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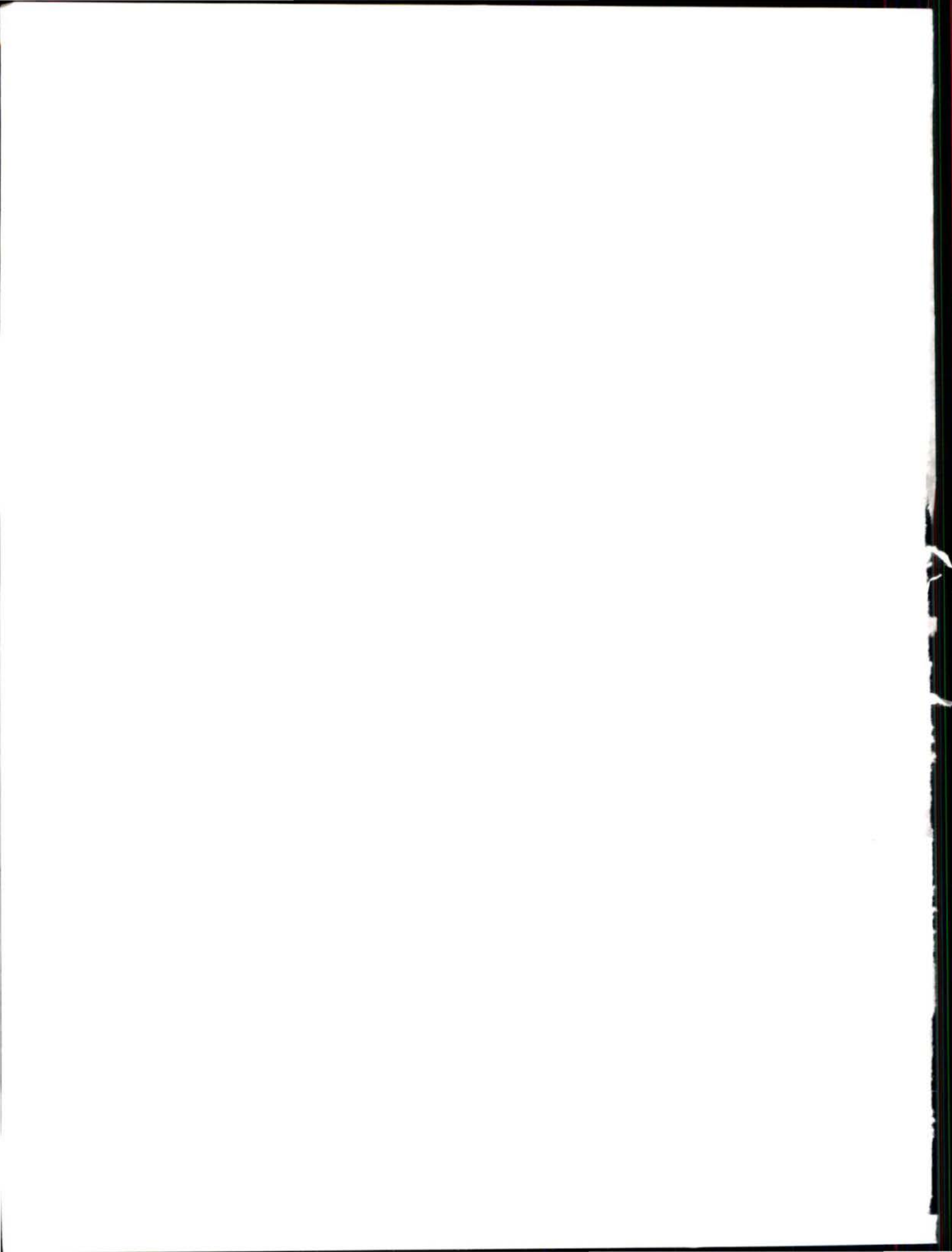
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मंत्री भारी उद्योग एवं लोक उद्यम मंत्रालय
Minister of Heavy Ind. & Public Enterprises
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**Report of the
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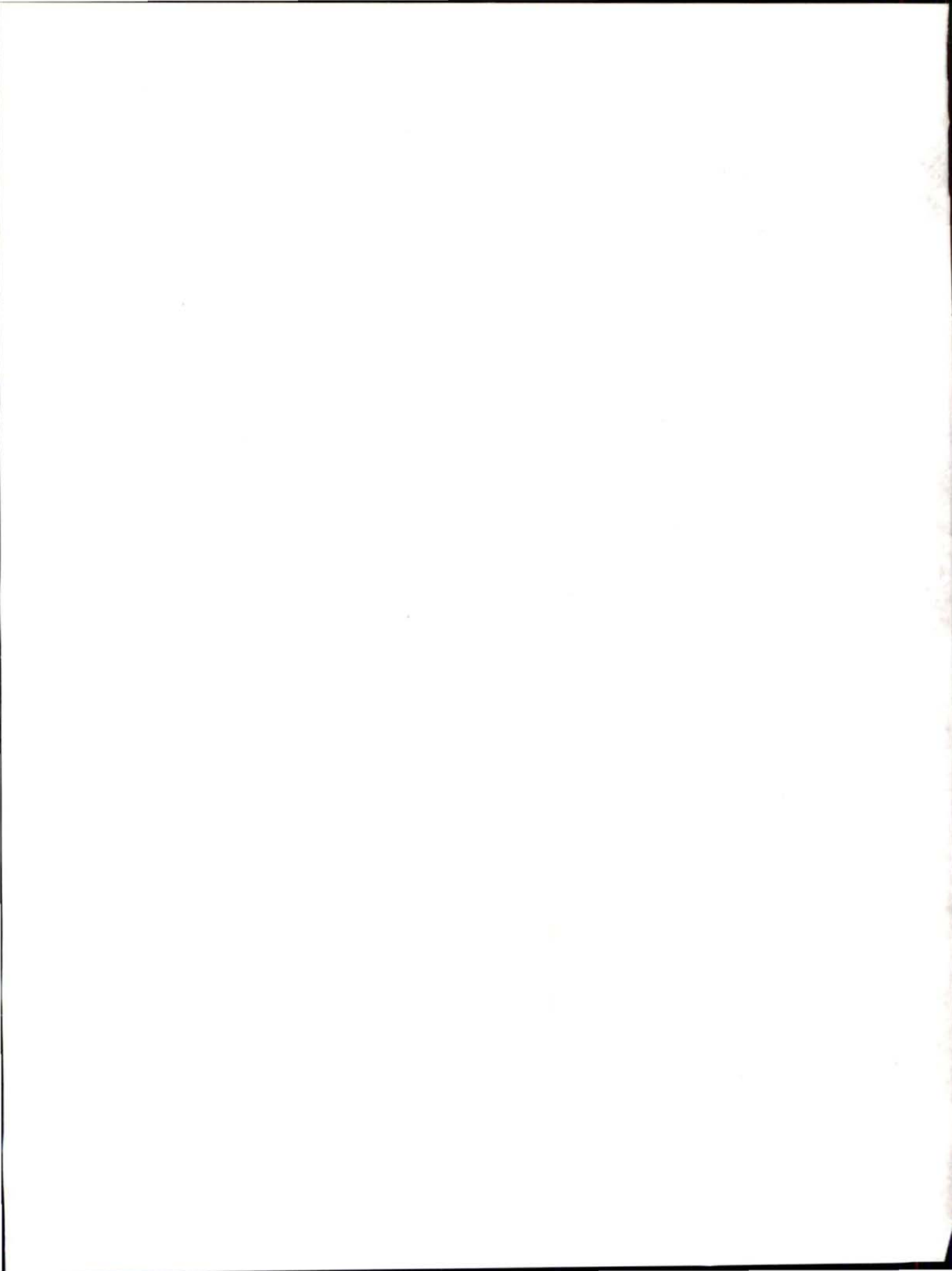
for the year ended March 2008

**Union Government (Commercial)
No. CA 23 of 2009-10
Information Technology Applications in
Public Sector Undertakings
(Compliance Audit)**



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PREFACE

A reference is invited to the prefatory remarks in the Report of the Comptroller and Auditor General of India–Union Government (Commercial) No. 22 of 2009-10 where a mention was made that Report No. CA 23 of Information Technology Applications in Central Public Sector Undertakings (PSUs) gives assessments on the use of Information Technology in selected areas of operations of selected PSUs.

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

Name of the Ministry/Department	Title of the Reviews/Name of the PSU
Ministry of Civil Aviation	Frequent Flyer Programme in National Aviation Company of India Limited
Ministry of Coal	CoalNet Project in Coal India Limited and its subsidiaries
Ministry of Defence	Production Planning and Material Management modules of SAP (Enterprise Resource Planning) package in Bharat Electronics Limited
Ministry of Petroleum and Natural Gas	Integrated IT system in Biecco Lawrie Limited
	RAMCO e Applications system in Chennai Petroleum Corporation Limited
	Financial Accounting Module of SAP in GAIL (India) Limited
	Material Management module of SAP-ERP system in Indian Oil Corporation Limited
	Functioning of Human Resource module in SAP R/3 system in Oil and Natural Gas Corporation Limited
Ministry of Steel	Functioning of Invoicing system in Bokaro Steel Plant of Steel Authority of India Limited



Overview

This Audit Report contains results of audit of computerised systems used in different areas of activity in nine Public Sector undertakings under five Ministries. Though audit covered diverse areas of computerisation and entities operating in different sectors, some common deficiencies noted in audit were:

- though standard Enterprise Resource Planning systems were used, these were not suitably customised to the particular business requirements/rules of the entity for optimal utilisation.
- all modules and functionalities of the system were not being used due to which stand alone systems and manual interventions continued.
- the business continuity plans, disaster recovery plans and IT security policy were either not in place and where formulated were deficient.
- weaknesses in input controls and validation checks did not ensure completeness, reliability and integrity of data.
- there was a lack of awareness among users of the ERP modules about accessibility input of correct data and security of the system.

An overview of the audit findings of individual audits is given below:

MINISTRY OF CIVIL AVIATION

National Aviation Company of India Limited

❖ Frequent Flyer Programme

The Frequent Flyer Programme is a customer loyalty reward programme. The system permits manual intervention by operators of the system posing the risk of unauthorised manipulations of data. The IT audit revealed deficient input controls resulting in issuance of award tickets even when adequate mileage points were not available at credit of members. The system had deficient information security controls due to which confidentiality, integrity and availability of information could be compromised.

MINISTRY OF COAL

Coal India Limited

❖ CoalNet Project in Coal India Limited and its subsidiaries

Coal India Limited (CIL) decided to implement computer network project 'CoalNet' for data sharing between the Ministry of Coal, CIL and its subsidiaries. The CoalNet project was not implemented completely in any of the subsidiary companies even after seven

years due to non standardisation of the business process. Our review discussed lack of proper input control, deficiency in validation checks and incorrect mapping of business rules. Absence of standard back up procedure made the data unsafe against disasters. Lack of adequate training on CoalNet and non-availability of user manuals also indicated the absence of business continuity plan. It was also seen that on account of deficiencies in monitoring, the pace of implementation was slow and ultimately led to foreclosure of the agreement with the implementation agency. The implementation of CoalNet remained unsatisfactory despite an investment of Rs.39.58 crore.

MINISTRY OF DEFENCE

Bharat Electronics Limited

❖ Production Planning and Material Management modules of SAP - Enterprise Resource Planning package

SAP was introduced in October 2006 in Bangalore Complex and subsequently in other units. Acquisition and implementation of SAP, utilisation of Production Planning and Material Management modules of SAP at Bangalore Complex were reviewed. The review revealed that the savings projected by implementation of SAP towards inventory carrying cost, cost of goods sold and reduction in sundry debtors by the Company did not materialise. Failure to design the required controls in the system, inappropriate customisation, lack of input controls and validation checks and inadequate controls during data migration resulted in non-utilisation of the SAP system to its full potential and as a result the integrity and accuracy of the data could not be ensured. Consequently the Company still depended on the legacy system and resorted to manual interventions in the current system.

MINISTRY OF PETROLEUM AND NATURAL GAS

Biecco Lawrie Limited

❖ Integrated IT System

The Company undertook computerisation without formulating an IT policy. User requirements as well as logical access controls were not defined or documented. The input controls and validation checks were also weak resulting in the existence of duplicate and unorganised data in the system. The deficiencies in system design like non-integration of different modules with finance modules and non-enforcement of data integrity resulted in manual intervention at each stage which rendered the system vulnerable to the risk of incorrect generation of data. In view of such deficiencies the Company could not achieve the complete benefits of computerisation.

Chennai Petroleum Corporation Limited

❖ RAMCO e Applications system

Chennai Petroleum Corporation Limited (CPCL) introduced VAX (Virtual Address Extension) system in the early 1990s using independent programmes developed in house. To integrate these systems using Enterprise Resource Planning (ERP), the RAMCO e Applications system was selected on the advice of CMC Limited and implemented during June 2002.

IT Audit of RAMCO e-Application system revealed control weaknesses such as users IDs were not linked with employee ID and employee wise entry details (IN entries) did not match with exit details (OUT entries) which defeated the primary objective of access control. Non-integration of the RAMCO e Applications system among various units resulted in manual intervention and led to risk of data entry errors. No provision to cancel the indent against the short closed purchase order was inbuilt in the system and the corresponding indents were manually closed as also non-provision of maintaining history of changes in the system resulted in lack of audit trails. The Company could not utilise the system effectively for optimal inventory utilisation and management.

GAIL (India) Limited

❖ Financial Accounting module of SAP

GAIL (India) Ltd. switched over to SAP ERP system in August 2005. Audit reviewed the Financial Accounting module and e-Security issues for the period from August 2005 to September 2008. Review revealed that lacking input controls, validation checks and supervisory controls resulted in unreliable database. Inadequate customisation of system led to incomplete or incorrect data. Non-rationalised user roles and authorisations to critical combinations and sensitive transactions posed the risk of misuse and manipulation. Thus, the Company could not reap full benefits from the system.

Indian Oil Corporation Limited

❖ Material Management module of SAP ERP system

Audit reviewed the implementation and customisation of Material Management module of Indian Oil Corporation Limited. The review revealed deficiencies in input controls and validation checks which ran the risk of unreliable data entering the system. Some features of the system were not adequately customised.

Oil and Natural Gas Corporation Limited

❖ Functioning of Human Resource module in SAP R/3 system

Human Resource module of the SAP system of Oil and Natural Gas Corporation Limited was not customised for manpower planning activities, determination of staffing needs, selection of personnel for various postings based on pre-defined criteria. Lack of input controls in the system also resulted in feeding of erroneous and incomplete data affecting integrity of data maintained leading to continued dependency on manual controls.

MINISTRY OF STEEL

Steel Authority of India Limited

❖ Functioning of Invoicing system of Bokaro Steel Plant

Bokaro Steel Plant (BSP) of Steel Authority of India Limited had a turnover of Rs.12037.57 crore during 2007-08. Invoices in respect of its products are prepared in invoicing section on the basis of data received from different departments/sections. The Company computerised the Invoicing System of BSP. The system comprised a 'File Server System' using *Oracle9i* developed in house. It was seen that there were multiple data entries of the same source data as a result of which the preparation of invoices was delayed. It was also seen that the system lacked input controls and validation checks which affected the completeness, accuracy and integrity of the data. There were inadequate physical access controls, as well as environment controls which rendered the System and data unsafe against un-authorised access, as well as fire hazards.

MINISTRY OF CIVIL AVIATION

Chapter: I

National Aviation Company of India Limited

Frequent Flyer Programme

1.1 Frequent Flyer Programme (FFP) of National Aviation Company of India Limited (Company) is a joint programme of erstwhile Air India Limited and Indian Airlines Limited for rewarding its frequent flyers. The information relating to flight details of members of FFP were captured in the FFP system from Indian Airlines Departure Control system for awarding and redemption of points in respect of journeys undertaken. The accrual and redemption of points and individual member profiles are managed through the FFP system. The details of mileage points in respect of each member of the FFP are available over its website www.flyingreturns.co.in.

The domestic segment of FFP is managed through a centralised mainframe computer located at New Delhi. The international segment 'FLY' is managed by M/s. IMRB International (IMRB) on a server at Mumbai. The uploading of data in the FFP system including maintenance of the system was done by IMRB through member service centres all over the country and two locations abroad (Singapore and Sharjah).

A review of the functioning of FFP system revealed deficiencies in access controls, data backup procedures, lack of input controls and validation checks as detailed below:

1.2 Audit findings

1.2.1 Connectivity

It was observed that the ticket numbers against which mileage points were redeemed were not captured in the system though such provision was available in the system, due to non linkage of the FFP system with the passenger ticketing system of the Company. As per rules the members can gift their award points earned in favour of non members as well. The details of such gifting done by the members were also not maintained in the system. In the absence of link between these two systems and the details of such gifts, the verification of redemption of points could not be done through the system.

The Ministry in its reply (February 2009) accepted manual entry of ticket numbers in this regard and stated that users have been instructed to utilise this provision. The Ministry also stated that this process would be eliminated in the proposed Passenger Services System solution which would include FFP module also. Regarding the gifting of award points, the Ministry stated that the purpose of capture of details of names of persons to whom tickets were gifted was not clear. It is stated that since the award letters were not transferable the details should be captured in the system in order to avoid misuse.

