4.3 Vendor discovery

As per the Policy (Chapter IX), the Corporate Material Management (MM) was to maintain supplier data of all the units and to share the same with other units. Any such exercise, if carried out, was not on record.

An exercise was made by Audit (July-August 2009) to compare the vendor database for selected products of two BHEL Units *viz.* New Delhi, PEM Noida and TBG with the list of Manufacturers Registered with Confederation of Indian Industry (CII) and it was observed that many of the vendors registered with CII were not registered with the BHEL units indicating inadequate efforts made to widen the vendor base.

Table 6.1

Product and BHEL Unit	Vendors Regd. with CII but not registered with BHEL Units	Effective No. of Registered Vendors with BHEL Units	No. of Orders placed by Units in three years	Value of Orders placed by the Unit in three years (Rs. in crore)
Circuit Breakers-TBG	6	4	43	43.99
Cooling Towers-PEM	1	2	16	251
DG Sets-TBG	5	2	10	8.57
Heat Exchangers-PEM	25	4	40	71
PLCC Equipment-TBG	1	3	24	20.18

Similarly, a comparison with data available on web site of Central Electricity Authority (CEA) (November 2009) regarding vendors available for four products, namely, Ash Handling Plant, Cooling Towers, DM Plant and Fuel Oil System, revealed that the number of vendors registered with the BHEL were far less than vendors available in the market.

Table 6.2

Product and BHEL Unit	Vendors to whom work of 11th plan was awarded according to CEA but not registered with PEM-BHEL Unit	Vendors to whom tender enquiry was sent by PEM- BHEL Unit	No. of Orders placed by Units in 3 years	Value of Orders placed by the Unit in 3 years (Rs. in crore)
Ash Handling Plant –PEM	13	6	2	45.73
Cooling Towers-PEM	10	3	16	251.00
DM Plant-PEM	17	3	6	19.28
Fuel Oil System-PEM	19	9	10	33.66

The Management stated (January 2010) that vendors registered with CII had been obtained and communicated to all the units and the list of CEA vendors would also be obtained and provided to the units. The Management, however, added that the requirement of power plants being very specific in nature and based on generic name of items being manufactured by any firm, it can not be construed that the items being supplied by these firms would be as per BHEL's requirements.

The fact remains that the Company, despite its poor vendor base, did not explore these important sources for procurement of equipment.

Recommendation No. 6.2

- ***The Company needs to visit its limited tendering Policy in view of its thin vendor base and also to bring in more competition.***
- ***Conscious efforts have to be made towards vendor development by appropriate market research which would help in identifying efficient, economical and reliable sources of supply.***

6.6.4.4 Vendors registration and performance assessment

a) Inadequate publicity

As per the Policy (Clause 3.1.3), open tender through press advertisement may be resorted to for enlisting of vendors. It was, however, observed that in Haridwar, Hyderabad, Trichy and TBG units, no press advertisement was issued for enlisting of vendors during the last three years ended March 2009. PEM Noida and Ranipet unit issued one press advertisement each in March 2007 and December 2008, respectively, for enlistment of additional vendors for a few products.

The Management stated (January 2010) that new vendor requirement was being published regularly by the concerned units through web / press advertisements. It further assured that web and press advertisements would be published annually.

b) Delays in Registration

As per Procedure, on receipt of supplier's self assessed form, evaluation should be completed within three months in case of no visit to the firm and five months in case visit is required. Audit observed the following instances of delays in registration of vendors:

Table 6.3

Name of unit	No of vendors not registered within the prescribed period of three/five months	Remarks
Haridwar	94	Out of 94 applications, 90 were pending for more than one year and four were registered after prescribed time.
PEM Noida	230	Out of 230 cases, 52 were pending for more than one year and 97 were pending for more than three months; remaining 81 cases were registered after prescribed time.
Ranipet	40	Out of these, six vendors were pending registration for over one year.
Trichy	11	Out of these, six cases were pending for over six months.

The Management stated (January 2010) that many a time the delay was due to incomplete information submitted by the prospective vendors and subsequent clarifications sought by the units.

The reply is not convincing as the delay of more than six months was justified on the ground of seeking clarifications from the prospective bidders.

6.6.4.5 Vendor database

a) Non sharing of database by the units

As per the Procedure (clause 2.0 of Chapter V), approved suppliers of sister units are exempted from detailed registration procedure provided the suppliers' past performance is satisfactory. Audit observed that information relating to vendors was being shared between Hyderabad and PEM Unit. However, in Bhopal, Haridwar and Trichy units the information was not being shared in respect of steel items and Rotor forgings.

The Management stated (January 2010) that the PMDs of all units were available on Corporate Material Management intranet web page and could be accessed by all units

The fact remains that the units were not accessing the vendor base of other units as borne out by the replies of Trichy and Haridwar units wherein they accepted that every unit created its own vendor base and procured the items and that they did not contact vendors registered with other BHEL units.

b) Orders/enquiries on banned vendors

The Company has issued guidelines for taking penal action against the vendors, who either fail to perform, or indulge in malpractices. Action could be in the form of hold, delisting or banning a vendor. Audit observed that:

(i) Information regarding banned vendors was not shared promptly amongst all units. Also the Company did not have any mechanism to use the computerised environment for publicizing any punitive action taken/proposed to be taken against a vendor by a unit to other sister units.

(ii) Hyderabad unit banned (March 2006) all business dealings with two firms[18]

[18] *M/s Techno Electric and Engg. Co. Limited and M/s GEA Energy System (India) Limited*

including their all allied/sister concerns[19] and partners for three years as these firms were found to have indulged in forming a cartel to bag an order quoting higher prices. The ban was lifted on 21 April 2008. Notwithstanding such a ban, the PEM unit awarded three works on the banned firm[20] (Rs. 5.55 crore) and 14 works on its allied/sister concerns[21] (Rs. 21.25 crore) during March 2006 to April 2008 at a total price of Rs. 26.80 crore ***(Annexure-XVIII)*** including POs for which enquiry was issued during the ban period. The PEM Unit Management stated (September 2009) that GEA Ecoflex India Pvt. Limited was not a sister concern of GEA BGR Energy System India Limited. The Management's reply is not acceptable as GEA Germany is the Holding Company of GEA Ecoflex India Pvt. Limited and M/s GEA Energy System (India) Limited.

(iii) Ranipet unit banned a firm[22] for all business dealings in August 2005 and the ban was lifted in June 2008. Though the TBG New Delhi Unit was aware of the ban, still two tender enquires[23] were sent to the banned firm for LT Cables.

The Management stated (January 2010) that information regarding de-listed or banned vendors was being compiled from all units for uploading on Corporate Material Management intranet web page.

c) Deficiencies in database

(i) In TBG Unit, two orders[24] for cables were placed on M/s Havells and M/s Hindustan Vidyut Products Limited respectively, who were not listed in the PMD, though the vendors were reported to be registered vendors. The Management stated (January 2010) that M/s Havells and Hindustan Vidyut Products limited were considered for enquiry on customer approval basis. The reply is not convincing as these vendors did not appear in the PMD.

(ii) In Haridwar, Hyderabad and Trichy units, the basis of inclusion of vendors in PMD was material category and not the material codes which are being allotted for different sizes/capacities within the same material category. Audit observed that most of the vendors registered under a particular material category did not qualify for all material codes (products) under that particular material category. Thus, material category-wise PMD did not show exact vendors registered under a particular material code.

The Hyderabad unit stated (August 2009) that this issue was being addressed in SAP which was under implementation. Haridwar unit stated (January 2010) that the vendors included in PMD are also linked with material code and the limitation if any is shown in PMD by putting $ sign against the vendor. Trichy unit stated that similar material codes are being grouped into material categories for convenience in floating enquiries.

The replies are not convincing as the PMDs did not depict the correct number of

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[19] ***M/S Gea Ecoflex India Pvt Limited***
[20] ***M/s Gea Bgr Energy System India Limited and M/s Techno Electric and Engg. Co. Limited***
[21] ***M/S Gea Ecoflex India Pvt Limited***
[22] ***M/s RPG Cables***
[23] ***Enquiry No. 342260131 dated 12 December 2006 for Afghanistan Project and No. 342270040 dated 19 April 2007 for Bangladesh***
[24] ***PO 4578277 and 4588340***

vendors against a particular material code.

(iii) In Power Sector Western Region, Nagpur, the status of revision of supplier list (required once in three years as per clause 2.9 of Work Instructions for the Unit) was called for from the Management (February 2009). In reply, the Management stated (February 2009) that need for supplier list was not felt especially as in each case approval of competent authority was obtained before floating of enquiry and also that no consolidated vendor list was available.

d) Non updation of database

In terms of Policy (clause 2.2 of Chapter I) the PMDs of units were to be updated regularly. Audit, however, observed that updating was not being done and 29 inactive vendors continued in the PMD in Haridwar, Hyderabad and TBG units giving a false assurance of existence of optimum number of vendors.

The Management noted (January 2010) the audit observation for suitable improvement in the draft supplier evaluation, assessment and review procedure (SEARP).

Recommendation No. 6.3

The centralised vendor database should be made more comprehensive and integrated so as to enable monitoring of vendors' performance at corporate level.

6.6.4.6 Vendor Development

Vendors under trial

As per Procedure, for vendors under trial for a particular material, the units can place maximum three orders. However, in exceptional cases more than three orders can be allowed with the permission of the Head of the unit not below the rank of GM/AGM. After successful execution of minimum three orders under development (Trial) code, MISCC approves the vendor on regular basis. Audit observed that in Bhopal, Haridwar, PEM and TBG units, 28 vendors under development category were awarded more than three orders *viz.* 138 orders valuing Rs. 390.74 crore, without assigning any reasons. Also such vendors were not reviewed for regularisation by MISCC.

The Management noted (January 2010) the audit observation and stated that units are being advised to take appropriate steps to avoid recurrence of such instances.

6.6.5 Award and execution

Audit examined the purchase process starting from indent stage to placement of orders and delivery of material and the following deficiencies were observed:

6.6.5.1 Delays in tender processing

As per Policy (Clause 15), the units should evolve and fix norms for purchase lead time (*i.e.* from the date of indent, raising enquiry, order placement and receipt of material) for different types of materials/components depending on the complexity of the product. No such norms had been fixed by units except Trichy where targets of 60 days to 120 days for conversion of purchase requisitions into purchase orders had been fixed.

A review of time taken for processing of purchase orders from indent stage to the placement of purchase order during three years ended 31 March 2009 revealed that there

was a general trend of abnormal delays in the process as indicated below in **Table 6.4**:

Table 6.4

Range	TBG	PEM	HEEP	HPEP	Nagpur	Bhopal	Total	Percentage
0-75 days	11	5	28	64	58	263	429	33
76-150 days	25	30	44	35	17	212	363	28
151-200 days	11	18	13	16	4	99	161	12
201-300 days	22	10	14	23	5	106	180	14
More than 300 days	21	19	4	48	1	77	170	13
Total	**90**	**82**	**103**	**186**	**85**	**757**	**1303**	**100**

The Management stated (January 2010) that the Purchase policy required the units to evolve and fix norms for purchase lead time and non-compliance of this provision by the units as pointed out by audit would be communicated for implementation.

6.6.5.2 Extra cost due to delay in finalisation of purchases

The Company had to incur extra expenditure of Rs. 26.35 crore ***(Annexure-XIX)*** in purchases due to delayed placement of orders. The delays were on account of non placement of orders within original validity period, delay in finalisation of tender enquiry leading to vendors' revision of price bids, seeking snap price bids after expiry of bid validity period and delay in placement of order under rate contract despite rising prices, *etc.* Apart from the extra expenditure indicated above, the delay in finalisaiton of purchases has other costs like liquidated damages levied by the purchasers and potential loss of earnings which was not possible to estimate in Audit.

6.6.5.3 Non placement of repeat orders

As per policy, repeat orders, without calling for fresh tenders can be placed provided there is no downward price trend. However, in Haridwar unit for four products (covering selected six purchase orders valuing Rs. 139.06 crore), the unit did not place repeat orders resulting in an extra expenditure of Rs. 29.09 crore ***(Annexure-XX)***.

The Management stated that decisions were taken in view of the prevailing circumstances but noted the observation.

6.6.5.4 Delayed placement of purchase orders

Audit observed instances of ordering materials by units beyond the delivery schedules indicated in the indents raised as well as schedules committed to the customers as under:

(i) In Hyderabad unit, out of 186 orders reviewed in Audit, 55 orders were placed subsequent to the delivery dates given in the indents. In one case the delay was for 17 months. Further, in the case of three 36.8 MW Steam Turbine Generators (STG) for Naphtha Cracker Project Panipat costing Rs. 104.93 crore, the unit failed to place the orders within the period committed and, thus, had to pay liquidated damages amounting to Rs. 7.63 crore to the customer till January 2009.

(ii) In Trichy unit, out of 170 orders reviewed, indents relating to 77 orders were

converted into purchase orders after the expiry of the indented delivery period required for the projects. The delay exceeded 30 days in 53 cases, 60 days in 35 cases and 90 days in 30 cases.

(iii) In PSWR Nagpur, in three orders valuing Rs. 1.90 crore deliveries were sought after the scheduled date of completion of the project, whereas in one case, the indent was raised (November 2007) after scheduled date of completion of work (July 2007). Customers also withheld Rs. 14.65 crore due to delayed completion of work.

The Unit Management stated (January 2010) that advance planning for placing indents was now being done.

(iv) In PEM Noida, in five cases, orders for equipment valuing Rs. 24.95 crore were placed one to 10 months after the required date indicated in the Indent.

(v) In Bhopal Unit, in 170 purchase orders valuing Rs. 191.43 crore were placed subsequent to the delivery dates given in the indents.

The Management stated (January 2010) that delivery dates given in Purchase requisitions were indicative only and actual delivery was regulated in line with the production and project / customer requirements. The reply is not convincing as indents are raised on the basis of actual requirements indicated in the project schedule. The dates of delivery indicated were the scheduled date of requirement for the project which was not adhered to.

6.6.5.5 Reverse auctioning

The Company has recognised Reverse auction[25] as a tool for procurement of material/services for greater transparency at competitive prices and decided that procurement through Reverse auction should be resorted to in upto 25 *per cent* of the total purchases. Audit observed that Hyderabad and Trichy Units achieved 3.81 *per cent* and 2.07 *per cent* of targets leading to savings of Rs. 77.86 crore on the total value of purchases of Rs. 575.42 crore during three years ended March 2009. Despite substantial savings, the Management did not explore the possibility of applying this mechanism for other items across all the units.

The Management stated (January 2010) that though units were encouraged to procure through Reverse auction, there were a number of considerations (*e.g.* market volatility, competition available and vendors willing to participate in Reverse auction) while deciding to procure an item through Reverse auction.

The reply is not convincing as efforts were not made by the units to explore the possibility of using Reverse auction for other items.

Recommendation No. 6.4

Procurement through reverse auction, as per the decided policy may help the Company to reap the benefits of competitive prices.

[25] ***Reverse auction is a process of procurement by the Company through online bids obtained from technically and commercially acceptable vendors on the Internet at a scheduled date and time through a service provider.***

6.6.5.6 Availing of excise and customs duty benefits

In the absence of proper clauses in the tenders, the units failed to avail excise and customs duty exemptions as discussed below:-

Hyderabad and Trichy Units are importing common materials *viz.* Boiler quality plates, Alloy steel plates, Carbon steel plates, high tensile plates, pure Nickel for their production requirements. During the three years ending March 2009, the Hyderabad unit procured material valuing Rs. 138.09 crore which were cleared on payment of duty. Though the materials were issued for duty free projects also, no duty drawbacks were claimed. The amount of duty drawback not availed could not be worked out as details of materials issued for duty free projects were not on record. The unit stated (September 2009) that the drawback claims would be made on completion of the projects. The reply is not convincing as the units are not maintaining separate records for indigenous and imported materials to ascertain the quantities and the value thereof for preferring duty drawback claims. The Management stated (January 2010) that the units were being advised to make drawback claims wherever applicable in due time.

6.6.5.7 Post award relaxation of delivery period

In Bhopal, Hyderabad, Nagpur, TBG New Delhi and Trichy units, there were delays in delivery by the suppliers and in 237 cases delivery period agreed as per purchase orders was subsequently relaxed up to a maximum of 20 months which also led to delay in supplying of the materials to the customers. These cases also included the delays on account of non finalisation of drawings by BHEL and the customers. However, there was nothing on record to pin point the delays on this account.

The Management stated (January 2010) that liquidated damages could only be levied if delay in supply was attributed to vendor.

The reply indicated that all these delays were on the part of the Management which needed to be looked into and avoided. Extension of delivery period to the suppliers without recorded reasons was not justified.

6.6.6 Inadequate internal controls

6.6.6.1 Non adherence of rotation policy in sensitive departments

As per Corporate Guidelines, employees should be transferred from sensitive areas after every four years. A review of placement of executives in the selected units revealed that in Bhopal, Hyderabad, PEM, TBG and Trichy units 115 employees serving in sensitive positions in Material Management, Finance and HR departments, *etc.* were continuing in the same positions for more than four years. The engineering wing which decides technical specifications for a tender has not been classified as sensitive.

The Management stated (January 2010) that this exercise was in progress and such positions had been identified in most of the units.

6.6.7 Conclusion

The Company has witnessed an increasing trend in the cost of procurement of materials *vis-à-vis* its turnover over the last three years. This may be attributed to the substantial purchases through limited tenders with limited vendor base and absence of system of preparing proper cost estimates before purchases. Unit level material identification and

supplier review committees need to play a more active role to widen the vendor base and expedite vendor registration and development process. There is a need to review the existing guidelines and develop comprehensive guidelines on procurement to ensure efficient and economical purchases through reliable sources of supply.

The matter was reported to the Ministry in February 2010; their reply was awaited (March 2010).

MINISTRY OF PETROLEUM AND NATURAL GAS

CHAPTER VII

Indian Oil Corporation Limited

Efficiency of Panipat and Mathura Refineries

Executive summary

Indian Oil Corporation Limited is India's largest commercial enterprise with a turnover of Rs.2,85,337 crore and a net profit of Rs.2,950 crore in 2008-09. The Company has eight refineries with a total capacity of 49.70 Million Metric Tonne Per Annum (MMTPA). A performance audit conducted to assess the efficiency of the Mathura and Panipat refineries (with refining capacities of 8 MMTPA and 12 MMTPA respectively) located in northern India, for the three year period from 2006-07 to 2008-09 disclosed that both the Refineries achieved more than 100 per cent of their respective achievable targets during the period reviewed (except Panipat Refinery during 2006-07 due to stabilisation problem). There was scope for further improvement in capacity utilisation of processing units and improving yield by enhancing the middle and light distillates, which are more profitable. The major audit observations were:

- The Company could not install Delayed Coker unit at Mathura Refinery and, thus, was deprived of the benefits of higher distillate yield and enhanced Gross Refinery Margin of about Rs. 800 crore per annum.
- The Mathura Refinery produced Propylene more than its demand and had to blend back 16,665 MT of propylene with LPG resulting in loss of Rs. 11.38 crore.
- The Company revamped Continuous Catalytic Reforming Unit at Panipat Refinery at an expenditure of Rs. 61.77 crore but did not utilise its enhanced capacity rendering the investment on its revamping infructuous.
- Vis Breaker Unit of Panipat Refinery set up at a cost of Rs. 38.34 crore did not achieve designed yield resulting is loss of Rs. 27.22 crore.
- A PX-PTA project at Panipat Refinery set up at a cost of Rs. 2,630.11 crore did not produce the designed yield leading to loss of Rs. 69.93 crore.
- An investment of Rs. 81.67 crore on revamping of Reside Fluidised Catalytic Unit proved to be unproductive as LPG yield increased only marginally from 19 per cent to 20 per cent against the envisaged LPG yield of 29 per cent.

- On environment front Audit found that the Company did not achieve ILP targets in terms of Sulphur recovery, production of Euro III compliant MS and HSD in all the three years except production of MS in 2007-08. The short recovery of sulphur also resulted in loss of Rs. 108.66 crore during the above three year period besides polluting the environment.

Some of the important recommendations made by Audit deserve attention of the Management for further improving its performance by (a) optimum utilisation of the installed capacities, (b) achieving the designed yield in both the Refineries and (c) increasing distillate yield in respect of Mathura Refinery by Installing Delayed Coker Unit by perusing the most feasible option.

Summary of recommendations

The Management may improve the performance of the refineries by:

- ***Increasing the distillate yield in respect of Mathura refinery by implementing a viable yield optimization project and optimal utilisation of PX/PTA at Panipat Refinery,***
- ***Optimum utilisation of the capacity created among its various processing units like the Vis- Breaker Unit, the Continuous Catalytic Reforming Unit, the Resid Fluidised Catalytic Unit etc. at Panipat refinery,***
- ***Managing costs through rationalizing its manpower,***
- ***Giving due importance to environmental issues like sulphur content and the Clean Development Mechanism project.***

7.1 Introduction

Indian Oil Corporation Limited (Company) is India's largest commercial enterprise, with a turnover of Rs. 2,85,337 crore and a net profit of Rs. 2,950 crore during 2008-09. It is also the highest ranked Indian Company in the Fortune 'Global 500' listing, currently at 105th position in 2009. The Company has eight refineries with a total capacity of 49.70 Million MTs Per Annum (MMTPA). The performance audit has been conducted of Mathura (8 MMTPA) and Panipat (12 MMTPA) refineries which constituted a capacity of 20 MMTPA.

- Mathura Refinery

Mathura Refinery was commissioned in 1982 as the Company's sixth refinery with an original capacity of 6 MMTPA, which was increased to 8 MMTPA through a revamp in July 2000. The refinery processes crude oil to produce petroleum products like Motor Spirit (MS), High Speed Diesel (HSD), Aviation Turbine Fuel (ATF), Superior Kerosene Oil (SKO), Liquefied Petroleum Gas (LPG), Furnace Oil (FO) and Bitumen.

- Panipat Refinery

Panipat Refinery was commissioned in 1998, with an original capacity of 6 MMTPA which was increased to 12 MMTPA after commissioning of Panipat Refinery Expansion Project (PREP) in August 2006 and its further expansion to 15 MMTPA by August 2010 was in progress (December 2009).

- Refining Process

At a refinery, petroleum products are produced by refining the crude oil. The process involved in production can be classified under four basic steps: Distillation, Cracking, Treating and Reforming.

- Distillation

Distillation involves pumping oil through pipes in hot furnaces and separating light hydrocarbon molecules from heavy ones. During this process, the lightest materials like propane and butane, vaporise and rise to the top of the atmospheric columns. Medium weight materials like gasoline, jet and diesel fuels, condense in the middle. Heavy materials called Reduced Crude Oil (RCO) condense in the lower portion of the atmospheric column. The basic distillation is done in Crude Distillation Unit (CDU) and Vacuum Distillation Unit (VDU).

- Cracking

Vacuum Gas Oil (VGO) is converted into gasoline, jet and diesel fuels by using processing plants that "crack" large, heavy molecules into smaller, lighter ones. Heat and catalysts are used to convert the heavier oils to lighter products using different "cracking" methods: (i) Fluidised Catalyst Cracking Unit (FCCU), (ii) Hydro cracking Unit (HCU) and (iii) Coking (or thermal cracking).

- Treating

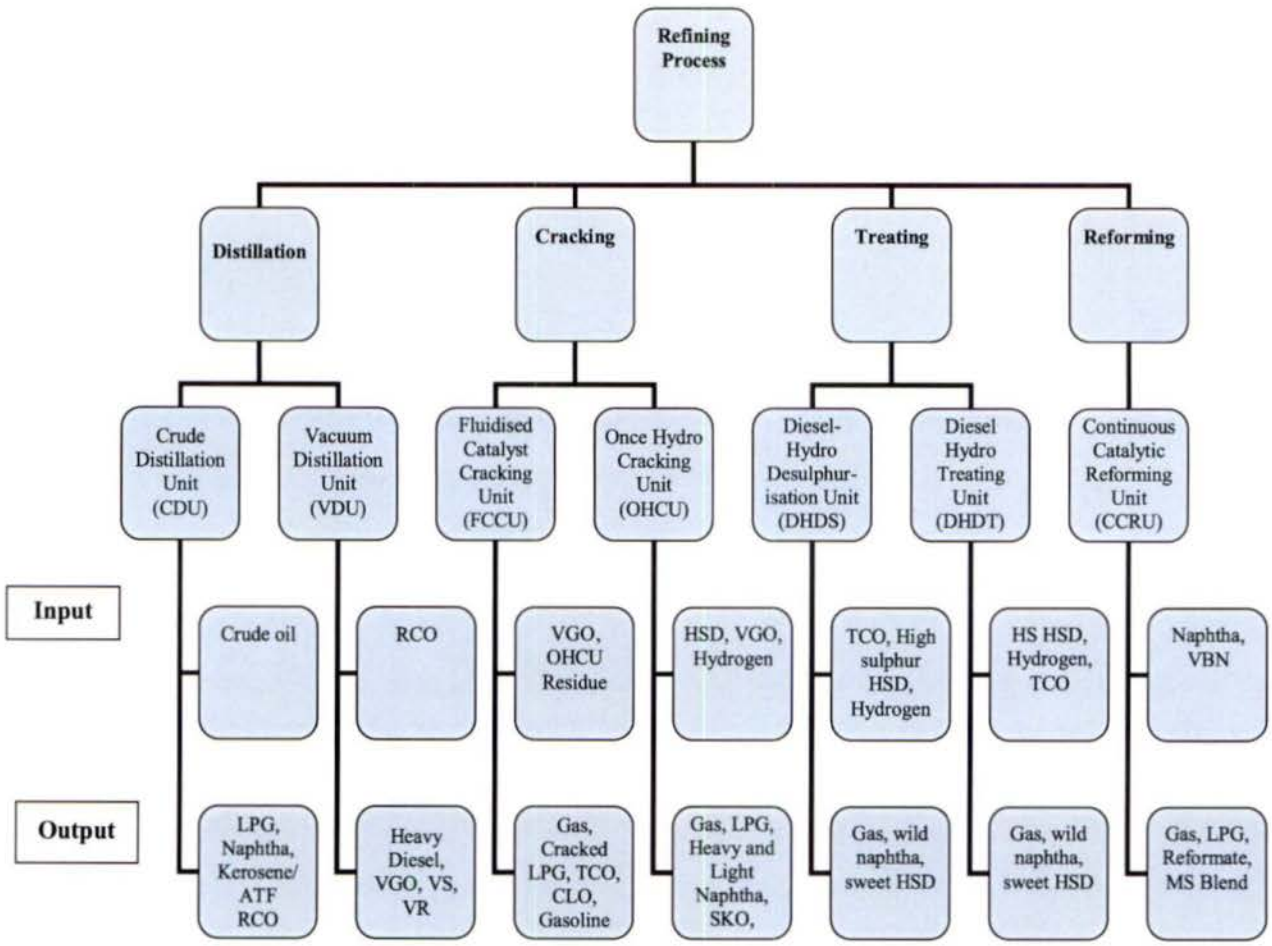
In order to meet environmental norms (Bharat Standard (BS)-II / Euro-III), the sulphur content of gas oil has to be reduced to the acceptable levels. For this purpose, the gas oil produced in Crude Units / FCCU is treated in Diesel Hydro Desulphurisation (DHDS)/ Diesel Hydro Treating Unit (DHDT) with the help of hydrogen.

- Reforming

Much of the gasoline component that comes from the Crude Units does not have enough octane to burn well in vehicles. The reforming process involves removing of hydrogen from the low-octane gasoline and helps in improving the octane rating in the gasoline.

Under the above refining processes, the main processing units and their major products are depicted in the following **Chart 7.1**:

Chart 7.1



ATF- Aviation Turbine Fuel, CLO-Clarified Oil, HSD- High Speed Diesel, MS-Motor Spirit, RCO-Reduced Crude Oil, TCO-Total Cycle Oil, VGO-Vacuum Gas Oil, SKO-Superior Kerosene Oil, VBN-Vis-Breaker Naphtha, VGO-Vacuum Gas Oil, VR-Vacuum Residue, VS-Vacuum Slop

7.2 Scope of Audit

The Audit covered appraisal of the performance of the various primary and secondary units of Mathura and Panipat Refineries including auxiliary services, process planning, cost controls, creation of additional facilities and environment and safety for three years from 2006-07 to 2008-09. The Audit was conducted from July to November 2009.

7.3 Audit objectives

The main objective of audit was to adjudge the efficiency of the refineries during the period 2006-07 to 2008-09 based on the following sub-objectives:

- To examine the designed *vis-à-vis* actual capacity utilisation of process units and utilities;

- To examine the rationale behind fixation of production targets by the Company in MOUs with GOI and review the actual performance, including designed and actual yield pattern;
- To examine the existing costing system including various cost elements such as fuel, power, chemical, catalyst, repairs and maintenance, manpower, administration and other overheads;
- To review repairs and maintenance policy, annual shutdown plan and emergency shutdown management, justification for having an idle / standby asset and to evaluate the mechanism in place for augmentation of infrastructure; and
- To examine compliance reports of the Company regarding environmental, occupational health and safety laws, regulations, guidelines and permit requirements.

7.4 Audit criteria

Following criteria were adopted for assessing the efficiency of Mathura and Panipat Refineries:

- Designed capacity of processing units and utilities;
- System of fixation of efficiency targets and achievement;
- MOU targets and achievements;
- Internal targets with respect to cost elements;
- Management and Government's policies and Feasibility Reports;
- Prevalent Industrial Standards / Norms; and
- Environmental laws, Government's policy and guidelines.

7.5 Audit Methodology

Audit involved review and analysis of refinery performance reports with reference to Detailed Project Reports (DPR) / Feasibility Reports for augmentation of infrastructure, Memorandum of Understanding (MOU) with the Government of India (GOI). An entry conference was held on 3 July 2009 with the Management to discuss the audit objectives, audit criteria and audit methodology. The draft performance report was issued to the Management on 7 October 2009 and partial reply was received on 25 November 2009. Exit conference was held on 27 November 2009 with the Management to discuss the draft performance audit report. The views expressed therein and the Management's replies, wherever, received have been suitably incorporated in this report.

7.6 Acknowledgement

Audit acknowledges the co-operation of the Company in providing necessary records and information at various stages of the performance audit.

7.7 Audit findings

Audit noted that though Mathura and Panipat Refineries achieved performance targets based on parameters fixed in MOU (except Panipat Refinery during 2006-07), there was scope for improvement in the following areas:

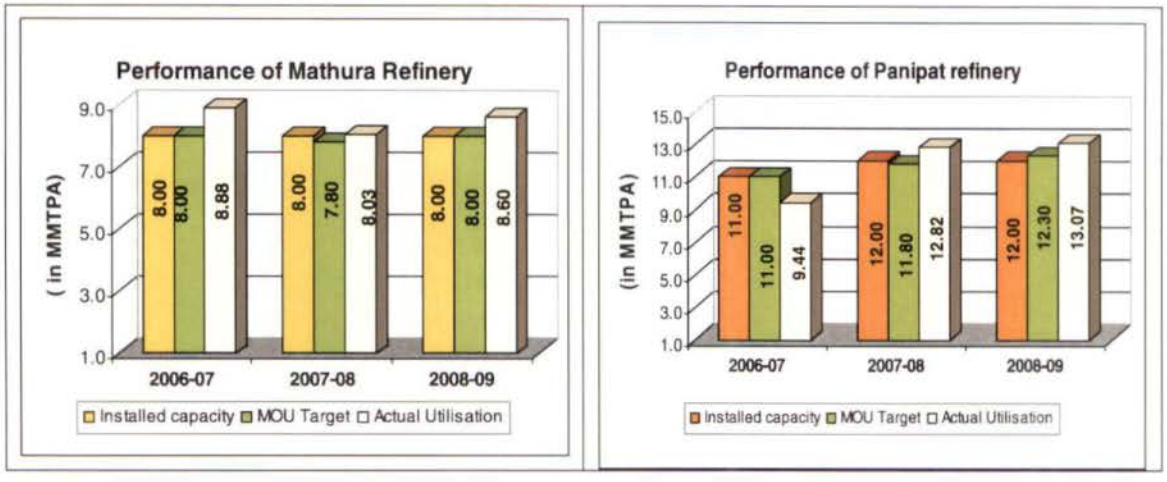
- Improper production of Propylene – Mathura Refinery;
- Under utilisation and non-achievement of designed yield by Vis-Breaker Unit-Panipat Refinery;
- Under-utilisation of Continuous Catalytic Reforming Unit - Panipat Refinery;
- Low distillate yield due to non-providing of Delayed Coker unit - Mathura Refinery;
- Under performance of PXPTA Complex - Panipat Refinery;
- Un-fruitful expenditure on the revamping of Resid Fluidised Catalytic Unit-Panipat Refinery;
- Excess consumption of power - Panipat Refinery;
- Creation of excess power generation capacity - Panipat Refinery;
- Non-recovery of sulphur to the optimum level - Panipat Refinery;
- Non registration of Flare Gas Recovery System as Clean Development Mechanism project - Panipat and Mathura Refineries; and
- Higher expenditure on overtime allowance due to non-rationalisation of manpower - Mathura Refinery.

Detailed audit findings are discussed in the succeeding paragraphs:

7.7.1 Performance of the Mathura and Panipat Refineries vis-à-vis MOU Targets

The major parameters for a performance benchmark fixed by the Ministry of Petroleum and Natural Gas (MoPNG) are crude throughput, capacity utilisation, yield and fuel and loss. The targets for these parameters are fixed in the MOU with the GOI for evaluation of the performance of refineries. Performance of the refineries against the installed capacity and MOU targets during 2006-07 to 2008-09 is given in the following **Chart 7.2**:

Chart 7.2



From the above, it may be seen that both the refineries had achieved more than 100 *per cent* of the targets during the last three years except during 2006-07[1] when Panipat Refinery could not achieve the target due to stabilisation problems of PREP. The Refineries achieved the targets in terms of distillate yield and fuel and loss in all the three years except in 2006-07 in Panipat Refinery as could be seen from ***Annexure-XXI.***

From the analysis of installed capacity, MOU targets and available on stream hours, it was observed that installed capacity and MOU targets were fixed based on 8000 standard on stream hours per annum whereas the available on stream hours were more as could be seen from the following **Table 7.1**. Thus, MOU targets were fixed on lower side.