1.2.2 Input controls and validation checks

The input controls and validation checks ensure that the data received for processing are genuine, complete, accurate and entered without duplication. Data analysis revealed that:

- (i) The mileage points were to be awarded in the system based on the class of journeys. However, in five cases mileage points were awarded through the system without indicating the class of journey undertaken.

The Ministry accepted (February 2009) absence of input controls in this regard.

- (ii) Data as on 30 November 2007 contained negative closing balances aggregating to 25,19,671 points against 246 members, indicating that the system permitted the issue of award letters for redemption of mileage points earned, even when enough points were not available on credit, due to lack of input controls.

The Ministry replied (February 2009) that the negative closing balances may be due to subsequent corrections of incorrect postings after redemption of such points, incomplete data migration and in some cases issuance of award tickets against future credits due to commercial goodwill. This indicated poor input controls and awarding of credits in respect of future travel which were not permitted in case of FFP.

- (iii) Gaps were noticed in the serial number of award letters issued for redemption transactions and neither the reasons were recorded in the system nor were records made available for explaining such gaps. This posed the risk of misuse of award letters in the absence of link among the FFP system, the ticket issuing and revenue accounting system.

The Ministry stated (February 2009) that gaps were due to blocking of serial numbers of award letters which have not been issued and could be also due to technical malfunction. It is reiterated that necessary indication through flags may be incorporated in the system to avoid misuse of such blocked serial numbers.

1.3 Conclusion

Absence of connectivity between the FFP system and passenger ticketing system combined with continued dependence on manual controls could pose the risk of unauthorised manipulation of the data and could pave way for fraudulent transactions. Deficient input controls and validation checks in the system made the data available in the system incomplete, inaccurate and unreliable. Thus, the FFP system contained unreliable data and was vulnerable to errors and manipulations impinging on the transparency of its operations.

The Ministry accepted (February 2009) the observations and stated that these would be taken care of in the proposed Passenger Services System solution to be acquired soon.

MINISTRY OF COAL

CHAPTER: II

Coal India Limited

CoalNet Project

Highlights

Absence of proper planning and monitoring, inadequate study of business processes across the Coal India Limited subsidiaries, inadequate involvement of user companies in the process of development of application software, resulted into delay and partial implementation of CoalNet Project. Expenditure towards procurement/hiring of hardware and software remained unfruitful.

(Para 2.7.1 and 2.7.2)

Incorrect mapping of business rules resulted in payment of allowances to non-entitled employees.

(Para 2.7.4)

Inadequate input controls and lack of validation checks resulted in incomplete data, duplication of data in respect of name, Provident fund numbers, Bank account numbers, Permanent account number *etc.*, and made the data unreliable.

(Para 2.7.5)

There was ineffective disaster recovery and business continuity plan, backup and password policy.

(Para 2.7.6)

2.1 Introduction

Coal India Limited (Company) is the holding Company for eight subsidiaries* situated in different parts of the country. The function of the Company includes monitoring of mining and non-mining projects implemented by its subsidiaries, centralised purchasing of Heavy Earth Moving Machinery (HEMM), explosives, establishing coal linkages for supply of coal through concerned subsidiaries, maintaining statistics on coal production, removal of over burden *etc.*

Computerisation in the Company started initially in 1988-89. To enable use of Information Technology (IT) for improving administrative efficiency in the organisation,

* Central Coalfields Limited (CCL) Ranchi, Mahanadi Coalfields Limited (MCL) Sambalpur, Northern Coalfields Limited (NCL) Singrauli, South Eastern Coalfields Limited (SECL) Bilaspur, Eastern Coalfields Limited (ECL) Sanctoria, Western Coalfields Limited (WCL) Nagpur, Bharat Coking Coal Limited (BCCL) Dhanbad, Central Mine Planning & Design Institute Limited (CMPDIL) Ranchi.

a Committee headed by the Secretary, Ministry of Coal & Mines (MoC), decided in November 2000 to implement computer network project 'CoalNet' for data sharing between the MoC, Company and its subsidiaries. As per directive from MoC, bids were invited from two Government organisations, Indian Institute of Technology (IIT), Kharagpur and National Informatics Centre (NIC), New Delhi. Work order for an amount of Rs.8.95 crore was issued by the Company on IIT, Kharagpur on 3 July 2001 for implementation of CoalNet in the Company and its subsidiaries Headquarters. Under Phase I duration of the project was two years including maintenance support. The first Phase of the project was scheduled to be completed within 12 months from the date of awarding work order. For its implementation, a top down approach was adopted to form the backbone of the information infrastructure, over which a Decision Support System (DSS) could be built to enhance the quality and effectiveness of decision-making. It was decided that 'CoalNet' project would be designed as an integrated application system using Java based technology with Oracle at the back end with multi-tier architecture.

It was also decided that 'CoalNet' comprising 13 modules^{*}, would be implemented in three Phases. In first Phase, linkage was to be established between MoC, Company and Subsidiaries' Headquarters to communicate data and voice along with the video conferencing facility. In second Phase, the 'CoalNet' was to be extended from Subsidiaries Headquarters level to Areas^{*}/loading point level. In the third Phase, CoalNet was to be implemented in collieries. Initially, implementation of this application software was optional, but later on it was made compulsory for all the subsidiaries. It was also decided that any software developed, independently or with outside help, by any subsidiary should necessarily be compatible with CoalNet.

2.2 Objectives of CoalNet

The main objectives of CoalNet were catering to an integrated information requirement of Department of Coal, MoC, Company and its subsidiaries and standardisation of process, platform, technology and application across the corporate level of the Coal Industry.

2.3 Objectives of audit

The objectives of audit were to verify whether:

- (i) The CoalNet had been designed and was functioning in terms of the stated objectives.
- (ii) The business rules have been correctly mapped and information/reports generated were reliable, complete and accurate.
- (iii) The general controls were adequate, reliable, and security aspects were properly taken care of.
- (iv) To identify the bottlenecks for delayed/ partial/ non-implementation of CoalNet.

^{*} Finance, Production, Project, Personnel, Payroll, Corporate Plan, Grievance, VVIP Information, Equipment, Material Management System, Sales and Marketing, Parliamentary Affairs Division, Management Information System

^{*} Area comprises one big or several small coal mines

2.4 Scope of audit

None of the modules had been fully implemented (till June 2008) and used across all the subsidiaries. Some of the partially implemented modules, as mentioned below, have been covered in audit.

- (i) Payroll: Bharat Coking Coal Limited (BCCL), Mahanadi Coalfields Limited (MCL), Central Coalfields Limited (CCL) Ranchi, Central Mine Planning & Design Institute Limited (CMPDIL) Ranchi and the Company (Headquarters) (Phase I)
- (ii) Material Management System (MMS): MCL (Phase I) and BCCL (Phase II)
- (iii) Sales & Marketing: BCCL, MCL and Eastern Coalfields Limited (ECL)(Sales Office), Kolkata (Phase I)
- (iv) Production: BCCL (Phase II), MCL (Phase I) and CCL (Phase I)
- (v) Equipment : CCL (Phase I)
- (vi) Finance: Company (Headquarters) and CMPDIL (Phase I)

2.5 Audit criteria

While conducting IT audit following criteria were kept in view:

- (i) Business rules and procedures;
- (ii) Accounting policy and orders/circulars/notification issued from time to time by the competent authority; and
- (iii) Best practices for Information Technology development and implementation.

2.6 Audit methodology

Field audit of CoalNet Application software was conducted by adopting following methodology:

- (i) Study and scrutiny of records/ documents;
- (ii) Discussion with officials of System Department in charge of various modules as well as officials of concerned department; and
- (iii) Data extraction and analysis thereof through Computer Assisted Audit Techniques (CAAT) followed by verification of records, whereby necessary.

2.7 Audit findings

2.7.1 Implementation of CoalNet

Implementation of Phase I of the CoalNet project was scheduled to be completed by July 2002, which was later extended to March 2003 and then December 2004. Phase II was to be completed by March 2005, but later extended to March 2006. It was noticed that:

- (i) As per work order, under Phase I, 13 modules were to be implemented in each of the subsidiaries and the Company Headquarters aggregating to 117 modules. But only 21 modules* were implemented as on April 2008. In spite of this, an amount

* CIL-3, CCL-4, WCL-1, SECL-5, MCL-4, NCL-1 and CMPDIL-3

of Rs.6.55 crore was paid to IIT for implementation of Phase I against total contracted amount of Rs.8.95 crore for Phase I; and

- (ii) Out of ten modules to be installed in 36 areas of different subsidiaries under Phase II only the MMS module was implemented in eight stores of CCL though an amount of Rs.4.11 crore was paid to IIT as on March 2008.

The reasons for the delays were as follows:

- (i) Though the work orders for Phase I was placed on 3 July 2001, the Company took 17 months in selection of back-end database for CoalNet as Oracle. The actual work of implementation in subsidiaries started between October 2003 and September 2004 only;
- (ii) The software was not thoroughly tested before implementation at the site which resulted in number of bugs in the software. Further, frequent changes of personnel in IIT team hindered the process of implementation. In absence of any provision in the work order the Company could not enforce IIT to deploy manpower on continuous basis;
- (iii) According to clause 14 of the work order dated 3 July 2001 placed on IIT, User Training and Maintenance Training would have to be imparted. But it was noticed in audit that no training was provided in MCL, WCL and CCL; and
- (iv) No effective mechanism was developed to monitor and supervise the development and implementation of different milestones of the project either at the Company Headquarters or at subsidiary Company. In ECL non-availability of servers delayed the implementation. In NCL, no bridging programme was developed to make their ERP solution (IBS) compatible with CoalNet. In WCL, CoalNet became non-functional in July 2007 due to crash of application server because accepted standard procedure was not being followed for back up of data.

It was also noticed that due to non-implementation of wide area network connectivity among the Areas under CoalNet Phase II, stores worth Rs.17.21 lakh lying for more than five years as on 31 March 2008 at Lodna area of BCCL could not be utilised by other areas needing these while Katras area of BCCL purchased the same.

2.7.2 Inadequate study of business processes and non-involvement of users

The basic requirement for re-engineering of the business processes for implementing an ERP solution across all subsidiaries ensuring standardisation and uniformity in business processes as far as possible and also providing for exceptions at various subsidiaries in the same application was not followed by the Company. Documents like user requirement specification, system requirement system and study design and development were prepared by IIT and approved by the Company. But, the specific and local requirements of subsidiaries were not incorporated in the above mentioned documents, based on which the application package was developed by the vendor. As non-uniform business processes required modifications, changes and customisation in the various modules of the CoalNet at subsidiaries ultimately delayed the project.

2.7.3 Inadequate documentation

Operational manuals on different modules were prepared by the IIT. But, due to the specific requirements of subsidiaries, number of changes were incorporated in the

standard application package. However, operational manuals were not updated resulting in deficient utilisation of the package. Further, any modification to the system would also be difficult and inconsistent in the absence of documentation of the latest version of system design and changes.

2.7.4 Incorrect business rule mapping

It was also noticed that business rules were incorrectly mapped in Payroll module of the CoalNet. The module was designed for preparation of pay slip. Analysis of database revealed the following discrepancies in payroll module of subsidiary company.

2.7.4.1 Payment of washing allowance to non-entitled employee

As per NCWA* agreement, certain employees e.g. peon, driver, nurse, para-medical staff, security personnel etc., who were required to wear Uniform were alone entitled for washing allowance.

Due to incorrect mapping of above business rule in the system, washing allowance was paid to some categories of non-entitled employees of MCL Headquarters and the Company Headquarters. The same was subsequently recovered at MCL. However, the deficiency in the system was not rectified.

2.7.4.2 Payment as well as recovery of House Rent Allowance to/from non-entitled employee

According to NCWA agreement House Rent Allowance (HRA) is payable to the employees who are not allotted Company's accommodation. Due to incorrect mapping of this rule, HRA was shown as paid erroneously to the employees who were also allotted Company accommodation in MCL Headquarters, BCCL, CCL, CMPDIL and the Company's Headquarters.

2.7.4.3 Excess overtime payment

Regulations regarding overtime (OT) payment provide for ceiling in respect of monthly rated workers/staff/officers. Non mapping of this ceiling in the system resulted in excess payment of OT in MCL.

MCL Management replied (8 September 2008) that the monthly working days for non-executives should be taken as 26 instead of 30. However, there was still over payment of OT even after considering monthly working days as 26.

2.7.5 Input controls and validation checks

Input control ensures that the data received for processing are complete, accurate, properly authorised and entered timely without duplication. Validation check ensures that the data entered are valid within the prescribed range/limits. Inadequate input and validation controls noticed in different modules are mentioned below:

2.7.5.1 Payroll module

Instances of inadequate input controls in the system are given below:

- (i) In case of 5435 out of 59213 employees in CCL the designation as well as department of employees was entered as '0';

* National Coal Wage Agreement

- (ii) Different Provident Fund (PF) numbers were allotted to the same person in case of 58 out of 77300 employees in BCCL;
- (iii) Different Codes were designed for same discipline of activity in BCCL in 94 out of 213 cases;
- (iv) Same PF number was allotted to more than one employee in 178 cases in BCCL and 263 cases in MCL out of 77300 and 23840 cases respectively;
- (v) No PF number was entered against 12572 employees out of 77300 employees in BCCL and 2608 employees out of 23840 employees in MCL;
- (vi) Same Permanent Account Number (PAN) was entered for 167 out of 59213 employees in CCL and for 10 out of 3624 employees in CMPDIL;
- (vii) System accepted date of joining of an employee as a date preceding date of birth in 315 cases and also same as date of birth in 152 cases in CCL out of 59213 records; and
- (viii) MCL Management accepted (September 2008) that there was same PAN for different employees by mistake. However, they were in the process of 'thorough checking' of data to make the things right.

2.7.5.2 Sales module

Sales module deals with road sales to both linked* and unlinked parties. Inadequate input controls and validation checks in the system are shown below:

- (i) Irrelevant & incomplete data were entered in address field in 500 records out of 38720 in BCCL and in 897 records out of 19204 in CCL;
- (ii) PAN was not entered in 36871 records out of 38720 in BCCL and in 14945 records out of 19204 in CCL;
- (iii) Duplicate PAN was entered against 285 records out of 38720 in BCCL and in 48 cases out of 19204 in CCL;
- (iv) No delivery order code was mentioned in 2488 cases out of 12796 in CCL;
- (v) Customer code field was kept blank in 207 cases out of 17707 in ECL; and
- (vi) System accepted railway receipt date as a date preceding loading date in ECL.

2.7.5.3. Production module

This module provides for periodical review of target distribution and capturing daily coal production and over burden removal data, shortfall analysis *etc.* Data analysis revealed that:

- (i) In the database of CCL due to inadequate input controls, no production time was entered. Thus, all the shifts were entered as 'G' indicating General Shift which was not correct as the project was running round the clock and shift-wise dispatch should be entered according to the shifts viz. 1st /IInd or IIIrd shift.

* *Linked Party-Core sector and few other coal consumers were linked to a particular colliery of a Company for meeting their demand of coal.*

- (ii) The dispatch mode was entered as 'General' only though the dispatches were done through different modes like, Rail, Road *etc.*
- (iii) The washery code and coalfield code were not standardised.

It was further noticed that area wise Coal and OBR production of MCL and CCL for the year ended 31 March 2007, as compiled in the Performance Report at the Company's Headquarters, did not match with those in CoalNet.

2.7.5.4 Material management module

The MMS module deals in monitoring status of indent, comparative analysis of subsidiary-wise inventory and consumption, monitoring subsidiary-wise critical stock items *etc.*

CoalNet Phase II was planned for implementation in 36 areas (BCCL-14, CCL-10, MCL-10 and ECL-2). The status report showed that in none of the areas MMS has been properly implemented except CCL, where this was implemented in few areas. Deficiencies revealed during data analysis in CCL are highlighted as follows:

- (i) Same vendor was allotted different vendor codes in 49 cases out of 751 in CCL;
- (ii) Item location, lead time in procurement, vendor identity and equipment code were kept blank in CCL and BCCL;
- (iii) Inventory Controls like HML/FSN/VED/ABC analysis were not linked with the actual transaction and minimum, maximum re-order and safety levels were not fixed in CCL and BCCL;
- (iv) Part number of material was not entered in 6577 items out of 35992 in CCL and in 98561 items out of 113953 issued in CCL;
- (v) Vital details like inspection note number, date of inspection, inspected by whom *etc.* were kept blank in CCL;
- (vi) Same indent was issued on different dates in 14 cases out of 381 in CCL;
- (vii) There was mismatch between quantity received at stores and quantity accepted on inspection in case of 138 stores items out of 21825 in CCL; and
- (viii) Number of items issued from stores was more than that requisitioned by the user department in respect of 144 stores items out of 113950 in CCL.

It was noted in Audit that there was difference between consumption quantities shown in the database and the same calculated by Audit taking into account the opening stock, receipt/transfer in, return and issue/transfer out of the item.

The Management of CCL replied (September 2008) that (i) though many vendors had same name but their addresses were different and (ii) data for inventory control management, like ABC, VED *etc.* were not fed into the system. The Management's view is not acceptable in view of the fact that (i) different code and identity existed for exactly same vendor name and address and (ii) necessary data needed to be fixed and fed in the system for effective use of the module.