Table 7.1

Refinery	Available on stream hours after adjusting planned shut down			Throughput for available on stream hours (in MMTP)			MOU target (in MMTP)		
	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Mathura	8760	7764	8760	8.76	7.764	8.76	8.0	7.8	8.0
Panipat	7963	8352	8760	10.53	12.83	12.85	11.0	11.8	12.3
PREP	7296	8760	8366						

7.7.2 Capacity Utilisation of Processing Units

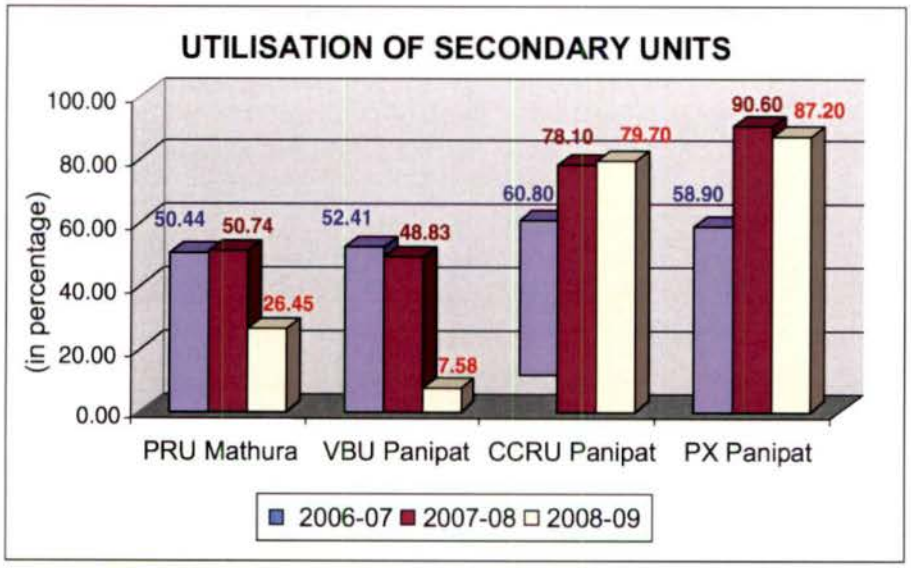
Refining capacity utilisation is an important measure of a refinery's efficiency. It indicates the percentage of utilisation of the total installed capacity during a year. Processing units at a refinery include primary and secondary processing units. Primary

[1] ***For 2006-07, the Management indicated the installed capacity of 7.5 MMTPA, however, in view of commissioning of AVU of PREP on 1 June 2006, the proportionate installed capacity worked out to 11 MMTPA***

processing units are CDU (Crude Distillation Unit) and VDU (Vacuum Distillation Unit); both units together are called Atmospheric Vacuum Unit (AVU).

Secondary processing units include all other remaining processing units, which get feed from the primary units or any other secondary processing unit. Details of capacity utilisation of processing units are shown at ***Annexure-XXII*** and details of production of various products are shown in ***Annexure-XXIII.*** From the analysis of the utilisation of the secondary units, it was observed that the utilisation was generally in line with the installed capacity except some cases mentioned in the Annexure. Underutilisation of Propylene Recovery Unit (PRU), Vis Breaker Unit (VBU), Continuous Catalytic Reforming Unit (CCRU) and Para Xylene Unit (PX) which are discussed in detail in this report are depicted below in **Chart 7.3**:

Chart 7.3

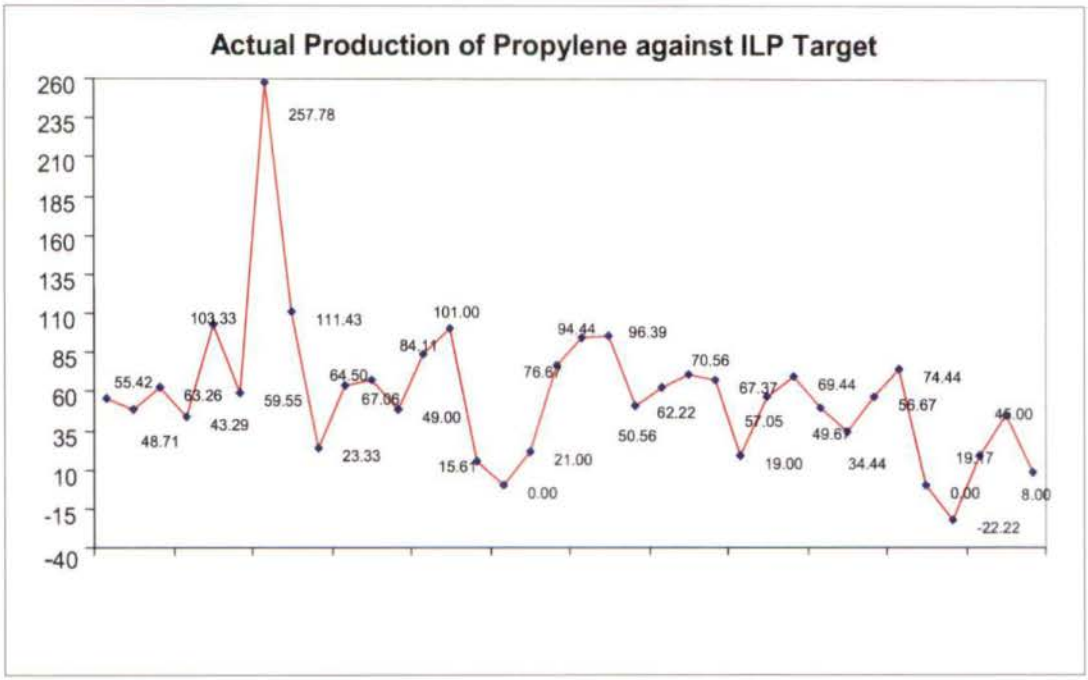


7.7.2.1 Improper production of Propylene - Mathura Refinery

Propylene Recovery Unit (PRU) at Mathura refinery was commissioned (January 1996) at a cost of Rs. 38.24 crore. It was designed to produce 34,460 MT *per annum* polymer grade propylene from cracked Liquified Petroleum Gas (LPG).

The capacity utilisation of PRU during the years 2006-07 to 2008-09 was 39.22, 39.02 and 21.50 *per cent* respectively, producing 13,514 MT, 13,445 MT and 7,408 MT of propylene. Monthly Industry Logistics Plan targets and actual production of propylene during last three years is depicted in the following **Chart 7.4**:

Chart 7.4



It is seen from above that Mathura refinery could achieve the ILP projections only in four months during 2006-09. Further, during the year 2007-08, the unit was operated continuously despite low demand and it failed to market actual production. Consequently, 16,665 MT of propylene was blended back with LPG resulting in loss of Rs. 11.38 crore[2] on variable cost of production of propylene.

The Management stated that the unit was kept running in order to avoid intermittent start-up, shut down and stabilisation and resultant quality problems. The ILP projections were stated to have been finalised in anticipation of identifying new customers and then meeting the supply, which did not materialise. This low capacity utilisation was attributed to low market demand for propylene.

The reply is not convincing as the Company should fix ILP production target after detailed market research. Blending of propylene back to LPG reflected deficiency in the system of fixation of ILP targets. Further, the unit was shut-down seven times during the year 2008-09 due to high stocks available. To avoid additional production cost, the unit could have been shut-down in 2007-08 also in tune with the demand pattern.

Recommendation No. 7.1

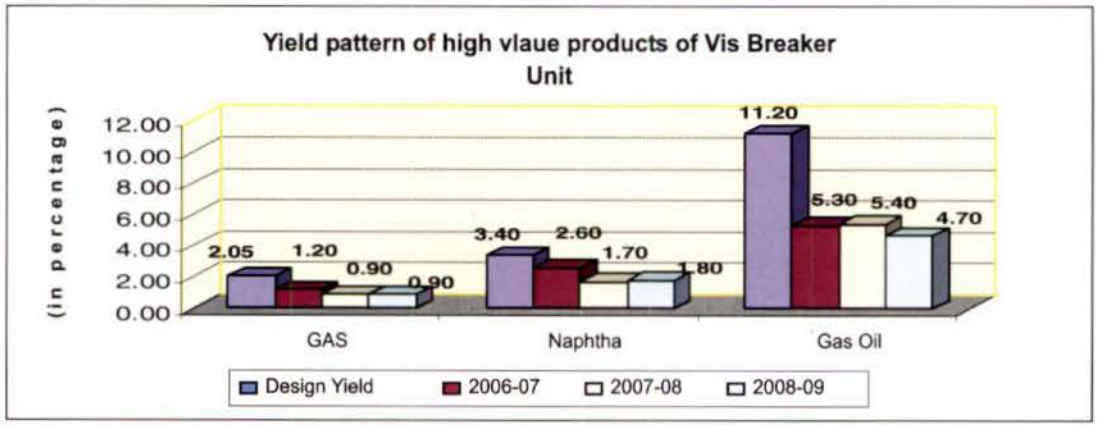
While fixing the ILP targets, the Management may consider the market demand of the product and actual production may be done in tune with the market demand to avoid additional production cost.

[2] ***Worked out at Rs.6,831 per MT being the additional variable cost on 16,665 MT of propylene blended with LPG***

7.7.2.2 Underutilisation of Vis-Breaker Unit - Panipat Refinery

Vis-breaker Unit (VBU) at Panipat Refinery was commissioned (October 1998) at a cost of Rs. 38.34 crore and was designed to process through cracking 4,00,000 MT per annum of Vacuum Residue (VR) received from Vacuum Distillation Unit (VDU). The main product from the unit is Fuel Oil (Heavy Petroleum Stock-HPS) besides other products like Gas Oil, Naphtha and Fuel Gas. During 2006-07, capacity utilisation of VBU was 52.41 *per cent*, which declined to 48.83 *per cent* in 2007-08 and 7.58 *per cent* in 2008-09. The designed product pattern and actual production of gas, naphtha and gas oil during 2006-07 to 2008-09 are given in the following **Chart 7.5**:

Chart 7.5



From the above, it is seen that the yield of value added products such as gas, naphtha and gas oil had declined. As per the VBU Operating Manual, the potential yield of gas, naphtha, and gas oil should have been to the extent of 2.05 *per cent*, 3.40 *per cent* and 11.20 *per cent* respectively. However, in actual operations, the potential yield could never be achieved during the years 2006-07 to 2008-09. Due to underutilisation of the installed capacity of VBU and non-achievement of designed yield, the Company lost net margin of Rs. 27.22 crore during the above period.

The Management stated that the unit could not be utilised up to its designed capacity due to lower demand of HPS and that it was considered non operational after commissioning of Delayed Coker Unit (DCU) which also uses the common feed *i.e.* vacuum residue. It further stated that profitability of process units was not separately identified.

The reply of the Management is not convincing as it continued to operate VBU though at low capacity in spite of commissioning of DCU in August 2006 that too without any cost benefit analysis. Further, the Management's reply was silent regarding non-achievement of designed yield and consequential loss.

Recommendation No. 7.2

While installing new units to the existing refinery, the Management may consider alternate uses/disposal of units, which may become obsolete/non-operational after conducting its cost-benefit analysis. To enhance Gross Refinery Margin (GRM), the Management may endeavour to optimise the actual yield.

7.7.2.3 Under-utilisation of Continuous Catalytic Reforming Unit - Panipat Refinery

The CCRU at Panipat refinery was commissioned (December 1998) originally at a cost of Rs. 134.19 crore and was designed to process through reforming 5,00,000 MT per annum of feedstock (chiefly naphtha) to produce high octane reformate[3]. The CCRU was revamped in 2008-09 at a cost of Rs. 61.77 crore by augmenting its capacity[4] from 500 to 640 Thousand MTs Per Annum (TMTPA). The capacity utilisation data of CCRU during 2006-07 to 2008-09 was as follows:

Table 7.2

Year	Installed Capacity (TMTPA)	Actual Throughput (in TMT)	Capacity Utilisation (*in percentage*)
2006-07	500	304.2	60.8
2007-08	500	390.6	78.1
2008-09	640	510.3	79.7

It was observed in Audit that:

(i) Even though the existing capacity of CCRU was not being fully utilised[5], {in spite of Naphtha (the feed for CCRU) being available in surplus}, a decision was taken (March 2006) for revamping of CCRU to increase the capacity to 640 TMTPA. Even after revamping (March 2008), only 510 TMT of input was processed in 2008-09, which could have been done without revamping of CCRU.

(ii) As per Detailed Feasibility Report of the CCRU revamp, returns from revamping of CCRU at about 53 *per cent* per annum was expected for a period of 24 months from the date of commissioning of revamped CCRU to the installation of Naphtha Cracker Project (NCP). NCP was approved in December 2006 at a cost of Rs.14,439 crore and was expected to be commissioned in the first quarter of 2010. The refinery could not gainfully use the enhanced capacity of CCRU.

Thus, it is evident that the Management's decision for revamping CCRU overlooked the underutilisation of its existing capacity and rendered the additional investment wasteful.

The Management stated that CCRU capacity utilisation was basically linked to MS production numbers finalised in ILP target by Corporate Optimisation group and after implementation of CCRU revamp project, MS production from Panipat refinery had increased from 673 TMT in 2006-07 to 987 TMT in 2008-09 matching increase in the All India demand of the Company. The Management further stated that to meet MS quality improvement project requirements, full capacity utilisation of CCRU was required even in post Naphtha Cracker scenario.

Reply is not convincing as production of 673 TMT MS was achieved with a throughput of 304.2 TMT in CCRU and, thus, with this level of performance[6], the refinery was capable of producing as much as 1,106 TMT MS with the existing capacity *i.e.* 500 TMT itself. Thus, revamping did not fetch any additional gains and investment (Rs. 61.77 crore) made on revamping the unit was not fruitful. It is clear from the Management's contention that full capacity utilisation would be required in the post NCP scenario to

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[3] ***Octane reformate is used as one of the blending components for production of Motor Spirit***
[4] ***with 98 RON of reformate and also to increase MS production by 174 TMTPA***
[5] ***At 82.54, 86.76 and 81.82 per cent in 2001-02, 2002-03 and 2003-04***
[6] ***(MS production/CCRU throughput)*100 = (673 TMT/304.2 TMT)*100 =221.24 per cent***

meet MS quality improvement project requirements is an afterthought as no such utilisation was envisaged in the DFR.

Recommendation No. 7.3

Before initiating proposal for capacity augmentation, the Management may take into account the existing idle capacity and inbuilt cushion in the design.

7.7.3 Production Process and Yield Pattern

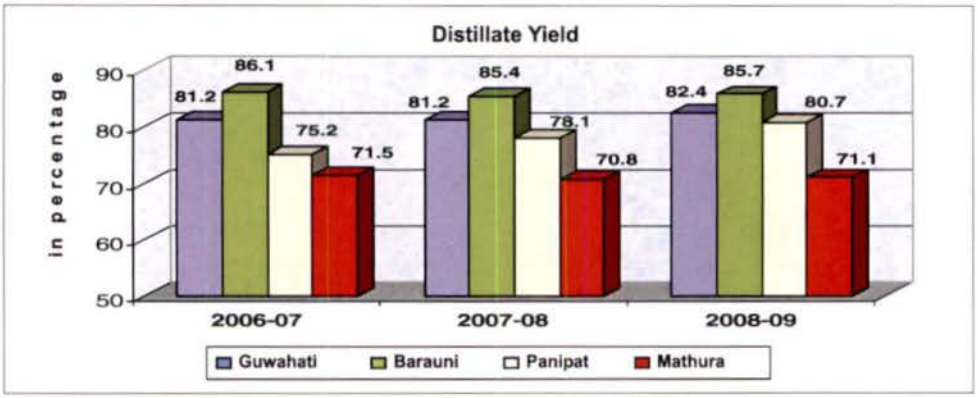
The Company does production process maximisation (enhancing gross refinery margin by optimizing distillate yield) by making production plans based on a linear programming module for each refinery, on the basis of demand for petroleum products, availability of required grade of crude oil as per designed parameters of processing units, refinery configuration and other constraints like emergency shutdown, non-availability of feed for secondary units. Yield pattern of the refinery depends upon the crude mix, refinery configuration, technology, finished product demand, production process optimisation and operating performance of primary and secondary processing units. Scrutiny of records revealed the following:

7.7.3.1 Low Distillate yield due to non-providing of Delayed Coker Unit - Mathura Refinery

Mathura Refinery was originally designed to process 6.0 MMTPA of crude oil, which was later increased to 8 MMTPA in July 1988. The Company carried out another revamp in June 2004 in order to increase yield, optimise energy and augment the capacity of one of its primary Units *i.e.* CDU to 11 MMTPA. The capacity of VDU as well as the secondary processing units, however, remained compatible only to the pre-revamped crude process capacity of 8 MMTPA.

The Distillate yield of Mathura Refinery *vis-à-vis* other refineries of the Company are depicted below in **Chart 7.6**:

Chart 7.6



The main reason attributed to significantly higher distillate yields in other refineries was presence of a Coker unit in them. The Coker unit is an additional secondary unit, which converts heavy bottom feed into lighter feed stocks resulting in significantly higher distillate yield. Even an increase of one *per cent* in distillate yield contributes to increase of approximately Rs. 100 crore in Gross Refinery Margin (GRM). This also enables the

refinery to optimise utilisation of crude by deriving maximum possible yield and saving foreign exchange for the country.

Mathura Refinery initiated (April 2007) a proposal for 'Residue up gradation and distillate yield improvement' including installation of a Coker Unit (estimated cost – Rs. 1,607 crore) at the existing capacity of 8 MMTPA for which the Ministry of Environment and Forest (MOEF) finalised the Terms of Reference (TOR). In the meanwhile, the Refinery initiated (March 2008) another proposal (estimated cost-Rs. 5,514 crore) for 'Residue up gradation and distillate yield improvement' at an enhanced capacity of 11 MMTPA. The environmental clearance for capacity augmentation for refinery as a whole was also sought (April 2008) from MOEF. As the second proposal was for capacity expansion of a plant falling under Tajmahal Trapezium Zone (TTZ), the MOEF directed the Company to file an affidavit before the Supreme Court and take necessary orders from the Court for facilitating further action as MOEF had filed (1996) an affidavit in the Court to the effect that no expansion would be allowed in the units operating in TTZ without their approval. The matter was pending (December 2009).

Instead of pursuing its earlier proposal of distillate yield improvement including Coker unit for which the Terms of Reference had already been finalised by MOEF, the Company entangled itself in a complex scenario wherein it cannot proceed further without getting environmental clearance from the Court for its capacity enhancement project. Resultantly, the Company could not install Coker unit and, thus, was deprived of the benefits of higher distillate yield and enhanced GRM.

The Management stated that Mathura Refinery approached MOEF seeking clearance for capacity augmentation from 8 to 11 MMTPA in view of the favourable indications from statutory authorities and considering its long term plan. The Coker capacity would have been inadequate, had the unit been upgraded at 8 MMTPA.

The reply is not convincing as there had already been an inordinate delay in initiating the process for providing Coker Unit at Mathura Refinery whereas the same was initiated much earlier (1999) in Panipat Refinery. Besides, environmental clearance for higher capacity was to be obtained from the Court which is time consuming while the original proposal without capacity expansion could have been cleared by the MOEF. Considering the magnitude of incremental GRM foregone (around Rs. 800 crore *per annum* with increase of distillate yield by about eight *per cent*), it was in the interest of the Company to upgrade the refinery with a Coker unit (estimated to cost Rs. 1,607 crore) at the existing capacity, if not at an enhanced capacity of 11 MMTPA at the earliest. Thus, the Company continues to be deprived of improved yield.

Recommendation No. 7.4

Efforts may be made to install a Coker unit, of the capacity permitted by MOEF with cushion for its up-gradation, without loss of time by pursuing the most feasible option to improve distillate yield.

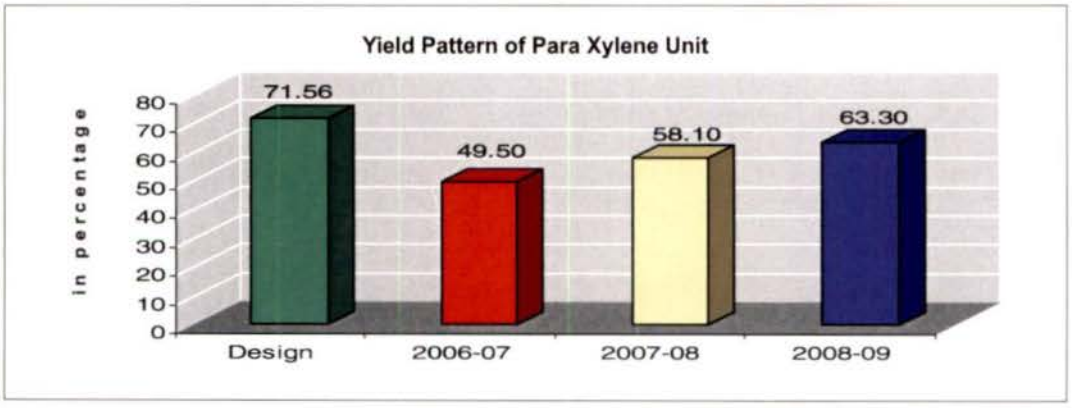
7.7.3.2 Under performance of PXPTA Complex – Panipat Refinery

The Company set up an Integrated Para Xylene (PX)/ Purified Teraphthalic Acid (PTA) integrated project (PXPTA Complex) (May-November 2006) at a cost of Rs. 2,630.11 crore at Panipat. The Project envisaged to process 5,00,000 MTPA of 'Heart Cut Naphtha' to be made available from Panipat and Mathura refineries to produce 3,57,810

MTPA Paraxylene, which would then be fed to PTA plant with other inputs (Oxygen and hydrogen) to produce 5,25,000 MTPA Purified Teraphthalic Acid.

A review of performance of the integrated PXPTA plant revealed that though the capacity utilisation of the unit was generally satisfactory, its yield recovery was less than the designed rate of recovery during all the three years (2006-09) of review as could be seen from the following chart **Chart 7.7**:

Chart 7.7



Audit also noticed that the Company was aware that one *per cent* increase in yield of PX unit enhances GRM by Rs. 8.47 crore[7], however, it could not achieve the designed yield in spite of commissioning of PX plant in May-November 2006. During 2008-09, there was a short recovery of 36,070.17 MT of PX resulting into loss of GRM of Rs. 69.93 crore[8].

The Management stated that the production of PX had not been as per projected yield as the actual feed to the complex was at variance from the designed feed.

The reply is not convincing as different grades of the feed (Naphtha) considered in DFR envisaged yield from 71.56 *per cent* to 71.74 *per cent*.

Recommendation No. 7.5

The Management should analyse the reasons for non-achievement of projected yield and take remedial measures to optimise the yield.

7.7.3.3 Un-fruitful expenditure on revamping of Resid Fluidised Catalytic Unit - Panipat Refinery

Resid Fluidised Catalytic Unit (RFCCU) at Panipat refinery was commissioned (January 1999) at a cost of Rs. 190.39 crore. In order to enhance LPG yield from 19 *per cent* to 29 *per cent* by weight from RFCCU, Panipat Refinery developed (November 2003) a process package and also increased (September 2008) its capacity from 7,00,000 MTPA to 8,50,000 MTPA at a cost of Rs. 81.67 crore through a revamp.

Audit observed that even after revamping of RFCCU, the yield of LPG remained at almost the same level (20 *per cent* weight) as it was before revamping (19 *per cent*

[7] ***As per performance of the Company and price of the PX prevailing during 2008-09***
[8] ***36070 MT at the rate of Rs 19386 per MT***

weight) which was much less than the envisaged LPG yield of 29 *per cent*. Thus, the expenditure incurred for revamping of RFCCU did not prove to be remunerative.

The Management in its reply stated that RFCCU's capability to produce 29 *per cent* of LPG was demonstrated and operation of RFCCU was adjusted because prices of MS were more than that of LPG.

The reply of the Management is not convincing as price of MS had always been more than that of LPG. This should have been considered at the DFR stage to avoid unfruitful investment.

7.7.4 Operating Cost Management and control

Operating cost is the cost of running a particular process, utility or department for a given period of time. The Company had fixed norms for cost control for power, steam and other utilities. However, it had not prepared any norms for payment of overtime allowance. The actual consumption of the utilities were within norms except excess consumption of power in Panipat Refinery in 2006-07 and 2007-08 resulting in extra expenditure of Rs. 20.94 crore.

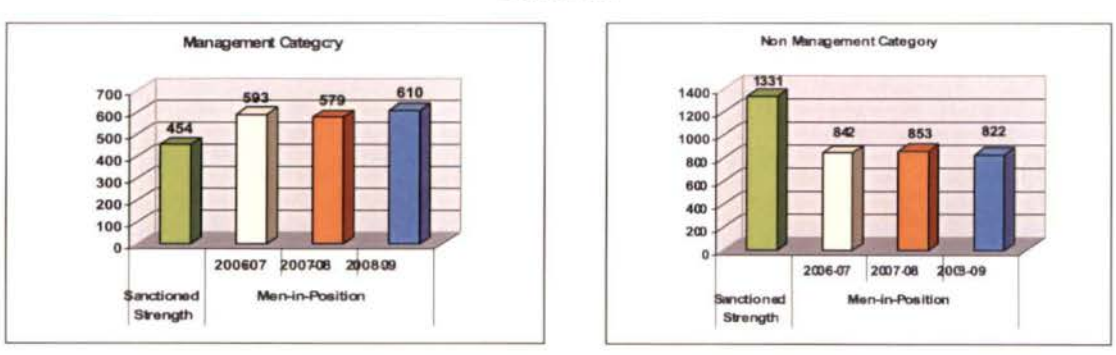
The Management stated that the excess consumption of electricity was on account of shut-down, start-up, revamp shut down and stabilisation.

The reply is not convincing as the Company itself was able to control the excess consumption of power in 2008-09 and there were no excessive unscheduled shut down in 2006-07 and 2007-08.

7.7.4.1 Higher establishment cost on payment of overtime allowance due to non-rationalisation of manpower - Mathura Refinery

In Mathura Refinery, the operating cost *per* MT had increased from Rs. 535 in 2006-07 to Rs. 693 in 2008-09. This increase was mainly attributed to increase of establishment cost from Rs. 137 *per* MT to Rs. 280 *per* MT. The sanctioned staff strength and men-in-position is given below in **Chart 7.8**:

Chart 7.8



It is seen from the above that there is excess men-in-position in the management category leading to higher establishment cost and less men-in-position than required in non-management category leading to higher overtime hours. As against the sanctioned strength of 331 in the production department, the actual men-in-position were 266, 291 and 282 at the end of 2006-07, 2007-08 and 2008-09 respectively. This shortfall in manpower was co-related with higher number of overtime hours which were 6,14,146

hours (Rs. 14.47 crore) during 2006-07, 6,25,711 hours (Rs. 15.54 crore) during 2007-08 and 5,70,363 hours (Rs. 15.32 crore) during 2008-09.

The Management stated that increased manpower cost was due to pay-revision and overtime (OT) hours had decreased over the last three years and initiatives to optimise manpower have been taken based on the attrition profile.

The reply is not convincing as an analysis of increase in establishment costs during last three years ending March 2009 across the Company's other refineries revealed that percentage increase was in the range of 97 to 111 in 2007-08 and 161 to 200 in 2008-09 whereas the same in Mathura refinery was 122 and 204 respectively.

Similar analysis of OT hours *per* MMT of throughput revealed that utilisation of OT hours in Panipat refinery ranged between 29,961 and 37,820 hours per MMT of throughput as against between 66,313 and 77,892 hours per MMT in Mathura. This indicates that there was scope for improvement in the case of Mathura Refinery.

Recommendation No. 7.6

The Management may strive to rationalise manpower and reduce establishment cost considering the parameters set by other refineries.

7.7.5 Refinery Asset Management

Refinery assets include primary and secondary processing units, storage facilities, utilities like power, steam, water *etc.* The main focus of refinery asset management is the adequacy of infrastructure available at refineries, commissioning of new plant(s)/secondary unit(s) and utilities, idle asset/standby assets, impairment of assets *etc.* A review of utilities provided in the refineries revealed that though water, steam and storage facilities were being utilised satisfactorily, there was a scope for improvement in respect of the utilisation of power generation capacity created in Panipat refinery, as brought out in the following paragraph.

7.7.5.1 Creation of excess power generation capacity

While considering the feasibility for expansion of Panipat refinery from 6.0 MMTPA to 12.0 MMTPA, the total power requirement was assessed to be 95 MW (50 MW normal power requirement of the existing refinery and 45 MW for expansion requirement) and additional requirement of 40 MW for PXPTA. Against the requirement of 135 MW the Panipat refinery created a total of 225 MW power generation capacity[9]. The refinery had also additional power back up from HSEB to take care of emergencies. Creation of such excess capacity was not justifiable.

The Management stated that normal power requirement for PR, PREP and PX/PTA units on the basis of design/feasibility report of consultant was 167 MW to 187 MW; DFR for Panipat Expansion Project did not include power requirements of PX/PTA. Accordingly, captive power plant of 225 MW capacity was installed considering additional requirements on account of annual maintenance and repair jobs.

[9] ***Three Turbo Generators with a capacity of 25 MW each and five Gas Turbines with a capacity of 30 MW each***

The reply is not convincing as the maximum regular usage during the three years (2006-09) *i.e.* consumption of power in the refinery as well as township was around 120 MW and it also had power back up arrangements with HSEB for temporary additional requirement.

Recommendation No. 7.7

The Management needs to evolve a proper mechanism to make reasonable estimates of the power requirement and explore possibilities of alternate uses of the excess generation capacity available with the Company.

7.7.6 Environment, health, safety and social aspects

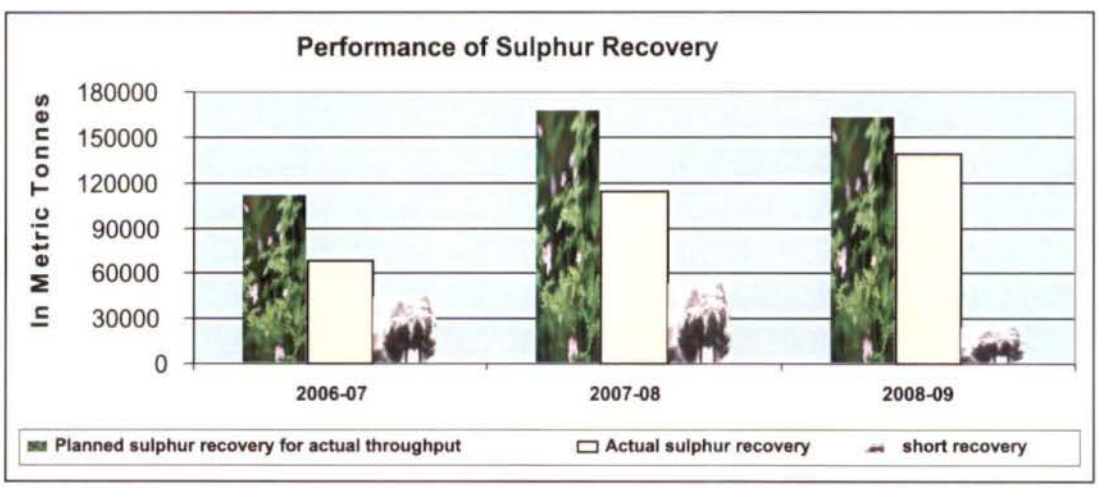
The details of norms fixed by statutory authorities for various pollutants and actuals there against in respect of Mathura and Panipat Refineries during the last three years ending 2008-09 are shown in ***Annexure-XXIV*** and there were no violations of any stipulation in respect of environmental aspects during last three years. However, there was scope for improvement in the following areas:

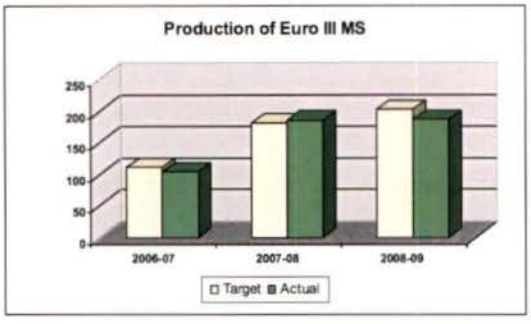
7.7.6.1 Non-removal of Sulphur to the optimum level - Panipat Refinery

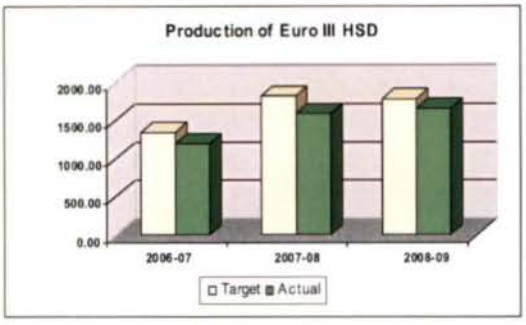
The Panipat refinery has a Diesel Hydro De-sulphurisation Unit (DHDS) and the Expansion Project has a Sulphur Recovery Unit. These units desulpharise the products and only residual amount of Sulphur remain in them. The more the Sulphur in the product, the more will it pollute the air after combustion leading to environmental hazards.

The planned sulphur recovery, production of Euro-III compliant MS and HSD as per ILP targets *vis-à-vis* actuals thereagainst in respect of Panipat Refinery during the last three years is depicted in the following **Chart 7.9**:

Chart 7.9







It is seen from above that the Company did not achieve ILP targets in terms of Sulphur recovery, production of Euro III compliant MS and HSD in all the three years except production of MS in 2007-08. The short recovery of sulphur also resulted in loss of Rs. 108.66 crore during the above three year period besides polluting the environment.