2.7.5.5 Equipment module

This module pertains to planning and processing of equipment maintenance tasks, capacity planning and scheduling, recording data to build up a maintenance system, representing and managing equipment in a structured manner *etc.*

The deficiencies in input controls in Equipment Module of CCL are highlighted as follows:

- (i) In 247 cases out of 1355 same machine serial number was allotted to different equipment; and
- (ii) In 131494 cases out of 135492, hours worked by Heavy Earth Moving Machinery were not entered.

Thus, deficient input controls in all modules coupled with deficient validation checks made the data base incomplete, incorrect and unreliable. This also resulted into inconsistent results that could not be used for any Management Information System or Statements.

2.7.6 Information system security control

CoalNet application software has three levels of security viz. application level, module level and database level security. Role-based access or user-based access in CoalNet could be provided through data base administrator and in both the cases, function wise access can also be provided to users by assigning the roles of data entry, authentication, approval *etc.* There is an automatic password expiration procedure built in the system which enables automatic expiry of passwords after certain interval of time.

However, it was noticed that despite the adequate inbuilt security features, such facilities were not used. It was also noticed that records had been deleted from the database by getting access to the back-end that resulted in gap in identities. Authorisation for accessing back-end data was not on record, which made the system unsecured and vulnerable to manipulation of data with malafide intention. No password and back up policy had been formulated till the end of the audit. Because of not adhering to the standard back up and data recovery procedure, WCL had lost substantial data and struggled for recovery of the same.

2.7.7 General observations

2.7.7.1 Unfruitful expenditure on procurement/hiring of hardware materials in BCCL and MCL

BCCL

The BCCL Management hired 17 Sun servers for a period of 60 months for a total rental value of Rs.11.81 crore (installed in September 2003). Due to non-implementation of Phase II in different areas the servers were not utilised at all and the hire period also expired in September 2008.

MCL

Though Phase I of the project was not implemented successfully, MCL procured hardware worth Rs.3.95 crore, including annual maintenance contract, which is now lying idle for more than two years due to non-implementation of Phase II.

2.7.7.2 Foreclosure of agreement with IIT

It was observed that except in CCL, IIT had withdrawn on-site support from all subsidiaries in June 2007. It was also noticed that the Company and its subsidiaries had no in-house expertise to maintain and customise CoalNet application software. In view of above, the Board of Directors of the Company in their Meeting held on 11 July 2008 approved foreclosure of the agreement in respect of implementation of CoalNet Phase I and Phase II and engagement of Electronic Corporation of India Limited for maintenance support to the subsidiaries where CoalNet was in use. Poor management resulted in not fixing the user requirements well in advance and poor monitoring of the implementation led to the delays and foreclosure of agreement with IIT Kharagpur, while the CoalNet was yet to be implemented completely in the Company and its subsidiaries even after seven years.

2.8 Conclusion

Even after seven years Phase I of CoalNet was not implemented completely in any of the subsidiary companies till now (July 2008). Non standardisation of the business process, platform, technology and application across the corporate level as envisaged combined with acceptance of User Requirements without considering the specific requirements of the subsidiaries led to lot of changes in the software and resulted in non uniformity of CoalNet in the implemented areas. Lack of proper input control, deficiency in validation checks and incorrect mapping of business rules made the data incomplete and unreliable in implemented areas. Absence of standard back up procedure made the data unsafe against disasters. Lack of adequate training on CoalNet and non-availability of user manuals also indicated the absence of business continuity plan. Inadequate monitoring of the implementation resulted in slow pace of implementation and ultimately led to foreclosure of the agreement with the implementation agency, i.e., IIT. Thus, the implementation of CoalNet remained unfruitful even after seven years and spending Rs.39.58 crore (Rs.10.66 crore on implementation and Rs.28.92 crore on procurement of Hardware/Software).

2.9 Recommendations

- The Company should review the status of implementation of balance modules and draw up a well defined strategic plan to customise the CoalNet after identifying the specific requirements of subsidiaries within a defined time frame.
- The Company should arrange for training of their personnel in CoalNet project. A detailed user manual and system operation manual should be prepared and documented.
- Input control and validation checks should be built in order to ensure correctness, completeness and integrity of data.
- Policy and procedures regarding data security, password management, back up and data recovery should be formulated and implemented.

The matter was reported to the Ministry in December 2008; reply was awaited (January 2009).

MINISTRY OF DEFENCE

CHAPTER: III

Bharat Electronics Limited

Production Planning and Material Management modules of SAP (Enterprise Resource Planning package)

Highlights

The projected savings that SAP was to achieve did not materialise with regard to inventory carrying cost, cost of goods sold and reduction in sundry debtors in number of days of sales.

(Para 3.7.1.1 (iii))

Users resorted to manual process due to lack of proper training and non-utilisation of all available provisions. Audit Information System module was not implemented.

(Para 3.7.1.2)

The IT policy including information security policy was still under preparation.

(Para 3.7.2.1 & 3.7.2.2)

Log files of access control device were not maintained and not monitored. The password policy and data classification were yet to be prepared.

(Para 3.7.2.3 & 3.7.2.4)

Offsite storage of backup data was not established.

(Para 3.7.2.7)

Materials valued Rs.1.02 crore although sold were shown under finished goods.

(Para 3.7.3 (iv) (b))

Production orders were not closed and shown under Work-In-Progress (WIP) even after completion of sales and manual entries had to be resorted to reduce WIP by Rs.2.36 crore.

(Para 3.7.3 (iv) (c))

Advance and letter of credit payments amounting to Rs.1.40 crore not adjusted on receipt of material resulting in over statement of both current assets and current liabilities.

(Para 3.7.3 (v))

The value of WIP exceeded the net realisable value by Rs.1.44 crore without adhering to the Company's accounting policy on inventory valuation resulting in overstatement of WIP.

(Para 3.7.4)

Abnormal variation in valuation of inventory item valued Rs.0.61 lakh was taken as Rs.7.01 crore and due to wrong entry of exchange rate and material valued Rs.15000 was shown as Rs.14 lakh.

(Para 3.7.6 (iv) and 3.7.6 (v))

3.1 Introduction

Bharat Electronics Limited (Company) was incorporated in April 1954 as a fully owned Government of India Undertaking under the Ministry of Defence. At present the Company has nine production units, two Central Research Laboratories, six Regional Offices and two overseas offices located at New York and Singapore.

Major customers of the Company are the three Defence Services, Para military forces, All India Radio, Doordarshan, Bharat Sanchar Nigam Limited, Indian Space Research Organisation *etc.* The Company's turnover during the year 2007-08 was Rs.4102.54 crore of which the Defence Sales contributed 83 *per cent.*

3.2 Organisation

The Information Systems (IS) Division in Corporate Office is headed by a General Manager, who is assisted by an Additional General Manager. There are functional groups handling various modules of SAP, systems administration group and network administration group.

The details of the process of computerisation in the Company are as follows:

- (i) **Integrated Financial Accounting System:** The material accounting (COBOL based) was started in Information System (then EDP) Division during 1965 and subsequently was replaced (1988) with Oracle database based Integrated Financial Accounting System (IFAS). The IFAS stock and value were the basis for financial accounting.
- (ii) **Manufacturing Resource Planning:** During 1996-98, Oracle based Manufacturing Resource Planning (MRP II) was implemented in all the divisions for generating Purchase Requisitions, shortages, *etc.* and the material accounting transactions of IFAS were transferred to central server.
- (iii) **Enterprise Resource Planning:** Based on the recommendations of Tata Consultancy Services (TCS) for a Centralised Common Integrated System, and also to support current and future business requirements, the Company entered into an agreement (December 2004) with SAP INDIA SYSTEMS at a fee of Rs.3.87 crore for Enterprise Resource Planning (ERP) software and with WIPRO for implementation of ERP at a total contract price of Rs.5.65 crore.

The system is based on 3-tier architecture (R/3). Application is centrally run in servers at Information System–Corporate Office {IS (CO)}. Clients are connected to the server through Local Area Network for Bangalore Complex and through Wide Area Network for units outside Bangalore.

SAP (ERP) was introduced in October 2006 in Bangalore complex and subsequently in other units. In July 2008, it was implemented in the Corporate Office. Hence, Audit conducted a general review of the acquisition, implementation and utilisation of ERP system with a specific thrust on the transactions for the years 2006-07 and 2007-08.

3.3 Scope of audit

Out of ten modules*, two modules i.e. production planning and materials management modules, which are of critical importance for the functioning of the Company were reviewed. Being the major unit of the Company, analysis of data was restricted to Bangalore complex. The scope of audit was to examine the controls built in for system acquisition, operations and maintenance.

3.4 Audit methodology

Audit conducted the review in the following manner:

- (i) Reviewed the acquisition of Information System facilities and system's development;
- (ii) Extraction and analysis of data using Computer Assisted Audit Techniques;
- (iii) Collection of data through issue of questionnaire, audit requisitions, audit enquiries and replies received;
- (iv) Discussion/interaction with the officers of Information System/User Departments;
- (v) Test check of sample transactions; and
- (vi) Follow up of Audit observations of earlier Accounts Audits/reviews and other relevant information relating to the ERP System.

3.5 Audit objective

The objective was to review the performance of SAP and seek assurance on the following:

- (i) The system documentation was adequate to ensure efficient and continuous operation of the system.
- (ii) Planning, acquisition and implementation to assess the effective achievement of ERP objectives.
- (iii) General and application controls available in the system with reference to production planning and material management modules.
- (iv) Data was complete and reliable in terms of its integrity.
- (v) Business rules of the Company were correctly mapped.
- (vi) Information System controls in the system provided reasonable assurances for the intended objectives.

The earlier system of IFAS and MRP II systems was reviewed by the C&AG of India and observations were brought out in the Audit Report No.4 of 2005. In response to many observations the Management had stated that these discrepancies would be taken care of in the new SAP system. The same were followed up during this audit.

* *Product Lifecycle Management, Sales and Distribution, Production Planning, Materials Management, Finance and Controlling, Quality Management, Project Systems, Human Resources (excluding payrolls), Plant Maintenance Customer Support*

3.6 *Audit criteria*

The following criteria were adopted for review of the SAP modules:

- (i) Parameters prescribed in the SAP system, procedures and practices adopted;
- (ii) Control and security parameters as per best practices; and
- (iii) Corporate Rules, Government guidelines, amendment parameters incorporated in the SAP modules.

3.7 *Audit findings*

3.7.1 *System acquisition, development and implementation*

3.7.1.1 *Implementation issues*

- (i) The Company had various milestones in the implementation of the project. There were delays ranging from 9 months to 2 years in achieving the individual milestone targets as well as overall completion of project.

The Ministry accepted (March 2009), the delay and attributed the complex nature of business requirements of the Company and the large volume of legacy data to be migrated to SAP as the reasons for the delay.

The reply is not acceptable since the Company during the feasibility study of the project should have considered the complexity of its business requirements. Thus the improper project planning had led to delay in implementation of various milestones.

- (ii) As per the agreement, WIPRO was entitled for pro-rata payment on completion of various milestones. In December 2007 despite non completion of implementations at Ghaziabad, Kotdwara and Panchkula, the Company released Rs.32 lakh to WIPRO against bank guarantee. As the agreement did not provide for payment in advance, release of amount before completion of milestone was not in order.
- (iii) The Company appointed (December 2002) TCS to study and identify the gaps between the existing IT infrastructure and future business requirements. TCS in its report (May 2003) worked out an investment of Rs.37.50 crore with an estimated pay back period of about two years upon implementation of ERP system. TCS identified tangible benefits like reduction in inventory, cost of manufacturing and sundry debtors accruing to the Company. However, it was observed that there were no improvements in Company's performance after implementation of ERP in October 2006, as envisaged, e.g. the sundry debtors in number of days of sales had increased during 2007-08 and the savings projected for inventory carrying cost and cost of goods sold by the Company did not materialise. Reasons for non-accrual of anticipated benefits may be attributed to partial implementation of checks and controls, non-utilisation of system in follow up of bills and non-utilisation of automated process available in the system as has also been brought out in the succeeding paragraphs.

The Ministry stated (March 2009) that a number of benefits have accrued from implementation of SAP for monitoring of inventory and sundry debtors. It further stated that the implementation was yet to be completed and since only Bangalore

Complex has been on SAP for 18 months, the payback period would have to be reworked.

The reply is not acceptable as sundry debtors and inventory carrying cost were on increasing trend even two years after the implementation. Though the Company clarified that SAP increased the visibility of inventory across the Company, no reduction in cost of manufacturing and reduction in inventory was achieved. Thus, the intended benefit on implementing SAP was not achieved.

3.7.1.2 Utilisation of modules

- (i) The Company initiated production activity based on customer orders. There after purchase process was initiated by raising purchase requisition by the planning department, followed by request for quotations, preparation of comparative statements and finally placement of orders by the purchase department. Even though this business process was mapped into the system, details of purchase requisitions already raised by the planning department were reentered in purchase department for initiating the purchase process. In addition, the subsequent process of request for quotations and comparative statements were also prepared manually. It was observed that it was not used by the users due to non familiarisation to the automated processes even after a lapse of one and half years (October 2006 to March 2008) indicating lack of adequate training. Thus, users resorting to manual process even after availability of automated processes resulted in data inconsistency and partial utilisation of the system and thereby increasing the risk of input errors.

The Ministry replied (March 2009) that the Purchase Requisitions entered by Planning Department were not required to be re-entered in the system for initiating purchase process. Ministry further stated that due to non availability of Supplier References information for non-standard parts, manual processes were resorted to and such data were being uploaded in SAP in a phased manner for utilising the same during purchase process.

Thus, the non completion of uploading entire data into the system even after two years resulted in users resorting to manual process.

- (ii) It was observed that the Audit module (Audit Information System) was not activated, resulting in non-utilisation of the module that could have been used effectively as management information system as well as for internal control purposes. The Ministry stated (March 2009) that the implementation of Audit Information System in the upgraded version of SAP will be taken up separately.

3.7.2 General controls

General controls create the environment in which IS applications and related controls operate. If general controls are weak, reliability of controls associated with individual IS applications i.e. application controls get diminished. Following deficiencies in general controls were noticed:

3.7.2.1 The IT policy was under preparation even though the Company has had computerisation efforts for over 30 years.

3.7.2.2 IS security

The information security policy was under preparation.

3.7.2.3 Physical access controls

The physical access to the data centre was restricted through access control device and door lock. The access control system consists of reader to permit access based on employee identity card, magnetic lock and controller that record every entry. For easy access during working hours, the door lock was kept open. It was seen that the video camera was not commissioned. The log files of access control device were not maintained to monitor unauthorised access. Also no review of access authorisation was evaluated regularly to ensure the validity. Considering the confidentiality of data in the system relating to defence sector equipment, weakness in the physical access controls exposes the systems and data to unauthorised access.

The Ministry accepted (March 2009) the observations relating to IT Policy and IT Security Policy. The Ministry further stated that the video camera has been commissioned and the installation of an access control system for tracking of access to the system has been planned.

3.7.2.4 Logical access controls

(i) Provision was available in SAP to assign roles and authorisations to different users and to maintain log and audit trail. It was seen that the provision was not customised by the Company. The Ministry stated (March 2009) that provision and facilities in SAP to assign roles and authorisations to different users and maintenance of audit trail were now being used.

(ii) The password policy and data classification was to be prepared and documented. Though the password had to be changed regularly without repeating, the same could not be verified due to absence of data. Generic user names (group user names) were provided and review/monitoring of changing the password on employee leaving the Company was not being carried out. Hence, responsibility and accountability could not be fixed and it increased the risk of unauthorised access to data. The Ministry stated (March 2009) that the user ID system was being revised to take care of audit trails and proper accountability.

(iii) The automatic timeout of idle logons after 20 minutes was extended for the entire server on need basis wherein the transactions could not be completed within 20 minutes. The list of changes to idle timeout was not stored in the system. However, it was seen that SAP had option where the transactions could continue unhindered even though the system went into time out. Thus, the extension of timeout increased the risk of unauthorised access to the system. The Ministry stated (March 2009) that such extensions were allowed only on specific request for a specific period only. The reply is not tenable as that the extension was being provided to the entire server, thereby enabling use by all other users connected to that server. Further, the reply was silent regarding the option in SAP to allow such transactions even during the timeout periods.

(iv) Though the systems connected to SAP and Internet were separated, in the absence of restrictions to upload files with provision to use external hardware (Pen drive, CD drive etc.), there was no safeguards against malicious programs infecting the SAP system. Though as a policy "on access scan" had been enabled in the anti virus software

which slows down the system processing, the users were permitted to change the settings, thereby circumventing the controls.

The Ministry in its reply (March 2009) stated that SAP servers at the Company are Unix based which were immune to viruses. The PCs used for accessing SAP system were only front end systems which can not push viruses to SAP servers.

Though the server was Unix based and protected from virus, the front end systems were window based with facility for use of external hardware and sharing of files. The systems connected to the network were thus not immune to virus. Hence, the circumventing of controls needs to be addressed centrally and the reply is not acceptable.

3.7.2.5 Environmental control

The data centre was located in the ground floor and with partial roofing that had seepage stains indicating seepages during rains. The risk of damage due to water to the server room and equipments in the room could not be ruled out. The Ministry stated (March 2009) that the seepages in communication room have been plugged (January 2009).

3.7.2.6 Network controls

- (i) The Company did not have information on the information assets which could lead to situation where loss of any such assets remains untraced.
- (ii) The connectivity outside Bangalore was established using router. Firewall and intrusion prevention systems were yet to be installed. Hence the system security was under the risk of unauthorised access. Though the connection was secured with encryption algorithm and leased lines, in view of the unused access points remaining open the risk of unauthorised connections to server causing intentional or unintentional damages to the data was still present.

The Ministry stated (March 2009) that the open ports would be disabled in a phased manner and Firewall and Intrusion Prevention System would also be installed.

3.7.2.7 Business continuity and disaster recovery

It was observed that the business continuity plan and disaster recovery plan were yet to be framed and documented. The alternate data centre was set up in Bangalore complex. The Company stated that in view of the data being updated at alternate site using transaction logs and backed up every day, off site storage of tapes were not necessary. The reply is not convincing as in the absence of offsite backup storage, the backup data is also exposed to similar natural risks as that of the original data. This risk is more pronounced in view of the strategic importance of the equipment manufactured for defence supplies.

The Ministry stated (March 2009) that it has been planned to shift the Disaster Recovery site to Chennai by mid 2009 pending which, the backup tapes were being kept eight kilometres away from the data centre in the corporate office.

3.7.3 System design/customisation

The following customisation deficiencies were noticed in audit.

- (i) As per the accounting policy the inventory should be valued on weighted average rate. However, the system was configured to value the inventory at different rates

with reference to corresponding sale orders. This led to valuation of inventory against the Company's accounting policy. Test check of raw materials in one store of Bangalore complex revealed that a certain material was valued at different rates with a difference amounting to Rs.49 lakh.

- (ii) Lack of relational integrity between the materials shown under work in progress (WIP) in material management module and the corresponding status of the material in the production planning module was noticed. System displayed the status of material of one division of Bangalore complex valuing Rs.72 lakh as on 31 March 2008 as raw material while the same items were accounted as work in progress. Also there was a difference of Rs.5.63 crore between the value of raw material in material management module and the value of raw material in the finance module in respect of the same division.

The Ministry stated (March 2009) that the store mentioned against the materials was the store from which it was issued for production order and further stated that the difference of Rs.5.63 crore was due to inter division transfer of material. The reply is not tenable since such misleading depiction of status of the materials could have been avoided by using the designated field to store the location of the material. The reply that the difference was due to internal transfer of material cannot be accepted; as all inter transfers in material management module should get automatically reflected in finance module.

- (iii) Scrutiny of Purchase Order (PO) without value relating to inter divisional transfer revealed that the issue of materials by a division was made with value assigned to the material where as receipt of these materials in the receiving division was made without any value assigned to the material. Lack of relational integrity led to the risk of improper depiction of individual accounts of the divisions. The Ministry stated (March 2009) that the deficiency in the system has now been rectified.

- (iv) Referential integrity

The Company initiates multiple production orders based on a sale order. In the absence of customer indent in case of spares, the production orders were processed based on work order or approval order. On completion of sale, all corresponding production orders should be closed automatically. The absence of referential integrity between sale order and production order which is essential to ensure integrity of data resulted in data inconsistency, incorrect valuation of raw material and manual intervention. This increases the risk of incorrect data being processed and accounted as illustrated below:-

- (a) The value of the raw materials differed among account schedules, purchase price, store ledger and pricing entry. The Company stated that the variations were due to changes in duties, taxes and material value between dates of placement of order and account of material upon receipt. The Ministry endorsed (March 2009) the reply of the Company. The reply is not tenable since being an integrated system any changes in one module should have been reflected in other related modules.
- (b) The status of material worth Rs.1.02 crore were shown as 'finished goods' as on 31 March 2008 even though the materials had been sold in March 2007.

- (c) Test check of major completed sale orders revealed that out of six sale orders selected, against three sale orders the production orders were not closed (May 2008). Hence, these were still shown under WIP and manual entries were resorted to effect value reduction (Rs.2.36 crore) in WIP as at 31 March 2008. This issue was also discussed in the earlier Audit Report no.4 of 2005 of the C&AG of India.

The Ministry stated (March 2009) that necessary checks have been incorporated (July 2008) to close production orders before issue of material to finished goods and also to close the corresponding production orders before delivery of materials.

- (d) Out of 3702 production orders reviewed, 177 were created without linking to any authorised orders. The Company while agreeing with the observation replied that now a check has been introduced so that production orders can not be created without account assignment. The Ministry endorsed (March 2009) the reply of the Company.
- (v) The system was not designed to adjust the advance payment made immediately on receipt of material. This resulted in over lapping of accounting entries of both debiting and crediting inventory account and wrong depiction of accounting status of payment as advances. On test check in five POs it was observed that the advance payment of Rs.1.40 crore (by Letter of Credit or bank payment) were not treated as payment on receipt of material and also the items were taken to inventory without quality inspection and acceptance.
- (vi) The advances paid upon placement of order, are to be proportionally adjusted against receipt of material in a staggered manner. However, the system was not designed accordingly and the entire advances alone could be adjusted. This led to overstatement of current assets and current liabilities bearing an impact on the financial accounts. On test check of four cases it was observed that advances and sundry creditors were overstated to the extent of Rs.1.09 crore and on being pointed out by Audit, the Company passed rectification entries to correct the unadjusted advances. The Ministry accepted (March 2009) the deficiency and attributed it to manual interventions during the adjustment of advance payments including L/C payments.
- (vii) The business rule of the Company regarding sub-delegation of powers based on value for various activities (release of purchase/sale orders) was not mapped into the system. The automated work flow available in the system was also not yet activated. This had the risk of irregular release of POs. The Ministry stated (March 2009) that a system for release of POs as per delegation of powers was being configured.

3.7.4 Mapping of business rules

As per the accounting policy of the Company, the WIP should be valued at actual cost or net realisable value of the corresponding sale order to which the material costs are being booked, whichever is lower. However, it was observed that the net value of WIP exceeded the net realisable value amounting to Rs.1.44 crore. In reply the Company stated that during migration, WIP was uploaded linking it to one sale order even if it pertained to more than one sale order of the same project. The reply is not tenable since

it violates the accounting policy and valuation of WIP should be linked to the corresponding sale order under which the cost was being booked. The lack of control to restrict the quantity and value of material in WIP to the corresponding sale order resulted in overstatement of WIP.

The Ministry stated (March 2009) that the case projected was one off case that had occurred due to difficulty in migration of data from legacy system to SAP which had varying business logic. The reply is not tenable since while migrating the data, the Company failed to map the business rules in the system. The Company also did not incorporate appropriate control to restrict the quantity and value of material in WIP to corresponding sale order. Hence it could not be treated as one off case

3.7.5 Data migration

- (i) On completion of migration, the uploading option should be closed as a security measure. However, it was observed that the initial upload account was operated during the year 2007-08 in 77 materials for transaction worth Rs.1.27 crore using general user authorisations. This indicates that the data was not complete and also exceptional transactions were transacted by the general users.

The Ministry accepted (March 2009) the correction of the migrated data in due course and attributed the cause for such mistakes to voluminous master data and multiple legacy systems that were in operation before SAP. The reply is not tenable as audit observed the uploading option was open to general user even after 'go live' for 18 months in Bangalore complex.

- (ii) During migration, the defective material from the legacy system was taken into SAP as inventory. This was shown as normal material without flagging for defect, even though the option was available in the system. This led to improper projection of stock position which affects the further procurement process. The Ministry stated (March 2009) that this was an isolated case that had happened during the transition from legacy system to SAP.
- (iii) During data migration, finished goods pertaining to more than one sale order were loaded into the SAP system against a single sale order. The system could not restrict total quantity of finished goods against the corresponding sale order quantity. Sample review of two finished goods which were compared with the sale order revealed that the quantity shown as balance in finished goods exceeded the total quantity against the corresponding sale order. The failure to design the system to maintain relational integrity, further led to wrong depiction of finished goods pertaining to a sale order. The Ministry accepted (March 2009) the observations and stated that such errors will not be encountered in the SAP system.
- (iv) It was observed that due to incomplete data migration, the non-moving/slow moving stock report could not be generated from the system. Hence, the Company resorted to manual process which resulted in duplication of work. In response, the Ministry stated (March 2009) that the Company had developed (December 2008) a transaction code to generate a report of the non moving/slow moving stock from the system.

- (v) During data migration, the data was not cleansed and finished goods were not reconciled between system stock and physical stock. The system continued to maintain such data which affected the further production process. In order to rectify the inconsistency, manual entries were passed during finalisation of accounts. The Ministry stated (March 2009) that this error due to data migration was corrected and now the sale order wise WIP is shown on a real time basis.

3.7.6 Input control and validation checks

Input control procedure is to be employed in the system to ensure that all data is received and recorded completely, accurately and without duplication. Validation checks ensure that the data entered into the system is valid. However, it was observed that due to absence of proper input control and validation checks, the data was incomplete and unreliable.

- (i) There was no uniform pattern for coding of material built into the system and this resulted in inconsistent material code entered into the system, even though the coding pattern was incorporated into the system.

The Ministry stated (March 2009) that proper coding of material existed in the system and cases pointed out in audit related to some of the old project part numbers, which were not as per standard numbering system. The reply is not acceptable since the inconsistent pattern was being continued in the system and the Company had not corrected it as of March 2009.

- (ii) On analysis of the details of 60950 materials from the material master revealed that all particulars were not filled in respect of 12395 materials due to absence of validation check and input control. The blanks in columns like profit centre, purchasing group *etc.*, affected the cost allocation.

- (iii) It was observed that out of 21151 POs, 8263 POs were without any net value, 381 without material code, 7770 without vendor code and 41 without quantity. The Company stated that this exists in case of inter Company stock transfers. Even in such cases division code should be provided against vendor code and materials should be transferred with actual cost as division wise accounts were prepared. The non incorporation of the same affected allocation of cost and the accounts of the units.

The Ministry replied (March 2009) that action has been taken to book the transferred material at the cost of the sending plant and errors noticed would not occur in future.

- (iv) The value of one material with description 'wire' had been wrongly captured as Rs.7.01 crore against the actual value of Rs.0.61 lakh. It was seen that there was no supervisory authorisation to ensure the correctness of input data at operational location. This led to over valuation of stock. Further, the system was not configured to restrict the value of the inventory to the procurement cost. The Ministry replied (March 2009) that the error has been rectified. It is however reiterated that necessary checks should be built in to the system to avoid such occurrences in future.
- (v) On receipt of invoice for the imported materials, the exchange rate should be used from the exchange rate table stored in the system. However, it was noticed that

the system did not automatically adopt the rate and allowed manual entry. The lack of inbuilt validation check to link with the table and consequent manual intervention led to wrong valuation of a material at Rs.14 lakh *per* unit, against procurement cost of US\$ 400 (Rs.15000 approx.).

The Ministry accepted (March 2009) manual intervention leading to error in valuation and stated that the same had since been rectified. Even though the said cases were rectified, no checks were employed in the system to avoid such occurrences in future.

- (vi) The system was configured to allocate the labour cost to WIP whenever labour was booked. However, it was observed that the labour cost was not allocated to WIP as and when it was incurred. This had the risk of under valuation of WIP and also the labour cost being charged off as expenses, contrary to the accounting policy of the Company; and
- (vii) The system was designed to block duplicate entries of vendors. However, inconsistency in pattern of data entry led to duplicate vendor codes, which led to risk of inconsistent order placements and payment tracking for the vendors.

The Ministry accepted the audit observation and stated (March 2009) that though the system has a manual search provision to avoid duplicate vendor codes, the system could not prevent duplicate vendor codes due to manual errors.

3.7.7 Non monitoring of service level agreement

The minimum service level of 99 *per cent* was to be provided for wide area network connectivity and penalty was stipulated for service below minimum. However, the payments were made without confirming the performance which had the risk of making extra contractual payment.

The Ministry stated (March 2009) that action is being initiated to monitor the performance before making payment.

3.8 Conclusion

The Company dealing in strategic defence service sector, decided to implement SAP as a state of art technology with the objective of having organised information online. Failure to design the required controls in the system, inappropriate customisation, lack of input controls and 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. Consequently the Company still depended on the legacy system and resorted to manual interventions in the current system. Further, deficient physical access controls, logical access controls and network controls made the system vulnerable to unauthorised access to data. Inadequate use of the system coupled with the manual interventions and weak security controls exposed the system to manipulations, unauthorised use and led to the risk of unreliable data.

3.9 Recommendations

The Company should implement the following to optimise the benefits from implementing the SAP system:

- Formulate and implement Information system policy and Information security policy.

- Adopt business continuity and disaster recovery plan and establish the off site data center at the earliest.
- Establish procedure for periodic review of master and transaction data for integrity and reliability.
- Appropriate controls to be employed to depict correct value of inventory in the accounts.
- Strengthen validation checks and internal control procedures.
- Ensure that all automated features in the software are properly utilised to reap the benefit of SAP and manual interventions to be minimised.

MINISTRY OF PETROLEUM AND NATURAL GAS

Chapter: IV

Biecco Lawrie Limited

Integrated IT System

Highlights

Absence of proper System Requirement Specification and User Requirement Specification resulted in maintaining of asset accounting, certain sales activities, job costing *etc.*, out side the system.

(Para 4.6.2.1)

Absence of referential integrity in the system resulted in lack of data integrity in respect of stocks, purchase and receipt of materials *etc.*

(Para 4.6.2.2)

Absence of password policy and non availability of logs rendered the system insecure.

(Para 4.6.3)

Lack of input and validation controls resulted in incomplete, inaccurate and unreliable data.

(Para 4.6.4)

4.1 Introduction

Biecco Lawrie Limited (Company) is a public sector enterprise under the administrative control of Ministry of Petroleum & Natural Gas, Government of India. It is engaged in manufacturing and repairing of electrical equipments, Lubricating Oil Blending Operation and Marketing and project work of Electrical Turnkey Projects, Hydel Power Stations and Electrical Power Stations. The Company is carrying out its business activities from two locations in Kolkata (a) Switch-gear works at Hide Road and (b) Corporate Office and Electrical Repair Works, Projects and Petroleum Products Unit at Mayurbhanj. In addition, the Company has Sales offices in Kolkata, New Delhi, Mumbai, Chennai and Lucknow. During 2005-06 to 2007-08, the Company earned profits of Rs.2.21 crore, Rs.2.31 crore and Rs.3.22 crore respectively.

4.1.2 Objectives of IT system

The Company started computerisation in 1993-94. In 1995 a separate Information Management (IM) Division was formed with the following broad objectives:

- (i) Create infrastructure of hardware, networking and software.
- (ii) Prepare and monitor Master Plan of action for business process computerisation in line with corporate plan of the Company.
- (iii) Design, develop and implement computerised integrated business modules through in-house resources.

4.1.3 IT infrastructure

The IT system was operating on HP-UNIX and the application modules are based on Oracle 8.0.4. The Company was in the process of upgrading its Oracle database from Version 8 to 10g. The computerisation was managed by the Information Management (IM) Division headed by a Deputy General Manager. Till 31 March 2007, the Company incurred an expenditure of Rs.1.62 crore on computerisation. To computerise its business processes, the Company developed several modules*. All these modules, barring Accounting & Financial Management System developed by an outside agency Sascon Private Limited, were developed in-house.

4.2 Scope of audit

The scope of audit was limited to an assessment of the IT controls, mapping of business processes into the system and functioning of the accounting & financial management system, purchase & inventory management system and costing system.

4.3 Audit objectives

The main objectives of audit were:

- (i) To analyse the achievement vis-à-vis the objectives of computerisation.
- (ii) To assess the adequacy and effectiveness of IT controls.
- (iii) To evaluate the planning and implementation of Business Process Reengineering.
- (iv) To assess the comprehensiveness and effectiveness of the modules examined.

4.4 Audit criteria

The criteria used for audit were the provisions of the Company's Purchase manual and Accounting Policies.

4.5 Audit methodology

The methodologies adopted were as follows:

- (i) Study and analysis of relevant records;
- (ii) Discussion and interaction with departmental functionaries and user;
- (iii) Collection of data through questionnaires and requisitions; data extraction from tables and standard in-house reports; and
- (iv) Analysis of data using CAATs*.

4.5.1 Limitations

During the conduct of audit, the following limitations were faced by Audit:

- (i) Log files to assess access controls were not available in the system; and

* Accounting & Financial Management System, Purchase & Inventory Management System, Manufacturing / Engineering System, Payroll & Wages System, Marketing & Sales, Costing- Standard Cost & Actual Job Cost, Spares System, Decision Support System, Personal Information System, Administrative System, IT Information System and Workflow application & Internal Mailing System.

* Computer Aided Audit Tools

- (ii) The Cost Ledger was not finalised during the period Audit was conducted. As a result detailed analysis in respect of total cost booked under different heads such as Material, Labour and Overhead could not be reviewed.

4.6 Audit findings

4.6.1 IT strategy, planning and policies

Computerisation should be preceded by the development of a properly documented 'Information Technology Strategy'. Further, for proper planning and implementation, active involvement of the top level management through an IT committee was necessary. It was, however, observed that the Company had not prepared a documented strategy nor constituted an IT committee before computerising its activities. While accepting that no long term strategy was framed, The Management stated (July 2008) that this was due to major technological changes happening in the field of Information Technology at that point of time. In this regard Audit is of the view that formulation of IT strategy and constitution of an IT committee was to facilitate preparation and monitoring of master plan of action for computerisation of business processes.