The Management stated that quality requirement of all the products was met and sulphur dioxide emission was well within the environmental norms. Quantity of Euro III grade product was decided considering the least positioning cost of product to the demand centers.

The reply is not convincing as the sulphur recovery in line with the ILP targets fixed by the Company would have resulted in additional profit from increased quantity of sale of sulphur and better quality of MS and HPS, besides reducing the environmental pollution.

Recommendation No. 7.8

The Panipat Refinery may endeavour to achieve maximum possible production targets (including sulphur recovery) rather than being content with the achievement of minimum statutory requirement.

7.7.6.2 Non Registering of FGRS as a Clean Development Mechanism project

For getting Clean Development Mechanism (CDM) benefits, Mathura and Panipat Refineries registered the following proposed projects with United Nations Framework Convention on Climate Change (UNFCCC):

- Pressure Recovery Turbine (PRT) in FCCU project,
- Reduction of the stripping steam in LGO and HGO stripper,
- Stoppage of DHDT furnace and Pinch analysis study of CDU pre-heat train,
- Utilisation of bio gas from PTA ETP to SRU incinerator,
- Installation of blending unit for use of water emulsified fuel in VDU-I furnace and
- Heat Recovery from C-7(Naphtha splitter) bottom product through stabliser-splitter heat integration.

Audit noted that Flare Gas Recovery System (FGRS) at Mathura[10] and Panipat[11] refineries initiated in August 2004 and June 2009 respectively were not registered for CDM. During the initial period of registration of ten years with UNFCCC, the Company could have gained Rs. 62.71 crore through 'Certified Emission Reduction' (CER) credits.

In response, the Management stated that FGRS projects at Panipat and Mathura did not meet the additionality criteria to get registered as CDM projects.

The reply is not convincing as similar projects at Haldia, Guwahati and Gujarat refineries were registered as CDM projects.

Recommendation No. 7.9

Once a policy decision has been taken by the Company to take credit under CDM, the Management may endeavour to make maximum use of the scheme in respect of eligible projects undertaken by it.

7.8 Conclusion

Out of the eight refineries of the Company, performance audit was conducted of two refineries located in northern India at Mathura and Panipat for three years 2006-09. Audit found that though the Company achieved MOU targets fixed by the Ministry, these targets were fixed without considering actual throughput in the previous year and planned on stream days. There was scope for enhancing capacity utilisation of the various secondary processing units (CCRU and RFCCU at Panipat Refinery) and enhancing the light and middle distillates, which are more profitable, by installation of Delayed Coker Unit at Mathura Refinery and achievement of designed yield in VBU and PXPTA at Panipat Refinery.

There was also a scope for more recovery of sulphur in accordance with the targets fixed by the Company and thereby enhancing GRM and helping in reduction of environmental pollution.

The matter was reported to the Ministry in February 2010; their reply was awaited (March 2010).

[10] ***Commissioned in October 2006***
[11] ***Scheduled to be commissioned in December 2010***

CHAPTER VIII

Oil and Natural Gas Corporation Limited

Exploration in shallow water blocks

Executive Summary

Oil and Natural Gas Corporation Limited (Company) has been carrying out activities relating to exploration and production of hydrocarbon since 1956. The Company has offshore shallow water blocks (water depth upto 400 metres) in five sedimentary basins.

Upto 1998, the Company was offered exploratory blocks on 'nomination basis' (nomination blocks). The policy for nomination blocks was also amended in March 2002. In 1999, the MoPNG implemented the New Exploration Licensing Policy (NELP) through the Directorate General of Hydrocarbons.

The Performance Audit covered performance of the Company during 2004-08 in 37 shallow water blocks comprising of 21 nomination blocks and 16 NELP blocks. Performance Audit revealed systemic and compliance deficiencies mainly relating to absence of norms for key activities, delays/failures in carrying out acquisition, processing and interpretation (API) of seismic data, delayed tendering, mismatch in planning of exploration activities including drilling of wells which resulted in unfruitful expenditure (Rs. 2,136.45 crore) and avoidable expenditure (Rs. 94.67 crore) besides entailing liability for payment of liquidated damages (Rs. 252.20 crore).

- In 7 of the 16 NELP blocks, the Company took 8 to 12 months in completion of Environment Impact Assessment (EIA) studies which had adverse impact on timely API of seismic data. In the absence of norms, the reasonableness of time taken in completion of EIA studies and API could not be ascertained in audit.
- The pace of completion of API was also very slow in a number of blocks with the result that exploration commitments in the nomination as well as the NELP blocks could not be completed in time. The slow pace coupled with the mismatch between rig deployment plan and availability/deployment of rigs affected in fulfilling the drilling commitments. This had cascading adverse impact as exploration blocks had to be surrendered after incurring substantial expenditure.
- There was no reserve accretion in any of the 16 NELP blocks as all the wells drilled were found to be dry. The Company had surrendered/proposed to surrender 10 of the 16 NELP blocks after incurring substantial expenditure of Rs. 1,461.36 crore over the period 2004-08 though the Company had bid for the blocks after analyzing their prospectivity.
- Some of the important recommendations made by Audit in the Report deserve attention of the Management towards (a) completion of exploration activities in a time bound manner to avoid surrender of blocks; (b) prescribing norms for EIA and determining average API cycle time to ensure their timely completion; (c)

initiation of tendering process well in advance so that survey vessels could be hired and deployed at the beginning of the fair weather season and; (d) ensuring availability of suitable rigs while finalising the rig deployment plan.

Summary of recommendations

The Company should:

(i) Complete exploration activities in a time bound manner as re-grant for these blocks would not be available beyond the current re-grant cycle as per MoPNG Directive of 2002, to avoid surrender of nomination blocks without fully exploring their prospectivity.

(ii) Determine the average API cycle time for each basin and monitor its adherence to ensure completion of the API cycle.

(iii) Initiate the tendering process in advance so that the survey vessels could be hired and deployed at the beginning of the fair weather season.

(iv) Observe its internal instructions relating to floating of a single consolidated tender for similar description/specification of work.

(v) Initiate the process for pre-seismic EIA studies immediately after award of the blocks and also frame norms to ensure their timely completion.

(vi) Ensure timely signing of rig deployment plans and service level agreements for effective utilisation of drilling resources.

(vii) Ensure availability of suitable rigs while finalsing the rig deployment plan.

(viii) Release the locations on time considering the commitments scheduled in the PSC.

(ix) Ensure soil investigation prior to rig movement.

(x) Ensure reduction of non productive time by better coordination among the various service providers.

8.1 Introduction

Oil and Natural Gas Corporation Limited (Company) has been carrying out activities relating to exploration and production of hydrocarbon since 1956. Upto 1998, the Company was offered exploratory blocks on 'nomination basis' and was allowed to apply to the Ministry of Petroleum and Natural Gas (MoPNG) for grant of Petroleum Exploration Licence (PEL) in respect of the blocks and, hence, these blocks were called nomination blocks.

To accelerate the exploration of hydrocarbon resources in the Indian sedimentary basins[1], the MoPNG in 1999 implemented the New Exploration Licensing Policy (NELP) through the Directorate General of Hydrocarbons (DGH) by offering the exploratory blocks to private as well as foreign players. Between 1999 and 2006, 50 shallow water blocks (water depth upto 400 metres) in five sedimentary basins[2] were offered under NELP I to VI rounds to private as well as public companies including joint ventures. The main

[1] ***Sedimentary basins are depressions in the earth's crust where organic matters are deposited.***
[2] ***1.Western offshore, 2.Krishna Godavari, 3.Cauvery, 4.Mahanadi-Bengal-Andaman and 5.Cambay.***

features relating to grant of the nomination and NELP blocks are given in ***Annexure-XXV.***

Year-wise number of blocks held by the Company in five sedimentary offshore basins in the category of nomination as well as NELP blocks for the period from 2004-05 to 2007-08 were as under:

Table 8.1

Shallow water blocks with the Company during 2004-08

Year	Nomination blocks			NELP blocks			
	Opening balance	Surrendered	Closing balance	Opening balance	Acquired	Surrendered	Closing balance
2004-05	21	-	21	12	-	1	11
2005-06	21	-	21	11	2	-	13
2006-07	21	1	20	13	-	4	09
2007-08	20	2	18	9	2	1	10

8.2 Scope of audit

The Performance Audit covered exploratory activities of the Company in 37 shallow water exploratory blocks (21 nomination blocks and 16 NELP blocks) for the period from 2004-05 to 2007-08. The activities covered under the performance audit included data acquisition, processing and interpretation (API), release of locations for drilling, drilling of exploratory wells and estimation of reserve accretion.

8.3 Audit objectives

The Performance Audit of the exploration in shallow water blocks was carried out keeping in view the criticality of the exploration activities in achieving the strategic pursuit of intensified exploration of the Company which aims to create new oil and gas assets on a continuous basis through reserve accretion. The main audit objectives were to assess that:

- Adequate exploratory efforts were made for nomination blocks in view of MoPNG Directive 2002;
- Minimum Work Programme (MWP) commitments made in the Production Sharing Contracts (PSCs) of NELP blocks were fulfilled within the prescribed time;
- Adequate and timely acquisition, processing and interpretation of data was done and suitable locations were released;
- Adequate drilling resources were hired and deployed in time for fulfilling the drilling targets;
- Targeted reserve accretion was achieved;
- Requisite environmental clearances were secured in time and were in compliance with statutory requirements; and

- Measures were taken to ensure safe and healthy working conditions of the employees.

8.4 Audit criteria

i. *Exploration of nomination blocks:* Work commitments under nomination blocks.

ii. *Exploration of NELP blocks: PSCs and MWP commitments, policies of MoPNG/DGH as applicable.*

iii. *Acquisition, processing and interpretation of data: Preparation of exploration* work programme, applicable provisions of Material Management (MM) Manual/Corporate directions, last purchase price in respect of the contracts for API entered into by the Company during earlier period, market trend and conditions of contract.

iv. *Hiring of rigs and drilling: MWP, Service Level Agreement (SLA), Rig Deployment Plan (RDP), rig hiring contracts and well objectives.*

v. *Reserve accretion: Geo Technical Order (GTO), production testing, well completion, Five Year Plans (FYPs) and Annual Plans (APs).*

vi. *Health, Safety and Environment (HSE) Management: Statutory requirements, and HSE* policy of the Company.

8.5 Audit methodology

Audit reviewed the records relating to acquisition of shallow water exploratory blocks besides contracts and payments for survey and interpretation of data, interpretation reports, planning and execution of deployment of rigs, well completion and reserve accretion and HSE management relating to these blocks. All the 37 blocks (21 nomination and 16 NELP blocks) were selected for reviewing activities relating to acquisition, processing and interpretation (API) of seismic data for the period from 2004-05 to 2007-08. Of the 78 exploratory wells drilled in 20 blocks, a sample of 41 wells was selected. This included six wells over six blocks where one well each had been drilled and 35 wells, about 50 *per cent, selected on random sampling basis from* 14 blocks where more than one well was drilled.

An entry conference with the Management was held on 21 January 2009 wherein the audit objectives, scope and methodology were explained. Audit findings and recommendations were discussed in the exit conference held on 3 December 2009.

8.6 Acknowledgement

Audit is thankful for the cooperation extended by the Management at all levels in providing information, records and clarifications to Audit from time to time and for arranging discussions with the concerned officers as and when required. Their cooperation facilitated the conduct of the review.

8.7 Audit Findings

Performance Audit revealed audit findings relating, mainly, to mismatch in planning of exploration activities, delays/failure in carrying out acquisition, processing and interpretation of seismic data and drilling of wells, surrender of blocks involving

unfruitful expenditure (Rs. 2,136.45 crore), avoidable expenditure (Rs. 94.67 crore) besides liability/payment of liquidated damages (Rs. 252.20 crore) due to systemic and compliance deficiencies. The audit findings are discussed in the succeeding paragraphs:

8.7 A Exploration of nomination blocks

8.7.1.1 The Company acquired 21 nomination blocks ***(Annexure-XXVI)*** in shallow waters between 1985 and 1999. These blocks were retained on re-grant obtained from MoPNG between 2001 and 2005. The Company could convert two nomination blocks[3] into Mining Lease (ML) and four[4] were relinquished on account of low prospectivity during the review period. Nine blocks[5] were in the last two years of the exploration cycle whereas the remaining six blocks[6] were in the fifth year of re-grant.

The Company had achieved the targets for 'acquisition, processing and interpretation' of seismic data and drilling of wells in four blocks[7]. However, exploratory efforts in respect of another five blocks (ED-A, WO-9, SWBH, KDGKH and C-OS-IX) were slow and only seven against the commitment of 13 wells were drilled.

Scrutiny in audit revealed that in the above five blocks the Company had taken more than two years to reprocess and interpret the seismic data. Acquisition of fresh data was also delayed which resulted in delay in release of locations and drilling of wells. The existing re-grant validity of the fifth year of KDGKH block expired in March 2009 and that of ED-A block was expiring in November 2009. The re-grant validity of the C-OS-IX block was upto December 2010. The Company approached (April 2009) MoPNG for further extension in ED-A and KDGKH blocks. The MoPNG granted (October 2009) further extension upto March 2011 for KDGKH block as a one time dispensation subject to production of bank guarantee equivalent to committed work programme, drilling of one well during the extended period and to pay liquidated damages in case the Company fails to complete the committed work programme within the permitted time. This condition was also made applicable to C-OS-IX block.

Thus, even after retaining the five blocks for more than ten years till April 2009 and incurring an expenditure of Rs. 390.67 crore (during 2004-08) on exploratory efforts, the Company was yet to explore their potential. Further, no extension had been granted for three blocks (ED-A, WO-9 and SWBH). In case no discovery is established during the current cycle, these three blocks will have to be surrendered as per MoPNG Directive 2002.

The Management while acknowledging (November 2009) the delays stated that the constraints like acquiring of 3D data with Ocean Bottom Cable (OBC) technology, drilling commitments *vis-à-vis* rig availability impacted the progress of exploration.

The reply is not satisfactory as not only was the Company's pace of acquisition of seismic data slow, the Company consumed more than two years of the re-grant period in interpretation of seismic data alone with the result that subsequent exploration activities

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[3] ***BOX-III and B-192-A.***
[4] ***B-192, Kutch H Block I & II, C-OS-X and SM-86 (Annexure-II).***
[5] ***ED-A, WO-9, SWBH, R6/R28, (BOFF-1/2/3), KDGKH, C-OS-IX, IF and IG (Annexure-II).***
[6] ***Saurashtra Dahanu, Kutch BK-I, Kutch A&B, IA, IB and IE (Annexure-II).***
[7] ***IF, IG, R6/R28 and BOFF-1/2/3.***

were also delayed and potential of the blocks had not been established as of September 2009 even after retaining them for more than 10 years.

a) Non-achievement of exploratory objectives in WO-9 block

WO-9 block having an area of 562 square kilometer (SKM) in Western Offshore basin (WOB) had been with the Company since December 1996. The first re-grant was obtained (December 2002) for four years (upto 2006) after relinquishing an area of 144 SKM. During the re-grant period, 135 Line Kilometer (LKM) of 2D data was acquired. Interpretation of 2D data and re-interpretation of 3D data (acquired in the original grant period) took almost three of the four years' re-grant period. Fresh 3D data was acquired during the fourth year of the re-grant period. However, no location was identified for drilling and extension for retaining the block was obtained upto December 2009. The Company acquired additional 3D data in February 2009 at a cost of Rs. 17.31 crore. Interpretation of the data for generating prospect was in progress (September 2009) whereas the current cycle of the re-grant was expiring in December 2009. Despite holding the block since 1996, the exploration in this block remained incomplete. The Company had incurred an expenditure of Rs. 34.86 crore in the block during 2004-05 to 2007-08. Though the Company had planned drilling of one well during the last year ending December 2009, the abnormally long time taken in acquisition of seismic data reduced the availability of time for processing and interpretation of the 3D data, generation and release of location to only three months as the re-grant period was expiring in December 2009.

The Management while accepting that the drilling priorities could have been improved, stated (November 2009) that the Company had been able to convert 135 SKM area of the block into mining lease by delineating the discoveries in blocks B-192 and B-45.

The fact remains that the Company had been retaining the block for the last 13 years and conversion of the area into mining lease was not as a result of exploratory efforts in WO-9 block. The Company may have to surrender remaining 283 SKM area of the block as it consumed three of the four years of the re-grant period in acquisition of data only and failed to establish the potential of the block.

b) Relinquishment of prospective area in IB Block

The Company was having IB block with an area of 1,187.5 SKM in Krishna Godavari basin since October 1986. One well (GS-29-1) drilled in GS structure in December 1992 indicated presence of oil and gas. The northern part of the block (246 SKM) was, however, surrendered during 1994 for development through a joint venture. The Company further surrendered 726.11 SKM of this block in August 1995 and retained only a net area of 165 SKM. It acquired additional 2D and 3D data in 1998-2004. Meanwhile, the second re-grant period expired in October 2004 and the Company had to relinquish (November/December 2004) 42 SKM area, being 25 *per cent* of remaining area due to insufficient coverage of 2D/3D data and non observance of interesting hydrocarbon zones. The Company further acquired 3D Q-marine data of 65.11 SKM and drilled (October 2004 and February 2005) two wells, of which one (GS-29-5) was gas bearing. Further processing of 3D Q-marine and GXT[8] data (December 2008) revealed

[8] ***A specialised survey for acquiring 2D long offset data.***

that the deposits of 'cretaceous period'[9] in the adjoining prospective blocks (*viz.* IG and IE) were extending through the surrendered area of 16.82 SKM of the IB block.

Audit observed that due to delay of 16 years (December 1992 to December 2008) in mapping and delineating the extension of discovery noticed in GS-29-I well, the Company had to relinquish 16.82 SKM prospective area.

In its reply (November 2009), the Management did not offer any comments.

c) Acquisition of C-OS-X block in notified area leading to its surrender

The Company acquired C-OS-X block (area 1,155 SKM) in Cauvery offshore for four years in January 1998. Against the commitment of 'acquisition, processing and interpretation' of 700 LKM of 2D data and drilling of four wells, the Company could acquire only 566 LKM of 2D data. No wells were drilled since Tamil Nadu Government (Forest Department) had denied (January 2002) permission for drilling of wells as the area fell within 'Gulf of Mannar Biosphere[10] Reserve' water portion and drilling activities would have an adverse impact on the reserve. Subsequently, the Company obtained (May 2004) re-grant from MoPNG for an area of 866 SKM for another four years till December 2007.

Audit observed that the area was notified as biosphere area in June 1989. Despite refusal (January 2002) by the Tamil Nadu Government to grant permission on the ground that the block fell in a biosphere reserve, the Company obtained (May 2004) re-grant without bringing out these facts in its application to MoPNG. The Ministry of Environment and Forest (MOEF) declined (March 2007) Environment Clearance (EC) for undertaking drilling operations in the block on the ground that the block was located in the biosphere reserve. Consequently, the Company could not undertake drilling operations in the block even during the extended grant period. One location GMS-9-1 in the block was drilled from land as an extended reach drill well to probe Nannilam and Bhuvanagiri formations. However, the target formations could not be penetrated due to complications. As MOEF declined to give EC for drilling operations in the block, the Company relinquished the block (July 2008) after incurring unfruitful expenditure of Rs. 23.26 crore on exploration activities.

The Management stated (November 2009) that awarding of the said block and subsequent re-grant by MoPNG for the same implied that exploration activities could be carried out in the area subject to fulfillment of necessary obligations/commitments. As the MOEF denied permission even after active pursuance by the MoPNG, there was no option for the Company but to surrender the block.

The reply indicates that both the MoPNG as well as the Company failed to ascertain whether the block was within the notified biosphere area at the time of initial grant. Even after noticing in January 2002 that the block was located in biosphere area and not fit for undertaking petroleum exploration activities, obtaining of re-grant from MoPNG in May 2004, and making attempts to obtain EC from MOEF for continuing drilling activities in such an area was not justified. This resulted in unfruitful expenditure.

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[9] ***Refers to time period between 144 million and 66 million years ago.***

[10] ***Biosphere is the ecological system integrating all living beings and their relationships, including their interaction with the elements of the lithosphere, hydrosphere and atmosphere.***

8.7 B Exploration of NELP Blocks

8.7.1.2 At the time of bidding for 16 blocks ***(Annexure-XXVII)*** acquired under NELP I to NELP VI rounds, the Company had the data of 2D survey of 99,074 LKM, 3D survey of 450 SKM as well as data of 52 wells drilled, of which 45 wells were dry ***(Annexure XXVIII).*** The Company also had identified 89 prospects and 33 prospective leads in these blocks and had bid for these blocks after analysing their prospectivity, the project economics and MWP involved.

Audit observed that after acquisition of these blocks, the Company incurred an expenditure of Rs. 1,632.48 crore during 2004-05 to 2007-08 on surveys, drilling of wells *etc.* However, it could not make hydrocarbon discovery in any of the blocks and surrendered/proposed to surrender 10 blocks after incurring an expenditure of Rs. 1,461.36 crore (2004-05 to 2007-08) on the ground that the blocks were not prospective though the Company had bid for these blocks after analysing their prospectivity.

8.7.1.3 Non completion of Minimum Work Programme leading to payment of penalty

In the Minimum Work Programme (MWP) of Phase I of nine NELP blocks ***(Annexure XXVII),*** the Company committed to drill 28 wells besides acquisition, processing and interpretation (API) of 2D/3D seismic data on or before March 2009.

Audit observed that the Company could drill only seven wells leaving a shortfall of 21 wells in nine blocks. Consequently, the DGH raised a demand for Rs. 309.44 crore as liquidated damages, of which the Company had since paid Rs. 68.80 crore as of September 2009.

The Management stated (November 2009) that Phase I is primarily meant for data acquisition. In respect of the nine blocks commented upon, the entire Phase I period was consumed mainly for API of 2D or 3D surveys and the wells committed could not be completed, due to reasons beyond its control.

The reply is not tenable as the Phase I commitments in nine blocks included data acquisition as well as drilling of exploratory wells (one well each committed in four blocks and three to eight wells committed in the five blocks) which were not fulfilled. Further, the delays were avoidable as brought out in the subsequent paragraphs[11].

Recommendation No. 8.1

To avoid surrender of nomination blocks without fully exploring their prospectivity, the Company should complete exploration activities in a time bound manner as re-grant for these blocks would not be available beyond the current re-grant cycle as per MoPNG Directive of 2002.

8.7.2 Acquisition, Processing and Interpretation of seismic data

Geophysical survey - the prime activity in exploration of hydrocarbons is carried out both in nomination and NELP blocks wherein 2D and 3D seismic data is acquired, processed and interpreted for analysing hydrocarbon accumulations. Prospects are thereby generated for release of locations for drilling of wells. Phase-wise MWP for the NELP

[11] ***Paragraph No. 8.7.2.1, 8.7.2.2, 8.7.2.2(iii), 8.7.2.3, 8.7.2.5, 8.7.3.3 (i) and 8.7.5.2***

blocks under Production Sharing Contracts (PSCs) and the work commitments for the nomination blocks stipulated targets for acquisition of seismic data.

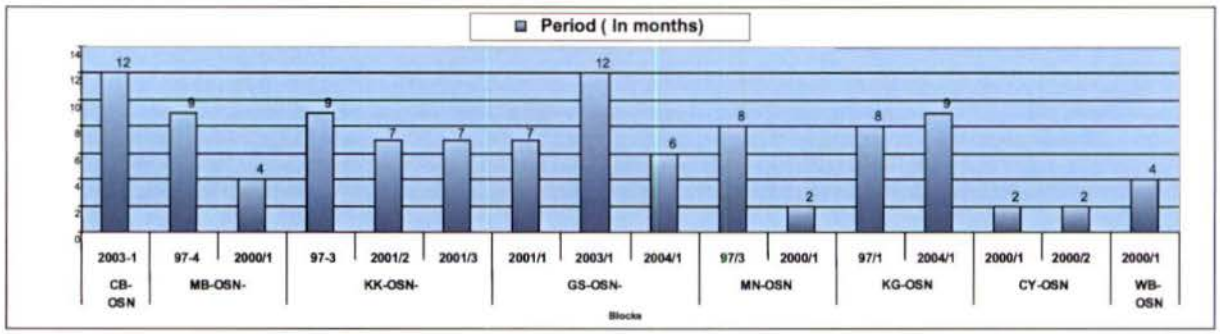
8.7.2.1 Time taken for pre-seismic Environment Impact Assessment (EIA) Studies

As per article 14.5 of the PSCs, the Company was required to carry out pre-seismic EIA studies before commencement of seismographic or other surveys. Pre-seismic EIA studies were assigned to National Environmental and Engineering Research Institute (NEERI)[12].

Audit observed avoidable delays of upto eight months from the date of award of the blocks in issuing work orders to NEERI to get the pre-seismic EIA studies conducted. The **Chart 8.1** given below shows the time taken by the Company towards conducting pre-seismic EIA studies in 16 NELP shallow water blocks:

Chart 8.1

Chart 1: Time consumed in pre-seismic EIA studies in NELP blocks



In five NELP blocks, Phase I was for two years and in respect of 11 blocks it was three years within which the Company had committed API of seismic data and drilling of exploratory wells.

Considering that in Phase-I, the major time required was for API of seismic data followed by identification/release of locations and, in some cases drilling of wells, ideally the EIA studies should be completed within a reasonable time from the date of award of a NELP block. However, the Company took 2 to 12 months for conducting pre-seismic EIA studies. The references for the studies were made to NEERI with delays upto eight months from the date of award of the blocks. Thus, in 7 of the 16 blocks, EIA studies alone took 8 to 12 months which impacted adversely the time available for API of seismic data.

The Management assured (November 2009) that necessary care would be taken in future to avoid unreasonable delays.

8.7.2.2 Delay in completion of API cycle

Acquisition, processing and interpretation (API) of seismic data is a crucial activity in petroleum exploration process as subsequent exploration activities for achievement of MWP/work commitments in the exploratory blocks depend on timely completion of API of the data and results thereof. API cycle includes planning also and the cycle ranges between three and ten months in offshore.

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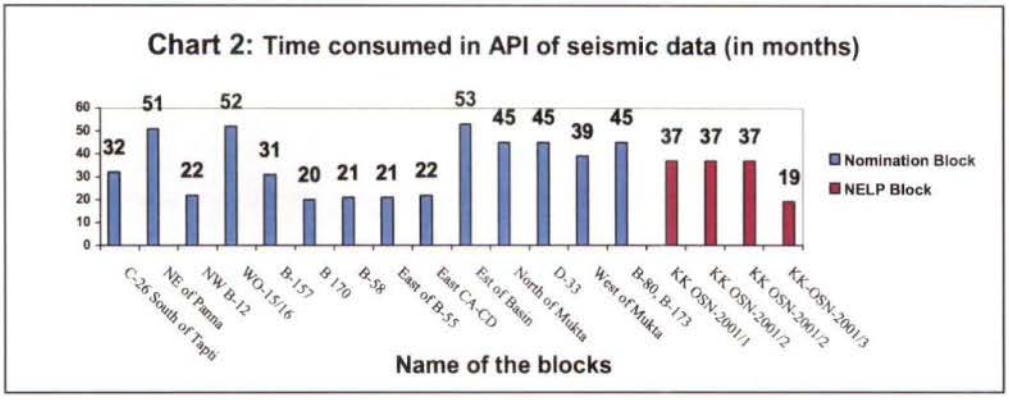
[12] ***NEERI is a Government agency to conduct such surveys in India.***

Audit reviewed the time taken for API cycle in respect of 14 prospects in nomination blocks and four in NELP blocks and observed that the actual time taken by the Company varied from 20 to 53 months in case of nomination blocks and from 19 to 37 months in case of NELP blocks as can be seen from the following **Chart 8.2:**

Chart 8.2



Audit further observed that the Company had not fixed any norms for each stage of the API cycle in offshore in the absence of which the reasonableness of the actual time taken could not be ascertained in audit. Audit observations relating to API cycle are discussed in the succeeding paragraphs.

The Management assured (December 2009) to review the feasibility of formulating basin specific norms for the API cycle.

(i) Relinquishment of prospective block due to delay in reprocessing and interpretation of data

B-142 nomination block was granted to the Company in April 1991. The first re-grant was allowed for an initial period of four years extendable by two years upto 21 April 2003. During the extended period, the Company carried out interpretation and special processing of the existing 2D data acquired before 1997 and studies around the identified prospects. Two wells drilled during 2000-02 indicated presence of hydrocarbon. The Company obtained (22 April 2003) second re-grant for four years and planned for acquisition of 3D data in 2004-05. However, the data was acquired only during the fourth year (2006-07) of the second re-grant by Q-marine technology. One location was released for drilling on 4 February 2008. The well (B-17-B) on the location was originally planned to be drilled by a jack up rig which was changed (January 2008) to a floater rig after soil investigation[13]. By the time the floater rig could be deployed, fifth year of the re-grant period expired (21 April 2008). On the request (September 2008) of the Company, the MoPNG agreed for extension upto 21 December 2008. The well drilled (September 2008 to November 2008) was found to be dry. As there was no discovery in the current re-grant cycle (though in earlier re-grant cycle there was an indication of hydrocarbon), the Company had to surrender (18 February 2009) the block on the direction of DGH.

Audit observed that the Company took more than three years (April 2003 to 2007) in interpretation and re-processing of 2D data which resulted in surrender of the block.

[13] ***Study for determining the physical strength of soil for deploying the rig.***

Therefore, due to delay in acquisition of 3D survey and slow progress of activities, a prospective block had to be surrendered after incurring an expenditure of Rs. 65.64 crore.

The Management stated (November 2009) that the Q-marine technology had been available since 2005. After its induction in other high priority areas, the same was introduced in the block in the field season 2006-07. This delay was also allowed by MoPNG and extension upto 21 December 2008 was granted.

The reply is not satisfactory as the Company was aware that the extended validity of the block was expiring in April 2008 and, hence, should have prioritised the acquisition of Q-marine data to pursue the leads obtained in October 2001. Though one well could be drilled in the extended period, the Company could not identify and drill any other location in the block during the re-grant period of five years to pursue the leads.

(ii) Slow exploratory efforts in the Kutch I A and B block despite obtaining hydrocarbon leads in an adjoining block

Kutch I A&B block was granted (6 June 1998) to the Company for four years upto 5 June 2002 followed by two extensions of one year each. On the basis of hydrocarbon leads obtained in an adjoining block *viz.* Kutch block extension where a gas well produced 28197 cubic metre of gas per day, the Company carried out interpretation and re-interpretation of the existing 2D data in Kutch I A&B block during 1998-2003 to probe Mesozoic[14] sequence. The Company also acquired additional 2D data in Mesozoic sequence and 140 SKM of 3D data during 2003-04 and applied (April 2004) to MoPNG for re-grant to explore the area further. An Internal Report[15] recommended (May 2005) acquisition of long offset data (10 kilometers or more) to get a better picture of the Mesozoic sequence. The Company, however, took two years to implement the recommendation and placed LOA in September 2007 for acquisition of 2D long offset data. As a result, only acquisition and processing of data could be completed till June 2009. Meanwhile, the Company applied (March 2009) for extension of the block for the sixth year. The MoPNG was yet (November 2009) to grant the extension for the block. Validity of the block would expire in June 2010.

Audit observed that the Company took four years in acquiring 2D long offset data to explore the Mesozoic sequence. Due to delay in acquiring 2D long offset data, the time left to probe the Mesozoic sequence was extremely short. Further, in view of slow progress of the exploratory efforts, the Company could not generate prospect in the block even after retaining the block for more than 10 years. The Company spent Rs. 52.50 crore in this block during 2004-08 and in case no discovery is made, it has to relinquish the block as per MoPNG directive 2002, without exploring the Mesozoic sequence.

The Management stated (November 2009) that 2D long offset seismic survey (5,230 LKM) was awarded in 2004-05 which, however, did not materialise due to non-mobilisation of vessel by the contractor.

The reply does not address the delay of two years in awarding the contract and the slow progress in exploration as validity of block will expire by June 2010.

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[14] ***Mesozoic refers to the rocks/strata deposits during the time period between 240 to 66 million years ago.***

[15] ***Internal Report on "Evaluation of Strati-Structural Prospects for Paleogene and Mesozoic sequences in Gujarat Kutch (GK) 28-41 Area (December 2004) and GK-3 area (May 2005)".***

(iii) Two blocks, KK-OSN-2001/2 and KK-OSN-2001/3, were awarded to the Company under NELP-III round with effect from 12 March 2003. In February 2006, the Company sought permission for extension of Phase I of MWP on the ground that available data from the already drilled wells in the area had cast doubts on the efficacy of the petroleum system in tertiary sediments and acquisition of 2D long offset data for probing the Mesozoic sequence was planned. The Company could not acquire the planned long offset seismic data for probing the Mesozoic sequence upto 10 August 2006 and sought another extension of Phase I after payment of Rs. 11.56 crore to the DGH.

Scrutiny in audit revealed that based on the wells drilled in this area, the Company had conducted a study in 1996 which indicated absence of source rock in the tertiary sediments. Despite having sufficient data for the area, the Company committed acquisition of the conventional 2D seismic data of 1,000 LKM in the block instead of 2D long offset data. Though the Company had awarded two contracts for acquisition of the long offset 2D data in 2004-05 and 2007-08, the requirement of acquisition of data in KK shallow water was not included in either of these contracts. Therefore, the Company had to seek second extension in Phase I till March 2007 after payment of LD of Rs. 11.56 crore in October 2006. The blocks were in possession of the Company till September 2009 when KK-OSN-2001/2 block was surrendered.

The Company did not make any efforts to induct the technology till September 2007 when it awarded a contract for induction of 2D long offset seismic data technology even though it had sought extension on the ground of its plans for induction of the technology in the blocks and paid LD.

The Management stated (November 2009) that the long offset technology was a new concept and its efficacy was unknown at the time of planning 2D data acquisition in this block. Further, Phase I of these blocks had expired by March 2007 with two extensions of six months each and, therefore, no provision was kept for long offset data while planning long offset survey in 2007-09.

The reply is not satisfactory as in September 2007 the blocks were valid and could have been included in the contract awarded for 2D long offset. The reply also does not explain the reasons for committing of acquisition of 1,000 LKM of conventional 2D data in Phase I even though inadequacy of this type of data in probing the Mesozoic sequence was known.

8.7.2.3 Delays due to tendering processes

As per the Company's Material Management Manual, the tender was to be finalised within 120 days for placement of Letter of Award (LOA). Sixty days were allowed for mobilisation of vessels. Considering the fair weather season from October to May and 60 days for mobilisation of the vessel, the tenders were to be finalised latest by the end of July each year. Audit observed that due to delay in finalising the tenders, the vessels could not be mobilised in time and the Company lost the fair weather season as discussed in the succeeding paragraphs:

(i) The proposal for acquisition of 3D data for the NELP blocks (GS-OSN-2001/1, KK-OSN-2001/2 and KK-OSN-2001/3) was approved on 21 May 2003. The tender was floated on 29 July 2003 and the LOA issued on 5 November 2003 *i.e.* after one month of the start of fair weather season. The contractor commenced work on 13 January 2004

after taking 60 days for mobilisation. Thus, the Company lost three months of fair weather season due to delay in finalisation of the tender. Further, due to bad weather conditions the acquisition work in block KK-OSN-2001/2 suffered and the work was suspended due to onset of monsoon. The Company obtained two extensions of six months each in this block by paying a penalty of Rs. 5.68 crore.

The Management stated (November 2009) that the tender was finalised on highest priority and the LOA was issued at the earliest.

The reply is not tenable as the tender was floated in July 2003 and LOA was awarded in November 2003. Hence, the contractor could commence work only in January 2004. As the Company was aware that the field season begins from October, the LOA should have been placed well in time so as to allow the contractor to commence work by availing the full field season.

(ii) M/s. Viking Maritime (contractor) submitted (25 October 2005) a proposal to carry out 3D seismic survey in the B-12-B area and West of Mukta in Bombay offshore1/2/3 block. The Company took three months to analyse this proposal and asked the bidder to resubmit the proposal considering the streamer length of 6,000 metres for B-12-B and 5,000 metres for West of Mukta. The bidder submitted (24 February 2006) the technical details of two streamers, each of 4,950 metres length and proposed to complete the work by February 2007. The Company, however, placed the order on 12 April, 2006 with streamer length of 6,000 metres and 5,000 metres. The contractor informed that its offer was only for 2 X 4,950 metres which was valid upto 23 June 2006. The Company revised the streamer length to 5,000 metres and placed the revised order only on 23 August 2006, which was declined by the contractor due to expiry of the validity of the offer. Consequently the acquisition of the 3D data was delayed by one year as the Company got the work carried out through two different contracts during 2006-07.

The Management stated (November 2009) that the data was subsequently acquired for area B-12-B without extra expenditure.

The reply is silent regarding the lapse of the Management in overlooking the technical specifications submitted by the contractor and the consequent delay in acquisition of data.

8.7.2.4 Delays in acquisition of data due to splitting up of order for hiring of survey vessels

Instructions issued (April 2002) by the Company stipulated that for a given description/specification of work, a single consolidated tender be floated. Audit, however, observed that the instructions were not followed while hiring services for acquisition of seismic data through advanced technologies *viz.* Ocean Bottom Cable (OBC) and Q-marine mode for acquisition of 3D seismic data as discussed in the succeeding paragraphs:

(i) M/s Western Geco (contractor) offered (26 July 2004) Q-marine vessels for hiring on a long term basis for seismic surveys for one to three field seasons at US$ 7.5 million per month with two *per cent* discount. The Company took ten months (till May 2005) to form a Committee to review the proposal. The Committee recommended (29 June 2005) for hiring of the vessels. After one year from the date of offer, the Company placed first LOA on 14 August 2005 on the contractor for one vessel each for field seasons 2005-06 and 2006-07 and second LOA on 26 August 2005 for another one vessel for field season

2005-06. Within a gap of nine months, the Company also placed (9 June 2006) a third LOA for one vessel for field season 2006-07 at higher rate (US $ 8.75 million per month).

Audit observed that the Company failed to firm up the requirement for Q-marine survey though it took one year to finalise the proposal. Moreover, the blocks awarded for the field season of 2006-07 were available at the time of awarding the second LOA and could have been clubbed with the first two LOAs. Thus, failure of the Company to firm up the requirement at the time of finalising the contract resulted in an extra expenditure of Rs. 40.32 crore[16].

The Management stated (November 2009) that as the Q-marine technology was totally new and to test its efficacy it was initially deployed in areas where conventional surveys had been done or discoveries had been made. The effectiveness of Q-marine technology could be established only after a certain period of time.

The reply that efficacy needed to be tested is not tenable, as the Company had been deploying the Q-marine technology in the blocks where conventional 3D data acquisition had not been done. It placed an order for three vessels in August 2005 which did not justify that order was for testing the efficacy. Moreover, the order placed in June 2006 was for only one vessel which could have been clubbed with that of August 2005.

(ii) The Company proposed (May 2004) acquisition of 1,176 SKM of 3D seismic data through OBC mode in the block Bombay offshore1/2/3 block (covering North Mid-Tapti (NMT) and Navasari-Low) and ED-A during 2005-06. The Company awarded (July 2007) a contract for carrying out survey in NMT area and ED-A block at the rate of US $ 84,844 (Rs. 34.17 lakh) per SKM and awarded (October 2008) the work relating to Navasari Low to the same contractor at the rate of US $ 97,962 (Rs. 47.63 lakh) per SKM after a gap of more than a year. Audit observed that splitting of work into different contracts not only resulted in delay in acquisition of data in Navasari Low area by one year but also resulted in an extra cost of Rs. 25.07 crore[17].

The Management stated (November 2009) that Navasari Low area was having stronger currents making the survey very difficult. The Management added that NMT area and ED-A block were included in one tender for likely acquisition of data in one field season and the contractor was not paid any de-mobilisation charges for Navasari Low area in the new contract.

The reply is not tenable as the audit observation related to splitting up of the requirement for similar description/specification of work and for floating a single consolidated tender, which has not been addressed by the Management. The extra expenditure of Rs. 25.07 crore could have been avoided by clubbing the requirement in July 2007.

8.7.2.5 Data security

DGH suggested (July 2005) reprocessing of 3D data of two locations *viz.* GMIO-3 and GS-OSN-A of GS-OSN-2001/1 block. However, the data tapes including the back up kept in the Panvel library were soaked due to the floods (July 2005) in Mumbai.

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[16] ***US$ 8,750,000 – (US$ 7,500,000 minus 2 per cent discount) x 6 months x Rs.48/US$.***

[17] ***US$ 97962 –US$ 84844 x 393 x Rs.48.62/US$=Rs.25.07 crore.***

Audit observed that the Company lost four months in retrieval and reprocessing of data which had a cascading effect on drilling of four wells committed in the MWP of this block. As a result, the Company had to seek an extension of six months and the remaining work of drilling of four wells could be completed after payment of LD of Rs. 15.26 crore for obtaining two extensions of six months each.

The Management stated (November 2009) that the suggestion of audit regarding the storage of data tapes at two geographically different locations in Mumbai will be followed in future.

8.7.2.6 Release of locations

The locations are proposed by the concerned Basins[18] considering various aspects such as interpreted seismic data, data obtained from the wells drilled in the nearby areas and reports of the outside consultants/experts, if any. The prospect of the location is presented to the Regional Exploration Review Board (REXB)[19] and, if found suitable, recommended to the Director (Exploration) for release. Audit observed that the recommendations of the consultants were not given due consideration and locations were released despite adverse recommendations as discussed below:

(i) The Company appointed (December 2005) an independent consultant (M/s. K.K.Howes), for evaluation of the Kerala Konkan offshore area who observed (May 2006) that 'source rock' was the critical risk in the area followed by 'seal and trap' and that no drillable prospects were seen in KK-OSN-2001/2 and KK-OSN-2001/3 blocks. Despite the observations made by the consultant, the Company released (26 December 2006) a location in the block which was drilled (December 2008 to March 2009) at a cost of Rs. 143.02 crore but found to be dry mainly due to absence of interesting zones from hydrocarbon point of view and lack of source rock.

Audit observed that all the previous wells drilled in KK basin were found to be dry and had indicated absence of source rock in the tertiary sequences of the area. Therefore, the decision to release the location even after the adverse recommendations of the domain expert resulted in an unfruitful expenditure of Rs. 143.02 crore.

The Management stated (November 2009) that recommendation of the consultant regarding '*no immediate drillable prospect*' needs to be understood in the light of the fact that it was required to be bolstered with 3D data acquisition prior to any drilling.

The reply is not tenable as recommendation of the consultant for 3D data acquisition prior to drilling was for deep water areas and not for shallow water area. Further, the consultant had clearly stated that '*given the limited prospectivity of the area, exit strategy should be considered'*.

(ii) The Company engaged (September 2005) a consultant (M/s. Steve King) for an independent acreage appraisal as well as to review two identified locations (RRPA and RRPB) in MB-OSN-97/4 block. The consultant advised that the identified prospect areas suffered from lack of well defined reservoir and, consequently, had low probability of geological success. Despite the adverse recommendations, the Company drilled (October

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[18] Basin is also referred to as an organisational unit engaged in exploration activities.

[19] REXB consists of experts from the Company's basins and its internal institutes viz. (i) Geo-data Processing and Interpretation Centre and (ii) Keshava Dev Malviya Institute of Petroleum Exploration at Dehradun.

2006 to December 2006) the location RRPA at a cost of Rs. 27.02 crore. The well was found to be dry. The main reason for the well being dry as given in the well completion report (WCR) was non existence of reservoir facies[20], was the same as predicted by the consultant prior to drilling of the well.

Audit observed that though the recommendations of the consultant were discussed (January 2006) in the proposal submitted by the Region for release of location, the specific observation of the consultant that *'the two identified prospect areas appeared to suffer from a lack of well defined reservoir interval and as a consequence, had low probability of geological success'* was not included in the proposal.

The Management stated (November 2009) that the comments of the consultant related only to the generality of reservoir development and low probability of success. Further, no predictive tool existed for assessment of any elements of hydrocarbon accumulation.

The reply of the Management is imprecise as the consultant was specifically appointed to review the identified prospects and had stated that '*the two main prospects which were reviewed are considered to be high risk'*.

Recommendation No. 8.2

The Company should:

(i) Determine the average API cycle time for each basin and monitor its adherence to ensure completion of the API cycle.

(ii) Initiate the tendering process in advance so that the survey vessels could be hired and deployed at the beginning of the fair weather season.

(iii) Observe its internal instructions relating to floating of a single consolidated tender for similar description/specification of work.

(iv) Initiate the process for pre-seismic EIA studies immediately after award of the blocks and also frame norms to ensure their timely completion.

8.7.3 Drilling of exploratory locations

Annual Plan (AP) of the Company specifies the drilling targets for each basin. Annual Plan includes the number of locations to be drilled along with drilling meterage. On the basis of the AP, rig deployment plan (RDP) is prepared for each basin taking into account the MWP/work commitments in NELP/nomination blocks and availability of suitable drilling rigs. The RDP is signed between the Head- Drilling Services and the concerned Basin Manager so as to ensure availability of services as scheduled. To achieve the drilling targets, the Basin enters into service level agreement (SLA) with the service providers' *viz.* Drilling Services, Cementing Services, Logistic Services, Well Services, Mud Services, etc. for planned mobilisation of drilling resources.

Audit observed that there were delays in signing of RDPs and SLAs and in some cases these were not even signed by the concerned parties.

The Management assured (November 2009) to make all efforts to sign SLAs and RDPs in time.

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[20] ***The overall characteristics of a rock unit that reflect its origin and differentiate the unit from others around it.***

8.7.3.1 Planned vis-à-vis actual drilling

The basin-wise approved drilling programme indicating number of locations planned for drilling as per AP/RDP and actual locations drilled in shallow water areas for the period from 2004-05 to 2007-08 are given in ***Annexure XXIX***. As seen from the Annexure, there was substantial shortfall in drilling activities. As against 128 locations and 130 locations planned for drilling as per AP and RDP respectively, only 76 locations were drilled by the Company resulting in a shortfall of 41 *per cent* in drilling.

8.7.3.2 Mismatch between plan for drilling and availability of rigs

The Company prepared basin-wise annual plan for deployment of rigs for the locations to be drilled keeping in view the work commitments under NELP and nomination blocks. For attaining the targets of drilling, it is necessary to assess availability of rigs correctly taking into account the owned rigs and make up the deficiency timely through hiring. However, audit observed mismatch between the rig deployment plan (RDP) and actual availability/deployment of rigs as discussed below:

(i) The Company planned drilling of one ultra shallow water location (NMT-A) during 2004-05, two high pressure high temperature (HPHT) locations (D-33 and B-12-O) in 2006-07 and two ultra shallow water locations (C-1-D and NMT-C) during 2007-08 in Bombay Offshore 1/2/3 block. These locations could not be drilled for want of HPHT and ultra shallow water rigs.

(ii) As per the work commitments in MBA basin, the Company was to drill 12 locations in three blocks[21] from July 2001 to August 2008. Audit observed that the Company invited the tender in July 2002 for hiring of one HPHT rig. Against the contract awarded in November 2004, the rig was mobilised in March 2005.

However, RDP of the basin for 2004-05, prepared in July 2003, considered availability of two rigs, though contract for the rig was awarded in November 2004 and no rig was likely to be available by the end of 2004-05. In the absence of the rig, the Company could not complete the MWP in time.

The Management accepted (November 2009) the above observations *(i) and (ii)* and assured that planning for induction of specialised rigs would be undertaken in future after due understanding of their deployment in other basins.

(iii) The Company planned drilling of four locations in KG Basin with rig 'Aban-II' during 2006-07, considering availability of the designated rig upto March 2007. The fact that the rig contract was valid only upto 4 November 2006 was overlooked which resulted in non-drilling of two locations.

The Management stated (November 2009) that it was aware of the rig contract validity and proposed (October 2004) to hire a mat supported rig for KG offshore.

The reply did not explain the basis on which availability of Aban II rig was considered in the RDP upto March 2007 when the contract was valid upto November 2006.

(iv) In MN-OSN-97/3 block, the Company availed of extensions of 18 months till 25 November 2006 to complete MWP of Phase II. These extensions were set off from Phase III (26 November 2006 to 18 May 2007) wherein the Company had committed drilling of

[21] ***WB-OSN-2000/1, MN-OSN-97/3 and MN-OSN-2000/1.***

one well upto the target depth (TD) of 4,500 metres. The Company instead proposed to drill two wells MN-OS-J (TD 1,000m) and MN-OS-I (TD-2200m) and applied (6 February 2007) to the MOEF for EC which was granted on 15 May 2007. The above two locations were spudded on 25 May 2007 and 14 August 2007 respectively and completed on 21 June 2007 and 22 September 2007 respectively. The Company sought extension of 99 days as excusable delays (6 February 2007 to 15 May 2007) *i.e.* the period between application date for EC and the date on which the clearance was given to the Company due to delay in grant of EC. The matter was pending with MoPNG for decision (September 2009).

Audit observed that the Company did not have the rig to drill these two locations within the limited time of six months available under Phase III and the rig 'Nordic' was available with the Mahanadi basin only from 19 May 2007.

The Management stated (November 2009) that the Company had requested for 99 days' extension as excusable delay. Thus, Phase III in MN-OSN-97/3 block would get extended from 25 May 2007 to 1 September 2007.

The reply is not tenable as the permission of MOEF was received within the period of 120 days specified in the PSC, based on which the wells were drilled. Therefore, the contention of the Management regarding non-receipt of formal EC does not hold good. The reply was also silent on non-availability of the rig.

(v) MN-OS-G location in MN-OSN 97/3 block was released on 16 August 2005 and was planned to be drilled by the rig 'Sagar Vijay' which was drilling locations in KG basin. Thereafter, the rig was to be sent for dry dock in November 2005. In the absence of rig 'Sagar Vijay', the Company decided to drill the location by rig 'Nordic' which was released for the location on 23 February 2006. The rig, however, could move only on 21 May 2006 due to stuck up of leg. Meanwhile, due to disagreement with DGH regarding payment of LD for the extensions of exploration phase as per the Extension Policy of 2006, the Company postponed drilling of MN-OS-G location and decided to move the rig to KG basin to drill the unplanned location YSAF.

Decision of the Company to move the rig to YSAF was taken without assessing the suitability of the rig for its deployment. The rig was under movement from 3 June 2006 till receipt of soil investigation report (13 June 2006). Based on the soil investigation report, the surveyor rejected (15 June 2006) the proposal of deployment of the rig at YSAF. By the time, the Company had incurred an expenditure of Rs. 23.53 crore[22] on the movement of the rig to YSAF. The Company decided to move the rig back to the location MN-OS-G. This proposal was also not agreed to by the surveyor due to onset of monsoon and non availability of shelter location. The rig was again kept waiting (14 June 2006 to 20 June 2006) at an intermediate location. The Company decided (20 June 2006) to move the rig to another location GS-15-DA in the KG Basin. The rig was kept waiting at the intermediate location for 14 days (23 June to 6 July 2006) as the sea bed survey was in progress. As a result, the Company incurred an expenditure of Rs. 5.75 crore[23] on idling of the rig.

The Company could finally spud the location GS-15-DA on 25 August 2006. Meanwhile, DGH informed (24 August 2006) regarding expiry of the contract (18 November 2005)

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[22] ***Rig hire charges (25 May 2006 to 20 June 2006) and other associated expenditure.***
[23] ***US$ 70515 x 17 days, US$ =Rs 48.***

and directed the Company to pay penalty equivalent to the cost of the unfinished work programme. To avoid relinquishment of the block, the Company paid the penalty of Rs. 19.48 crore towards extensions of exploration phase and moved the rig back to MN-OS-G by temporarily abandoning the location GS-15-DA (5 September 2006). The location MN-OS-G was spudded on 25 November 2006 and drilling was completed on 9 February 2007.

Audit observed that the decision to drill the location MN-OS-G by rig 'Sagar Vijay' was incorrect as the Company was aware of the fact that during June to September 2005, the rig was to drill two locations in KG Basin and was due for scheduled dry dock in November 2005. Further, the rig 'Nordic' was diverted to KG Basin to drill an unplanned location, without assessing the suitability for drilling which resulted in an unfruitful expenditure of Rs. 29.28 crore.

The Management while agreeing that the rig 'Nordic' could move to the location MN-OS-G only on 21 May 2006 due to stuck up leg, stated (November 2009) that the rig 'Sagar Vijay' was utilised for drilling one location in KG basin. However, considering the mandatory dry dock repairs and critical time-schedule for drilling of location MN-OS-G, it was decided to deploy the rig 'Sagar Vijay' in KG basin. Further, the well could not be drilled due to disagreement with the DGH regarding the payment of penalty for the extension of exploration phase. As substantial investment had been made for generating the location, the Company was of the view that third extension of six months might be allowed for drilling by the DGH.

The reply is faulty as the rig 'Sagar Vijay' was never planned to be deployed for the block MN-OSN-97/3 but was to be deployed in KG basin. The decision to oppose the terms of Extension Policy of 2006 was also injudicious considering the fact that the MoPNG had introduced the Extension Policy only after due consideration of the constraints brought out by various operators. At the same time, the Company had availed of the benefit of excusable delays in respect of blocks for which extensions were pending during formulation of Extension Policy.

Thus, improper planning in deployment of rig led to avoidable movement of the rig, thereby incurring an unfruitful expenditure of Rs. 29.28 crore.

8.7.3.3 Drilling of wells after expiry of the contract period

(i) In WB-OSN-2000/1 block, drilling of four wells besides acquiring of seismic data was committed by the Company in Phase I. However, due to delay in hiring of a rig, an extension of 18 months upto 29 January 2006 was availed of in Phase I. The first well (WB-OS-1) was spudded in March 2005 and completed in February 2006.

As there was a delay in grant of EC and in communication of excusable delay related thereto, another extension of 285 days (upto 10 November 2006) with special dispensation for 164 days (17 September 2007 to 27 February 2008) was granted by the MoPNG. The Company conveyed a meeting (23 September 2007) with the drilling contractor and warranty surveyor for identifying rigs for the remaining three locations wherein the surveyor communicated that the rig could be deployed only during January 2008 to April 2008.

As the Company had only two drilling months to drill three locations, it diverted two rigs from KG basin so as to undertake the drilling operation in the block. The first location

was drilled during the period from 30 January 2008 to 11 February 2008 and the second location was spudded on the last day (27 February 2008) of the extended Phase I. The Company applied (12 April 2008) for merger of Phase I and Phase II under the Merger Policy ***(Annexure-XXV)*** and spudded the well in third location on 13 April 2008 *i.e.*, after expiry of the contract period. The MoPNG rejected (16 January 2009) the merger proposal and directed the Company to pay the LD of Rs. 194.75 crore towards the cost of unfinished work programme and relinquish the block with effect from 27 February 2008. The block was surrendered on 28 February 2008 without paying LD. DGH asserted[24] (November 2009) that the Company was liable to pay the damages.

Audit observed that the Geological and Geophysical (G&G) study of the block was completed by April 2003 and the Company had also obtained (December 2003) a second opinion from an expert on the prospectivity of the locations. The two locations were, however, released (12 September 2006) nearly after three years and the remaining one location was released in January 2008.

The Management stated (November 2009) that the two locations were released in 2006 after considering the complications of the first well, special processing/reinterpretation of data and review of the same by the consultant. These locations were, however, rejected (14 January 2008) by the Kolkata Port Trust, which compelled the Company to release substitute location. Accordingly, the location WB-OS-09 was released on 28 January 2008 (before the expiry of special dispensation period) and the Geo Technical Order was issued on 7 April 2008.

The reply is not tenable as the Company took three years to release the locations after G&G studies (April 2003) by which time all the four locations should have been drilled. Due to delay in release of WB-OS-09 location, the well was drilled after expiry of the extended contract period. The reply is also inaccurate as the Company had applied to the Kolkota Port Trust only on 9 January 2008.

Thus, failure to release the locations on time resulted in non completion of MWP within the contract period.

(ii) The Company carried out MWP under Phase I of KG-OSN-97/1 block within the stipulated period. During Phase II, the Company availed of six months extension (19 May 2005 to 18 November 2005) to drill one committed well. As no significant zones of interest were observed, the well was abandoned without testing. The Company again requested for a second extension of six months under Phase II to carry out additional G&G studies which were not committed under MWP. The DGH, however, sought 100 *per cent* bank guarantee and 10 *per cent* LD for the unfinished work as per the Extension Policy of 2006. The Company did not agree to it and entered into Phase III (5 July 2006 to 4 January 2008). Meanwhile, the MoPNG allowed the time lost between 19 November 2005 and 4 July 2006 as excusable delay, being the time taken for formulating the Extension Policy 2006, without setting it off from the Phase III.

The Company released the location in August 2007 and the well was spudded on 3 January 2008 *i.e.* one day before expiry of the contract period. As no significant zones of interest were observed, the well was abandoned and the block relinquished (31 March 2008) after incurring an expenditure of Rs. 85.73 crore. Since the Company had carried out the drilling activities beyond the contractual period stipulated in the PSC, it requested

[24] ***Economic Times of 16 November 2009.***

(January 2008) for extension in Phase III (upto 31 March 2008). The extension had not been accorded by the MoPNG till September 2009.

Audit observed that the Company took 20 months (from December 2005 to July 2007) for carrying out additional G&G studies, as against the envisaged time of six months. Hence, it was not able to complete the MWP within the contract period.

The Management stated (November 2009) that the Company had initially disagreed with the conditions of Extension Policy of 2006 and request for extensions of Phase III was made to allow completion of drilling as per the provisions of Article 3.6 of PSC. The Management also stated that G&G studies were conducted by utilising extension of time (November 2005 to July 2006) and MWP commitments were completed within the provisions of PSC.

The reply is not tenable as the time taken for G&G studies was 20 months against the six months envisaged and the extension of time granted by DGH from November 2005 to July 2006 was for drilling of location and not for G&G studies. The applicability of Article 3.6 of PSC was for extension within the exploration phases and not beyond the contract period. Further, as per Article 3.9, the PSC would be terminated if no commercial discoveries were made by the end of the contract period.

8.7.3.4 Non productive rig time

As per the service level agreements, the target for rig down time was fixed at less than 10 *per cent* of actual rig availability during the year. The details of the productive and non-productive time of rigs for the period from 2004-08 are given in ***Annexure XXX.***

Audit observed that during the period from 2004-05 to 2007-08 the non productive time was much higher (30.50 *per cent* of available rig time) than the internal norm of the Company. Audit also observed that as per the International standard the norm for non-productive time is less than five *per cent* (excluding complications it is less than three *per cent*).

The Management stated (November 2009) that all efforts are being made to reduce the non productive time.

Recommendation No. 8.3

The Company should:

(i) Ensure timely signing of rig deployment plans and service level agreements for effective utilisation of drilling resources.

(ii) Ensure availability of suitable rigs while finalsing the rig deployment plan.

(iii) Release the locations on time considering the commitments scheduled in the PSC.

(iv) Ensure soil investigation prior to rig movement.

(v) Ensure reduction of non productive time by better coordination among the various service providers.

8.7.4. Reserve Accretion

The Company fixed targets for reserve accretion for the basin as a whole including onshore, shallow and deep water areas. The position of reserve accretion targets (initially in place) projected by the Company and actual reserve accretion thereagainst during the 10 Five Year Plan (FYP) and 2007-08 in respect of five basins is given in the following **Table 8.2**:

Table 8.2

Position of reserve accretion during 2002-03 to 2007-08

(Units in Million Metric Tonne Oil Equivalent (MMTOE)

Name of the basin	Projections by the Company		Actual accretion		Percentage of achievement	
	X Plan	2007-08	X Plan	2007-08	X Plan	2007-08
Western Offshore basin	302.00	60.50	261.15	71.54	86.47	118.25
Krishna Godavari basin	64.00	22.50	109.93	13.83	171.77	61.47
Cauvery basin	26.00	5.50	29.10	2.00	111.92	36.36
Mahanadi-Bengal-Andaman (MBA) basin	0.00	8.00	0.00	0.00	0.00	0.00
Western Onshore basin	0.00	0.00	0.00	0.00	0.00	0.00
Total	**392.00**	**96.50**	**400.18**	**87.37**	**102.09**	**90.54**

8.7.4.1 As seen from the above table, the reserve accretion in Krishna Godavari (KG) basin exceeded the targets during the 10th FYP period. However, in 2007-08 the target could not be achieved. Audit observed that only 7.22 MMTOE could be accreted to the reserves from the shallow water blocks in this basin due to delays in API of data and drilling of locations as mentioned in preceding paragraphs 8.7.7.2 and 8.7.7.3. The Company also could not achieve the reserve accretion targets in respect of Western Offshore basin (WOB) during the 10th FYP.

The Management stated (November 2009) that reserve accretion cannot be judged on a block/basin/year specific manner and target achievement in respect of a basin should be reviewed over a longer period of time. The Management, however, agreed that the Company was not able to achieve the reserve accretion targets in WOB as there was a deliberate shift in exploratory efforts to KG basin in the light of the discoveries.

The reply is not acceptable as even in KG basin, the Company failed to achieve the drilling targets and there was a shortfall of 18 wells during 2004-08. Further, as the Company had fixed basin-wise targets, the same should have been compared for evaluating the basin-wise achievements.

8.7.4.2 Audit also observed that no reserve accretion was envisaged in the 10th FYP in respect of three shallow water blocks of MBA basin though these blocks were with the Company since May 2000, July 2001 and August 2001 respectively. There was no

reserve accretion in the 16 NELP blocks acquired by the Company through bidding in NELP round as all the wells drilled were found to be dry.

The Management while accepting that there was no reserve accretion in NELP blocks assured (November 2009) that in future the accretion targets would be fixed for the blocks in MBA basin.

8.7.5 Health, Safety and Environment

The Company had an established system of monitoring the Health, Safety and Environment (HSE) aspects. The system includes a documented policy on HSE; issue of safety alerts on each accident; internal audit of Quality Health Safety Environment audit of rigs by the Company as well as Oil Industry Safety Directorate (OISD); review meetings in respect of the minor and major accidents on a weekly basis and reporting of near misses as part of measures to minimise such incidents *etc*. The audit observations are discussed in succeeding paragraphs:

8.7.5.1 Health and Safety

The Company started giving details about the near miss accident cases from the year 2005-06 which were discussed in the weekly drilling review meetings and the same were distributed to all rigs to prevent reoccurrence. Since 2006-07, the 'Potential Near Miss' cases were also discussed.

Audit observed that though the number of accidents and 'near miss' cases had reduced, the Company could not achieve its 'goal zero' of corporate environmental management in any of the years during the period 2004-08. The details of accidents and near miss reports are given in ***Annexure XXXI***. Major injury/serious injury cases occurred in all the three years. Such cases also increased from one case in 2005-06 to six cases during 2007-08. Further, 18 near miss cases were reported during the year 2005-06 on the rig 'Frontier Ice' and 11, 10 and 13 cases were reported on the rig 'Sagar Gaurav' during the years 2005-06, 2006-07 and 2007-08 respectively and 16 cases on the rig 'Sagar Bhushan' during 2007-08.

The Management stated (November 2009) that the Company is QHSE certified and had taken initiatives such as internal and external HSE audit for containing accidents.

8.7.5.2 Drilling of wells without environmental clearance

NELP block CY-OSN-2000/2 in Gulf of Mannar, Cauvery basin was granted from 16 August 2001. The Company committed acquisition of fresh 2D and 3D data and drilling of three wells in Phase I. The Company identified (May 2003) three locations (GM-6, GM-5 and GM-F-1) for drilling and submitted pre-drill EIA report to the MOEF and sought environmental clearance (EC) on 10 October 2003. MOEF denied EC on 8 November 2004. After further follow up by the MoPNG and the Company, MOEF finally granted EC on 16 September 2005.

Audit observed that the Company had, however, drilled two locations during the period February 2004 to September 2004 before the grant of EC which was in contravention of the provisions of the PSC and MOEF guidelines.

The Management stated (November 2009) that to avoid the huge cost involved in idling of offshore drilling rig, the drilling was undertaken in anticipation of the EC and that no drilling activities were carried out after denial of EC.

The reply confirms that the location was spudded before the grant of EC. The Company had, thus, violated the PSC provision.

8.8 Conclusion

The Company had to relinquish prospective areas of nomination blocks due to delays in exploration and failure to pursue the leads. Exploratory efforts in the five nomination blocks which were in the last two years of exploration cycle were slow. The Company had identified 89 prospects and 33 prospective leads in 16 shallow water NELP blocks. However, even after incurring an expenditure of Rs. 1,632.48 crore, no hydrocarbon discovery was made. The achievement of MWP committed in the Phase I was incomplete in 9 out of 16 NELP blocks and the entire Phase I was consumed mainly for API of seismic data and the wells committed in respect of nine blocks were not completed. Consequently, the Company surrendered/proposed to surrender 10 NELP blocks after incurring expenditure of Rs. 1,461.36 crore. The time taken for pre-seismic EIA studies ranged between 2 and 12 months in respect of the 16 NELP blocks which had a cascading effect on the overall schedule of the exploratory phases. As against 128 and 130 planned locations for drilling as per the AP and RDP respectively, only 76 locations were drilled resulting in a shortfall of 41 *per cent.* There were delays in release of location and mismatches in deployment of rig with reference to availability of suitable rigs which resulted in non fulfilment of the MWP within the contract period

The matter was reported to the Ministry in January 2010; their reply was awaited (February 2010).

MINISTRY OF SHIPPING

CHAPTER IX

Hindustan Shipyard Limited and Cochin Shipyard Limited

Ship repair activity in Indian dockyards

Executive Summary

Hindustan Shipyard Limited (Hindustan Shipyard), Visakhapatnam was set up in 1941 and it established ship repair unit in 1971. Turnover from the ship repair activity was varying from Rs. 87.90 crore to Rs. 144.13 crore against the total turnover of the Company which was ranging between Rs. 225.30 crore and Rs. 395.81 crore during 2004-05 to 2008-09.

Cochin Shipyard Limited (Cochin Shipyard) incorporated in March 1972 commenced ship repair operations in 1981. The ship repair turnover of the Company was varying from Rs. 148.02 crore to Rs. 270.06 crore against the total turnover which ranged between Rs. 276.48 crore and Rs. 1256.21 crore during 2004-05 to 2008-09.

The performance audit of ship repair activity of these companies for the period 2004-05 to 2008-09 was conducted to assess efficiency and economy of their ship repairs operations and their ability to expand the ship repair business in domestic as well as international markets. The deficiencies noticed in ship repair activities in these companies were as below:

- The turnover of Indian ship repair industry during the years 2004-05 to 2008-09 ranged between Rs. 316.07 crore and Rs. 490.38 crore. Though Hindustan Shipyard and Cochin Shipyard being the leading shipyards in the country had major share ranging between 73.74 per cent and 91.36 per cent, there was no defined action plan to capture market potential.
- Out of Rs. 970.67 crore of ship repair expenditure by Shipping Corporation of India during 2004-05 to 2008-09, Rs. 849.20 crore, i.e., 87.49 per cent was spent for repairs in foreign yards.
- Repair business of Hindustan Shipyard and Cochin Shipyard from foreign ships was Rs. 44.25 crore (31 ships) and Rs. 60.23 crore (5 ships) respectively during this period.
- Hindustan Shipyard and Cochin Shipyard did not revamp or modernise the infrastructure in tune with market potential.