4.6.2 System design and development

4.6.2.1 A System Development Life Cycle (SDLC) specifying the System Requirement Specification (SRS) and User Requirement Specification (URS) specific to the business requirements to be addressed by the IT system should be prepared in consultation with users of all functional branches. It was seen that the Company had neither adopted a SDLC nor the URS was defined. Further, it was observed that the Company has neither documented the details of each module developed nor framed any change management policy for ready reference for future users. In the absence of documentation, it could not be ascertained whether all user requirements had been taken care of and business processes mapped into the system. In the absence of proper SRS and URS, following deficiencies in system development were observed:

- (i) The fixed assets register, its accounting and calculation of depreciation thereon were prepared in excel spreadsheet and subsequently incorporated in the system's final accounts. Since the process required for generating the fixed asset register was maintained outside the system the risk of errors increased. The Management stated that issues relating to the fixed assets register would be resolved during migration to 10g Version;
- (ii) The sales activities of all Divisions except the Switchgear Division were prepared outside the system and then imported into the Finance module. Further, the data generated from the Purchase and Inventory were not directly linked with Finance module but fetched manually. Such manual intervention increases the risk of missing data and wrong data capture in the module along with delayed availability of data. Consequently, the figures in the final accounts might not be depicted correctly. For instance it was observed that :
 - (a) The Switchgear Unit raised 605 invoices for panels during 2007-08. Review of the database, however, revealed that till March 2008, invoices only up to February 2008 were available. Further, out of 527 invoices raised by Switchgear Unit up to February 2008, four* invoices were not

* 01-01-9028, 01-01-9029, 01-01-9033 & 01-01-9040

found in the Finance module and in another four* out of the 523 invoices, the total amount in the Finance module did not match the invoice value of the original invoices. As regards missing invoices, it was noticed that these invoices related to inter-unit stock transfer of switchgear panels from Hide Road works to Lucknow Sales office. On further analysis it was seen that a customer, New Bharat Electric was billed twice for Rs.11.58 lakh for the same sale which indicated that the control over invoices in respect of stock transfer items were not incorporated in the system.

- (b) Thirteen invoices amounting to Rs.8.24 lakh raised in 2006-07 were entered in the system during September 2007 with the date 1 April 2007, as pointed out in Para 4.6.4.4 supra. As a result, sales have been booked in the year 2007-08 instead of 2006-07.
- (c) Out of 1815 POs of switch gear units, 23 POs entries were not available in the Finance module. Further, total order value in respect of 47 items under different POs did not tally with the order value in the Material module of Switchgear Unit. Similarly out of 850 records of electrical repairs unit, 5 PO entries were not available in the Finance module.

The Management stated (July 2008) that the invoice/PO data were transferred to Finance module whenever required. The Management further contended that at any point of time, analysis of outstanding PO, value of material received, *etc.* was available. The Management reply was not acceptable since without purchase/invoice data, the debtors/creditors position at any point of time would not be available; and

- (iii) Details of jobs (manufacturing) completed was not captured in the system though such provision was available in the Cost Ledger. As a result, data relating to Finished Goods and Work in progress at any particular date were not available through the system. Since these data was compiled manually, the objective of online processing through the system was defeated. While accepting the observation the Management stated that necessary changes in the system would be made.

4.6.2.2 In a relational database system*, data integrity is ensured with the help of referential integrity so that any changes in the data will have a cascading effect on all the related records. Audit analysis of the records of the Switchgear Division revealed that data integrity between different modules and within the modules was not enforced as evident from the following cases:

- (i) Stock records of Switchgear Division revealed that in case of 31 items, though closing quantity was nil the value of the stock was positive. However, in the Store ledger the quantity and value of the same items were shown as zero. Similarly, value of 250 items in the stock records of the Switchgear Division was different to the value shown in the stock ledger. Further, in respect of 76 items, the quantity of stock as on 31 March 2008 as per stock records of Switchgear unit does not tally with the quantity shown in the stores ledger;

* 01-01-0231, 01-01-0232, 01-01-0278 & 01-01-0476

* A relational database is a set of relations that help to organise and structure the data, in addition to forcing the database to conform to a set of requirements as per business rules encoded in the system

- (ii) Analysis of the PO details revealed that during the year 2007-08, the Switchgear Unit placed 1815 POs. It was observed that value of POs depicted in the table was not giving a true picture of value of the POs, as even though the PO quantity for 23 items was nil, order value existed in the database. It was further observed that the ordered quantity of 380 items in the Goods Receipt Note (GRN) records did not match with their PO. Incorrect ordered quantity in the GRN led to receipt of more material than the ordered quantity as was observed in the case of 68 items. Thus, there was risk of unauthorised procurement of materials. The Management stated that zero quantity POs have arisen due to amendment of those orders. The Management also stated that the quantity has been amended but not updated in the system which will be rectified. The Management's reply corroborated that receipt of material and consequent payment of bills were not controlled through the system; and
- (iii) Customers with multiple locations are assigned multiple customer codes and all these customer codes are then grouped under a single debtor code. Each customer is accordingly assigned unique debtor code maintained as master records to enable reconciliation of receipts. Data analysis of the invoices raised by the Switchgear Unit, however, revealed that in respect of 48 customers, the debtors' code assigned in the master records differed to those available in the invoice details. Thus, the debtors' codes in the invoices were not linked with the customer master records indicating deficient referential integrity. It was further observed that these debtor codes in invoices were being used in the Finance module for generating debtors' balances which could be unreliable. The Management stated (July 2008) that these errors occurred as the Debtors code in the customer master was not made mandatory and that the same would be taken care of.

4.6.3 Logical access controls

Strong logical access controls prevent unauthorised access to system and ensure data integrity. It was, however, noticed in Audit that there was no documented password security policy and controls such as setting of minimum password lengths and regular password changes. Further, log files in this regard were not made available to Audit. On a query, it was informed that these files were deleted by the annual maintenance contract vendor. As a result, the vulnerability of the system to unauthorised use could not be verified. While accepting that there was no regular password change procedure, the Management contended (July 2008) that good logical access controls were in-built in the system. These controls, as claimed by the Management, were, however, rendered ineffective as they were not implemented through proper password policy and non availability of logs.

4.6.4 Input and validation controls

Input control ensures that the data received for processing is genuine, complete, accurate, properly authorised and entered in time and without duplication. Validation check ensures that the data conforms to the business rules. Therefore, input controls and validation check together ensures the correctness and completeness of data. Analysis of data for the year 2007-08, however, revealed the following:

4.6.4.1 Inconsistent codes and duplicate description in the material master

Analysis of the data of Switchgear Division revealed that proper coding pattern was not followed. Out of 8383 records in the Material Master, 4490 had alphanumeric material codes while 3893 had numeric material codes. Further, analysis of the alphanumeric codes revealed that for 145 items (material description being the same), 427 material codes were allotted. It was therefore evident that for the same material, more than one code was allotted indicating weak input controls which resulted in inconsistent database. The Management stated (July 2008) that both alphanumeric and numeric codes are allowed in the database to identify different groups of items used in different products. The Management's contention was not acceptable as materials of different groups can be better identified by following a properly defined coding pattern. The Management's further contention that availability of descriptions for different material codes in another data table was also not acceptable as analysis revealed that out of 427 material codes having duplicate descriptions, 222 codes items did not feature in that data.

4.6.4.2 Inconsistencies in vendor /supplier master

Analysis of the master files relating to vendors revealed that out of 451 codes, 10 codes had been allotted to 5 vendors indicating existence of duplicate vendors in the database. It was further observed that during the year 2007-08, 11 POs were placed on 2 out of the above 5 vendors but under two different codes and payments made accordingly. Presence of duplicate codes indicated weak input controls affecting financial control. The Management stated (July 2008) that these will be taken care of during migration to 10g Version.

4.6.4.3 Non classification of age wise stores

An effective inventory control system requires stores to be classified under non-moving and slow moving items. It was, however, noticed that there was no such system of classification of stores. It was also observed that the receipt dates and issue dates in respect of 9601 items were not available indicating inadequate input controls. In the absence of such details, categorisation of stores as moving and non-moving was not possible. The Management stated that the items were basically non-moving/ slow-moving and that the blank receipt/ issue dates have been entered at the time of creation of the database when information was not available. The Management's reply indicated that the database was not updated.

4.6.4.4 Existence of duplicate sales invoices

Analysis of the database of the Accounting and Financial Management system revealed that for 270 invoice records, there were 72 sale invoices indicating the existence of duplicate invoices. The duplicate invoices range between 2 to 48 records. Further analysis of the invoices revealed that in 8 cases, same invoice number was generated on the same date for two different customers and 44 duplicate invoice numbers involving 201 records were generated in just one year i.e., 2007-08. The existence of duplicate invoices may lead to distorted debtors' balance. The Management stated (July 2008) that multiple occurrences of the same invoice were due to part payment against an invoice. The Management further stated that in case of advance payment, dummy invoices such as 01-000001 onwards were generated and if there was more than one advance payment in a day, the last digit would change. Thus, duplicate invoices with different dates would be generated. The contention of the Management regarding part payment was not acceptable

as no payments were received against the duplicate invoices which were shown as Original Sales Bills. On the contrary, it was noticed that date of 13 invoices raised during January 2007 to March 2007 had been altered and entered in the system as 1 April 2007. In respect of another invoice, the number had been entered wrongly which proved that both input and validation control were lacking. The Management's further contention of generation of duplicate dummy invoices was also not acceptable as there were instances where same invoice number was created on the same day.

4.6.4.5 Inadequate control over cost booking

Analysis of the Stores issue ledger of the Switchgear Division for the year 2007-08 revealed that out of 38879 records, in 24966 instances the items were issued to Job No. 'XXXXXX' which is a non-existing job. Absence of issue details of 64 per cent of the stock issued during the year of a particular Division gave an incorrect status of the cost booking of items issued. It was further observed that requisitions against jobs like Job No. EX-51344 and EX-513 were accepted in the system and materials issued against the same even though Job No. EX-51344 and EX-513 did not exist. These indicated that proper input controls and validation checks were lacking in the system. The Management stated that the materials are subsequently allotted to different jobs. The Management's reply indicates that the issues are not directly booked to the specified jobs but are done manually increasing the risk of erroneous booking of cost.

4.6.4.6 Monitoring of procurements

An effective purchase procedure followed should ensure timely supply of material as per delivery schedule stipulated in the PO. Data analysis indicated that scheduled delivery dates of the ordered items were not specified in the system. The Management stated (July 2008) that the delivery date field has been made optional due to variance in the product mix and customer requirements and action would be taken after consultation with the purchase department. The Management contention was not acceptable as in most of the POs, delivery date has been mentioned as "immediate" instead of a specific date. Further, in the absence of schedule delivery dates, monitoring of delivery on scheduled dates would not be possible.

4.6.4.7 Costing module

The costing module has been designed mainly to arrive at the cost of each job in the manufacturing process of the Switchgear Unit. The main reports generated in this module were the Cost Ledger and the Stores Ledger. Review of the costing module with reference to issue requisition, bin cards, store related records and generation of sales invoices, however, revealed the following deficiencies:

- (i) One hundred and fifty five sale orders were received by Switchgear Unit for supply of different types of panels. Out of these, 109 sale orders were completed and the total quantity was invoiced. It was, however, observed that the requisitions for materials raised against 47 such orders had not been issued from the stores. This indicated that the materials issued against other jobs were utilised for manufacturing these completed jobs. Due to which job wise costing valuation of Closing Stock and Work in progress would be unreliable. The Management stated that the issue of materials against a requisition is allowed up to three months. However, the fact remained that the costing module would not give the desired results; and

- (ii) The Bill of Materials (BOM) quantity should determine the quantity requisitioned which in turn should determine the quantity issued. To have proper control over the process of manufacturing and booking of cost, issue of materials should be controlled through BOM quantity. It was, however, observed that in 3230 out of 11394 requisitions, the requisitioned quantity was higher than the issued quantity while in 850 cases, issued quantity was more than the quantity requisitioned and no materials were issued against 351 requisitions. Further analysis revealed that in one requisition (No.IS218064) the issued quantity was only one-tenth of the requisitioned quantity. This indicated that the requisitioned quantity was not directly captured from the BOM and manual intervention had been permitted. The Management stated that the occurrence of higher issue against quantity requisitioned may happen due to wrong inputs and that necessary action will be taken.

4.7 Conclusion

The Company undertook computerisation without formulating an IT policy. User requirements were not defined or documented and logical access controls essential to prevent misuse of the system or unauthorised manipulation of data were inadequate. The input controls and validation checks were also weak resulting in the existence of duplicate and unorganised data in the system. Further, deficiencies in system design like non-integration of different modules with finance modules and non-enforcement of data integrity resulted in manual intervention at each stage which rendered the system vulnerable to the risk of incorrect generation of data. As a result, computerisation efforts of the Company failed to fully yield the expected results.

4.8 Recommendations

- An IT strategy should be formulated and an IT committee consisting of representatives of different user departments should be constituted for monitoring the functioning of the IT system by the top management.
- The Company should consider preparation and maintenance of system documents and manuals. Further, the system should be designed in such a way that all the modules should be properly integrated to ensure accuracy of data and generation of correct reports.
- A well defined password policy should be framed and implemented and system of archival of log files should be developed and monitored.
- The Company should consider incorporation of appropriate in built input and validation controls in the system to ensure data consistency.

The matter was reported to the Ministry in November 2008; reply was awaited (January 2009).

Chapter: V

Chennai Petroleum Corporation Limited

RAMCO e Applications System

Highlights

Non integration of the RAMCO e Applications system among various units resulted in manual intervention and led to risk of data entry errors.

(Para 5.4.1)

Deficient user training and insufficient monitoring led to improper closing of the system and non utilisation of swipe cards to gain entry and exit out of the system.

(Para 5.4.2)

Procurement processes were not linked and led to absence of audit trail in the system.

(Para 5.4.3.2)

Lack of input controls and validation checks made data incorrect, incomplete and unreliable.

(Para 5.4.4)

The system was not utilised effectively for inventory management.

(Para 5.4.5)

5.1 Introduction

Chennai Petroleum Corporation Limited (Company) was established in the year 1965. The Company has two refineries one at Manali with a refining capacity of 9.5 Million Metric Tonnes Per Annum (MMTPA) and another in Cauvery Basin at Nagapattinam with a capacity of one MMTPA. The main products of the Company are Liquefied Petroleum Gas, Motor Sprit, Superior Kerosene, Aviation Turbine Fuel, High Speed Diesel, Naphtha, Bitumen, Lube Base Stocks, Paraffin Wax, Fuel Oil, Hexane and Petrochemical feed stocks.

The Company introduced VAX (Virtual Address Extension) system in the early 1990s using programmes developed in house which were independent and not integrated. Hence the Company proposed to integrate these systems using Enterprise Resource Planning (ERP). The RAMCO e Applications system was selected on the advice of CMC Limited and implemented during June 2002 at a total cost of Rs.3.77 crore. RAMCO e Applications system uses client server architecture with MS-SQL 2000 as database and Windows 2000 as Operating System.

5.2 Audit objectives

The main audit objective was to find out whether the implemented ERP system had achieved the main objectives of the Company viz. generation of single point online Management Information System (MIS), integration of the various business processes etc., and to check the accuracy, completeness, integrity, confidentiality and reliability of data in the inventory module of the system.

5.3 Audit methodology

The backup of data (up to December 2007) provided by the Company was used to study the data structure relating to inventory modules and the data was analysed using SQL and MS Access. Audit enquiries were further issued and replies obtained to confirm the results of the analysis. Discussions were also held with users from concerned departments.

5.4 Audit findings

5.4.1 Implementation of ERP system

The Company is using RAMCO e Applications system at both the refineries. However, these two units were not integrated online. The General Ledger Balances and Trial Balance generated at Nagapattinam Refinery were being forwarded to the Company for preparation of Financial Statements using MS EXCEL.

Further, the Company has ten leased locations to store their products and monitor their sales. These locations were not having RAMCO e Applications system. The fortnightly sales data received from such locations were being manually fed into the system.

Non-integration of systems at refineries and non availability of RAMCO e Applications system at store and sale locations thus had resulted in non availability of information on “real time” basis. It also had manual interventions which ran the risk of data entry errors which could affect the integrity of the data.

The Management stated (July 2008) that an Oracle based system was provided to the leased locations and data downloaded from these locations were uploaded into RAMCO e Applications system at regular intervals, as the system requirements for various sales locations were varied and customisation of RAMCO e Applications system to the specific requirement required many changes. However, non customisation of RAMCO e Applications system at the leased locations and non linking of the systems at two refineries necessitated manual interventions leading to risks of data entry errors.

The Ministry assured (February 2009) that the three leased locations and CBR would be fully integrated in 2009-10 when the Company moves over to SAP.

5.4.2 Physical and logical access control

The Company formulated an IT security policy document in February 2009, after being pointed out in Audit (July 2008). However, the following control weaknesses were observed in the practice adopted by the Company.

5.4.2.1 User identities (IDs) were not linked with Employee ID resulting in absence of any control ensuring accountability. The Ministry stated (February 2009) that the user IDs were currently assigned and linked with employee IDs. However, as of March 2009, the linking of user IDs with employee IDs was in progress.

5.4.2.2 The system captured NULL value whenever there was abrupt shutdown either due to power failure or due to improper shutdown by the users. Scrutiny of database revealed that in respect of 208 users, such improper shutdown was done more than 100 times. This indicated deficiencies in user training and subsequent monitoring of user’s operating performance. The Ministry accepted (February 2009) the deficiencies and stated that users have been imparted necessary training and strictly advised to follow logout procedures.

5.4.2.3 The entry into and exit out of the premises were controlled through a smart card enabled access control system. On review of the data base, it was observed that the employee wise entry details (IN* entries) did not match with the corresponding exit details (OUT* entries) defeating the primary objective of access control. The OUT entries exceeded the IN entries in respect of 827 employees and IN entries exceeded the OUT entries in respect of 820 employees, the excess in both cases ranged from two to ten *per day*. Further analysis of data revealed multiple swiping of the smart cards at the time of entry as well as exit, non use of swipe cards to secure entry or exit each time indicating inadequate training or failure of the system.

The Management stated (July 2008) that in respect of employees who were in night shift, the number of IN entries would not match with the number of OUT entries as the employee out time was recorded in the next day only. The reply is not acceptable because the difference between IN and OUT entries in respect of all the above cases was more than one per day and open IN or OUT entries indicated the risk of unauthorised entries as well. The Ministry accepted February 2009) the audit observation and stated that possibility of entry or exit of more than one person through the doors existed where turnstile gates were not provided. It further added that employees have been suitably advised to ensure swiping at the time of every entry and every exit.

5.4.3 Design deficiency

5.4.3.1 Cancellation of indents after receipt of material

Purchase Orders (POs) were manually linked to the respective Indents. When the POs were short closed due to some reasons, it was required to short close the indents also as otherwise these indents would be shown as pending in the system. However, it was observed that no such provision was inbuilt in the system. Hence, the corresponding indents against short closed POs were manually cancelled in the system. This resulted in lack of audit trail. An analysis of database revealed 1960 such indents were cancelled against which procurement to the extent of Rs.30.37 crore has since been made. Thus, non existence of provision to short close the indents could result in misleading MIS reports. The Ministry stated (February 2009) that introducing the option of "short closing indents" would be explored during the up gradation of the current ERP system to My SAP system.

5.4.3.2 Referential integrity

While preparing PO, the user has to manually link the Purchase Request (PR). It was observed that in many cases such link was not created resulting in absence of audit trail as discussed below:

In respect of 5128 duly authorised indents, the PO details could not be generated and audit trail could not be established. In respect of 2760 POs, indents were not linked to the POs. Hence it could not be ensured that all the PRs were processed, POs were issued and all POs issued were based on valid indents. The Ministry stated (February 2009) that "PO-PR Coverage" option was introduced at a later stage and hence earlier cases were not linked. It further added that a mandatory logical check was introduced during

* While entering into the premises employee has to swipe the smart card and system will record one IN entry against the employee number

* While making an exit, the smart card is swiped again and the system will record one OUT entry

November 2008 to ensure PO-PR coverage. It was, however, observed that even PO's issued during January/February 2009 were not linked with indents.

5.4.4 Input controls and validation checks

Input controls and validation checks ensure completeness, correctness, accuracy and integrity of the data. Data analysis revealed the following deficiencies in the controls.

5.4.4.1 On review of database, it was observed that the dates indicating chronological events were not entered in many cases or were filled up with unrealistic dates as detailed below:

- (i) Date of authorisation was not captured in 25 PO's (246 stock items) issued between 21 January 2002 to 20 August 2007;
- (ii) Date of creation of stock code was not captured for 65 stock items;
- (iii) Date on which the status of material was classified as "On Demand", "Stock", "Obsolete" etc., was not captured in respect of 49553 items and in respect of 33882 items the system default date 1 January 1900 was captured; and
- (iv) Date of inspection of goods received was not captured in 9474 records.

Thus, lack of input controls made the data incomplete.

The Ministry stated (February 2009) that necessary controls would be inbuilt with the help of RAMCO e-Applications system and during upgradation of the system to My SAP.

5.4.4.2 As per the Company's policy, as and when it was decided to replace equipment or upgrade a material in the plant, the spares of the equipment and the stock of such materials in stores were classified as "No-Further Order (NFO)" to prevent initiation of automatic procurement action. Whenever, the equipment was removed from service or the material was upgraded, the related spares/materials in stock were identified as "Obsolete". However, it was seen that, when such materials were required by user departments again, these items were reclassified as stock items or on demand items enabling placing of Indents and POs against them.

Analysis of data base revealed that due to non updating of material status date, 968 items already identified as NFO and for 104 items already identified as obsolete were procured after such identification. The Ministry stated (February 2009) that the status of material was dynamic and continuously changing as and when modification took place. It was, however, observed that there was no provision in the system to maintain a history of such changes to identify the status of a stock with reference to a particular period which also resulted in lack of audit trails.

5.4.5 Inventory control

5.4.5.1 Re-Order, Re-Order Quantity (ROQ), Maximum, Minimum and Safety levels in respect of stock items were fixed as per the Material Management Manual of the Company. The manual prescribed one year's consumption as ROQ and six months consumption as Re-Order Level (ROL). The Company has fixed ROQ for 17085 out of 168745 stock items. It was observed that no controls were available in the system to validate the PO quantity either with respect to the ROQ captured or with the actual consumption of previous 12 month while generating PO through the system.

Data analysis revealed that in respect of 730 stock items procured between 27 February 2002 and 12 December 2007, procurement in excess of ROQ worked out to Rs.7.18 crore. In respect of materials for which ROQ was not fixed in the system, the excess procurement over and above respective previous year's consumption was Rs.2.84 crore (227 stock items), Rs.1.58 crore (192 stock items) and Rs.2.23 crore (242 stock items) for the years 2005-06, 2006-07 and 2007-08 respectively.

The Management stated (July 2008) that due to frequent episodes of unit shut downs, periodic turn around and Refinery wide total production management activities, user departments indent, maintenance repairs & operation and consumable material in large quantities were procured which may defy the consumption logic and beyond the stock levels. It was further stated that because of the erratic consumption caused by such indenting and receipt of material, it was not advisable to revise the stock levels, which could lead to accumulation of non moving inventory.

Further, the Ministry stated (February 2009) that the consumption pattern during previous years were studied to minimise the inventory level.

As the periodic turnaround and TPM activities were preplanned activities, the Company could have fixed Re-Order Quantity for better inventory management.

5.4.5.2 Inventory holding in excess of maximum level

The Company's policy did not allow the maximum inventory holding more than the sum of ROL and ROQ (six months consumption + one years' consumption) fixed in the system. However, a review of stock balances of the years 2005-06, 2006-07 and 2007-08 revealed that, the stock holding was in excess of the maximum level resulting in blocking up of working capital to the extent of Rs.7.80 crore (2546 stock items), Rs.14.73 crore (2425 stock items) and Rs.13.08 crore (3096 stock items) respectively.

The Ministry stated (February 2009) that the consumption of project and Refinery spares was not regular and fixing norms was therefore practically not possible. Due to frequent occurrence of unit shut downs, periodic turn around and Refinery wide TPM activities, user departments indent MRO and consumable material in large quantities which would defy the consumption pattern. The reply was not convincing since materials like consumables and MRO items, utilisation of which could be planned in advance, constituted more than 70 per cent of the overall excess holdings and as discussed earlier, the periodic turnaround TPM were planned activities; the Company could have fixed norms for such items.

5.4.6 Other point of interest

The status of 441 POs issued between 1 April 2002 and 31 March 2006 against which no material was received and 337 POs issued prior to April 2006 against which more than 90 per cent of ordered quantity was received still remained open. Keeping the PO as open had the risk of entry of further transactions on such orders. The Ministry stated (February 2009) that a user friendly query has been developed recently and made operational in order to scrutinise such POs. However, it was seen that such facility was not used to close the PO's.

5.5 Conclusion

Absence of on line integration of Refinery at Nagapatinam and ten leased sales points necessitated manual intervention for loading data from these units into RAMCO e

Applications system even after six years of implementation. As such trial balance could not be generated from the system on real time basis. It further compromised the data integrity due to manual intervention. The input control and validation checks were deficient and the integrity of data could not be assured due to deficiencies in access controls. The Company also did not utilise the application for effective inventory control, leading to excess procurement and higher inventory carrying cost. Thus, the Company could not utilise the RAMCO e Applications system to achieve the stated objectives.

5.6 Recommendations

- The Company should integrate all the systems to have an online single point MIS for effective control over and to avoid continued dependency on manual controls.
- Input and validation controls need to be built into the system to make the data complete, accurate and reliable.
- The Company should strengthen the logical and physical access control and inbuilt audit trails in the system.
- The Company should evolve a suitable IT security policy.
- The procurement processes like indents, PRs, POs *etc.* need to be linked with each other for better monitoring.
- The Company should utilise the system effectively for better Inventory Management.

CHAPTER: VI

GAIL (India) Limited

Financial Accounting module of SAP

Highlights

Credit management was not exercised properly in absence of credit master data for customers.

(Para 6.6.1.3 and 6.6.2.1)

Repetitive payments (upto 61 times) were made to vendors though these had been classified under One-time vendors.

(Para 6.6.3.2)

Defective customisation in respect of depreciation on assets resulted in incorrect depreciation.

(Para 6.6.3.3)

Imperfect user roles and authorisation resulted in users having access to critical combination of functions; system sensitive and irrelevant transactions.

(Para 6.6.5.1 and 6.6.5.2)

6.1 Introduction

GAIL (India) Limited (Company) was incorporated in 1984 as a principal gas transmission and marketing company of India and has since expanded its activities into

exploration, production, processing, transmission, distribution and marketing of petrochemicals, Liquefied Petroleum Gas and telecommunications.

Computerisation in the Company began in 1986 with the installation of minicomputers and implementation of in-house developed Payroll and Financial Accounting Systems. The Company implemented SAP ERP solution in August 2005 at an estimated cost of Rs.55 crore.

The Company covered its entire business through nine integrated SAP Modules*. The SAP R/3 release version 4.7C has been installed on Solaris 9 operating system and platform and Oracle is used as database management system.

6.2 Scope of audit

Audit reviewed the general ledger, accounts payable, accounts receivable and asset accounting in Finance and Controlling (FICO) module and e-Security issues. Audit examined the transactions, system reports* and SAP Tables at Infohub, Noida.

6.3 Objectives of audit

The main objectives of audit were:

- (i) To assess whether the FICO Module of SAP was customised as per the Company's requirements.
- (ii) To check the adequacy and completeness of mapping of the Company's transactions in FICO Module as per business and managerial requirements.
- (iii) To ensure that the information/documents/reports generated through SAP were accurate to meet all managerial, customer and statutory requirements.
- (iv) To ensure that the roles and authorisation were properly defined and duties were segregated rationally.
- (v) To assess the adequacy of e-Security measures adopted by the Company.

6.4 Audit criteria

The audit criteria included:

- (i) The Company's policies, manuals and managerial requirements;
- (ii) Industry rules and procedures and Government guidelines;
- (iii) The Company's user policy and job profiles of users; and
- (iv) Best practices in IT development and implementation.

6.5 Audit methodology

Audit was conducted by adopting the following methodology:

- (i) Discussion/correspondence with the Management; and

* *Material Management, Sales & Distribution, Plant Maintenance, Project Systems, Finance & Controlling, Human Resource, Production Planning, Quality Management and Customers Relationship Management*

**System Reports: Standard SAP reports and Company's customised reports*

**Computer Aided Audit Techniques*

- (ii) Data extraction using standard and customised SAP Reports and analysis thereof using CAATs[♦].

6.6 Audit findings

FICO module of SAP handles all the financial transactions of the Company. This module is used for maintaining books of accounts, Asset management and preparation of final accounts including balance sheet, profit & loss accounts, *etc.* Test check of transactions, balances and reports revealed following observations on accounts receivables, accounts payable, general ledger accounting and asset management:

6.6.1 Input controls

Integrity of data in any system rests heavily on the controls over input. The objective of input controls is to ensure that the data received for processing are complete, not previously processed and entered without duplication. Weak input controls may increase the risk of entry of irrelevant, incomplete, duplicate and redundant data. Following are the observations regarding input controls:

6.6.1.2 Vendor master

The Company is maintaining vendor masters for its Material Management and accounts payables transactions. It is essential that one vendor should carry one vendor code. The Company was maintaining 44039 vendor master records, review of which revealed the following:

(a) Purchase orders placed on vendors with incomplete details

There were 94 vendor records carrying only the name and city and no further information about their address, telephone *etc.* On 7 vendors out of these 94 vendors, 11 Purchase Orders (POs) worth Rs.119.41 crore were placed during the period July 2005 to November 2007. The management assured (December 2008) to take corrective action.

(b) Duplicate vendors

There were 161 vendors carrying 333 vendor codes. Out of these, POs (15 Nos.) aggregating Rs.8.03 lakh were placed on four vendors carrying eight vendor codes during February 2006 to April 2008.

The management assured (December 2008) to take corrective action.

6.6.1.3 Missing credit master data

The Company was maintaining credit data of its customers, which includes credit limit and actual credit extended there against. It was seen that the credit data was not available for 5188 customers out of 9839 customers. Out of the above, 797 customers were carrying outstanding balance of Rs.1302.37 crore ranging from Rs.4 to Rs.115.25 crore.

Thus, the system could not be used to exercise credit management.

The Management stated (December 2008) that the Credit & Risk Management has only been activated in SAP system for Petrochemical (PC) and Liquid Hydrocarbon (LHC) customers as per the business requirements. The reply is not acceptable as the Company has failed to use an available feature of the system and moreover customers other than PC and LHC are also having credit master data in contravention to the reply.

6.6.1.4 Multiple vendors with same bank account

It was seen that there were 76 vendor records attached with 37 bank accounts; indicating risks of irregular payments.

The Management stated (December 2008) that it had prepared an exception report to identify vendor records with similar bank records. The reply, however, is not acceptable as during the verification, it was found that 21 bank accounts were attached to 43 vendors, while the report only pointed out 6 accounts with 14 vendors.

6.6.1.5 Data entry in general ledger (GL) accounts

Incorrect posting in GL accounts

During test check of general ledger accounts, it was found that incorrect entries were also posted in general ledger accounts. It was seen that:

- (i) In GL account 6115620-Water Charges Township, one entry valuing Rs.5.46 lakh related to Electricity bill of Vijaypur was posted;
- (ii) In GL account 6112920-Salary-Casual Labour-India, one entry valuing Rs.1.95 lakh related to 'Expense for GM ED Directors' was posted;
- (iii) In GL account 6199380-Other Exp- Bank Charges, one entry amounting to Rs.1.41 lakh pertaining to courier charges was debited; and
- (iv) In GL account 6199010-Other Exp-Demurrage and wharfage charges, one entry amounting to Rs. 0.25 lakh pertaining to telegram expenses was posted.

Absence of input control and supervision to ensure recording of transactions in the intended accounts resulted in defective Management Information System (MIS) and incorrect expenditure details, at the same time defeating the purpose of having designated GL accounts.

The Management assured (December 2008) to take corrective action.

6.6.1.6 Non-use of narration field of transactions

The data fields enabling transactions in SAP also have a provision to capture narration relating to transactions. This helps in bringing more objectivity and clarity in GL accounts.

During review, it was observed that entries were posted without compulsorily capturing the narration, thus making it difficult to trace the objectivity of the transaction.

Lack of input control and supervision to ensure the capture of narration compulsorily and correctly resulted in incomplete recording of transaction details and incomplete MIS.

The Management stated (December 2008) that majority of the entries in the financial books are autoposting and accordingly the narration feature has not been mandatory. The reply is not acceptable as the use of the field can atleast be made mandatory for non-auto postings and the issue could be explored with SAP.

6.6.1.7 Assets carrying negative value

As per the general principles of asset accounting, assets should not carry negative balances, since that will turn them into liabilities rather than assets. During review of

assets for the year 2008-09, it was found that two assets were carrying negative balance aggregating to Rs.2.40 lakh.

The absence of input control in the system to disallow negative posting of assets resulted in defective MIS and wrong asset accounting, which led to misrepresentation of assets in the financial statements of the Company.

The Management stated (December 2008) that the assets referred are assets under construction and hence are carrying negative balance. The reply is not acceptable since assets under construction could not be taken into books of accounts as “assets” and necessary corrective action is required.

6.6.2. Validation checks

Sound validation checks are vital to the integrity of any system. Placement of validation checks in the system ensures that the data received for processing are genuine, accurate and properly authorised. Lacking validation checks may increase the risk of entry of unauthorised, irrelevant, redundant data. Following are the observations regarding validation checks:

6.6.2.1 Credit extended beyond credit limit

A review of credit management data of customers was carried out and it was seen that the credit extended was not validated from the respective credit limit prescribed. As a result, 307 customers, for whom the credit limit was defined as zero, were extended credit of Rs.308.06 crore. Further, three customers were extended credit of Rs.19.21 crore against a credit limit of Rs.9.83 crore.

Thus, the system could not be used for credit management to restrict the credit sales and rationalise Company’s accounts receivables.

The Management stated (December 2008) that the Credit and Risk management has been activated for PC and LHC customers only as per the business requirements. The reply is not acceptable as the customers referred included customers from LPG (transmission) and natural gas business. Moreover, the credit limit defined in the system has not been used as a controlling measure to rationalise sales thereby defeating the purpose of defining a credit limit.