- Hindustan Shipyard received Rs. 8.27 crore from the GoI for modernisation of ship repair facility against which it could utilise only Rs. 1.19 crore even after lapse of 5 to 46 months.
- No benchmarks were fixed for key activities such as steel renewal, sand/grit blasting, painting.
- In case of Hindustan Shipyard 77 orders were reviewed of which the Company executed 62 orders with time overrun ranging from 1 to 319 days which resulted in loss of Rs. 10.91 crore to the Company. In Cochin Shipyard out of 177 orders 98 orders were completed with time overrun leading to a loss of Rs. 2.73 crore.
- Realisation of the dues did not take place within the agreed credit period. In case of Hindustan Shipyard there were delays ranging between 6 and 882 days and in case of Cochin Shipyard it was up to 350 days after allowing the agreed credit period.

Summary of recommendations

The Companies should:

(i) Make efforts to fully explore the Indian ship repair market potential by adopting suitable marketing strategy and take positive steps to capture the foreign ship repair market.

(ii) Fix benchmarks for the key activities of the ship repair industry to reduce repair cycle time.

(iii) Ensure timely completion of repairs by effective planning to turnout more ships to increase ship repair revenue.

(iv) Stipulate time frames for raising invoices and ensure internal compliance to avoid blockage of working capital.

(v) Ensure realisation of repair bills within the agreed credit periods and incorporate suitable clauses in the contracts to recover interest in case of belated payments by the parties.

Hindustan Shipyard should

(vi) Utilise Government funds for the intended purposes within the stipulated period to derive the envisaged benefits.

(vii) Maintain proper records and comprehensive database of enquiries received, quotes submitted, orders lost with reasons thereof and orders firmed up.

(viii) Accredit 'ship repair' as a separate cost and profit centre.

9.1.1 Introduction

Hindustan Shipyard Limited (Hindustan Shipyard), Visakhapatnam was set up in 1941 by Scindia Steam Navigation Company and was later taken over by the Government of India (GOI) in 1952. It became a fully owned Government Company from July 1961. The Company established Ship Repair Unit (SRU) in 1971 and an exclusive division to undertake Submarine Repairs (Retrofit) in 1997.

Cochin Shipyard Limited (Cochin Shipyard), incorporated in March 1972, was established as a green field shipyard in technical collaboration with Mitsubishi Heavy Industries of Japan and is presently a wholly-owned GOI enterprise. It commenced ship repair operations in 1981. It is a Category-I Mini Ratna Company.

Hindustan Shipyard and Cochin Shipyard are under the administrative control of the Ministry of Shipping (Ministry). The details of ship repair facilities available in both the companies are indicated in ***Annexure XXXII***.

9.1.2 Performance of the Companies

The total turnover *vis-à-vis* ship repairs turnover of Hindustan Shipyard and Cochin Shipyard during 2004-05 to 2008-09 is given below in **Table 9.1**:

Table 9.1

(Rs. in crore)

Company	2004-05		2005-06		2006-07		2007-08		2008-09	
	TT	ST	TT	ST	TT	ST	TT	ST	TT	ST
Hindustan Shipyard Limited	225.30	135.12	243.58	87.90	327.63	92.14	384.52	108.46	395.81	144.13
Cochin Shipyard Limited	276.48	148.02	373.53	151.27	719.74	241.53	833.79	252.14	1256.21	270.06
TT – Total turnover of Company; ST – Ship repair turnover of Company										

The total profit and profit from ship repair activity of Hindustan Shipyard and Cochin Shipyard during 2004-05 to 2008-09 is given in the following **Table 9.2**:

Table 9.2

(Rs. in crore)

Company	2004-05		2005-06		2006-07		2007-08		2008-09	
	TP	SP	TP	SP	TP	SP	TP	SP	TP	SP
Hindustan Shipyard Limited[1]	(7.89)	10.81	6.28	29.05	(75.90)[2]	17.37	23.48	39.11	(136.73)	44.41
Cochin Shipyard Limited	16.86	20.94	25.45	18.09	85.77	15.74	149.40	23.44	247.63	80.01
TP – Total Profit / (Loss) of Company; SP – Ship repair profit of Company										

Ship repair segment is the only activity in Hindustan Shipyard which made profits consistently. Cochin Shipyard also made profits consistently from ship repairs activity.

9.1.3 Ship repair industry scenario

Ship, being a floating structure, requires regular inspection and maintenance for smooth and safe functioning during ocean voyages and also during cargo handling operations at Ports. Ships are also governed by scheduled periodic repairs as per the guidelines

[1] ***Profit from ship repair activity has been arrived at by appropriating the unallocated overheads in the ratio of overheads of respective segment (viz., shipbuilding, ship repair and retrofit segments)***

[2] ***Excluding extra ordinary/prior period adjustments on account of capital restructuring***

formulated by the Classification Society and other Statutory Bodies. Accordingly, Ship repair yards generally have a continuous and consistent flow of business with predictable revenue generation. As such, the ship repair industry is evergreen.

The annual fleet of the domestic ships operated during the last five years ending 31 March 2009 was on increasing trend which is given below in **Table 9.3**:

Table 9.3

Year	2004-05	2005-06	2006-07	2007-08	2008-09
Total fleet	669	721	776	850	902

The promotion of the ship repair industry is of paramount importance in Indian context due to:

(i) the industry being labour-intensive will act as a conduit for providing employment;

(ii) the growth of the industry will contribute to the growth in related industry like steel and other industries such as electronics and chemicals; and

(iii) lays foundation for development of an independent shipbuilding and ship repair industry.

9.2 Scope of Audit

Performance audit covers the ship repair activity undertaken by Hindustan Shipyard and Cochin Shipyard during the five year period from 2004-05 to 2008-09.

9.3 Audit objectives

The overall objective of performance audit was to assess whether the principles of economy, efficiency and effectiveness were followed in ship repair operations. Detailed audit objectives were to assess and evaluate:

- Goals and responsibilities set up to improve market share of the Companies in ship repair business;
- Activities for revamping and modernisation of the ship repair facilities and other ancillary facilities;
- Benchmarks fixed by the industry and companies for execution of different operations of ship repair activity;
- System of response to enquiries, acceptance and firming up of ship repair orders;
- Execution of ship repair orders; and
- Realisation of contractual dues.

9.4 Audit criteria

The main audit criteria were:

- Goals set forth by Govt. of India in its Five Year Plans (FYP) for Indian shipyards and reports of the working group of the Planning Commission;

- Memorandum of Understanding (MOU) signed by the respective Company with GOI;
- Corporate plans and policies, technical manuals, delegation of powers, minutes of board meetings, cost sheets, annual reports, industry journals, bulletins *etc;*
- Turnover per occupancy day of dry dock;
- Revamping and modernisation plans;
- Terms and conditions of contracts, government sanctions; and
- Various Consultancy and Management reports.

9.5 Audit methodology and sample

The audit methodology included examination of related documents and discussions with Managements. Audit held entry conferences with Hindustan Shipyard and Cochin Shipyard wherein the audit objectives were explained to the respective Managements. Audit also held exit conferences with the Managements to explain the audit findings.

During the period under audit, Hindustan Shipyard had executed 151 repair orders out of which 77 orders were selected for review using Stratified random sampling method. In case of Cochin Shipyard for evaluating and analysing the time taken for the preparation and settlement of invoices for the ships repaired during the period under review, audit adopted random sampling of the invoices each involving Rs. 0.50 crore and above. For other areas, entire population was considered for analysis.

9.6 Acknowledgement

Audit acknowledges the cooperation and assistance extended at different levels of the Companies, which facilitated the completion of this performance audit.

9.7 Audit findings

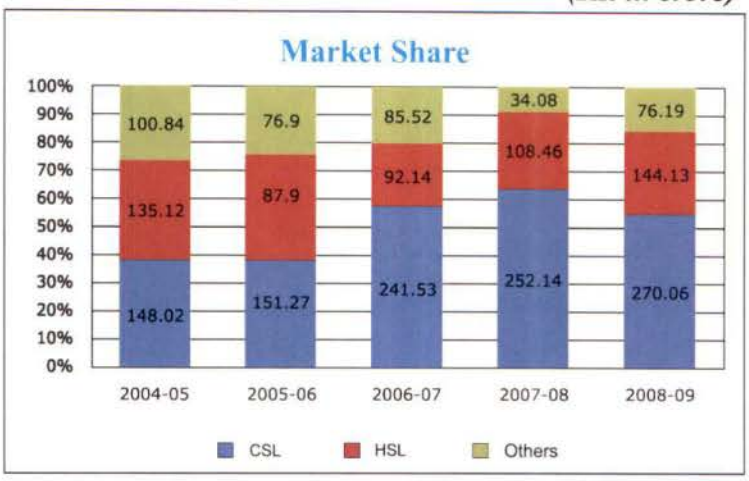
Audit findings as a result of performance audit of ship repair activity of Hindustan Shipyard and Cochin Shipyard are discussed in the succeeding paragraphs:

9.7.1 Market Share

The turnover of Indian ship repair industry during the years 2004-05 to 2008-09 was Rs. 383.98 crore, Rs. 316.07 crore, Rs. 419.19 crore, Rs. 394.68 crore and Rs. 490.38 crore respectively ***(Annexure XXXIII).*** Hindustan Shipyard and Cochin Shipyard being the leading shipyards in the country had major share ranging between 73.74 *per cent* and 91.36 *per cent* during the review period.

Chart 9.1

(Rs. in crore)



From the above chart it is evident that the market share of Cochin Shipyard increased consistently, excepting 2008-09, whereas the share of Hindustan Shipyard was not steady and reduced in the subsequent years as compared to its share of 2004-05. The gap in the market share between Hindustan Shipyard and Cochin Shipyard during 2004-05 which was three *per cent* widened in the subsequent four years, the maximum being 36 *per cent* in 2007-08. This was mainly due to undertaking repair work of oil rigs of ONGC and air craft carrier of Indian Navy on regular basis by Cochin Shipyard, whereas Hindustan Shipyard undertook the repairs of rigs only during 2004-05.

In this connection it was observed that:

- No concrete action plan was drawn by Hindustan Shipyard and Cochin Shipyard to capture the huge market potential.
- Even though Working Group[3] envisaged undertaking of repair business of Indian ships within the country, there was no effective action plan by these Companies to achieve this objective. This is evident from the quantum of repair work carried out at foreign yards. Out of Rs. 970.67 crore of ship repair expenditure by Shipping Corporation of India (SCI) during 2004-05 to 2008-09, Rs. 849.20 crore, *i.e.*, 87.49 *per cent* was spent for repairs in foreign yards.
- Hindustan Shipyard stated (January 2010) that it had not repaired SCI bulkers, tankers and container ships from 2004-05 to 2008-09 as SCI was not inviting quotations from Hindustan Shipyard.
- There exists a market potential of Rs. 100 crore per annum from the repair of Naval and Coast Guard Vessels. Hindustan Shipyard, however, did not quote for Coast Guard Vessels in 2007-08 and 2008-09 on the premise that these vessels were not profitable. Considering the profit of 22 *per cent* on four Coast Guard vessels repaired during 2004-05 and 2005-06, the Management version that repair

[3] ***Working Group for shipbuilding and ship repair industry for the eleventh five year plan (2007-2012)***

business of these vessels was not profitable lacks justification. In fact, no cost-benefit analysis was carried out before taking such stance.

- As per the Working Group report, the annual repair market from repair of foreign vessels would be Rs. 1,150 – Rs. 1,400 crore. Audit, however, observed that Repair business of Hindustan Shipyard and Cochin Shipyard from foreign ships was Rs. 44.25 crore (31 ships) and Rs. 60.23 crore (5 ships) respectively during the review period. Thus, potential foreign ship repair business remained largely untapped.
- Cochin Shipyard in its corporate plan (2005-15), recognised the existence of potential international market for ship repairs due to its strategic location but the Company failed to capitalise the same. It was not successful in as many as 23 global tenders for repair business (Rs. 202.89 crore) including eight foreign ships (Rs. 26.69 crore) during the year 2007-08 and 2008-09.

Recommendation No. 9.1

The Companies should:

(i) Make efforts to fully explore the Indian ship repair market potential by adopting suitable marketing strategy.

(ii) Take positive steps to capture the foreign ship repair market.

9.7.2 Revamping and modernisation of infrastructure

- Need for additional facilities

The Eleventh FYP emphasised creation of additional facilities as a measure necessary for promotion and growth of the ship repair industry. Audit, however, observed that there was no defined action plan in this regard as discussed below:

9.7.2.1 Failure to utilise Government funds for revamping

Hindustan Shipyard, from time to time, made proposals seeking the financial assistance from Ministry for revamping / improvement of ship repair facilities. Sequel to these proposals GOI released funds in the form of interest bearing loan during 2004-05 to 2008-09. The details of projections, requisitions, sanctions, purposes and utilisation of Plan Funds from GOI relating to ship repair unit during the review period are given below in **Table 9.4**:

Table 9.4

(Rs. in crore)

Year	Requirement projected by ship repair division of Hindustan Shipyard Limited	Projection by Hindustan Shipyard Limited to GoI	Funds received from GoI	Utilisation completed	Details of items planned for replacement/ modernisation
2004-05	5.00	3.18	3.18	Nil	Workshop machinery and Caisson gate
2005-06	5.00	1.19	1.19	1.19	DG Set, Small tools, compressors, forklifts, mobile cranes & pipelines
2006-07	5.00	1.50	1.50	Nil	Dewatering pump
2007-08	67.03	4.00	0.60		
2008-09	46.74	38.00	1.80	Nil	Work shop machinery, small tools and refurbishment of cranes
Total	**128.77**	**47.87**	**8.27**	**1.19**	

a. As per terms of sanction by GOI, the funds received during 2004-05 to 2008-09 were to be utilised for the intended purposes within a period of 4 to 14 months of their receipt. Hindustan Shipyard, however, did not utilise 86 *per cent* of funds received from GOI for achieving improvement of ship repair facilities even after expiry of 5 to 46 months. The Ministry did not insist for utilisation certificates to ensure that the funds released were utilised for the intended purpose.

b. The internal projections of 2007-08 and 2008-09 for augmentation of infrastructure at Dolphin Jetty (Rs. 4.00 crore) and East Quay (Rs. 20.55 crore), replacement of six EOT/ELL[4] cranes (Rs. 67 crore) that were installed 30 years ago and procurement of new water blasting equipment (Rs. 2.5 crore) were not submitted to Ministry. Resultantly, the required expansion and renovation plans did not materialise.

Hindustan Shipyard Limited stated (October 2009) that it was committed to utilise more than the amounts released by GOI during 2004-05 to 2008-09.

The reply is not convincing as the time limits stipulated were not on commitments but on utilisation of the funds for the intended purposes.

9.7.2.2 The Board of Directors of Cochin Shipyard sought approval of Ministry (December 2007) to expand the capacity of its dry dock from the existing 1.25 lakh DWT to 2 lakh DWT by raising funds through Initial Public Offerings of 2.4 crore equity shares. The approval of the Ministry was awaited (December 2009).

[4] ***Electrically operated trolley / Electrical level luffing***

Recommendation No. 9.2

Hindustan Shipyard should utilise Government funds for the intended purposes within the stipulated period to derive the envisaged benefits.

9.7.3 Non-fixation of benchmarks for ship repair operations

According to working group report, the capacity/productivity in Indian yards for steel renewal and sand/grit blasting was far below when compared to foreign yards in the neighbourhood.

It was observed that Hindustan Shipyard and Cochin Shipyard did not fix any benchmark for key activities such as steel renewal, sand/ grit blasting, painting of ship repair. In the absence of benchmarks, it is not possible to ascertain whether the repair operations were carried out economically and efficiently.

Recommendation No. 9.3

The Companies should fix benchmarks for the key activities of the ship repair industry to reduce repair cycle time.

9.7.4 Firming up of orders

9.7.4.1 Deficiencies in the system of firming up orders

According to order of the CMD of Hindustan Shipyard, effective from April 2004, the enquiries received for ship repairs and other allied business activities shall be put up to him for a decision. But this was not complied. Hindustan Shipyard did not have a system of maintaining a database of enquiries received and follow-up action thereon. Resultantly, there was no monitoring in Hindustan Shipyard of the system of firming up of orders.

Recommendation No. 9.4

Hindustan Shipyard should maintain proper records and comprehensive database of enquiries received, quotes submitted, orders lost with reasons thereof and orders firmed up.

9.7.5 Execution of ship repair orders

9.7.5.1 Avoidable loss due to time overrun

Audit observed that out of 77 repair orders (2004-05 to 2008-09) reviewed, Hindustan Shipyard executed 62 orders with time overrun ranging fom 1 to 319 days. The time overrun was due to the delays in (i) procurement of material, (ii) sub-contracting and off-loading jobs and (iii) finalisation of steel renewal contract. Hindustan Shipyard owned the responsibility of time overruns in 24 orders and incurred a loss of Rs. 10.91 crore on account of Liquidated Damages (LD) (Rs. 9.87 crore), waiver of berthing charges (Rs. 0.78 crore) and service charges (Rs. 0.26 crore).

Hindustan Shipyard while accepting the delay stated (October 2009) that, business conditions were not ideal to achieve zero LD.

The reply is not convincing, considering the deficiencies in procurement as well as off-loading which in turn significantly contributed to time overrun of ship repair orders.

Out of 177 orders executed during the last five years ending 31 March 2009, Cochin Shipyard completed 98 repair jobs with time overrun. The time overrun was due to the delays in (i) obtaining approval from ship owners for carrying out repair works involving additional jobs, (ii) procurement of machineries and spares for the ships from the original equipment manufacturers, (iii) procurement of additional materials for want of advance payments *etc.* Cochin Shipyard accepted for liquidated damages of Rs. 2.73 crore levied in eight cases due to excess time taken over and above the agreed time.

Cochin Shipyard replied (December 2009) that necessary steps had been taken to contain the delay in the best possible manner.

9.7.5.2 Execution of ship repair orders without proper planning

As per the instructional order (April 2004) of CMD, the Management is required to finalise repair strategy, fund requirement, procurement plan of spares, selection of sub-contractors, estimated man-hours required and a PERT chart and obtain approval of CMD before commencement of each repair order. There was no evidence on record that these directions were complied with in any of the 77 orders reviewed.

Hindustan Shipyard Limited stated (November 2009) that though the instructional order effective from April 2004 was fulfilled by Ship Repair Division, no proper records were maintained to that effect for submission to audit and relevant records would be maintained from 2009-10 onwards.

9.7.5.3 Loss due to poor performance

The tenders for repair of dredgers floated by Dredging Corporation of India Limited (DCI) stipulated that the previous performance[5] would be factored for evaluation of the price bids. In three tenders floated by DCI, though Hindustan Shipyard's quoted prices (Rs. 21.56 crore) were lower by 10 to 56 *per cent* compared to the prices (Rs. 26.22 crore) quoted by its foreign competitor, Hindustan Shipyard had to offer discounts of Rs. 8.48 crore for repair of the dredgers[6], because of poor performance factor due to longer cycle time taken by Hindustan Shipyard Limited in previous repair orders.

Hindustan Shipyard Limited stated (October 2009) that considering its poor performance factor discounts were offered to get the orders.

9.7.5.4 Non-enforcement of contractual clauses

In off-loading contracts for steel renewal works, Hindustan Shipyard stipulated a norm for scrap at five *per cent* of the steel issued to the contractor. The contract also provided that a contractor should furnish a reconciliation statement of steel issued and consumed along with each bill submitted for releasing payments. Though Hindustan Shipyard had issued 3886.13 tonnes of steel to contractors valuing Rs. 14.97 crore during the last three years ending March 2009, neither the contractors furnished nor did Hindustan Shipyard insist for compliance of the contractual clause.

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[5] ***Calculated by dividing the "actual time taken" by the "contractual repair period" averaged for 3 drydocks carried out at that Yard.***

[6] ***executed between September 2006 and October 2008***

Hindustan Shipyard Limited stated (November 2009) that reconciliation of steel pointed out by Audit was in progress.

This indicates failure of internal controls leading to payments to the contractors without reconciliation. Consequently, the Company was deprived of the opportunity to recover the value of excess generated scrap, if any, over the norm from the contractors.

Recommendation No. 9.5

The companies should ensure timely completion of repairs by effective planning to turnout more ships to increase ship repair revenue.

Hindustan Shipyard should accredit 'ship repair' as a separate cost and profit centre.

9.7.6 System of billing and realisation of contractual dues

9.7.6.1 Delays in raising of invoices

There was no time frame laid down for raising invoices both in Hindustan Shipyard and Cochin Shipyard. The delays in raising invoices are discussed in the succeeding paragraphs.

In 71 out of 77 orders executed by Hindustan Shipyard, there were abnormal delays up to 714 days in presentation of 147 invoices (Rs. 342.33 crore) after completion of repairs resulting in avoidable loss of interest of Rs. 11.27 crore. Despite persistent delays, Hindustan Shipyard did not devise a mechanism to identify and prevent delays.

Hindustan Shipyard, while accepting the delays, stated (October 2009) that computerisation was now introduced and officers were clearly instructed to clear the bills in time bound manner.

In case of Cochin Shipyard, there were delays upto 133 days[7] in presentation of 111 invoices (Rs. 300.80 crore) after completion of repairs resulting in loss of interest of Rs. 1.72 crore[8].

Cochin Shipyard stated (December 2009) that the minimum time required for raising the invoices was 30 days.

The reply is not acceptable as it was able to raise 22 and 48 invoices valuing Rs. 23.37 crore and Rs. 112.70 crore within 10 days and 11 - 30 days respectively.

9.7.6.2 Delays in realisation of invoices

The payment terms with the vessel owners provided for a definite credit period. There were delays ranging between 6 and 882 days in realisation of dues after allowing the agreed credit period (30 to 120 days) from the dates of raising the bills, which were delayed. There was no proper pursuance to ensure that the dues are collected within the agreed periods. Consequently, Hindustan Shipyard suffered a loss of Rs. 6.50 crore on account of interest.

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[7] ***after allowing 7 days from the date of completion of work order.***

[8] ***Calculated at 6 per cent per annum as against average rate of 6.65 per cent earned on term deposits.***

Hindustan Shipyard stated (October 2009) that there was no delay in realisation of outstanding dues from all other owners except DCI and it was pursuing with DCI for realisation of dues.

The reply is not convincing. Though Rs. 13.93 crore from DCI and Rs. 5.09 crore from other parties were outstanding over six months to five years as on 31 March 2009, there was no system by which the outstanding dues of Hindustan Shipyard are subjected to review by its Board of Directors.

In case of Cochin Shipyard, excess time taken by vessel owners (31 cases) over and above agreed time for settling the invoices (Rs. 165.38 crore) was upto 350 days. This resulted in loss of interest of Rs. 2.26 crore in respect of 31 repair jobs.

Cochin Shipyard stated (December 2009) that the delay in settlement was a matter of concern.

Recommendation No. 9.6

The companies should:

(i) Stipulate time frames for raising invoices and ensure internal compliance to avoid blockage of working capital.

(ii) Ensure realisation of repair bills within the agreed credit periods and incorporate suitable clauses in the contracts to recover interest in case of belated payments by the parties.

9.8 Conclusion

There was no defined action plan to capture market potential assessed by Eleventh FYP. Hindustan Shipyard and Cochin Shipyard could neither capture domestic market in totality nor could make a major dent in the international business of ship repairs. Hindustan Shipyard and Cochin Shipyard being the major players in the country did not revamp or modernise the infrastructure in tune with market potential. Delays in execution of contracts due to delay in procurement of material and release of job orders led to payment of liquidated damages and waiver of berthing charges. No benchmarks were fixed for key activities such as steel renewal, sand/ grit blasting, painting. There were abnormal delays in raising invoices on customers. This apart, in Hindustan Shipyard and Cochin Shipyard, the realisation of the dues did not take place within the agreed credit period.

The matter was reported to the Ministry in February 2010; their reply was awaited (March 2010).

MINISTRY OF TEXTILES

CHAPTER X

Jute Corporation of India Limited

Fulfillment of socio-economic objectives

Executive Summary

Jute Corporation of India (Company) was set up in 1971 with the main aim of providing Minimum Support Price (MSP) to the jute farmers and to serve as a stabilizing agency in the raw jute sector. The Company procures jute from the farmers at MSP and supplies to the jute mills. The performance audit, covering a period of six years (2003-2009), was conducted to assess whether the Company implemented the price support operations effectively to ensure remunerative prices to the jute farmers. Audit sample covered 26 Departmental Purchase Centres (DPC) out of 171 DPCs in six major jute growing states. A number of deficiencies mentioned below were noticed in the functioning of the Company:

- The Company procured only 0.99 per cent to 10.4 per cent of available jute in India during the six years (2003-09). Thus, the Company could not play any significant role in price stabilization and in ensuring remunerative prices to the jute farmers.
- The analysis regarding total estimated production and stock of the raw jute is made by the Jute Advisory Board in advance. The Company, however, did not formulate any business plan, based on this information.
- Out of 500 centres where jute trading takes place, the Company operates in 171 centres and has appointed co-operative societies in 40 centres for carrying out MSP operation on its behalf. Thus, total coverage by the Company is only 43 per cent of the jute centres. Geographical location of some of the centres is not convenient to farmers resulting in long distance travel and extra cost to the farmers and even distress sale in the local markets.
- Due to the lack of storage facilities, some centres stopped procurement on several occasions which forced the farmers to go in for sale to the middlemen at lower prices.
- The company could not enhance its turnover and suffered losses in all years from 2004-05 to 2007-08 excepting the year 2004-05. The company continued to depend on subsidies. GOI reimbursed Rs. 36.59 crore for overhead costs for 2007-08 and regularized grants of Rs. 147.06 crore released from 2003-04 to 2007-08.

The per quintal operational expenses of the Company are Rs. 409 which are higher than the operational expenses of Rs. 367 of private traders.

Though the company's present price support operations cannot be called effective, there is tremendous scope to rectify deficiencies in its functioning.

Summary of recommendations

The Company should:

(i) Develop its own system of identifying the jute growers with the help of State governments.

(ii) Take steps to ensure that MSP for all grades and locations is announced well before the commencement of the sowing season each year.

(iii) Increase its procurement substantially if the market prices are found to be below Minimum Support Price during the peak season.

(iv) Make comprehensive business plan so that the existing resources can be optimally utilised to procure maximum jute offered by the farmers.

(v) Take immediate steps to have suitable infrastructure at all the centres and idea of mobile purchase centres may be explored along with higher involvement of village level Self Help Groups for procuring raw jute.

(vi) Unviable Departmental Purchase Centres and sub-centres need to be quickly identified and relocated to ensure better operating performance.

(vii) Temporarily enhance its storage facility by hiring godown during peak procurement season in those areas where there are higher arrivals. Efforts may be expedited to hire godowns of National Jute Manufacturing Corporation in Kolkata.

(viii) Take steps to ensure that provisions of the sales contract are strictly adhered to avoid delays in lifting of jute by the mills.

(ix) Make efforts to have back to back arrangement with the jute mills so that jute is directly transferred to mills.

10.1 Introduction

Jute is a plant fibre that can be spun into coarse, strong thread. The fibre comes from the stem and ribbon of the jute plant and is extracted by a process called retting in which the jute stems are bundled together then immersed in water to remove extraneous matter. Jute is one of the cheapest natural fibres and is second only to cotton in amounts produced and variety of use. It is used primarily for producing hessian, sacking, carpet, yarn and twine among others. The technical usages of jute include applications in the agricultural, automotive, construction, engineering and medical sectors. India with overall production of 58 *per cent* of world jute production is the highest jute producer in the world followed by Bangladesh with 33 *per cent*. Production of jute is mainly concentrated in eastern part of India and north Andhra Pradesh. The average production of jute is 109.79 lakh bales[1] per annum. Jute industry occupies a significant place in the economy and provides

[1] ***1 bale is equal to 180 Kg***

livelihood to around 40 lakh farm families and direct employment to two lakh workers. Jute has about 9.37 lakh hectares area under cultivation in India.

10.1.1 Government support to jute sector

Raw jute and jute textiles were included as essential commodities under the Essential Commodities Act 1955. The Government of India (GOI) also issued various control orders for facilitating Minimum Support Price (MSP) operations. These control orders empower the Jute Commissioner to (i) fix prices of raw jute and jute products, (ii) to control production of jute textiles (iii) to regulate stocks of raw jute, (iv) to inspect quality *etc.* The powers were also vested under clause 5 of the Jute and Jute Textile Control Act 2000 (modified in November 2002) with the Jute Commissioner (JC) to prevent default in lifting of jute by jute mills from Jute Corporation of India (Company). In addition to the control orders, the Jute Packaging Materials (compulsory use of Packing Commodities) Act 1987 (JPM Act) was promulgated and jute packaging of food grains and sugar was made mandatory.

10.1.2 Role of Jute Corporation of India

Jute Corporation of India (JCI) was set up in 1971 with the main aim of providing MSP to the jute farmers and to serve as a stabilising agency in the raw jute sector. The authorised and paid-up capital of the Company is Rs. 5.0 crore. The administrative control of the Company vests with the Ministry of Textiles (MoT). Day- to- day management of the Company is vested with the Board of Directors. The Additional Secretary and Financial Advisor (AS&FA), Joint Secretary (Jute) and the Jute Commissioner (JC) are the members of the Board. The Chairman cum Managing Director conducts the business of the Company as per powers delegated by the Board. The Company functions through its Head office located in Kolkata and sixteen Regional Offices (RO) and 171 Departmental Purchase centres (DPC) and Sub-centres (SC) located in six[2] major jute growing states. The DPC and SC are responsible for purchasing, sorting, baling, pressing, packing, storage and delivery of raw jute to the jute mills under the overall control of the Head Office.

During March 2003-04, the accumulated loss of the Company amounted to Rs. 127.32 crore as the Government of India did not reimburse the losses incurred by the Company under MSP operation. MoT approved (June 2005) the functional and financial reconstruction of the Company retrospectively from 2003-04. The Company could not enhance its turnover and suffered losses in all years from 2004-05 to 2007-08 excepting the year 2004-05. The details of turnover and profit/(loss) of the last five years are given below in **Table 10.1**:

[2] ***West Bengal, Assam, Bihar, Andhra Pradesh, Orissa and Tripura.***

Table 10.1

(Rs. in crore)

Year	Turnover	Profit/(loss) after tax
2004-05	188.53	1.53
2005-06	41.41	(17.77)
2006-07	32.76	(44.04)
2007-08	142.63	(13.80)
2008-09	166.93	92.08

Even after financial and functional restructuring, the Company continued to depend on subsidies. GOI reimbursed (January 2009) Rs. 36.59 crore for overhead costs for 2007-08 and regularised grants of Rs. 147.06 crore released from 2003-04 to 2007-08.

10.1.3 Linkage of JCI jute

Food Corporation of India and other public agencies purchase jute bags by placing purchase orders to Directorate General of Supplies and Disposal (DGS&D). The DGS&D coordinates with the Ministry of Textiles. The Jute Commissioner (MoT) thereupon issues monthly Production Control Order (PCOs) under Essential Commodities Act on the Jute Mills in the country depending upon the monthly allocation indents. The JC allocates the indents among the mills by issuing Purchase Control Orders (PCO) for supply of subscribed quantity of B-Twill bags directly to the procurement agencies. JC also allocates the quantum of MSP raw jute to be lifted by jute mills at a MSP derivative price[3] from the Company against the B-Twill linkage. The prices of B-Twill bags which are cost plus are also fixed by JC as per the recommendation of the Tariff Commission[4].

10.2 Scope of Audit

This performance audit covers the procurement of raw jute under MSP in the six jute growing states covering a period of six years from 2003-04 to 2008-09.

10.3 Audit objectives

The performance audit was conducted to assess whether the Company could effectively implement price support operations to ensure remunerative prices to the jute farmers.

10.4 Audit criteria

The fulfillment of socio-economic objectives of the Company was assessed in terms of the following criteria:

- Directives of the GOI for MSP operations; and

[3] ***Reimbursement of MSP value of raw jute plus incidental operational expenses and service charges.***

[4] ***The commission is headed by a full-time chairman of the rank of Secretary to the Govt. of India and is assisted by full-time member designated as Member-Secretary in the rank of Additional Secretary. The other members of the commission will be part-time members whose number may vary from 3 to 5.***

- Instructions/ Circulars issued by the Company to all ROs, DPCs and SCs.

10.5 Audit methodology

After a preliminary study and collection of background information, entry conference was held on 24 April 2009 for discussion of audit objectives and audit criteria with the Management of the Company. Test audit was conducted during May 2009 to August 2009. Exit conference to discuss the audit findings and recommendations was held on 13 October 2009.

10.6 Audit sampling

Detail audit was conducted in 26 DPCs situated in six[5] major jute growing states. Survey of farmers satisfaction was also conducted in 52 DPCs (including the 26 DPCs selected for detail audit). The selection of DPCs was done by using the sampling method of Probability Proportion to Size without Replacement (PPSWOR).

10.7 Acknowledgement

Audit acknowledges the cooperation and assistance extended by the Management of the Company at various stages of the performance audit.

[5] ***West Bengal, Assam, Bihar, Andhra Pradesh, Orissa and Tripura.***

10.8 Audit findings

10.8.1 Preparedness for procurement of raw jute

10.8.1.1 Identification of jute growers

To ensure that the benefit of price support is availed by genuine jute farmers, it is imperative that the jute farmers are correctly identified. It was observed that the Company does not have a system of identifying such farmers. The Company instead depended on the state governments concerned to furnish a list of growers of the respective areas. Except in Andhra Pradesh which issues a passbook to the farmers, such lists of jute cultivators were not always found available in the remaining jute growing states.

While admitting the facts, the Management stated that such system of identification was followed from last so many years. The Management further stated that the DPCs were advised to prepare list/ register of jute growers of the villages under the respective DPC under JTM, MMIII.[6]

From the reply it is clear that the system of identification of jute growers is inadequate. The list prepared by some DPCs under JTM scheme was only for two hundred farmers. Hence, majority of the jute farmers have not been covered in the list prepared by the Company.

Recommendation No. 10. 1

The Company, with the help of *state* governments, should develop its own system of identifying the jute growers.

10.8.1.2 Announcement of MSP

The Commission for Agriculture Costs and Prices (CACP) [7]declares the Ex-Assam MSP for TD-5[*] between October to December every year. Thereafter, the JC fixes and notifies the MSP for all other locations and grades based on the calculation made by JCI. After this notification, the Company announces the MSP to the farmers through its ROs, DPCs and SCs. It was observed that inspite of repeated suggestions of the CACP to announce the MSP well before the commencement of the sowing season (February-April) the MSP was generally announced in the month of May or June. Delayed announcement of MSP adversely affects the decision of farmers to allocate land and other resources to jute farming.

In reply the Management stated that the delay in announcement of MSP was due to delay in announcement by the Government.

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[6] ***Jute Technology Mission, Mini Mission-III***

[7] ***A central Government body to advise the Government on price policy of major agricultural commodities with a view to evolving a balance and integrated price structure in the perspective of the overall needs of the economy and with due regard to the interests of the producer and the consumer.***

[*] ***Variety of jute***

Audit observed that between 1999-2000 to 2008-09, the MSP announced by CACP and the Government has been the same. Hence, had the Company taken up the matter proactively with the JC, a quick announcement of MSP was possible. Audit found no evidence that the Company took up the matter proactively with JC.

Recommendation No. 10.2

The Company along with JC and MoT may take steps to ensure that MSP for all grades and locations is announced well before the commencement of the sowing season each year.

10.8.1.3 Grade differential

The gradation of jute is done from TD-1[8] to TD-8. The medium to inferior grades of jute fibre which are graded lower than TD-4 constitute the major quantum of production. For making high value products, jute of better fibre quality is required. It was, however, observed from the MSP fixed for Assam for all the grades (TD-1 to TD-8) for the year 2007-08 that the MSP differential between the highest grade (TD-1) and the inferior grades (grades lower than TD-5) was 26 to 47 *per cent*. Thus, there was a marginal price differential between different grades. Due to such marginal differential, the MSP fixed, may not, encourage jute growers to go for production of higher grades.

The Management in reply stated that the Company has initiated schemes under Jute Technology Mission (JTM) for enhancement of the quality of raw jute to ensure higher price to the farmers. Regarding the enhancement of price differential between grades, the Company has been regularly discussing with JC and accordingly prices are fixed.

The price differential between different grades of jute has remained the same and marginal for more than five years. Audit observed that Company did not take up the matter with JCI to ensure that there was enhancement of price of higher grades of jute.

Recommendation No. 10. 3

The Company should take up the matter with the JC to enhance price differential between different grades so as to promote the production of higher grade jute in the country.

10.8.1.4 Lower MSP for North Bengal Jute

Jute produced in North Bengal is superior in fibre quality (tex), fiber and yarn tenacity. It fetches a premium of Rs. 300 - 400 per quintal in the market over the jute produced in South Bengal. However, its better quality has not been considered while fixing the MSP for North Bengal jute. The MSP of TD-5 (North Bengal) along with other location is derived after deducting freight charges, other charges and market levy from TD-5 Kolkata derivative price of that particular location. The freight charges are higher for north Bengal and are reduced from the Kolkata derivative price for north Bengal districts. Thus, the MSP for North Bengal is lower[9] than that of South Bengal despite better quality.

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[8] ***Variety of jute***

[9] ***MSP for the north Bengal TD-5 jute was Rs. 1,275 per quintal and the MSP for the south Bengal TD-5 jute was Rs. 1,313 per quintal (2008-09)***

The Management in reply stated that such practice is being followed for so many years to fix the MSP of raw jute. JCI has taken up the matter with JC in 2005-06 and regularly following to fix premium for North Bengal over South Bengal in line with ruling premium in trade.

The actions taken by the Company do not appear to be sufficient to ensure remunerative price to the farmers for premium quality of jute of North Bengal. Even after four years of the matter having been taken up with JC, the discrepancy remains. It appears that the jute mills are benefiting by getting premium jute at lower price at the cost of the farmers.

Recommendation No. 10.4

The Company should pursue with JC for fixing MSP of better quality North Bengal jute in such a way that MSP remains unaffected due to the freight element.

10.8.2 Procurement performance

Table 10.2 below indicates the procurement made by the Company against the total production of jute in the country during the last six years ending on 31 March 2009.

Table 10.2

Year of operation	Production of jute and mesta (lakh bales)	JCI procurement of raw jute (lakh bales)			Percentage of JCI procurement to total production	Procure-ment expenses (Rs. in crore)	Fixed overhead expenses (Rs. in crore)
		under MSP	under Commer-cial	Total			
2003-04	111.73	11.22	0	11.22	10.04	187.36	36.59
2004-05	102.72	3.56	0	3.56	3.47	75.20	41.11
2005-06	108.40	0.002	1.41	1.41	1.30	33.63	34.29
2006-07	114.21	0.023	4.82	4.84	4.24	123.45	38.72
2007-08	113.40	7.66	0	7.66	6.75	158.00	40.68
2008-09	103.28 (estimated)	1.02	0	1.02	0.99	33.66	70.81

The Company was expected to assume a commanding position in the jute market and act as the most powerful stabilizing factor to ensure remunerative prices to the jute farmers. The Company, however, procured only 0.99 *per cent* to 10.04 *per cent* of the available jute in India during the last six years. Thus, despite substantial expenditure it could not play any significant role in price stabilisation and in ensuring remunerative prices to the jute farmers. In fact, due to low market prices during 2007-08, farmers had to sell produce below MSP price.

The Management in reply stated that the performance of the Company was lower due to the higher market price over the MSP.

The reply is not convincing as the Company itself admitted that during 2007-08, the farmers had to sell their raw jute below MSP price. During that year the procurement by the Company was only 6.75 *per cent* of the total production. Even during the years 2001-02 to 2003-04 market prices were depressed but the procurement by the Company at MSP ranged between 2.11 and 11.65 *per cent* of total production.

10.8.2.1 Lower procurement in the peak season

More than 50 *per cent* of the total jute production is brought to the market during the harvesting months of August to November. During this peak period due to sudden huge availability, prices tend to fall below the MSP level. Rather than maximise its procurement in this peak period, it was seen that the maximum procurement of the Company in terms of percentage of total arrival of jute in the market ranged only between 16.90 *per cent* (2004-05) and 27.49 *per cent* (2003-04). This not only resulted in the market price dipping below the MSP in certain jute markets but also affected the overall procurement of the Company.

The Management in reply stated that the lower procurement was due to irregular MSP.

The reply of Management is not acceptable as during the peak season (August to November) the prices are generally lower than the MSP and in order to fulfil its objectives to ensure the benefit of MSP to farmers, the Company should have procured higher quantity of raw jute.

Recommendation No. 10. 5

During the peak season, the Company should increase its procurement substantially if the market prices are found to be below MSP.

10.8.2.2 Lack of planning

The market price of raw jute depends on the availability of raw jute. If crop year starts with higher estimated production and opening stock, the price tends to fall below the MSP. The analysis regarding total estimated production and stock of the raw jute is made by the Jute Advisory Board[10] in advance. The Company, however, did not formulate any business plan based on this information. Accordingly, no procurement targets were set for its centres. In the absence of a detailed action plan most of the raw jute remained out of the purview of the MSP operation of the Company.

In reply the Management stated that in every MSP seasons JCI conducts periodic operational meetings and circulates appropriate instructions to its DPCs and SCs to conduct MSP by extensive utilisation of its available infrastructure.

The Company did not fix centre-wise procurement targets based on the forecast arrival of jute. Contrary to efficient business practice the Company merely issued circulars which were routine in nature.

Recommendation No. 10.6

The Company should make comprehensive business plan so that the existing resources can be optimally utilised to procure maximum jute offered by the farmers.

10.8.2.3 Limited coverage

There are 500 centres where jute purchases are transacted. The Company through its DPCs and SCs, operates in 171 centres and has appointed co-operative societies in further

[10] ***Jute Advisory Board, a body representing the government, growers, industry and traders.***

40 centres for carrying out MSP operation on its behalf. Thus, total coverage by the Company is only 43 *per cent* of the jute centres resulting in some DPCs and SCs catering to more than 10 administrative blocks. It was also observed that the geographical locations of some DPCs[11] and SCs are not farmer convenient since they are located at places far from the jute growing areas. This resulted in both long distance travel and extra cost to the farmers and even distress sale in the local markets. It was also observed from the records pertaining to 113 centres, there were 30 centres without suitable infrastructure like effective bailing press, godowns, assortment shed or office premises which affected procurement.

The Management reply was silent about the inconvenient geographical locations and unsuitable infrastructure of some DPCs and SCs. However, the Management stated that the concept of mobile DPCs would be explored with relocation/ merger of existing DPCs to economically cover more areas.

Recommendation No. 10.7

The Company should take immediate steps to have suitable infrastructure at all the centres and idea of mobile purchase centres may be explored along with higher involvement of village level Self Help Groups for procuring raw jute.

10.8.2.4 Unviable and under performing centres

It was observed that there were 12 centres where there was either no procurement or negligible procurement during the last three to five years. Fixed overhead cost of Rs. 169.59 lakh continued to be incurred during the same period. There are 10 DPCs and SCs where the procurement during the last five years was low and the Company incurred on an average Rs. 1,080 to Rs. 4,928 per quintal on salaries and wages during the last five years. However during the period the MSP was ranging between Rs. 890 and Rs. 1,250 per quintal.

The Management stated that initiatives are being taken to identify underperforming centers for their relocation. With relocation/merger of few DPCs, the Company can curtail some variable/fixed overhead expenses.

In this context audit observed that the unviable or poor performing DPCs have been in the knowledge of the Company for the past several years but no suitable remedial action for relocation has been taken so far.

Recommendation No. 10.8

Unviable DPCs and SCs need to be quickly identified and relocated to ensure better operating performance.

10.8.2.5 Limited Storage

Average storage capacity of each godown available with the centres is around 2000 quintals. Due to this limited storage capacity, the Management directed the DPCs and SCs to restrict their purchase to 250 quintals and 200 quintals per day, respectively

[11] ***Gwalpara, Puraini, Alamnagar, Basanpur etc., these areas are located 15-30 Km away from the DPCs.***

against an arrival of more than 1500 quintals per day. Due to the lack of storage facilities, some centres stopped procurement on several occasions which forced the farmers to go in for sale to the middlemen at lower prices. The Company's proposal (June 2007) of taking NJMC[12] godowns at Kolkata mills for storage by paying rent of Re. one per square foot per month has not been finalised.

The Management in reply stated that generally during the peak purchasing seasons the Company hired additional godowns as per requirements. Under Jute Technology Mission (mini mission-III) there is provision for construction of additional storage capacity to cope up with additional storage needs.

Audit observed that the JTM was approved by the Government during June 2006 and is being implemented only from 2007-08. The Company had not taken appropriate action for enhancing even temporary storage for last several years and instead the DPCs and SCs were asked to restrict daily procurement.

Recommendation No. 10.9

Since the cost element on rent in rural area is nominal, the Company may temporarily enhance its storage facility by hiring godown during peak procurement season in those areas where there are higher arrivals. Efforts may be expedited to hire NJMC's godowns in Kolkata.

10.8.2.6 Slow stock rotation

The Company takes around 135 days from the date of procurement of raw jute to deliver the same to the mills. The deployment of lower than required number of contractual labourers resulted in more mandays taken for sorting and packing. Further delays are caused by the delay in receiving linkage from JC. The Company gets the linkage order on submission of stock statement to the JC. Since the Company submits the stock statement in the last week of the month, JC considers stock statement of the preceding month for the issue of linkage, thus, causing delay of one month. These issues resulted in the Company having to face severe storage constraint and incurring higher operational cost. It was further observed that most of the mills defaulted in lifting of raw jute allotted to them. This was due to the fact that the mills generally lift JCI raw jute only when market prices increase above the Kolkata landed MSP.

The Management in reply stated that in peak seasons there is an acute shortage of hired labour along with transportation problem. Company has implemented on-line data transfer facility, coordinating all its procurement centres for summarisation of stocks on daily basis and submission of the same to the appropriate authority. The Management further stated that delay in lifting of jute by mills may be dealt in association with the JC and mills by pursuing them as per provision of contract.

From the reply of the Management it is clear that there is lack of planning by the Company which causes problems of insufficient labour and transportation year after year. The online data transfer facility is not fully implemented. Audit found no evidence that

[12] ***National Jute Manufacturing Corporation Limited***

the Company ever cancelled contracts and charged the mills for the difference in the contract price and the market price on date as per the provisions of sales agreements. Thus, the reply of the Management is not convincing.

Recommendation No. 10.10

Stock statement may be submitted to the office of JC at shorter intervals (weekly or fortnightly) to avail faster linkages for quick rotation of stock.

Steps may be taken to ensure that provisions of the sales contract are strictly adhered to avoid delays in lifting of jute by the mills.

10.8.3 Marketing inefficiencies

10.8.3.1 Avoidable higher operational expenses

The per quintal operational expenses of the Company are Rs. 409 which are higher than the operational expenses of Rs. 367 of private traders. Audit observed that this is because private traders have arrangement with the mills which provides them ready sales outlet. The Company does not have such arrangement with the mills. Instead the Company waits for the JC to award the PCO linkage. Thus, the centres have to shift the stock to the local storage incurring additional expenditure on transportation, loading, unloading, stacking and godown rent. Prolonged storage affects the weight coupled with additional expenditure for reweighing. Due to higher operational costs, the Company is not in a position to compete with the private traders.

The Management in reply stated that due to payment of sales tax the expenses are higher than the private traders. The modification in procedures of back to back arrangement can only be possible with the consent of the buyer for which JCI has been making all efforts.

The reply is not convincing as the operational expenses of private traders (Rs. 367) also include the payment of sales tax[13]. The Company incurs higher operational expenditure because no back to back arrangements[14] with the mills have been made due to lack of marketing efforts.

Recommendation No. 10. 11

The Company should make efforts to have back to back arrangement with the jute mills so that jute is directly transferred to mills.

10.9 Conclusion

The MSP operation of the Company covers only 43 *per cent* of the trading centres. Due to poor planning and inadequate infrastructure, the existing centres could procure only 0.99 to 10.04 *per cent* of total production of jute between 2003-04 and 2008-09. As a result, the benefit of price support was not made available to most of the farmers. As a result, at times the farmers had to sell their produce at prices lower than MSP. A number

[13] ***Rs.58 per quintal***

[14] ***Under such arrangement, the Company may procure jute on behalf of mills and despatch it directly to the respective mills.***

of deficiencies were noticed in the functioning of the Company. The Company did not plan operations systematically to cover the high operating expenses. For the Company to fulfil its price support obligations and to be self sustaining, the MSP operations need to be systematised and scaled up.

The matter was reported to the Ministry in February 2010; their reply was awaited (March 2010).

(SUNIL VERMA)
Deputy Comptroller and Auditor General
(Commercial) and Chairman, Audit Board

New Delhi
The - 8 JUL 2010

Countersigned

(VINOD RAI)
Comptroller and Auditor General of India

New Delhi
The - 8 JUL 2010

ANNEXURES

Annexure –1

(Referred to in paragraph no.2.3)

Sampling techniques used for selection of the units and data

1. In the first stage BSNL Corporate Office and head offices of all the Maintenance Regions (Northern Telecom Region, Southern Telecom Region, Western Telecom Region and Eastern Telecom Region) were selected for the Performance Audit.

2. At the territorial circles, one General Manager office was selected for field study. Along with General Manager office, one Deputy General Manager office was also covered in the Performance Audit. In large circles where more than one Deputy General Manager office functioned, viz., Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Madhya Pradesh, Tamil Nadu, Uttar Pradesh, two Deputy General Manager offices were taken up for detailed study. The details of selection are given below:

Region	GM/DGM office	Total	Selected	Percentage
ETR	GM	2	2	100
	DGM	9	6	66.67
NTR	GM	5	5	100
	DGM	11	9	81.82
WTR	GM	4	4	100
	DGM	15	13	86.67
STR	GM	7	4	57.14
	DGM	12	11	91.67
Total	GM	18	15	83.33
	DGM	27	39	82.98

3. Apart from the above Administrative offices, Level I TAXs functioning in the territorial circles were covered.

Annexure – II

(Referred to in paragraph no.2.8.4)

Statement showing links and cost of Purchase Order (phase wise)

PHASE	Date of Purchase Order	Cost of Purchase Order (Rs. in crore)	Links provided
PHASE-I	29.09.2005	19.62	3000
PHASE-II	20.12.2006	60.20	19200
PHASE-III	23.05.2008	58.80	NA
TOTAL		**138.62**	**22200**

Annexure – III

(Referred to in paragraph no.2.8.4.1)

Delay in Providing Point of Intersection (POI) to private operators

Region	Division/Route	Delay (in days)		Amount (Rs. in lakh)
		From	To	
NTR	Lucknow	6	137	5.45
ETR	Bihar & Jharkhand	300	570	264.00#
WTR	Ahmedabad	44	168	9.50
	Rajkot	0	545	14.96
	Bhopal	17	336	9.22
	Raipur	2	101	3.31
Total				**306.44**

includes potential loss due to non-provisioning of POI also

Annexure – IV

(Referred to in paragraph no.2.8.4.2)

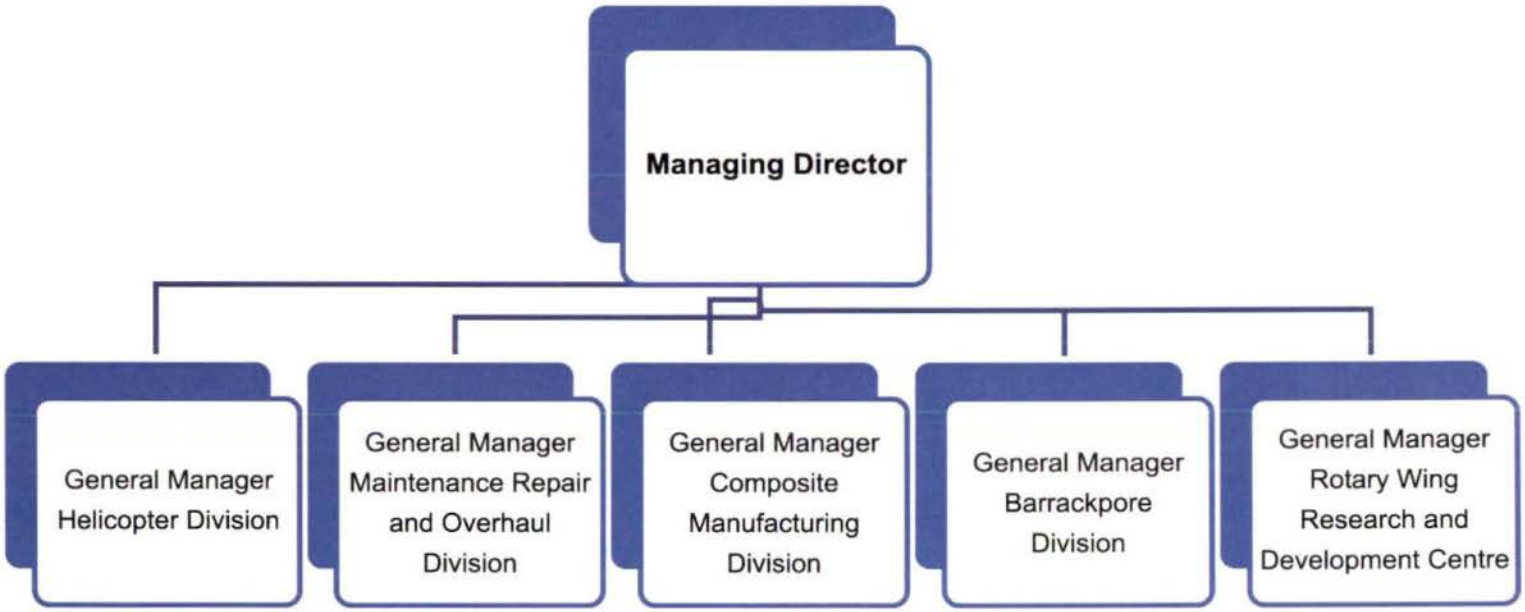
IUC Outstanding (Post-IOBAS Period) against Private Operators

Region	Division/Route	Period		Amount (Rs. in crore)
		From	To	
ETR	Patna, Bhubaneswar, Guwahati, Kolkata	April 2005	March 2009	37.18
WTR	Gujarat (Ahmedabad and Rajkot)	November 2005	January 2009	4.47
	Madhya Pradesh (Bhopal and Raipur)	December 2005	March 2009	2.00
STR	Bangalore and Chennai	April 2008	March 2009	0.29
Total				43.94

Annexure – V

(Referred to in paragraph no.3.1)

Organisation Chart of Helicopter Complex



Annexure-VI

(Referred to in paragraph no.3.1)

Statement showing details of ALH project cost (September 2009)

(Rs. in crore)

Nature of expenditure	Sanction cost	Expenditure incurred	Remarks
Design of ALH-Basic Helicopter	**536.05**	**536.05**	Customer funded
WSI Project			Customer funded
Army	405.95	243.64	
Navy	139.92	137.81	
IAF	54.29	42.70	
Sub total of WSI Project	**600.16**	**424.15**	
Total	**1136.21**	**960.20**	Customer funded
Infrastructure			
Capital – ALH	259.25	176.52	Company funded
Capital – Shakti engine	070.16	15.52	Company funded
DRE - ALH	408.80	177.41	Company funded
DRE – Shakti engine	029.25	17.19	Company funded
Total	**767.46**	**386.64**	
Civil version of ALH	89.31	89.17	Company funded
WSI – Shakti Engine	110.05	104.62	Initially to be funded by Company and later on to be recovered during production phase.
Total	**966.82**	**580.43**	Company funded

Annexure – VII

(Referred to in paragraph no.3.7.1.1)

Major milestones of helicopter development programme

1. Specification of development target values
2. Freeze of ALH basic configuration
3. Definition of critical components
4. Release of long lead items (LLITS) for prototype
5. Lay down of test programmes and test procedures
6. Design freeze of PT1
7. GTV operational
8. PR1 roll out
9. PT2/PT3 first flight
10. Design freeze of production version
11. PT4 first flight
12. Acceptance of performance data
13. PT delivery to Indian Armed Forces text centre

Annexure-VIII

(Referred to in paragraph no.3.7.3)

Statement showing the working of profitability of ALH-Defence and Civil customers

(Rs. in crore)

Year	No. ALH sold	Sale value		Material cost	Labour cost	Other costs	Total cost	Material cost per unit	Labour cost per unit	Other costs per unit	Total unit cost	Profit/Loss
		Total	per ALH									
2004-05	12	437.71	36.48	281.56	44.25	32.85	358.66	23.46	3.69	2.74	29.89	
	2	55.20	27.60	46.93	7.38	5.48	59.79	23.46	3.69	2.74	29.89	
	14	**492.91**	**35.21**	**328.49**	**51.63**	**38.33**	**418.45**	**23.46**	**3.69**	**2.74**	**29.89**	**5.32**
2005-06	11	378.08	34.37	261.58	49.83	36.19	347.60	23.78	4.53	3.29	31.60	
	2	64.00	32.00	47.56	9.06	6.58	63.20	23.78	4.53	3.29	31.60	
	13	**442.08**	**34.01**	**309.14**	**58.89**	**42.77**	**410.80**	**23.78**	**4.53**	**3.29**	**31.60**	**2.41**
2006-07	**10**	**368.55**	**36.86**	**225.67**	**41.23**	**28.30**	**295.20**	**22.57**	**4.12**	**2.83**	**29.52**	**7.34**
2007-08	9	309.60	34.40	170.73	90.78	32.92	294.43	18.97	10.09	3.66	32.72	
	1	25.50	25.50	18.97	10.09	3.66	32.72	18.97	10.09	3.66	32.72	
	10	**335.10**	**33.51**	**189.70**	**100.87**	**36.58**	**327.15**	**18.97**	**10.09**	**3.66**	**32.72**	**0.79**
2008-09	3	106.34	35.45	59.28	26.66	15.82	101.76	19.76	8.89	5.27	33.92	
	11	364.94	33.18	217.34	97.74	57.99	373.07	19.76	8.89	5.27	33.92	
	14	**471.28**	**33.66**	**276.62**	**124.40**	**73.81**	**474.83**	**19.76**	**8.89**	**5.27**	**33.92**	**-0.26**

Annexure-IX

(Referred to in paragraph no.3.7.5.2)

Customer /year of order	Ordered Nos.	Supplied Nos	Order Value Appx- (Rs. crore)	Remarks
ONGC Limited (April 2005)	3	2	111	Third ALH was not accepted by ONGC. Reasons not on record. Subsequently, it was supplied to Ministry of Home Affairs resulting in locking up Rs.30.49 crore for two years. Further due to non-provision in the contract with ONGC for recovery of operation and maintenance charges during the period of non utilisation of the ALH due to snags, the Company could not recover from ONGC Rs.2.17 crore it had paid to the service provider.
Govt. of Jharkahand (February 2005)	2	1	62	Due to delay of two years in supply of first ALH the order for the second ALH was cancelled.
Royal Nepalese Army (Jan 2003)	2	2	76	One ALH delivered met with an accident (October 2004) due to failure of Tail rotor control tube resulting in Company absorbing repair/replacement cost of Rs.9.17crore.
Ecuador Air Force (April 2008)	7	5	254	One ALH crash landed in October 2009. Supply of balance ALH pending outcome of the enquiry report of crash.

Annexure X

(Referred to in paragraph no.5.5)

Sampling

Sampling techniques used for selection of the units and data

The performance audit was conducted as a horizontal study across the four PSU insurers viz., NIA, NIC, OIC and UIIC with corporate offices at Mumbai, Kolkata, New Delhi and Chennai. The following methodology was adopted for selection of units and sample selection of policies underwritten for test audit.

1. Two Regional Offices (ROs) for each PSU insurer under each zone were selected on the basis of claims incurred during the last three years. The selected ROs represented 68 *per cent, 75 per cent,* 51 *per cent* and 79 *per* cent of the premium collected by NIA, NIC, OIC and UIIC respectively.

2. Out of total 95 ROs of the four PSU insurers 32 ROs were selected for detailed audit. The ROs in metro cities with high density of health policies and high claim ratio were selected. Two DOs under each selected RO were selected by respective office of the Principal Director of Commercial Audit & ex-officio Member Audit Board at Mumbai, Kolkata, New Delhi and Chennai and one BO under each DO was selected by the audit party on judgmental basis. Thus, 32 ROs, 64 DOs and 64 BOs were visited during the performance audit.

3. 100 *per cent* analysis of the data furnished by the TPAs in respect of issue of identity cards, cashless settlement, reimbursement claims and claims settlement was done using IDEA so as to evaluate the performance of the Third Party Administrators.

4. Structured Query Language (SQL) was used for data analysis in respect of individual mediclaim policies.

5. In respect of underwriting, out of the 3882 TMGPs issued by the selected Divisional offices/Branch offices, 701 policies were selected using appropriate sampling techniques for test check. Details of cases selected are given below:

PSU insurer	No. of TMGPs issued	No of TMGP selected
NIA	2534	254
NIC	600	135
OIC	507	172
UIIC	241	140
Total	**3882**	**701**

Annexure XI

(Referred to in paragraph no.5.7.1.3)

Corporate Clients of PSU Insurers

Sl. No.	Year	Insurer	Insured	Premium	Claim	ICR
1.	2007-08	OIC	ALCATEL	63,000,000	49,100,000	77.94
2.	2008-09	OIC	ALCATEL	64,200,000	49,800,000	77.57
3.	2007-08	OIC	AMAR RAJA BATTERIES	3,278,000	1,131,000	34.50
4.	2008-09	OIC	AMAR RAJA BATTERIES	5,145,000	5,174,000	100.56
5.	2006-07	NIC	ANZ Operations & Tech.	13,873,006	9,175,523	66.14
6.	2007-08	NIC	ANZ Operations & Tech.	10,538,650	17,962,918	170.45
7.	2006-07	NIC	ASIAN PAINTS	12,600,000	25,500,000	202.38
8.	2007-08	NIC	ASIAN PAINTS	11,700,000	13,800,000	117.95
9.	2008-09	NIC	ASIAN PAINTS	16,300,000	19,700,000	120.86
10.	2007-08	OIC	BLUE STAR	8,800,000	8,100,000	92.05
11.	2008-09	OIC	BLUE STAR	9,600,000	11,100,000	115.63
12.	2006-07	NIC	Caterpillar	7,571,350	6,934,206	91.58
13.	2006-07	NIC	Caterpillar	21,505,839	41,809,591	194.41
14.	2007-08	NIC	Caterpillar	2,381,490	2,873,192	120.65
15.	2007-08	NIC	Caterpillar	2,803,489	5,152,482	183.79
16.	2008-09	NIC	Caterpillar	5,766,367	1,213,414	21.04
17.	2008-09	NIC	Caterpillar	19,616,472	20,061,204	102.27
18.	2006-07	OIC	CTS	83,200,000	121,600,000	146.15
19.	2007-08	OIC	CTS	187,800,000	182,000,000	96.91
20.	2008-09	OIC	CTS	193,400,000	230,000,000	118.92
21.	2007-08	OIC	DHL	4,500,000	6,100,000	135.56
22.	2006-07	OIC	DQ ENTERTAINMENT	2,207,000	3,611,000	163.62
23.	2007-08	OIC	DQ ENTERTAINMENT	4,545,000	7,868,000	173.11
24.	2006-07	NIC	EXIM BANK	5,200,000	4,500,000	86.54
25.	2007-08	NIC	EXIM BANK	4,800,000	5,600,000	116.67
26.	2008-09	NIC	EXIM BANK	8,400,000	6,800,000	80.95
27.	2006-07	NIC	First Indian Corpn.	10,642,840	11,012,061	103.47
28.	2008-09	NIC	First Indian Corpn.	14,561,045	9,657,419	66.32
29.	2006-07	NIA	HDFC	114,600,000	95,100,000	82.98
30.	2007-08	NIA	HDFC	230,300,000	179,600,000	77.99
31.	2006-07	NIA	HPCL	518,600,000	365,900,000	70.56
32.	2007-08	NIA	HPCL	504,800,000	428,800,000	84.94
33.	2006-07	NIC	I I T, Chennai	1,591,659	2,705,615	169.99
34.	2007-08	NIC	Inautix Tech.	14,513,462	15,017,602	103.47
35.	2008-09	NIC	Inautix Tech.	12,759,544	7,612,012	59.66
36.	2006-07	NIC	Indian Instt of Tech	4,040,143	9,218,820	228.18
37.	2006-07	NIC	Indian Instt of Tech	1,972,220	4,658,044	236.18
38.	2008-09	OIC	INFOR GLOBAL	4,759,000	6,713,000	141.06
39.	2006-07	OIC	INFOR GLOBAL SOLUTIONS	7,754,000	7,161,000	92.35

40.	2007-08	OIC	INFOR GLOBAL SOLUTIONS	6,631,000	4,842,000	73.02
41.	2006-07	NIC	Infosys	80,434,824	132,518,227	164.75
42.	2007-08	NIC	Infosys	136,292,332	141,706,283	103.97
43.	2008-09	NIC	Infosys	142,303,196	100,834,954	70.86
44.	2007-08	NIC	Infosys - dependants	19,529,812	23,950,708	122.64
45.	2008-09	NIC	Infosys - dependants	24,850,308	16,677,283	67.11
46.	2007-08	NIC	Infosys BPO	26,013,514	19,532,866	75.09
47.	2008-09	NIC	Infosys BPO	8,139,315	16,085,655	197.63
48.	2006-07	NIC	INTEGRAN MANAGERD	2,100,000	200,000	9.52
49.	2006-07	OIC	INTERGRAPH CONSULTING	1,858,000	1,999,000	107.59
50.	2008-09	OIC	INVENSYS DEV CENTRE INDIA PVT LTD	5,339,000	7,742,000	145.01
51.	2008-09	OIC	ITC INFOTECH LTD	8,989,000	10,326,000	114.87
52.	2006-07	NIC	JAIN IRRIGATION	3,500,000	3,600,000	102.86
53.	2007-08	NIC	JAIN IRRIGATION	6,800,000	11,600,000	170.59
54.	2008-09	NIC	JAIN IRRIGATION	11,400,000	14,000,000	122.81
55.	2006-07	OIC	JET AIRWAYS	21,300,000	72,000,000	338.03
56.	2007-08	OIC	JET AIRWAYS	39,500,000	72,600,000	183.80
57.	2008-09	OIC	JET AIRWAYS	90,000,000	110,400,000	122.67
58.	2006-07	NIC	KEOMI TRAVELS	3,400,000	7,300,000	214.71
59.	2007-08	NIC	KEOMI TRAVELS	3,400,000	8,800,000	258.82
60.	2006-07	NIC	KOLKATA MUNICIPAL CORP	19,447,000	49,194,000	252.96
61.	2007-08	NIC	KOLKATA MUNICIPAL CORP	19,447,000	24,567,000	126.33
62.	2008-09	NIC	KOLKATA MUNICIPAL CORP	19,447,000	24,567,000	126.33
63.	2006-07	NIC	KOLKATA POLICE FORCE	27,016,000	49,939,000	184.85
64.	2007-08	NIC	KOLKATA POLICE FORCE	37,363,000	49,490,000	132.46
65.	2008-09	NIC	KOLKATA POLICE FORCE	32,962,000	27,327,000	82.90
66.	2006-07	NIA	LIC	437,100,000	747,200,000	170.94
67.	2007-08	NIA	LIC	711,500,000	792,200,000	111.34
68.	2006-07	NIA	LIC AGENTS	28,200,000	31,900,000	113.12
69.	2007-08	NIA	LIC AGENTS	27,200,000	21,200,000	77.94
70.	2008-09	NIA	LIC AGENTS	41,800,000	60,700,000	145.22
71.	2006-07	UIIC	M/s. Bharat Electronics Ltd. Corporate office	31,357,037	40,370,720	128.75
72.	2007-08	UIIC	M/s. Bharat Electronics Ltd. Corporate Office	37,827,214	38,737,475	102.41
73.	2006-07	UIIC	M/s. Bharat Electronics Ltd. Jalahalli	17,408,000	36,928,357	212.13
74.	2007-08	UIIC	M/s. Bharat Electronics Ltd. Jalahalli	17,405,860	22,589,092	129.78
75.	2006-07	UIIC	M/s. Corporate Infrastructure Services	6,874,094	14,000,932	203.68
76.	2007-08	UIIC	M/s. Corporate Infrastructure Services	16,224,612	27,934,618	172.17
77.	2006-07	UIIC	M/s. Delphi TVS Diesel Systems Limited	4,103,729	2,793,596	68.07
78.	2007-08	UIIC	M/s. Delphi TVS Diesel Systems Limited	3,790,819	3,267,340	86.19
79.	2008-09	UIIC	M/s. Delphi TVS Diesel Systems Limited	4,163,375	3,791,039	91.06
80.	2006-07	UIIC	M/s. Goldman Sachman	14,909,926	18,117,933	121.52