6.6.2.2 Wrong classification of assets

For classifying similar type of assets in one group, the concept of asset class is used in SAP. Depreciation rate is attached to asset class to charge the depreciation accordingly on each asset in that class.

During a test check of 9400 fixed assets in ‘Corporate Services’, it was observed that 156 assets like airconditioners and refrigerators, carrying a book balance of Rs.14.41 lakh were classified into the asset class relating to Furniture and Fixtures despite the fact that separate asset class for these existed.

Wrong classification of assets due to absence of validation checks and proper supervision, resulted in wrong calculation of depreciation and defective MIS.

The Management assured (December 2008) to take corrective action.

6.6.3 Inadequate customisation of the system

To reap full benefits of any ERP solution, it is necessary for the organisation to customise the software as per its requirements and take care of various industry specific, Government specific and law specific issues such as local taxes, financial statements, etc. A review of customisation of the FICO module was carried out and the customisation was found lacking to the following extent:

6.6.3.1 Payments trail in SAP

To facilitate a trail on payment cycle it is necessary that date of vendor invoice and date of receipt of invoice are captured in the system. It was observed that the system had not been customised to capture these dates.

The Company, however, has a Bill Watch System (BWS), an in-house developed application, in place which is integrated with SAP. This helps in tracking the bills by vendors and management and brings transparency in payment cycle. For this, it is required that whenever an invoice is received from vendor, it is to be entered in BWS, when the system allots a receipt number which can be used to track its status.

A test check of transactions valuing more than Rs.10 lakh revealed that during the years 2006-07 and 2007-08, 2827 payments aggregating Rs.14386.66 crore were made without using BWS. Even after excluding payments to Government Authorities and banks, there were 1285 payments aggregating to Rs.12516.09 crore without using BWS.

Lack of customisation to capture necessary details in respect of invoices and to allow processing of payments without BWS resulted in inability of the system to track the payments and bring about transparency in payment cycle.

The Management stated (December 2008) that it has created an exception report to monitor the payments not routed through BWS. The reply is not tenable as the issue observed allowing of processing of payments without using the BWS system.

6.6.3.2 Misuse of one-time vendor feature

One-time vendor code is used in SAP for those vendors to whom payment is expected to be made only once and the Company does not want to assign a permanent code to that vendor. The details regarding one-time vendors are entered in the system by users at the time of processing payment transaction.

During the review, it was noticed that 515 vendors were made payments for 2 to 61 times, despite these vendors having been categorised as 'One-time vendor'.

Due to lack of customisation to block repetitive payments to one-time vendors, possibility of misuse of one-time vendor code could not be ruled out.

The Management assured (December 2008) to restrict the use of one time vendor code for repetitive payments.

6.6.3.3 Defective customisation in respect of depreciation on assets

In SAP, the assets are assigned an asset class and requisite depreciation rate is attached to each asset class to calculate the depreciation as per the accounting policy of the Company and the Companies Act, 1956.

A review of fixed assets as on 31 March 2008 was carried out and it was found that assets were not charged depreciation as per the accounting policy of the Company, which specifies that assets costing upto Rs.5000 were depreciated fully during the year *i.e.* charged to revenue during the year of acquisition itself and no balance was carried forward to the financial statements of next year. Details are as under:

- (i) Six hundred and twenty five assets aggregating to Rs.16.32 lakh were either not depreciated or were partially depreciated during the year 2007-08 despite their individual value being less than Rs.5000 thereby leaving undercharge of Rs.13.96 lakh on account of depreciation in contravention of the accounting policy of the Company;
- (ii) Three assets acquired during the year 2006-07, valuing Rs.0.70 lakh; were attached to a depreciation chargeable asset class, but no depreciation was charged on them during the year; and
- (iii) Thirty seven assets aggregating Rs.14.04 lakh, each valuing more than Rs.5000, were completely charged off during the year and were carrying no value at the end.

Deficiency in customisation to map the business rule in correctly charging depreciation resulted in inaccuracies in the financial statements of the Company and defective MIS.

The Management assured (December 2008) corrective actions in respect of point (i) and (iii) and stated in respect of point (ii) that the depreciation for the year 2006-07 for the referred asset had been charged through the system. The reply is not acceptable as the observation is not concerned with charging of depreciation for the year 2006-07, but for the year 2007-08 as no depreciation had been charged for the year 2007-08.

6.6.4 Non-use of system

The Company levies liquidated damages (LD) for late/undelivered POs. The system is not used for calculation of LD for delayed supplies of materials and services.

It was observed that during the year 2007-08, the Company charged Rs.5.49 crore from vendors on account of LD, without calculating the same through system.

Due to non-use of system to calculate LD, the Company was not able to reap the benefits of the system fully and left the calculation at the discretion of users.

The Management accepted (December 2008) the non availability of such facility in the system and also stated that it was already explored with solution provider and was found not feasible. However, it is reiterated that necessary provision to charge LD through the system may be built in so as to minimise the human interventions.

6.6.5 e-Security

In SAP environment, it is of paramount importance that various physical as well as logical security layers are established to ensure integrity, correctness and sanctity of transactions and security of business information. In addition, emphasis should also be given to rationalisation of users' roles and authorisation and segregation of duties.

6.6.5.1 Segregation of duties

Before deciding about the user roles and authorisation, system administrator should follow the principles governing the segregation of duties:

- (i) Users that authorise transactions should not enter them;
- (ii) Users that maintain master records should not enter transactions; and
- (iii) In accounts payable, separate users should maintain vendor master records, enter invoices and pay invoices.

During review it was noticed that segregation of duties among SAP users dealing with various core functions requires a detailed review by the Management.

(a) Users with critical combination of procurement functions

The major functions in a procurement cycle include placing of Purchase Requisition (PR), release *i.e.* approval of PR, creation of PO, release of PO indicating approval of the same, creation of vendor masters, modification in vendor masters, receive goods, receive invoice and process payments. Since, all these functions have a bearing on outflow of funds; the rationalisation of combination of transactions assigned to users was important.

During review it was found that users enjoyed various combinations of critical transactions, the details of which are as follows:

- (i) Eight hundred users were authorised to create PR and release *i.e.* approve the PR;
- (ii) Nineteen users were authorised to create PO and release *i.e.* approve the PO; and
- (iii) Thirteen users were assigned roles to receive goods (Make Goods Receipt Voucher) and process vendor invoices.

The Management assured (December 2008) to review and rationalise user roles and authorisation.

(b) Users with critical combination of sales and distribution functions

The major functions in a sales and distribution module cycle include creation of customer master data, customer master data maintenance, creation of sales order, processing outbound deliveries, process sales invoices, maintain credit master data of customers, *etc.*

During review it was noticed that users were assigned critical combinations of transactions, the details are as follows:

- (i) Two hundred and seventy three users were assigned authorisations to process sales orders and process outbound deliveries which had the risk of a user being able to create or change sales orders and deliveries to hide misappropriation of goods;
- (ii) Two hundred and seventy six users were authorised to process outbound deliveries and process customer invoices which involved the risk of a user being able to create or change a delivery and create or change invoice;
- (iii) One hundred and sixty users were assigned roles to maintain customer credit master data and incoming payments which involved the risk of a user being able to create a customer and then post payments against the customer;
- (iv) One hundred and twenty seven users were assigned roles to maintain customer credit master data and process outbound deliveries which involved the risk of a user being able to create a customer and deliver goods to the customer and thereby misappropriate goods;

- (v) One hundred and forty three users were authorised to process outbound deliveries and process incoming payments which involved the risk of a user being able to create incorrect or fictitious delivery and enter payments against these; and
- (vi) One hundred and seventy eight users were authorised to process sales orders and process incoming payments which involved the risk of a user being able to create or change a sales order and process incoming payments inaccurately or fraudulently.

The Management assured (December 2008) to review and rationalise user roles and authorisation.

6.6.5.2 System administration

The authorisation to transactions should be monitored and rationalised by system administrators. Transactions attached to various SAP users and their respective job profiles were reviewed and following irregularities noticed:

(a) Authorisation of system sensitive transactions

There are certain system sensitive Transaction Codes* (T-Codes) in SAP which are highly critical in nature *i.e.* the access to these T-codes should not be extended to users other than Superusers* and System Administrators, as it posed a risk to the smooth working of organisation.

Review revealed that users other than Superusers and System Administrators were also extended access of some system sensitive transactions like SE38, SA38, SE16, SM20, *etc.* This posed risks to the system like ability to perform development related functions; ability to run programs directly in the background; bypassing transaction level security; access to all the tables; access to all the sensitive data like personal details; and ability to view the security logs to name a few.

The Management assured (December 2008) to review and rationalise user roles and authorisation.

(b) Irrelevant authorisation

In a SAP environment, the users are given authorisations to execute transactions according to their profile to avoid undue load on the system and possibility of conflicting roles being attached to any user.

A review of the user profiles and roles attached revealed that common users were also extended authorisation to create or change PO; individual or collective release of PO; create goods receipt for invoice verification, *etc.* This posed the risk of user being able to carry out transactions that he was otherwise unauthorised to perform.

The Management assured (December 2008) to review and rationalise user roles and authorisation.

* *Transaction Code: Used to identify various screens in SAP*

* *Superuser: A special user who has privileges to perform all administrative tasks on the system. Superuser has the special powers like ability to read and write to any file, run all programs etc.*

6.7 Conclusion

The absence of input controls and validation checks coupled with inadequate supervisory controls led to presence of unreliable data in the system. Inadequate customisation and mapping of business rules led to incomplete or incorrect capture of data apart from non-availability of important features for control on the purchase process and audit trails. Absence of adequate security through the role and authorisations and grant of authorisations to critical combinations and sensitive transactions made the system vulnerable to misuse and manipulation. Thus, not only was the system insecure, it was not appropriately customised and also contained unreliable data to be of effective use to the Company.

6.8 Recommendations

The Management may consider following measures to optimise the benefits from such an investment in the ERP system:

- Strengthening of input controls, validation controls and internal controls procedures to ensure accurate, reliable, pertinent and complete capture of data.
- Ensure customisation and usage of the ERP Solution as per business requirements, statutory requirements and guidelines of the Government and policies of the Company.
- Proactively pursue with the solution provider to explore possibility of various scenarios such as calculations of LD, etc in the system.
- The 'Master Data' needs to be revisited/reviewed periodically for ensuring veracity of data and authorisation thereof.

The matter was reported to the Ministry in November 2008; reply was awaited (January 2009).

CHAPTER: VII

Indian Oil Corporation Limited

Material Management Module of SAP-ERP system

Highlights

Inadequate customisation in respect of Material Masters allowed zero stock quantity shown with value.

(Para 7.6.1.1)

Goods receipt based invoice verification feature was not used compulsorily and as a result, invoices of Rs.44.04 lakh were created without/in excess of goods receipt vouchers.

(Para 7.6.1.3)

Non-mapping of approval for procurement resulted in under-utilisation of system as approval was taken outside SAP.

(Para 7.6.2.1)

Non-use of material requirement planning feature resulted in under-utilisation of the system, incorrect management information system and inadequate inventory management.

(Para 7.6.2.3)

Vendor and customer master records were carrying incomplete details and also duplicate/multiple codes.

(Para 7.6.3.1 and 7.6.3.2)

Lack of input controls and validation checks resulted in creation of purchase orders without following the complete process in SAP and placement of purchase order on black/holiday list vendors.

(Para 7.6.3.4)

7.1 Introduction

Indian Oil Corporation Limited (Company) was formed in the year 1964 through the merger of Company (1959) and Indian Refineries Limited (1958). The Company's principal activities are manufacturing and marketing of petroleum products, lubricants & grease, oil base & additives and other related products.

The Company went for the implementation of ERP* package across all its locations in a phased manner during the year 2001. For this purpose, Price Waterhouse Coopers were appointed as consultant and were paid Rs.30.42 crore. The Company selected ERP solution of M/s SAP namely SAP R/3. The Company has incurred a total of Rs.87.03 crore on communication network and related hardware for ERP solution.

The SAP package has different modules through which all the transactions are mapped in an integrated manner. These modules are:

- (i) Human Resource (HR);
- (ii) Material Management (MM);
- (iii) Financial Accounting & Controlling (FICO);
- (iv) Project Systems (PS);
- (v) Plant Maintenance (PM); and
- (vi) Sales & Distribution (S&D)

SAP is implemented in the Company in a centralised and three layer architecture namely Database, Application and Presentation layers. The SAP system is having three servers *i.e.* Development Server, Quality Assurance Server and Production Server.

The Company is using UNIX as its operating and application system, while Oracle has been used as RDBMS (Relational Database Management System) for managing its database. The Company has kept its Database and Application servers at the corporate data centre and they are accessible through leased line and/or very small aperture terminal from all state offices, refineries and pipeline units' networks. Other units such as terminals, depots and bottling plants *etc.*, are connected to SAP through connectivity to the nearest State Office/Refinery.

* ERP: Enterprise Resource Planning

7.2 *Scope of audit*

Audit reviewed MM module and its sub modules and aimed to evaluate its implementation and customisation *vis-à-vis* Company's requirements.

7.3 *Audit objectives*

The main objective of the audit was to ascertain whether the implementation of MM module in the Company had been carried out in most effective manner. To achieve the main objective, Audit focused on the following:

- (i) Whether the MM module enabled the Company to map all related transactions in the system?
- (ii) Whether the Company was making optimum use of features available in MM module?
- (iii) Whether there was a desired level of customisation of the system to suit the requirements of the Company and users?
- (iv) Whether effective input controls and validation checks existed in the system to check and prevent recording errors?

7.4 *Audit criteria*

The Audit adopted following criteria to achieve the aforesaid objectives:

- (i) Documented User Requirements;
- (ii) Module manuals and available standard functionalities; and
- (iii) Procurement manual and procedures of the Company.

7.5 *Audit methodology*

The IT Audit of MM module of ERP environment was conducted by adopting the following methodology:

- (i) Entry conference with the Management;
- (ii) Correspondences and questionnaire issued to the Management and their feedback; and
- (iii) Data extraction using standard and in-house developed SAP reports and analysis thereof using CAATs*.

7.6 *Audit findings*

The basic functionalities of MM module were maintaining material & vendor master, material procurement, inventory management, material planning and valuation. Test checks revealed significant weaknesses in the customisation and utilisation of MM module, incorrect/incomplete master records, and lack of input controls and validation checks as detailed below:

7.6.1 *Inadequate customisation of the system*

To reap full benefits of any ERP solution, it is paramount for the organisation to customise the software as per its requirements and take care of various industry specific,

* CAAT: Computer Aided Audit Techniques

Government specific and law specific issues such as local taxes, financial statements, etc. A review of customisation in the MM module was carried out and the customisation was found lacking to the following extent:

7.6.1.1 Material masters

The Corporate Information System Cell (COIS) of the Company is authorised to maintain Materials Masters and bring about unique codification and rationalisation of Unit of Measurement (UoM). The cell has also been entrusted with updation of Material Master record on request from locations or end users. A review of Material Masters records revealed following inadequacies:

(a) Wrong definition of Unit of Measurement (UoM)

The Company has defined 308688 material codes for valued materials as on 31 March 2008. Out of these, for 294240 materials, the UoM was defined as "Each (EA)," which means that the quantity for these can exist only in whole numbers. It was, however, seen that system had provision to enter data in fractions also. As a result, in 418 cases, the materials had stocks in fractional quantities, indicating deficient customisation.

This resulted in defective Management Information System (MIS), incorrect stock-keeping and inadequate inventory management.

The Management stated (May and August 2008) that SAP standard allows fractional posting for EA UoM also and users had to keep a control at the time of transaction. The Ministry endorsed (February 2009) the Management's views.

In this regard it is stated that necessary supervisory controls may be inbuilt in the System to avoid such instances in future.

(b) Zero stock with value

As on 31 March 2008, seven materials were shown with stock value of Rs.5.53 lakh despite the fact that none of these materials was available in stock on that day. This resulted in overvaluation of stock by the same amount.

Lack of customisation to allow materials with stock value in system without any stock led to defective MIS reporting and incorrect accounting of assets.

The Ministry replied (February 2009) that necessary corrective action has since been taken.

7.6.1.2 Inaction on purchase requisitions

Review revealed that there were 60361 Purchase Requisitions *(PR) (39434 materials and 20928 PR for services/works), which had their delivery date prior to 31 March 2008 but no procurement action was taken.

As a result, check could not be exercised on creation of duplicate PRs and the system was fraught with risk of duplicate purchases and unwanted stock accumulation.

The Management accepted the fact and stated (June and August 2008) that checking for existing PRs from the same unit for the same item while creating PR by the system was

* Purchase Requisition: An indent for a material or a service.

not configured because the same material may be required by different departments of the same unit. Further, the units had been advised to check and close old open PRs regularly.

The Ministry further stated (February 2009) that a new transaction code was developed to close old PRs, thus reducing the possibility of double procurement.

The reply of Ministry is not acceptable as the system does not restrict the multiple PRs for the same material at the same plants and hence does not eliminate the possibility of multiple or unwanted procurement.

7.6.1.3 Payment without a Goods Receipt (GR)

To authenticate payment for any PO, the system has the provision 'Goods Receipt based Invoice verification,' which, if activated, verifies the quantity and value mentioned in the invoice with the figures of Goods Receipt Voucher (GRV) and then the payment is processed.