81.	2007-08	UIIC	M/s. Goldman Sachman	18,975,896	31,346,466	165.19
82.	2008-09	UIIC	M/s. Goldman Sachman	35,329,156	23,526,352	66.59
83.	2006-07	UIIC	M/s. Hewlett Packard-Employees	56,514,968	73,258,786	129.63
84.	2007-08	UIIC	M/s. Hewlett Packard-Employees	83,412,670	118,746,089	142.36
85.	2006-07	UIIC	M/s. Hewlett Packard-Parents	50,313,919	92,304,217	183.46
86.	2007-08	UIIC	M/s. Hewlett Packard-Parents	102,490,085	124,622,384	121.59
87.	2006-07	UIIC	M/s. IBM India Limited-Employees	113,459,776	116,548,706	102.72
88.	2007-08	UIIC	M/s. IBM India Limited-Employees	133,583,004	175,025,989	131.02
89.	2008-09	UIIC	M/s. IBM India Limited-Employees	174,342,829	219,786,549	126.07
90.	2006-07	UIIC	M/s. IBM India Limited-Parents	189,318,864	194,293,397	102.63
91.	2007-08	UIIC	M/s. IBM India Limited-Parents	235,422,557	292,533,054	124.26
92.	2008-09	UIIC	M/s. IBM India Limited-Parents	298,120,539	360,988,177	121.09
93.	2006-07	UIIC	M/s. J & B Software India Pvt. Ltd.	1,373,837	1,919,046	139.69
94.	2007-08	UIIC	M/s. J & B Software India Pvt. Ltd.	1,749,511	1,945,796	111.22
95.	2006-07	UIIC	M/s. Lucas TVS Ltd. Padi	18,745,608	18,423,926	98.28
96.	2007-08	UIIC	M/s. Lucas TVS Ltd. Padi	10,706,241	19,089,187	178.30
97.	2008-09	UIIC	M/s. Lucas TVS Ltd. Padi	17,272,570	19,574,273	113.33
98.	2006-07	UIIC	M/s. MRF Employees Union	3,459,136	3,921,365	113.36
99.	2006-07	UIIC	M/s. MRF Ltd.	1,788,654	6,380,284	356.71
100.	2007-08	UIIC	M/s. MRF Ltd.	4,513,323	8,281,562	183.49
101.	2008-09	UIIC	M/s. MRF Ltd.	4,388,640	9,263,228	211.07
102.	2006-07	UIIC	M/s. Sundaram Fasteners	3,424,692	2,527,069	73.79
103.	2007-08	UIIC	M/s. Sundaram Fasteners	4,072,162	4,832,412	118.67
104.	2008-09	UIIC	M/s. Sundaram Fasteners	4,512,844	5,484,107	121.52
105.	2006-07	UIIC	M/s. Technical Stampings	1,144,031	1,390,934	121.58
106.	2007-08	UIIC	M/s. Technical Stampings	1,222,803	2,326,898	190.29
107.	2006-07	NIC	MAGMA	3,492,000	9,449,000	270.59
108.	2007-08	NIC	MAGMA	6,494,000	14,548,000	224.02
109.	2008-09	NIC	MAGMA	7,498,000	0	0.00
110.	2006-07	OIC	MATRIX LAB	5,264,000	13,200,000	250.76
111.	2007-08	OIC	MATRIX LAB	10,700,000	8,900,000	83.18
112.	2008-09	OIC	MATRIX LAB	16,603,000	21,858,000	131.65
113.	2007-08	NIC	Neyveli Lignite	117,978,000	70,779,085	59.99
114.	2008-09	NIC	Neyveli Lignite	110,112,800	25,269,898	22.95
115.	2006-07	NIA	NIC MEDICLAIM STAFF	10,900,000	16,900,000	155.05
116.	2007-08	NIA	NIC MEDICLAIM STAFF	10,900,000	17,000,000	155.96
117.	2008-09	OIC	ORCHID CHEMICALS	11,400,000	21,100,000	185.09
118.	2006-07	NIA	PANCARD CLUBS	67,200,000	51,700,000	76.93
119.	2007-08	NIA	PANCARD CLUBS	88,500,000	46,900,000	52.99
120.	2007-08	NIC	PANTALOON	22,100,000	31,700,000	143.44
121.	2008-09	NIC	PANTALOON	24,500,000	27,800,000	113.47
122.	2008-09	NIC	PARSI GROUP	1,200,000	5,200,000	433.33
123.	2008-09	UIIC	PARSI RESOURCE	1,200,000	5,200,000	433.33
124.	2006-07	NIC	RALLIS	1,900,000	2,900,000	152.63

125.	2007-08	NIC	RALLIS	1,600,000	5,200,000	325.00
126.	2006-07	OIC	RIL	35,800,000	113,600,000	317.32
127.	2007-08	OIC	RIL	54,700,000	134,000,000	244.97
128.	2008-09	OIC	RIL	146,400,000	156,000,000	106.56
129.	2006-07	NIC	SAP India	7,881,680	11,347,551	143.97
130.	2007-08	NIC	SAP Labs	21,189,883	30,492,592	143.90
131.	2006-07	OIC	SHANTA BIOTECHNICS	2,766,000	1,606,000	58.06
132.	2007-08	OIC	SHANTA BIOTECHNICS	3,944,000	2,761,000	70.01
133.	2006-07	NIC	SREI INFRASTRUCTURE	1,565,000	4,723,000	301.79
134.	2007-08	NIC	SREI INFRASTRUCTURE	2,752,000	3,952,000	143.60
135.	2008-09	NIC	SREI INFRASTRUCTURE	3,801,000	5,711,000	150.25
136.	2007-08	NIC	SRF Ltd	2,137,904	2,434,939	113.89
137.	2008-09	NIC	SRF Ltd	2,851,772	1,240,442	43.50
138.	2006-07	OIC	SYNTEL	9,900,000	18,100,000	182.83
139.	2007-08	OIC	SYNTEL	11,100,000	20,600,000	185.59
140.	2008-09	OIC	SYNTEL	11,300,000	3,300,000	29.20
141.	2006-07	NIA	TATA MOTORS	26,400,000	34,600,000	131.06
142.	2007-08	NIA	TATA MOTORS	35,500,000	29,600,000	83.38
143.	2008-09	NIA	TATA MOTORS	25,100,000	23,400,000	93.23
144.	2006-07	NIA	TATA POWER	20,000,000	35,000,000	175.00
145.	2007-08	NIA	TATA POWER	25,000,000	40,000,000	160.00
146.	2006-07	NIA	TCS	491,900,000	640,300,000	130.17
147.	2007-08	NIA	TCS	791,200,000	991,600,000	125.33
148.	2006-07	NIC	Texas tech.	8,735,073	14,338,202	164.15
149.	2008-09	NIC	Texas tech.	14,747,173	14,701,535	99.69
150.	2008-09	OIC	TN GOVT EMP SCHEME	84,100,000	112,400,000	133.65
151.	2006-07	OIC	UIIC STAFF MEDICLAIM	128,500,000	215,500,000	167.70
152.	2007-08	OIC	UIIC STAFF MEDICLAIM	115,900,000	216,600,000	186.89
153.	2008-09	OIC	UIIC STAFF MEDICLAIM	134,900,000	245,100,000	181.69
154.	2006-07	NIA	VSNL	27,200,000	33,200,000	122.06
155.	2007-08	NIA	VSNL	42,300,000	44,700,000	105.67
156.	2008-09	NIA	VSNL	51,000,000	60,700,000	119.02
157.	2006-07	NIC	WEST BENGAL FINANCE CORP	727,000	844,000	116.09
158.	2007-08	NIC	WEST BENGAL FINANCE CORP	856,000	966,000	112.85
159.	2008-09	NIC	WEST BENGAL FINANCE CORP	1,251,000	905,000	72.34

Annexure XII

(Referred to in paragraph no.5.7.1..4)

Premium foregone due to non-compliance with guidelines

(Rs. in crore)

PSU Insurer	Year	No. of cases test checked.	Malus*		Other criteria**		Total
			No. of cases with short loading	Amount	No. of cases with short loading	Amount	
NIC	2006-07	31	6	9.74	2	0.15	9.89
	2007-08	32	17	28.32	0	0.00	28.32
	2008-09	72	10	24.17	1	1.55	25.72
Total		**135**	**33**	**62.23**	**3**	**1.70**	**63.93**
NIA	2006-07	57	14	2.79	21	1.83	4.62
	2007-08	97	17	4.84	44	5.60	10.44
	2008-09	100	16	10.54	45	9.97	20.52
Total		**254**	**47**	**18.17**	**110**	**17.40**	**35.58**
OIC	2006-07	27	6	2.28	2	0.12	2.40
	2007-08	35	8	6.49	8	0.84	7.33
	2008-09	110	17	6.68	7	2.92	9.60
Total		**172**	**31**	**15.45**	**17**	**3.88**	**19.33**
UIIC	2006-07	42	35	21.23	35	35.32	56.55
	2007-08	45	42	47.26	42	38.57	85.83
	2008-09	53	45	36.05	45	32.42	68.47
Total		**140**	**122**	**104.54**	**122**	**106.31**	**210.85**
Grand Total		**701**	**233**	**200.39**	**252**	**129.29**	**329.68**

* Malus loading premium foregone is worked out based on the incurred claim ratio of the previous policy period and in accordance with the guidelines issued by the respective PSU insurer.

** Other criteria like loading for pre-existing diseases, maternity, family floater, corporate buffer premium foregone was worked out in accordance with the guidelines of respective PSU insurer.

Annexure XIII

(Referred to in paragraph no.5.7.6.3)

Variation in the claims paid for the same disease

(in Rupees)

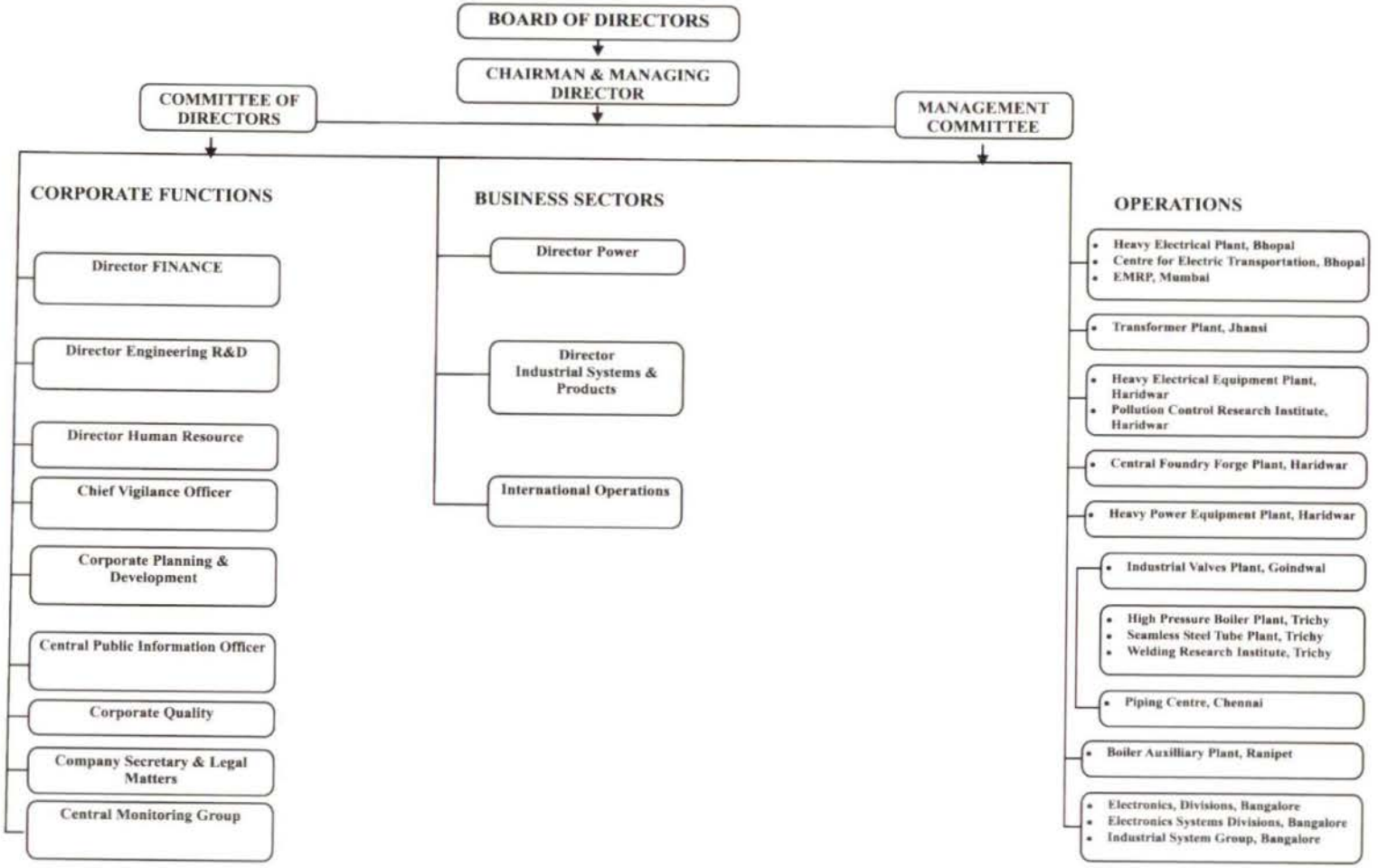
PSU Insurer		**2006-07**		**2007-08**		**2008-09**	
DISEASE – CATARACT							
	RO/TPA	Min	Max	Min	Max	Min	Max
	Chennai RO						
	TTK	10000	50188	10000	53866	10000	69458
NIC	FHP	10000	63713	10000	98000	10000	98000
	Bengaluru *RO*						
	TTK	10050	50000	10030	133391	10013	115395
	Mediassist	10000	50000	10000	100200	10000	74374
	Chennai RO						
	FHP	10210	29509	10095	90575	11884	41700
	Medicare	10137	60000	10222	65024	11604	56053
	Hyderabad *RO*						
OIC	TTK	10000	37600	10000	44700	10500	40511
	FHP	11086	50706	10000	29557	13225	41536
	Kolkata *RO*						
	Medicare	5928	51821	5932	34200	8800	29450
	Heritage	5642	30500	7304	51427	7289	90707
	Bangalore RO						
	Genins	10483	22000	10000	22000	10000	36000
	Mediassist	10132	91659	10000	85140	10000	155000
	Medsave	10000	39014	10000	55000	10000	25425
UIIC	Paramount	10199	58822	12607	25595	13452	25000
	Chennai RO						
	Medicare	14940	17140	15150	19580	18436	18436
	Medsave	10000	37810	10000	54000	10000	60000
	Paramount	10002	30000	10070	27000	11963	11963
NIA	Chennai RO						
	TTK	10000	78500	10000	139674	10000	66929

	MD India			12600	44100	10000	54270
	Medi Assist	0	0	10589	45000	10000	61000
	Hyderabad RO						
	Alankit	0	0	0	0	11000	64857
	FHPL	10400	49055	10000	58500	10605	45000
	GHPL	10000	60000	11720	131100	10000	72800
	MD India	15000	32000	26550	65000	10800	120000
DISEASE – APPENDICITIS							
	Chennai RO						
	TTK	11288	62861	10000	74912	10000	100044
NIC	FHP	12670	73672	12000	68190	10588	105856
	Bengaluru RO						
	TTK	11258	94718	10500	113837	10555	72939
	Hyderabad RO						
	FHPL	11530	55000	15273	66173	11148	72185
NIA	GHPL	27124	73500	20742	109762	21729	72523
	Chennai RO						
	Medsave	10765	69886	13710	200000	10000	85013
	Bangalore RO						
UIIC	Paramount	10432	30963	11396	46444	10163	38787
	Medsave	11060	54292	23620	28750	12075	40296
	Genins	14100	32197	16181	50000	14319	75273

Annexure-XIV

(Referred to in paragraph no. 6.1

Organization Chart of BHEL



Annexure-XV

(Referred to in paragraph no. 6.2)

Selected units and its functions

Units/Division, Location	Main Functions/Activities	Major Products Procured	Products Selected under Audit
Heavy Power Equipment Plant, Hyderabad	Manufacture of industrial and utility Turbo Generators i.e. Gas Turbines, Steam Turbines, Compressors & associated equipment like Heaters, Dearators, Heat Exchangers, Pumps, Bowl Mills, Switchgears, Oil Drilling Rigs etc.	Rotor forging, Nickel, Stainless Steel U-Tubes , Frame 9E Flange to Flange Machines, Hydraulic Couplings, Pump Casing, Bevel Planetary Gear Boxes Liner and Pads, Casings & Forgings.	Rotor forging, Nickel, Stainless Steel U-Tubes, Frame 9E Flange to Flange Machines, Hydraulic Couplings, Pump Casing, Bevel Planetary Gear Boxes Liner and Pads, Casings & Forgings.
High Pressure Boiler Plant, Trichy	Manufacture of Steam Generators for utilities/industries viz. Heat Recovery Steam Generators behind Gas Turbines, Fluidized Bed Combustion Boilers, Valves, Fittings & Soot Blowers, High Pressure Piping System, Nuclear Steam Generators, Seamless Steel Tubes etc.	Carbon Steel tubes, Boiler water circulating pumps, Alloys Steel Plates, Boiler quality plates, Pipes , Structural Steel Beams, Channels and Seamless Pipes.	Carbon Steel tubes, Boiler water circulating pumps, Alloys Steel Plates, Boiler quality plates, Pipes, Structural Steel Beams, Channels and Seamless Pipes.
Heavy Electrical Plant, Bhopal	Manufacture of Heavy Electrical equipments viz. Hydro, Steam, Marine & Nuclear Turbines, Heat Exchangers, Hydro & Turbo Generators, Transformers, Switchgears, Control gears, Transportation Equipment, Capacitors, Bushings, Electrical Motors, Rectifiers, Oil Drilling Rig Equipments and Diesel Generating sets.	Steel, Copper, Castings, Forgings, Cranes, Guide Vane, Cables, Bearings, Magnet Frame, Lead Wire Assembly, Commutator Bar Blank, Flange Barrel Assy, Suspension Tube, END Shield PE Casting, LE casting etc	Steel, Copper, Castings, Forgings, Cranes, Guide Vane, Cables, Bearings, Magnet Frame, Lead Wire Assembly, Commutator Bar Blank, Flange Barrel Assy, Suspension Tube, END Shield PE Casting, LE casting etc

Heavy Electrical Equipment Plant, Haridwar	Manufacture of Electrical Machines, Industrial controls panels, Turbo Generators, Hydro Sets, Steam Turbine, Condenser, Super Rapid Gun Mount, & Gas Turbine.	Rotors (Low Pressure, High Pressure & Intermediate Pressure), Outer Casing (High Pressure & Intermediate Pressure), Inner Casings (High Pressure & Intermediate Pressure), Moving Blades, Turbo Generator, Damper Wedge & Carbon Steel Plates.	Rotors (Low Pressure , High Pressure & Intermediate Pressure), Outer Casing (High Pressure & Intermediate Pressure), Inner Casings (High Pressure & Intermediate Pressure), Moving Blades, Turbo Generator, Damper Wedge &Carbon Steel Plates
Boiler Auxiliaries Plant, Ranipet	Manufacture of ESPs, Fans and Air Pre Heaters, Defence Systems, Gates & Dampers, Space Applications, Desalination Plants, Wind Electric Generators, Ash & Coal handling Systems	ECHVR, SS Wire, Plates, Sheets, Angles, Beams, Channels, CR Coils, Panel Type Hopper Heater.	ECHVR, SS Wire, Plates, Sheets, Angles, Beams, Channels, CR Coils, Panel Type Hopper Heater.
Power Sectors –Southern and Western Region, Chennai, Nagpur	Installation and Commissioning of Power Plants-Thermal, Hydro, Nuclear & Gas, Renovation & Modernization of Power Plants, Service after Sales.	Cement, Steel, Cranes and Capital items of customer related projects.	Cement, Steel, Cranes and Capital items of customer related projects.
Project Engineering Management, Noida	Project Engineering Management (PEM), procured Balance of Plant Equipments for BHEL's Projects. PEM also doing the Engineering's works for projects.	Condensate Polishing Unit, Cooling Tower, Lime Stone Handling System, Oxygen Dosing System, Power Station Cabling, Station Lighting System, LV Switchgears and DM Plants	Condensate Polishing Unit, Cooling Tower, Lime Stone Handling System, Oxygen Dosing System, Power Station Cabling, Station Lighting System, LV Switchgears and DM Plants
Transmission Business Group, Delhi	Transmission Business Group, procured Balance of Plant Equipments for Transmission Business and Power Projects.	G.I Structures, LT/ HT cables, Control & Relay Panel , Circuit Breakers, Steel, Clamp & Connectors , PLCC equipments & DG Sets.	G.I Structures, LT/ HT cables, Control & Relay Panel, Circuit Breakers, Steel, Clamp & Connectors, PLCC equipments & DG Sets.

Annexure-XVI

(Referred to in paragraph no.6.2)

Unit-wise details of Selected Sample

(Amount: Rupees in crore)

Name of the unit	Total No. of Purchase Orders	Total Value of Purchase Orders	Selected No. of Purchase Orders	Value of Selected Purchase Orders	Percentage of selected value to total value of Purchase Orders
Trichy	37513	11793	170	3941	33
Hyderabad	29589	8679	186	2865	33
Haridwar	16643	7961	151	2484	31
Bhopal	44227	5031	806	2091	42
PEM, Noida	2592	2526	85	848	34
TBG, New Delhi	1614	749	90	218	29
BAP Ranipet	7766	3102	394	1313	42
PSSR Chennai	783	780	75	521	67
PSWR Nagpur	298	149	85	141	95
Total	**141025**	**40770**	**2042**	**14422**	**35**

Annexure-XVII

(Referred to in paragraph no.6.6.4.2)

Limited Vendor Base

Unit	Product	No. of Vendors
Hyderabad	429 material categories	2
Bhopal	476 material categories	2
Haridwar	411 material categories	2
Trichy	37 material categories	2
PEM	12 material categories	2
Hyderabad	390 material categories	3
PEM	15 material categories	3
Trichy	98 material categories	3
Haridwar	402 material categories	3

Annexure-XVIII

(Referred to in paragraph no.6.6.4.5)

Statement Showing Details of Orders to Banned Parties

Job_No	Project Name	Po No	Po Date	Package	Vendor	PO Value
226	Lehra Mohabbat - 2x250 Mw	P-94/06	22-May-2006	temp-COLTCS	Gea Bgr Energy System India Ltd.	1,86,00,000
234	Amarkantak Tps 1x210mw	P-146/06	11-Jul-2006	Fuel Oil Handling And Storage System	Techno Electric And Engg. Co. Ltd.	3,27,25,000
234	Amarkantak Tps 1x210mw	P-147/06	11-Jul-2006	Fuel Oil Handling And Storage System-E&C	Techno Electric And Engg. Co. Ltd.	42,24,517
					Sub total	5,55,49,517
Name of sister concern of GEA namely (GEA ECOFLEX INDIA PVT LTD)						
		Date of issue enquiry				
281	Sikka TPS Extension Units 3 & 4, 2x270MW		P-183/08	03-Jul-2008	Heat Exchangers(Plate Type)	3,56,51,807
280	Koderma TPS Stage - I Unit 1 & 2	13.03.2008	P-172/08	30-Jun-2008	Heat Exchangers(Plate Type)	3,04,96,381
280	Koderma TPS Stage - I Unit 1 & 2	13.03.2008	P-176/08	30-Jun-2008	Heat Exchangers(Plate Type)	26,50,315
266	Budge Budge Generating Stn,1X250MW Unit3	01.12.2007	P-84/08	26-May-2008	Heat Exchangers(Plate Type)	75,11,933
279	Rayalseema TPP Stage III, UNIT 5	04.12.2007	P-85/08	26-May-2008	Heat Exchangers(Plate Type)	88,04,451
277	Santaldih 1X250MW Unit-6		P-44/08	13-May-2008	Heat Exchangers(Plate Type)	1,38,60,000
260	PARICHA EXTN 2x250MW,Unit-5&6		P-325/07	11-Sep-2007	Heat Exchangers(Plate Type)	1,47,40,001
262	2X250MW Harduaganj TPS Expansion		P-326/07	11-Sep-2007	Heat Exchangers(Plate Type)	1,47,40,001
269	DADRI 1X490MW STAGE II / Unit-2 NCTPP		P-329/07	11-Sep-2007	Heat Exchangers(Plate Type)	1,20,00,001
248	BARSINGSAR-2x125 MW, NLC		P-319/07	10-Sep-2007	Heat Exchangers(Plate Type)	1,90,10,002
244	Neyveli TPS II expansion - 2x250 MW		P-320/07	10-Sep-2007	Heat Exchangers(Plate Type)	1,74,50,000
239	BHILAI PROJECT 2x250 MW		P-337/06	10-Oct-2006	Heat Exchangers(Plate Type)	1,92,61,631
214	KORBA (EAST) TPS 2X250 MW		P-25/06	25-Apr-2006	Heat Exchangers(Plate Type)	1,62,75,423
					Sub Total	21,24,51,946
					Grand Total (Rs.)	**26,80,01,463**

Annexure-XIX

(Referred to in paragraph no. 6.6.5.2)

Details of Extra Cost due to Delayed placement of Orders

Unit name	PO No./Project	Material	Audit observations	Management's reply & further remarks	Rs. in Crore
Haridwar	T8N6320 & 6321 dated 29 July 2008	IP Shaft Forgings	Non placement of order within the validity of offer, later re-tendering and placement of order on same vendor in subsequent enquiry at revised negotiated price.	*The unit stated (June 2009) that approving authority deemed it suitable to pursue the vendor to accept its own LPP. However, the efforts made were unsuccessful and the validity expired.* The reply is not tenable as the validity period of the offers should have kept in mind while perusing the vendor.	6.10
Haridwar	PO No. T7N 6436 and 6437) and PI No. 71/ T/T212/7/1301N/1.	IP Shaft (5 nos.)	Approval for AMA was given by the Corporate office in June 2007 for procurement of IP Shaft but the enquiry was issued in August 2007 against the internal target of 9 days.	The unit stated (August 2009) that enquiry was issued late due to manpower/ time constraints/ priority of jobs in hand. Reply is not tenable as enquiry was issued after 81 days from the date of receipt of indent which can not be justifiable.	1.00[1]
Hyderabad	B708P035	Axial Turbo Blowers	Due to delay in finalization of specification of material and expiry of validity of bid, led to extra cost of Rs.4.47 crore.	*The unit stated (May 2009) that delay in finalisation of specification was due to time taken in reaching acceptable specification.* The reply is not acceptable as against the stipulated time of 75 days for conversion of indent to order, the time of six months taken for finalization of specifications per se was not justified.	4.47
Hyderabad	D308A016	Stainless Steel U-Tubes	Delay in placement of order within the validity period of offer. The enquiry was again re-issued (April 2008) Thus, due to failure to finalise the order within the initial offer validity period the unit incurred an avoidable extra expenditure of Rs 2.13 crore.	*The Management stated (January 2010) that though Indents were raised by Engineering in the year 2007, the actual production / supply of Heaters were not planned in the same financial year due to so many official reasons. Actual authorization for processing the indents was received after discussions by product Head and Head of MPC in January 2008.* .The reply is not acceptable as the due date for submission was extended upto 29-02-2008 from 19-02-08 due to non receipt of bids. Vendor"s price . was was valid upto 29-02-2008 only. The unit did not contact the vendor immediately for extension of price validity. Subsequently, the vendor agreed for extension of validity subject to 9 per cent	2.13

[1] Financial impact has been worked out taking the mean of price offers received in February 2007 and September 2007.

				increase in prices. Consequently, the tender was cancelled and revised bids were obtained which resulted in extra expenditure.	
Ranipet	Five POs	CR coils	The unit had not placed purchase order within time as a result the Vendor did not accept the order. Later, purchases were made at rates higher by Rs. 5.57 crore. As a result Company incurred extra expenditure.	The unit stated (June 2009) that during the reverse auction conducted on 19/02/2008, M/S ISPAT had signed the compliance report confirming that the rates were valid till 30 days from auction date i.e., up to 20/03/2008 and hence the order was placed on 04/03/2008, which was well within the validity period of 20/03/2008.The reply is not acceptable since M/S ISPAT had categorically stated that their offer was valid up to 29/02/2008. Therefore, though the price was valid for execution up to 20/03/2008 as confirmed by them in the reverse auction, the purchase order should have been placed by the unit before 29/02/2008. The Corporate Management, however, stated (January 2010) that other BHEL Units were advised to recover the extra financial implication from any of the pending bills of M/s ISPAT Industries.	5.57
TBG	No. 4588422, 4588423 and 4588424 dated 10th December 2008	Air Conditioning Ventilation System	Price bid was not opened within validity date. Later on revised price bid was submitted by the vendor which led to extra expenditure.	The. Management did not furnish any specific reply on the issue raised and stated (January 2010) that the specifications of packages were dependant on finalization of layouts at site and finalization of relevant equipment. In order to expedite the procurement engineering releases advance indents with an estimated data, which will change, based on the actual site requirement and needs customer approval. Hence there was a delay in finalization of purchase orders.	0.77[2]
TBG New Delhi	PO No. 4568136 dated 7 July 2006	LT Power and Control Cables for Chanderpura and Mejia project	Technical evaluation of bids against indent of November 2005 completed in March 2006 & offers were valid up to 7 April 2006. Due to non-extension of bids validity, apparently due to rise in prices, order placed against snap price bids on M/s KEI Industries for value Rs. 7.30 Crore, against Billing Break Up cost quoted to the customer Rs. 2.95 Crore, which lead to extra expenditure of Rs.4.25 crore.	The unit reply is silent on this issue. Management stated (January 2010) that the specifications of packages were dependant on finalization of layouts at site and finalization of relevant equipment. In order to expedite the procurement engineering releases advance indents with an estimated data, which will change, based on the actual site requirement and needs customer approval. Hence there was a delay in finalization of purchase orders. Management replies is not acceptable since the technical evaluation of bids against indent of November 2005 completed in March 2006 & offers were valid up to 7 April 2006 .	4.25[3]
TBG New Delhi	PO No. 4568072 & 4568071	Clamp & Connector for DVC Projects,	Against indent of 14 July 2005 and tender enquiry of 28 July 2005, technical evaluation sent on 5 December 2005 was received after 110 days on 25 March 2006 and	The unit noted the observation stating that technical evaluation was received after 16 weeks with enhanced scope. The Corporate Management stated (January 2010) that the specifications of	0.71

[2] The financial impact has been worked out with reference to first cost estimate.

[3] The financial impact has been worked out with reference to price quoted to the customer.

		220 KV Sub-station, Chanderpura and Mejia	bids were valid up to 4 April 2006. On requesting vendor to provide price of additional items, vendor submitted revised price bid valid up to 30 April 2006, as metal prices were rising and order placed for value Rs. 1.81 crore, whereas Billing Break Up Cost quoted to the customer was Rs. 1.10 crore.	packages were dependant on finalization of layouts at site and finalization of relevant equipment. In order to expedite the procurement engineering releases advance indents with an estimated data, which will change, based on the actual site requirement and needs customer approval. Hence there was a delay in finalization of purchase orders.	
Ranipet	PO No 3170120 & 3170119	Speed reducer type IIA and IIB	The Unit delayed the development of indigenous vendor and had to place order on the foreign vendor resulting in extra expenditure of Rs.1.35 crore.	The unit stated (January 2010) that speed reducers were initially imported and subsequently two indigenous vendors have been developed. It was also stated that being a critical item for the functioning of the air preheater, all precautions had to be taken before indigenous sources were introduced. The fact remains that the unit started the process of developing new indigenous vendors after a delay of 24 months	1.35
				Total	**26.35**

Annexure-XX

(Referred to in paragraph no.6.6.5.3)

Statement showing the Additional Expenditure of Rs.29.09 crore

Sl. No.	PO Reference	Audit Observation	Management's Reply	Amount (Rs. in crore)
1.	T7N6116 & T7N6117 (May 2007)	Two Purchase Orders were placed (23 February 2007) on M/s SDF @ EU 955000 for LP Rotors. Instead of approaching the vendor for repeat ordering against additional requirement of 6 LP Rotors, the unit floated fresh enquiry (22 March 2007). Accordingly, two purchase orders were placed one on M/s SDF @ EU 1329700 per pc for 4 LP Rotors for delivery before March 2009 and @ EU 1330186 per pc for 2 LP Rotors for delivery after 1 April 2009), which resulted in extra expenditure of Rs.14.24 crore (EU 2249172).	*The Corporate Management stated (January 2010) that repeat order was very delicate decision which was heavily dependent on assessment of market situation at that time. In many cases especially in recession times it may prove to be counter productive. Also, it was akin to Single Tender purchase. Hence repeat ordering was not encouraged in high value procurements. The* reply is not in the line with the provisions of Purchase Policy which insists the placement of repeat order provided there is no downward price trend.	14.24
2.	T8N6106 (April 2008)	The unit had placed PO (January 2008) for procurement of 4 LP Rotors @ EU1172100. Instead of approaching the vendor for repeat ordering on the vendors (M/s SAAR & M/s SDF), the Unit floated fresh enquiry (27 February 2008) despite knowing the increasing price trend. The rates offered in the subsequent enquiry were EU 1265000 per rotor which resulted in extra expenditure of Rs.6.47 crore (EU 1021900).	The unit stated (29 August 2009) that as the price bid against the earlier enquiry was opened, the clubbing of additional requirement was not possible. Reply is not tenable as: (i) After opening of price bid, the Company could have approached the L1 vendor for additional requirement as in case of repeat order. (ii) Moreover, the unit also had the option to place repeat order against PO placed in earlier enquiry. (Management replies and rebuttal as mentioned above)	6.47
3.	T7N6380 (September 2007)	Against the indent (21 May 2007) for 5 Nos. LP Rotors, the Unit approached (25 July 2007) M/s SDF for repeat ordering (PO No. 7/6117 @ EU 1329700 per pc) and placed a repeat order (PO No. 7/6231 and 7/6232 dated 31 July 2007). However, before placement of repeat order (PO No. 7/6231 and 7/6232), further indents for 3 Nos. LP Rotors with firm requirement had also been finalized (20 & 24 July 2007) which were received in Purchase Department on 26 July 2007. Instead of clubbing the additional requirement of 3 Nos. in repeat ordering, the Unit invited limited tender enquiry (16 August 2007). Only one offer of M/s SDF was received and the Unit placed two POs in September 2007 @ EU 1587800 per pc) on the vendor. Thus by not opting for repeat order, Company committed to incur extra expenditure of Rs 4.90 crore (EU 774300).	Management stated (June 2009) that:- (i) Against last enquiry M/s SDF had quoted for all 6 nos. with differential rates of EU 1329700 per pc for 4 Nos. with delivery till 31March 2009 and EU 1369600 per pc for 2 nos. deliveries after 1 April 2009. M/s Mitsui had quoted for 2 nos. @ EU1338357 per pc and delivery after 1 April 2009. (ii) Since delivery against indent 7/1300 was before 31March 2009 repeat order was placed on M/s SDF. However, for delivery after 1 April 2009 order had been placed on M/s Mitsui who had offered only 2 nos. against enquiry of 6 nos., competent authority ordered for fresh enquiry. Reply is not tenable because: (i) As per Corporate purchase policy a repeat order may be placed provided there is no downward price trend and it should give benefit in delivery. (ii) Since M/s SDF had quoted differential rates on delivery based, repeat order could have been placed for additional 3nos having required delivery after March 2009. (iii) Repeat order placed (PO No 7/6231-32) were with delivery after April 2009.	4.90
4.	T8N6091 (April 2008)	The unit had placed (2 January 2008) PO (No. T7N6633 and 6634) @ EU 341000 per pc for procurement of 4 nos. IP Rotor on M/s SAAR. But instead of approaching vendor for	*The Unit stated (October 2009) that since the last PO placed for one No. IP Rotor and indents were for 5 nos., it was thought prudent to issue fresh enquiry for taking*	1.77

		repeat order, fresh enquiry was floated (20 February 2008) and PO (T8N6091) was placed (19 November 2008) @ EU 381000 per pc against the additional requirement of 7 nos. IP Rotor. Thus, by not opting for repeat order Company committed to incur extra expenditure of Rs 1.77 crore (EU 280000).	*advantage of bulk quantity*. Reply is not tenable as the earlier PO (No. T7N6633 & T7M6634) was placed for 4 nos. on the same vendor.	
5.	T8M6612 (December 2008)	The unit had placed a PO (8/6234) for procurement of IP Inner Casing (3 Sets) on M/s Cividale @ EU 494500 per set. However, instead of asking the vendor for repeat ordering against the additional requirement of 4 sets, fresh enquiry was floated (22 July 2008) and PO (2008/6612) was placed (22 December 2008) on the same vendor @ EU 568094 per set resulting into extra-expenditure of Rs.1.40 crore (EU 220782).	*The Corporate Management stated (January 2010) that repeat order was very delicate decision which was heavily dependent on assessment of market situation at that time. In many cases especially in recession times it may prove to be counter productive. Also, it was akin to Single Tender purchase. Hence repeat ordering was not encouraged in high value procurements. The* reply is not in the line with the provisions of Purchase Policy which insists the placement of repeat order provided there is no downward price trend.	1.40
6.	F7K6566 (November 2007)	A PO was placed (3 August 2007) on M/s. Dilling GTS, for Carbon Steel Plates of thickness 110mm and 120mm @ EU 1225 per MT. Indent for the same material along with other items was again raised on 12 September 2007 (approximately one and half month after PO placement). Instead of asking the vendor for repeat order, the Unit went for fresh enquiry and placed PO on M/s. Reiner Brach @ EU 1320 & EU 1335 per MT respectively in November, 2007 resulting into extra expenditure of Rs.30.73 lakh.	*The Corporate Management stated (January 2010) that repeat order was very delicate decision which was heavily dependent on assessment of market situation at that time. In many cases especially in recession times it may prove to be counter productive. Also, it was akin to Single Tender purchase. Hence repeat ordering was not encouraged in high value procurements. The* reply is not in the line with the provisions of Purchase Policy which insists the placement of repeat order provided there is no downward price trend.	0.31
Total				29.09

Annexure-XXI
(Distillate Yield and Fuel & Loss)
(Referred to in paragraph no.7.7.1)

		Mathura Refinery			Panipat Refinery		
		2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Distillate Yield	MOU target (%)	69.9	70	70	78.6	77.0	78
	Actual (%)	71.5	70.8	71.1	72.2	78.1	80.7
Fuel & Loss	MOU target (%)	10.0	9.8	9.3	12.6	10	10.2
	Actual (%)	8.8	8.8	8.7	13.0	9.7	9.6

Annexure- XXII
Capacity utilization of processing units)
(Referred to in paragraph no.7.7.2)

(in percentage)

Units	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
	Mathura Refinery			Panipat Refinery		
CDU	111	104.5	107.5	89.7	97.1	101.0
CDU 2				67.6	116.6	116.8
VDU	106.75	95.37	103.26	79.6	87.5	92.6
VDU 2				63.9	114.3	115.1
BBU	135.80	89.72	79.39	87.0	74.6	53.9
CCRU	94.20	89.04	88.28	60.8	78.1	79.7
DCU				47.3	96.0	98.3
DHDS	79.74	74.99	84.76	52.5	66.4	109.6
DHDT	79.23	79.15	80.08	59.0	87.7	86.6
FCCU	103.29	90.08	100.41	103.5	104.4	100.4
HGU I	87.21	85.12	85.54	51.1	74.1	52.9
HGU II	62.64	54.69	65.16	47.9	60.0	67.2
NHDT	75.03	49.60	47.26			
NSU	78.00	98.44	106.07			
OHCU	97.70	90.00	100.95	77.8	100.0	107.2
PENEX	87.18	61.27	60.84			
PRU	50.44	50.74	26.45			
PX				58.9	90.6	87.2
PTA				36.4	75.2	77.5
PXPTA Splitter	60.09	56.01	56.75			
SRU	64.21	58.29	71.53	44.9	60.1	41.3
SRU 2				24.7	50.4	78.0
VBU	83.73	60.54	84.82	52.4	48.8	7.6
HCU				60.0	105.5	106.3

Annexure- XXIII

(Referred to in paragraph no.7.7.2)

Statement showing quantity of Production of various products

(Qty in MT)

Product	Mathura			Panipat		
	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Propylene	13514	13445	7012	-56	2220	-488
LPG	315972	294552	328317	289036	424450	465767
LAN	306807	257525	383966			
Super Naphtha	7660	3851	10739			
Naphtha				593371	806624	824631
PTA				196915	386201	401639
Paraxylene				-	17397	5097
PX-PTA feed Naphtha	155526	149603	154736			
MS-BS II				560423	570335	801231
BS-II 3% Bz	196075	259083	274950			
MS Xtra Premium				13083	0	0
MS Euro-III	890495	736257	720688	104225	185562	186010
MS 93 RON	1657	1184	1186			
SKO	509796	427430	437754	779779	1114106	1237813
ATF	716312	695843	674303	456722	661671	672759
MTO				9621	11817	10600
HSD BS-II				2891863	4190836	4404156
HSD Euro-III	1806515	1518617	1740179	1198342	1724645	1663307
HSD Winter Grade				1994	1751	2666
ULHSD	1536552	1488946	1466477			
DHPPA				5386	12068	14779
HPS	429757	391599	441615	319214	317330	191434
Bitumen	677917	717034	722638			
Bitumen (80-100)				365799	290133	246341
Bitumen (60-70)				118931	126924	134930
RPC				317533	699784	725015
Sulphur	38525	36276	42915	67782	113811	139170
Gas Fuel	163250	150873	143340	384011	-	-
Liquid Fuel				913157	-	-
Coke	54556	47455	53795	42150	-	-
FO	836885	721693	809325			
RFO	80115	64492	35708			

Annexure XXIV

(Referred to in paragraph no.7.7.6)

(Details of Pollution control)

a) Air Polluants: SO_2 Emissions

Sl. No.	SO_2 Emission from Process Unit	Limit	Mathura Refinery			Panipat Refinery		
			2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
1	AVU (Kg/MT Crude)	0.25	0.09	0.06	0.07	0.17	0.13	0.12
2	FCCU (Kg/MT of feed)	2.5	0.58	0.58	0.53	0.42	0.15	0.17
3	SRU (Kg/MT of Sulphur in feed)	120	18.62	21.28	21.28	30.69	17.6	18.8
4	Total SO_2 emission (Kg/hr)	450	333	302	308			

B Treated Effluent Leaving Refinery

B 1 Water Pollutants-Mathura Refinery

Sl. No.	Parameter	MINAS		Actual		
		Old Standard	Revised Standard*	2006-07	2007-08	2008-09
1	pH	6.0–8.5	6.0–8.5	7.5-7.9	7.3	7.1-7.7
2	Oil & Grease	10 max	5 max	5.5-6.0	5.6-6.0	4.5
3	Phenol	1.0 max	0.35 max	0.06-0.07	0.06-0.07	0.05-0.06
4	Sulphides	0.5 max	0.5 max	0.18-0.20	0.17-0.19	0.10-0.20
5	BOD	15 max	15 max	11.0-12.0	9.0-10.0	7.0-9.0
6	COD	-	125 max	-	-	65-88
7	TSS	20 max	20 max	10.0-11.0	9.5-10.2	9.0-11.0

**Revised Standard notified vide gazette notification dated 18 March 2008*

B 2 Water Pollutants-Panipat Refinery

Sl. No.	Parameter	Old Standard	Revised Standard*	Actual					
				2006-07		2007-08		2008-09	
				ETP-1	ETP-2	ETP-1	ETP-2	ETP-1	ETP-2
1	pH	6.0–8.5	6.0–8.5	7.8	7.4	7.2	7.3	7.9	7.6
2	Oil & Grease	10 max	5 max	7.4	7.1	7	7.5	7.2	7.1
3	Phenol	1.0 max	0.35 max	0.06	0.05	0.07	0.07	0.05	0.05
4	Sulphides	0.5 max	0.5 max	0.4	0.4	0.35	0.35	0.34	0.33
5	BOD	15 max	15 max	12.2	12.1	12.5	12.8	11.9	11.5
6	COD	-	125 max	83.6	84.7	106	109	89	87.2
7	TSS	20 max	20 max	16	13	16	15	15.2	14.4

ETP-Effluent Treatment Plant

Annexure XXV

(Referred to in paragraph 8.1 and 8.7.3.3)

Main features of Nomination blocks and NELP blocks

A. Nomination blocks

(a) Upto 1998, the Company was offered exploratory blocks on 'nomination basis' and was allowed to apply to the Ministry of Petroleum and Natural Gas (MOPNG) for grant of Petroleum Exploration License (PEL) in respect of the offshore blocks and, hence, these blocks were called as nomination blocks.

(b) The Ministry of Petroleum and Natural Gas (MOPNG) amended its policy in March 2002 and directed that the PEL would not be extended beyond the current re-grant cycle.

(c) The re-grant of Petroleum Exploration Licence (PEL) was given for four years with an extension of fifth year subject to surrender of 25 *per cent* of the original PEL area held by the Company.

(d) Sixth and seventh year extension is granted for pursuing the lead of hydrocarbon reserves with a condition that maximum area retained cannot exceed 50 *per cent* of the original PEL area.

(e) No re-grant would be available after completion of current grant cycle where neither leads have been obtained nor discovery has been made.

B. NELP blocks

(a) The Companies/JVs, while bidding for the NELP blocks submit Phase-wise minimum work programme (MWP) which is included in the Production Sharing Contracts (PSCs).

(b) The MWP consists of commitments made by the bidder for each block in terms of extent of surveys to be conducted and wells to be drilled within seven years, divided into three Phases.

(c) In the event of non-fulfillment of the MWP for any Phase, the Company can be granted first extension not exceeding six months without penalty.

(d) Further extensions, however, are granted as per the Extension Policy of 2006 which envisage furnishing of a bank guarantee equal to the cost of unfinished MWP besides payment of liquidated damages at the rate of 10 *per cent* and 30 *per cent* of the cost of unfinished MWP for second and third extensions (six months each) respectively.

(e) No extension is allowed beyond 18 months and the extended period of a particular Phase is subtracted from the subsequent Phase of the exploration.

(f) In case no discovery is made, the block has to be surrendered.

Merger Policy under NELP

The MOPNG introduced an optional scheme known as Merger Policy 2007 for NELP III and IV blocks to address the unforeseen situation on non availability of offshore rigs in the international market. The period of the existing Phase I was re-named as new Phase I and the MWP of existing Phase II and III was merged into a new Phase II to be completed in the period provided in the existing Phase III. However, the contractor was required to avail 18 months extension in terms of Extension Policy of 2006 before the merged period of erstwhile Phase II commenced. The contracts already entered in Phase II or which had only seismic work programme and no drilling commitments in Phase I were not covered under this scheme.

Annexure XXVI

(Referred to in para 8.7.1.1)

Statement showing details of the nomination blocks held during 2004-2008

Sl. No.	Name of the block	Name of the Basin	Date of original grant	Commencement of current re-grant period	Date of expiry of current re-grant	Area as on 31.03.2008 (SKM)
1.	Bombay Offshore Extn.-III	WOB	20.11.1989	19.11.2001	Converted into mining lease in November 2006.	523
2.	R-6/R-28 Structure	WOB	01.11.1996	1.12.2002	31.10.2009	362
3.	ED-A Structure	WOB	18.11.1996	18.11.2002	17.11.2009	506
4.	WO-9 Block	WOB	12.12.1990	12.12.2002	11.12.2009	277
5.	Bombay Offshore 1/2/3	WOB	14.11.1985	14.11.2003	13.11.2010	18599
6.	B-142 Structure	WOB	22.04.1991	20.4.2003	Surrendered in February 2009.	30
7.	SW of BH	WOB	01.01.1998	1.1.2004	31.12.2010	846
8.	KD-GKH Block	WOB	01.04.1998	1.4.2004	31.03.2011	4486
9.	Kutch Offshore Block I "A & B"	WOB	06.06.1986	6.6.2004	05.08.2011	279
10.	Kutch Offshore Block-I Extn.	WOB	01.01.1987	1.1.2005	31.12.2011	2118
11.	Kutch-H block I & II	WOB	27.06.1994	27.6.2004	Surrendered in December 2008.	159
12.	Saurashtra-Dahanu	WOB	20.07.1993	20.7.2005	19.12.2012	1880
13.	B-192 A Block	WOB	12.05.1995	12.5.2005	Converted into mining lease in November 2007.	157
14.	SM-86-A	WOB	01.02.1997	1.2.2003	Surrendered in December 2006.	520
15.	IA	K.G. Offshore	22.10.1998	22.10.2004	21.10.2011	110
16.	IB	K.G. Offshore	16.12.1998	18.12.2004	15.12.2011	123
17.	IE	K.G. Offshore	16.12.1998	15.12.2004	15.12.2011	201
18.	IF	K.G. Offshore	20.09.1997	20.09.2003	19.9.2010	309
19.	IG	K. G. Offshore	01.02.1997	01.02.2003	13.01.2010	104.40
20.	C-OS-IX	Cauvery Offshore	01.01.1998	01.01.2004	13.12.2010	803
21.	C-OS-X	Cauvery Offshore	01.01.1998	01.01.2004	Surrendered in December 2007.	866

Annexure XXVII

(Referred to in para 8.7.1.2)

MWP vis-à-vis achievement in respect of Shallow Water NELP Blocks

Sl. No.	Name of the block	Phase Years / Phase	Period	Commitment			Actual within the Phase – I Period			Shortfall/Remarks
				2D (LKM)	3D (SKM)	Wells	2D (LKM)	3D(SKM	Wells	
1.	MB-OSN-97-4	3-2-2 Phase I	8.5.2000 to 7.5.2003	500	150	1	512	152	-	1 well
2.	KK-OSN-97/3	3-2-2	8.5.2000 to 7.5.2003	-	100	1	-	100	-	1 (Well K-10 spud on 17.09.03) Block surrendered on 06.04.04.
3.	MB-OSN-2000/1	3-2-2 Phase I	2.8.2001 to 1.8.2004	1000	1500	5	1001	2418	3	2 (Block surrendered in 2008)
4.	GS-OSN/2001/1	3-2-2 Phase I	12.3.2003 to 11.3.2006	1000	2000	4	1022	2073	-	4
5.	KK-OSN-2001/2	3-2-2 Phase I	12.3.2003 to 11.3.2006	1000	500	1	990	591	-	One well under drilling during 2008-09
6.	KK-OSN-2001/3	3-2-2 Phase I	12.3.2003 to 11.3.2006	1500	500	1	1052	602	-	One well yet to be drilled
7.	GS-OSN-2003/1	2-3-2	5.12.2005 to 4.12.2007		500	-	-	510	-	MWP completed in Phase I
8.	GS-OSN-2004/1	4-3	02.3.2007 to 01.3.2011	3700	1000	1	3713	1069	-	
9.	KG-OSN-97/1	2-3-2 Ph.I	19.5.2000 to 18.5.2002	2000	-	-	2042	--	--	No pending MWP of Phase I
10.	KK-OSN-2000/1	2-3-2 Phase I	16.8.2001 to 15.8.2003	500	-	-	502	-	-	No pending MWP in Phase I Block surrendered on 15.02.2004
11.	CY-OSN-2000/1	2-3-2 Phase I	01.8.2001 to 31.7.2003	500	--	-	518	-		No pending MWP in Phase I, Block surrendered on 14.2.2007

Sl. No.	Name of the block	Phase Years	Period	Commitment			Actual within the Phase – I Period			Shortfall/Remarks
		Phase		2D (LKM)	3D (SKM)	Wells	2D (LKM)	3D(SKM	Wells	
12.	CY-OSN-2000/2	3-2-2 Phase I	16.8.2001 to 15.8.2004	1000	500	3	1174	1035	2	1
13.	CB-OSN-2003/1	3-2-2 Phase I	5.12.2005 to 4.12.2008	1000	-	8	1173	-	2	2008-09 Two wells drilled and 6 wells pending
14.	KG-OSN-2004/1	4-3 Phase I	25.5.2007 to 24.5.2011	500	1150	7	-	964		Phase I is upto 2011
15.	WB-OSN-2000/1	3-2-2 Phase I	30.7.2001 to 29.7.2004	2000	1500	4	2010	1508	-	Four Wells pending.
16.	MN-OSN-97/3	2-3-2 Phase I	19.5.2000 to 18.5.2002	1500			1280			No shortfall in MWP in Phase I
17.	MN-OSN-2000/1	2-3-2	16.8.2001 to 15.8.2003	500	-	-	500	-	-	No shortfall in MWP in Phase I

Note 1: MWP in Phase-I not completed in the blocks at Sl. No.1 to 6, 12,13 and 15.

2: Shortage of 21 wells in the blocks at Sl. No.1 to 6, 12,13 and 15.

3: Blocks upto NELP-V (15 Nos) and blocks in NELP-VI (2 Nos. viz. GS OSN 2004/1 and KG OSN 2004/1).

4: MWP completed in Phase I (6 Nos. viz. MN OSN 97/3, MN OSN 2000/1, CY OSN 2000/1, KK OSN 2000/1, KG OSN 97/1 and GS OSN 2003/1).

5. Blocks Surrendered as on 30th September 2009: Sl.No.1, 2, 4,11,12,15, 16 and 17.

6. Blocks Proposed to be surrendered as on 30th September 2009: Sl.No.3 and 9.

7. Block at Sl.No.10 was surrendered in 203-04 and as such was not within the scope of performance audit.

Annexure-XXVIII

(Referred to in para 8.7.1.2)

Statement showing project evaluation of 16 NELP shallow water blocks while bidding

Sr. No.	Name of block	Area in SKM	No. wells drilled earlier in the area	2D data acquired in LKM	No. of prospects identified	No. of leads identified
1	MB OSN 97/4	18860	4 (3 dry)	21762	25	10
2	KK OSN 97/3	15910	2 (dry)	6477	9	0
3	MN OSN 97/3	5420	4 (dry)	3100	0	13
4	KG OSN 97/1	4485	- (nil wells)	1107	3	2
5	MB OSN 2000/1	18414	8 (7 dry and 1 oil indication)	21516	5	0
6	CY OSN 2000/1	5920	Nil wells	2036	0	3
7	CY OSN 2000/2	3530	2 (dry)	3693	3	3
8	MN OSN 2000/1	6730	Nil wells	505	0	2
9	WB OSN 2000/1	6700	5 (dry)	1805	5	0
10	KK OSN 2001/2	14120	3 (dry)	8022	2	0
11	KK OSN 2001/3	8595	1 (dry)	8208	3	0
12	GS OSN 2001/1	9468	1 (dry)	8044	20	0
13	GS OSN 2003/1	5970	1(dry)	3142	3	0
14	CB OSN 2003/1	2394	5 (2 dry)	1695	6	0
15	GS OSN 2004/1	6589	2 (dry)	5111	0	0
16	KG OSN 2004/1	1151	14 (12 dry) (2 Gas)	2851 450 SKM – 3D	5	0
Total:			**52 wells**		**89**	**33**

Of the 52 wells, 45 were dry and 7 indicated presence of oil/gas.

Annexure XXIX

(Referred to in para 8.7.3.1)

Basin-wise details of number of locations planned as per AP and RDP and actual locations drilled during 2004-08

Year	Planned as per AP	Planned as per RDP	Drilled	Shortfall with reference to	
				AP	RDP
Mumbai Offshore Basin					
2004-05	24	22	14	10	08
2005-06	18	18	^^11	07	07
2006-07	17	17	13	04	04
2007-08 20	20 17	03	03		
Total	**79**	**77**	**55**	**24**	**22**
Krishna-Godavari Basin					
2004-05	5	8	2	3	6
2005-06	7	7	5	2	2
2006-07	5	7	2	3	5
2007-08	6	9	4	2	5
Total	**23**	**31**	**13**	**10**	**18**
Cauvery Basin					
2004-05	5	2	2	3	0
2005-06	2	2	0	2	2
2006-07	1	1	0	1	1
2007-08	0	0	0	0	0
Total	**8**	**5**	**2**	**6**	**3**
Bengal-Mahanadi Basin					
2004-05	6	2	0	6	2
2005-06	4	6	1	3	5
2006-07	4	4	1	3	3
2007-08	4	5	4	0	1
Total	**18**	**17**	**6**	**12**	**11**
Grand Total	**128**	**130**	**76**	**52**	**54**

^^excluding two locations planned in 2004-05 but drilled in 2005-06

Annexure XXX

(Referred to in para 8.7.3.4)

Details of productive and unproductive rig time (in hours)

Year	Productive Time	Non Productive Time					
		Total	Complica-tions	Waiting on man and material	Waiting on weather	Repairs	Others
2004-05	31757.52	16157.24	5494.14	3375.93	387.16	3411.77	3488.24
2005-06	30022.00	16844.32	9785.43	2486.93	275.72	2241.73	2054.50
2006-07	33810.59	20667.59	10679.88	1948.05	2816.32	4038.34	1184.00
2007-08	52058.05	11120.20	5668.75	2001.47	288.83	2153.17	1008.00
Total	**147648.16**	**64789.35 (30.5%)**	**31628.20 (14.9%)**	**9812.38 (4.6%)**	**3768.03 (1.8%)**	**11845.01 (5.6%**	**7734.74 (3.6%)**

Annexure XXXI

(Referred to in para 8.7.5.1)

Details of accidents and 'near miss' reports

Accident Report				
Rig name	**Year**			
	2004-05	**2005-06**	**2006-07**	**2007-08**
S/Gaurav	5 Mn	1P	2 Mn	4 Mn
S/Samrat	--	1P	--	--
CE Thornton	2 Mn	1Mn, 1 Sr	--	--
Badrinath	2 Mn	--	--	1 Sr
Kedarnath	1 Mn 2 Mj	--	--	2 Sr
D S Matdrill	--	--	1 Sr	2 Sr
Frontier Ice	--	2 Mn	1 Mn, 1Sr	--
S/Ratna	1 Mj	--	4 Mn, 1 Sr	--
S/Jyoti	2 Mn	3 Mn	1 Sr 2 Mn	1 Mn
S/Bhushan	1 Mn, 1Mj	5 Mn 1 Sr.	1 Sr	1 Sr.
Total	Mn 13 Mj 04	Mn 11 Mj 0 P 02 Sr 02	Mn 09 Mj 0 Sr 05	Mn 5 Mj 0 Sr 6
Mn-Minor Injury, Mj- Major Injury, Sr - Serious Injury, P- Property Damage				

Rig name	**Near Miss report**			
	Year			
	2004-05	**2005-06**	**2006-07**	**2007-08**
S/Gaurav	Not reported	11	10	13
S/Samrat		8	--	--
CE Thornton		4	--	04
Badrinath		--	--	--
Kedarnath		--	--	01
D S Matdrill		--	--	--
Frontier Ice		18	1	04
S/Ratna		--	6	09
S/Jyoti		--	--	07
S/Bhushan		17	10	16
Total:		**58**	**27**	**54**

Annexure – XXXII

(Referred to in Paragraph 9.1.1)
Details of facilities available at respective shipyards

Company	Facilities available

Hindustan Shipyard	• One dry dock to carry out underwater repairs of ships upto 70000 DWT
	• One wet basin to carry out afloat repairs
	• Lifting capacity in the form of cranes of the capacity of
	  • 40 tons – 2 nos
	  • 20 tons – 1 no
	  • 10 tons – 3 nos
	• other associated basic workshop facilities for blasting and painting, steel renewals, electrical, rigging etc.

Cochin Shipyard	• One dry-dock capable of accommodating ships up to 125000 DWT • Two quays (280 metre length with 15 ton cranage and 208 metre length with 5-10 ton cranage) • An engine and machine shop with allied tools and machineries.

Annexure-XXXIII

(Referred to in Paragraph 9.7.1)

Statement showing the ship repair turnover of Indian Yards during 2004-05 to 2008-09

	Shipyard	2004-05		2005-06		2006-07		2007-08		2008-09	
		amount	% age	amount	% age	amount	% age	amount	% age	amount	% age
1	Cochin Shipyard	148.02	38.55	151.27	47.86	241.53	57.62	252.14	63.88	270.06	55.07
2	Hindustan Shipyard	135.12	35.19	87.90	27.81	92.14	21.98	108.46	27.48	144.13	29.39
3	MDL	17.20	4.48	6.51	2.06	0.14	0.03	0.00	0.00	0.00	0.00
4	GSL	10.84	2.82	15.19	4.81	22.78	5.43	5.47	1.39	2.25	0.46
5	GRSE	6.90	1.80	0.60	0.19	0.00	0.00	6.30	1.60	0.93	0.19
6	HDPE	6.00	1.56	1.50	0.47	3.50	0.83		0.00		0.00
7	WISL	42.00	10.94	42.70	13.51	45.00	10.73	15.80	4.00	72.15	14.71
8	ABG	15.50	4.04	6.60	2.09	12.00	2.86	6.51	1.65	0.86	0.18
9	Vipul	0.80	0.21	1.20	0.38	1.50	0.36				
10	NN Ship builders	0.90	0.23	0.60	0.19	0.10	0.02				
11	Geeta engg.	0.70	0.18	2.00	0.63	0.50	0.12				
	Totals	**383.98**	**100.00**	**316.07**	**100.00**	**419.19**	**100.00**	**394.68**	**100.00**	**490.38**	**100.00**

Source:

- Annual accounts in respect Sl. No. 1 to 5 for the five years.
- Report of Working Group on Eleventh FYP in respect of Sl. No.6 to 10 for three years from 2004-05 to 2006-07.
- Websites and information furnished by the Company Secretary of Cochin Shipyard in respect of Sl. No.7 and 8 for the years 2007-08 and 2008-09.

GLOSSARY OF ABBREVIATIONS

(As used in Chapter VIII)

Sl. No.	Abbreviation	Full Form
1.	AP	Annual plans
2.	API	Acquisition, Processing and Interpretation
3.	DGH	Directorate General of Hydrocarbons
4.	DS	Drilling Services
5.	EC	Environment Clearance
6.	EIA	Environment Impact Assessment
7.	EPC	Executive Purchase Committee
8.	FYP	Five Year Plan
9.	GEOPIC	Geo-data Processing and Interpretation Centre
10.	GTO	Geo Technical Order
11.	HSE	Health, Safety and Environment
12.	JVs	Joint Ventures
13.	KDMIPE	Keshava Dev Malviya Institute of Petroleum Exploration
14.	KG-PG	Krishna Godavari- Pranhita Godavari
15.	LD	Liquidated Damages
16.	LKM	Line Kilometre
17.	LOA	Letter of Award
18.	MC	Managing Committee
19.	MM	Material Management
20.	MoEF	Ministry of Environment and Forest
21.	MoP&NG	Ministry of Petroleum & Natural Gas
22.	MoU	Memorandum of Understanding
23.	ML	Mining Lease
24.	MMTOE	Million Metric Tonne Oil equivalent
25.	MWP	Minimum Work Programme
26.	NEERI	National Environmental and Engineering Research Institute
27.	NELP	New Exploration Licensing Policy
28.	NIT	Notice Inviting Tender
29.	NOA	Notice of Award
30.	OBC	Ocean Bottom Cable
31.	OISD	Oil Industry Safety Directorate
32.	PEL	Petroleum Exploration License
33.	PSCs	Production Sharing Contracts
34.	RDP	Rig Deployment Plan
35.	REXB	Regional Exploration Review Board
36.	SKM	Square Kilometre
37.	SLA	Service Level Agreement
38.	TD	Target depth
39.	WCR	Well Completion Report
40.	WOB	Western Offshore Basin

GLOSSARY OF TECHNICAL TERMS

(As used in Chapter VIII)

Technical Term	Description
Approved Work Programme	A work programme that has been approved by appropriate authority.
Basins	A Depression in the earth's crust where sedimentary materials are accumulated over the years. With reference to the Company it refers to the entity that is involved in exploration related activities.
Biosphere area	Biosphere is the ecological system integrating all living beings and their relationships, including their interaction with the elements of the lithosphere, hydrosphere, and atmosphere.
Block	Area identified in a field which is offered by Government under nomination (PEL) or to prospective bidders under New Exploration Licensing Policy, for the purpose of exploration of oil and gas
Directorate General of Hydrocarbon	An organization including its successors under the Ministry of Petroleum and Natural Gas.
Exploration	Searching for oil and/or natural gas, including topographical surveys, geological surveys, seismic surveys and drilling of wells.
Exploratory Well	A Well drilled for the purpose of searching for undiscovered petroleum accumulations on any geological entity (be it of structural, stratigraphic, facies or pressure nature) to at least a depth or stratigraphic level specified in the Work Programme.
Geo Technical Vessel	Vessel deployed for carrying out geotechnical investigations like determining the physical strength of soil for various offshore structures like jack-up rigs, sub-sea pipelines, jackets *etc.*
Geo Technical Order	An order which indicates the well drilling plan in terms of days, depth indicating lithology vis-à-vis depth, pressure vis-à-vis depth, casing/cementing policy, mud requirement, bits required etc.
Hydrocarbon	In organic chemistry, a hydrocarbon is an organic compound consisting entirely of hydrogen and carbon.
Management Committee	The Committee constituted pursuant to Article 6 of PSC.
Mesozoic	Mesozoic refers to the rocks/strata deposits during the time period between 240 to 66 million years ago.
Miocene	Miocene is a geological epoch which started approximately 23 million years before the present and lasted for eighteen million years.
Prognostication	The process of forecasting or estimating the hydrocarbon potential of an area.
Prospects	Prospects indicate the areas of hydrocarbon accumulation.
Reservoir	A naturally occurring discrete accumulation of Petroleum.
REXB	REXB consists of experts from various basins as well as from institutes (GEOPIC & KDMIPE) of the Company.
Reservoir Facies	The overall characteristics of a rock unit that reflect its origin and differentiate the unit from others around it.

Technical Term	Description
Rig Days	Noumber of days for which rigs were in operation/available during a particular period.
Rigs	It is an equipment used for drilling a well bore.
Sedimentary basins	Sedimentary basins are depressions in the earth's crust where organic matters are deposited.
Spud	Process of starting the well drilling process by removing rock, dirt and other sedimentary material with the drill bit.
Stratigraphy	Stratigraphy, a branch of geology, studies rock layers and layering (stratification). It is primarily used in the study of sedimentary and layered volcanic rocks.
Streamer	Series of chains with hydrophones which receives reflective signals from the sub-surface strata.
Well	A borehole, made by drilling in the course of Petroleum Operations, but does not include a seismic shot hole.
Work Programme	A work programme formulated for the purpose of carrying out Petroleum Operations during a particular period.