During a review of GRs and invoice verification relating to POs placed by the 99 Purchase Groups* of the Company, it was found that for 11 materials, GRs worth Rs.13.53 lakh existed as against payments of Rs.48.55 lakh, while for three materials, invoices worth Rs.30.52 lakh were made though no GRV existed in the system.

Thus, in the absence of proper customisation for compulsory use of the invoice verification feature, payments against POs could not be authenticated through the system and hence, the system was exposed to various risks like excessive payment to vendor, payment to vendors without any supplies, *etc.*

The Management replied (June and August 2008) that invoice verification was done only after preparation of GRV except in some cases like hospital items, petty services, *etc.*

The reply is not acceptable because the cases mentioned above included items other than hospital items, petty services and port services.

7.6.2 Non-utilisation of the system

Review in Audit revealed that in the following cases, system was not utilised for effective monitoring and managerial control:

7.6.2.1 Non- mapping of approval for procurement

As per procurement process of the Company every PO has to be approved by competent authority before it is placed on the vendor. In SAP system every PO has to be released by the authorised user before it is placed on the vendor.

During review of procurement process, it was noticed that the approval for PO had not been captured in the system and the approval was taken on paper.

Since the authorisation was taken outside the system despite availability of the functionality, it made such approval untraceable through the system.

The Management stated (June and August 2008) that approval process was based on Delegation of Powers (DOP), and it was not practical to put this approval process in SAP. Hence, release of PO was delegated to some other officer as per DOP, who ensured its

* Purchase Group: Key for a buyer or a group of buyers, who is/are responsible for certain purchasing activities.

correctness before release. The Ministry (February 2009) endorsed the Management's view.

With regard to Ministry's reply it is reiterated that final approval i.e. release of the PO from the competent authority could be mapped in the system to bring about an authorised and transparent procurement process.

7.6.2.2 Valuation of finished goods

The Company maintains stock of finished goods in SAP. It was, however, noticed that the valuation of all finished goods was done outside the system and subsequently incorporated in the annual accounts of the Company.

Non-utilisation of the system for valuation of finished goods left room for manual intervention and manipulations, which could be avoided.

The Management stated that the valuation of stock figures for balance sheet was done outside SAP. The Ministry stated (February 2009) that the finished goods valuation was on Net realisable Value (NRV) and depends on large number of variables, all of which could not be captured by SAP.

In this regard it is suggested that the system could be explored to take care of valuation of finished goods through the system.

7.6.2.3 Inadequacies in material requirements planning

The SAP system has Material Requirements Planning (MRP) feature through which Minimum/Safety Stock Level and Re-order Stock level for critical materials can be defined to ensure their availability when they are needed. When the stock level of any of such material goes below its respective re-order level, the MRP feature can be run to generate a PR for procurement of that material with the prescribed quantity.

During review of safety/minimum stock level and re-order stock level at three Refineries (Guwahati, Barauni and Koyali), it was found that for 1787 materials, re-order stock level as well as minimum stock level was defined, while for 426 materials only re-order stock level was defined.

Among aforesaid materials for which re-order levels were defined, 1449 materials were having no stock. Out of these, in 442 cases, the MRP was not run and hence there was no PR and in 143 cases, the PR generated was insufficient to meet the re-order level (including 11 cases, where even minimum stock levels were not met).

Non-use of this feature resulted in under-utilisation of the resource, incorrect MIS and inadequate inventory management.

The Management assured (June and August 2008) that the units were being advised to run MRP regularly and update stock levels from time to time. The Ministry endorsed (February 2009) the reply of the Management.

7.6.2.4 Liquidated damages

The Company levies liquidated damages (LD) for late/undelivered POs. The system was not calculating liquidated damages for delayed supplies of materials and services. This resulted in manual calculation still being carried out and thus user intervention in the process.

The Management confirmed (May and August 2008) that the penalty on account of delayed delivery/completion of work was computed manually considering the merits of each case. The Ministry stated (February 2009) that penalty was levied considering the reasons of delay i.e. whether attributable to vendor or not and these matters being issue based cannot be configured in the system.

In order to bring more transparency, the LD could be calculated through the system for all cases of delay and waiver of LD may be made by the competent authority through the system in deserving cases so as to enable proper audit trail.

7.6.2.5 Old reservations lying open without any withdrawal

In terms of business process, automatic closure of the stock reservation in the system was required if the material is not withdrawn. The system is having a provision to close pending reservations. It was noticed (May 2008) that in respect of 980 reservations for 25030 materials, materials were not issued at all but the reservations were not closed for the period ranging more than seven years.

Non-use of system and absence of supervision to ensure review and deletion resulted in long pending unwanted reservations, which leaves scope for irregular practice.

The Management stated (June and August 2008) that units were being advised to close pending reservations at regular intervals.

7.6.3 Input controls and validation checks

Controls over input are vital to the integrity of the system. The objective of input controls and validation checks is to ensure that the data received for processing are genuine, complete, not previously processed, accurate and properly authorised and entered without duplication. Weak input controls/validation checks may increase the risk of entry of unauthorised/irrelevant/incomplete/duplicate/redundant data. Following are the observations regarding input controls and validation checks:

7.6.3.1 Vendor masters

The Vendor master records for sellers contain name, address, country, bank details, etc. The Company has authorised its COIS cell to bring about unique codification for materials as well as updation of the master records. The Company was maintaining 243894 vendor records analysis of which revealed that:

- (i) The address and bank account details were not completely captured in designated fields but against vendor names; and
- (ii) While one unique vendor record is required to be maintained for each vendor, multiple records in respect of vendors for material and services existed.

In the absence of proper input control and supervision to ensure data entry in the designated fields, the authenticity of the data entered could not be vouched safe and duplicate records with similar address and bank account details could not be analysed.

The Management stated (June and August 2008) that out of four name fields, two were sufficient to capture name. They had made a program to put vendor creation request and it disallowed user to put data if already created earlier. All past records had been reviewed and duplicate vendors had been blocked.

The reply, however, only reaffirms the audit observation that the system was carrying incomplete and unreliable master data. Further, on verification of the Management's reply, it was found that out of 52 verified duplicate vendor records, only two had been blocked. Also, 84 POs were placed on two vendors, carrying two vendor codes each.

7.6.3.2 Customer masters

The customer master records are maintained for sales and accounts receivables transactions. To maintain proper control, one customer should carry one customer code and onus to maintain uniqueness of customer codes was with COIS cell.

A review of 58340 customer records as on 31 March 2008 revealed that:

- (i) Fifteen thousand one hundred and sixty six customer records were carrying irrelevant pin codes;
- (ii) Three thousand four hundred and twenty six customer records were without complete address; and
- (iii) Eight hundred and four customer records were carrying 1656 customer codes and in 12 cases single customer was given four codes.

Due to lack of input control and validation checks, the system was fraught with the risk of multiple ledger maintenance for same customers as well as duplicity of data.

The Management replied (May 2008) that Divisional/Area Offices were responsible for creating customers records. COIS only uploads this data. The Ministry stated (February 2009) that actions were being taken in this regard and COIS had put in checks wherever possible to eliminate duplicate customer creation and taken up with Marketing Division for correction of incorrect pincodes.

The replies indicated deficient input and supervisory controls.

7.6.3.3 Inventory management

One of the main features of MM module is inventory management, which includes control of materials based on quantity, value and stocktaking.

(a) Negative stock of finished goods

The Company was maintaining stock of 308688 materials including finished goods as on 31 March 2008. Among these, there were 36 materials with negative stock quantity. Out of these, 17 materials were valued at Rs.1269.89 crore, 18 materials were carrying negative stock value to the tune of Rs.83.08 crore and one material was shown without value.

Weakness in input controls and supervision to allow entry of negative stock for finished goods resulted in defective MIS as well as inaccurate accounting of the stock.

The Ministry while accepting (February 2009) the Audit view stated that the process of book stock matching the physical stock was being implemented at logical locations and after the completion the stock would be shown at actual.

(b) Withdrawal of quantity over and above reservation quantity

As per business process in MM module, stock reservation is the controlling point for issue of any material and system should be so customised that material should not be issued in excess of reservation quantity. During review of reservation for material at

Panipat Refinery it was found that nine materials valuing Rs.14.01 lakh were issued in excess of the reservation quantity.

This resulted in unauthorised withdrawal of the material indicating absence of validation check for issue of material with respect to the reservation quantity.

The Management stated (June and August 2008) that the quantity field in reservation was inadvertently edited after the issue of material and assured to explore the possibility of disallowing editing feature below issued quantity. The Ministry stated (February 2009) that a check to disallow over-withdrawal of reservation quantity has now been inbuilt in the system.

7.6.3.4 Procurement of material/service

The procurement process in SAP has been defined adequately through various steps (a) placing of PR from the user/department (b) release of PR, (c) Request for Quotation (RFQ), (d) comparative statement of quotation, (e) Placing of PO and finally (f) release of PO. A review of the process revealed following deficiencies:

(a) Creation PO without referring to PRs and RFQs

As per the purchase procedures, the indenters create PR as per their requirements. This PR is auto-numbered by the system and is to be released/approved by the competent authority as per DOP. Materials department then sends RFQ to vendors and upon receipt of quotations, compares them and then creates the PO.

During a test check of 1014 POs at Guwahati refinery, it was observed that the process for creating PO was not followed completely as below:

- (i) Seventy five POs valuing Rs.197.28 crore were created without any PR.
- (ii) Thirty one POs valuing Rs.190.69 crore were created without reference to any RFQ

Thus, lack of validation check rendered the internal control system deficient. As a result, monitoring of POs issued on the basis of initial PRs/RFQs cannot be done through the system.

The Management stated (June and August 2008) that SAP provides facility to create a PO without a PR and units had been advised to follow complete process in SAP. The Ministry confirmed (February 2009) the reply of the Management.

(b) Placing POs on blacklisted/holiday list vendors.

The Company, sometimes, puts certain vendors under holiday list/black list for a definite or indefinite period and during that period no order can be placed on that particular vendor. During a review of POs placed on different vendors. It was found that there were 4273 vendors on black/holiday list indefinitely or for a defined period.

It was noticed that there was no input control in the system to stop users from placing POs on blacklisted/holiday list vendors; as a result, POs were placed on 67 vendors out of 694 blacklisted/holiday list vendors reviewed. In addition, further review of 11 vendors (on whom total 97 POs were placed) revealed following:

- (i) There were five vendors for whom no period of blacklisting was defined. Eight POs valuing Rs.1.02 crore and executed to the extent of Rs.78.75 lakh were placed on these vendors;
- (ii) POs valuing Rs.1.17 crore and executed to the extent of Rs.97.21 lakh were placed on five vendors during the period for which they were on blacklist; and
- (iii) One vendor was put on blacklist for the period from 29 December 2004 to 28 December 2005, but was unblocked on 2 January 2005 for one day when five POs valuing Rs.30.89 lakh were placed on this vendor on that day, which were executed to the extent of Rs.27.03 lakh.

Absence of an input control in the system to stop such POs posed risks of irregular and unauthorised procurement and risk of default in supply of material.

The Management accepted the audit observation (June 2008). The Ministry while confirming (February 2009) the Management's reply stated that no PO was placed during the period of blocking and it was the duty of the concerned official to block purchase function in SAP and also mention the period of blocking.

The reply of the Ministry is not acceptable because the purpose of blocking the vendor was defeated as vendors were unblocked to place Pos and were reblocked afterwards. Also, the information in respect of blocking period was not available in each case signifying lack of supervision and insufficient input control.

7.7 Conclusion

The basic functionalities of MM module were maintaining Material & Vendor Master, material procurement, inventory management, material planning and valuation. Audit analysis revealed that there were some deficiencies in the input controls and validation checks. Such deficiencies ran the risk of unreliable data entering the system. It was also seen that the Management had not succeeded in customising all the features in the system.

Thus, the Company could not exploit fully the potential of the MM module.

7.8 Recommendations

The Management may consider following measures to optimise the benefits from such an investment in the ERP system:

- Ensure customisation and usage of the ERP Solution as per Business requirement, statutory requirements and guidelines of the Government and policies of the Company.
- Periodic reconciliation of closing stock and sales at the end of each day to avoid the anomalies in the stock value.
- Proactively pursue with the solution provider to explore possibility of various scenarios such as calculations of LD, capturing of warranty details, *etc* in the system.
- The 'Master Data' needs to be revisited/reviewed periodically for ensuring veracity of data and authorisation thereof.

- Strengthening of input controls, validation controls and internal controls procedures to ensure accurate, reliable, pertinent and complete capturing of data.

CHAPTER: VIII

Oil and Natural Gas Corporation Limited

Functioning of Human Resource module in SAP R/3 System

Human Resource module of the SAP system was not customised for manpower planning activities, determination of staffing needs, selection of personnel for various postings based on pre-defined criteria. Lack of input controls in the system also resulted in feeding of erroneous and incomplete data affecting integrity of data maintained and continued dependency on manual controls

Oil and Natural Gas Corporation Limited (Company), a navratna oil E&P Company was established in the year 1956 for exploration and exploitation of hydrocarbons. The activities of the Company are geographically spread across the country on land as well as offshore areas. Human Resources (HR) of the Company as on April 2008 comprised of 32949* regular employees and 1082 other category of employees such as term or tenure based employees.

The Human Resource Management across the Company was computerised in March 2004 with implementation of System of Human Resource Automated Management Information for (SHRAMIK) based on SAP R/3 software platform. Subsequently, when the Company implemented the ERP* project- Information Consolidation for Efficiency (ICE)-during October 2003 and January 2005, SHRAMIK data was migrated into ICE. Human Resource (HR) module in ICE went live across the Company in February 2005.

Review of the functionality of HR module as implemented in the Company revealed the following:

- (i) The SAP system provides functionality for managing the HR based on predefined manpower norms for various activities. It was, however observed that the system was not customised for manpower planning activities and determination of staffing needs in conformity with activities at various work centres of the Company. The manpower planning activity remained a separate manual activity outside the system as was done prior to implementation of HR module. The system was also not customised to facilitate decision making on selection of personnel for various postings based on pre-defined criteria of educational qualification, trainings and actual field work experience. The usage of the system was, therefore, limited mainly to management of personal records of employees and employee related payments only. Thus, the system was yet to be utilised for strengthening manpower planning activity for optimum utilisation of related resources.

The Management stated (June 2008) that these activities were unstructured and required manual intervention, hence not configured in the system so far (September 2008).

* 22989 executives and 9960 non executive

* 22989 executives and 9960 non executive

Audit holds the view that the manpower norms, if configured in the system, would help minimise the errors in Human Resource planning.

(ii) Analysis of Data revealed deficiencies in customisation, lack of input controls resulting in erroneous and incomplete data affecting integrity of data maintained in the system and continued dependency on manual controls, as illustrated in following instances:

(a) **Reimbursement of conveyance for official use**

- The vehicle numbers against the reimbursements were not entered as it was not made mandatory to enter vehicle numbers resulting in incomplete data.
- System also accepted invalid and duplicate registration numbers and the reimbursements were continued to be made against them.
- The inbuilt controls to restrict the reimbursement to a single vehicle at a time were bypassed and two vehicles were allowed to be mapped against an employee at a time. Further, the entitlement of such reimbursements was rather linked to the cadre and not linked to the type of vehicle entered against the employee which may result in incorrect payments.

(b) **Dependency status**

The marital/employment status of daughters deciding the dependency was not monitored through the system due to non updation of such status in the system.

(c) **Leave details**

The monitoring of leave details was not done through the system and was largely dependent on manual records. It was also observed that the receipt of joining reports, monthly absentee statement *etc.*, was irregular.

Lack of inbuilt controls in implemented module and non utilisation HR module for Human resource planning and management led to continued dependence on manual controls even after implementing the ERP system. Thus, the objective of strengthening manpower planning activity, which is the major function of HR Department, could not be achieved through the system.

The Management assured (September 2008) to take corrective action as required.

The matter was reported to the Ministry in December 2008; reply was awaited (January 2009).

MINISTRY OF STEEL

CHAPTER: IX

Steel Authority of India Limited

Functioning of Invoicing System of Bokaro Steel Plant

Highlights

Lack of physical access controls, environment controls made the System and data unsafe against un-authorized access, fire *etc.*

(Para 9.2.1)

Lack of input controls and validation checks affected the completeness, accuracy and integrity of the data.

(Para 9.2.5 and 9.2.6)

Lack of integration of the system, multiple data entries of the same source data were made in the system and the preparation of invoices was delayed.

(Para 9.2.6)

9.1 Introduction

Bokaro Steel Plant (BSP) of Steel Authority of India Limited (Company) registered a turn over of Rs.12037.57 crore during 2007-08. Invoices in respect of its products are prepared in invoicing section on the basis of data received from different departments/sections.

Company's IT vision aimed to apply information technology to fulfill the information needs across the organisation. Accordingly, Invoicing System of BSP was computerised with a *File Server System* using *Oracle9i* developed in house.

The Movement Plan of the products and the pricing of various products of the Company are controlled by Central Marketing Organisation (CMO) Kolkata. Accordingly a Dispatch Advice (DA) is prepared in the system against the movement plan. The products after getting Test Certificates (TC) from R & C Laboratory are transported to their locations either by rail or road. An invoice is prepared in the system on the basis of movement plan, dispatch advice, test certificate, railway receipt (RR), price circular, rebate *etc.*

9.2 Audit findings

Audit of the system was conducted (April and June 2008) with the data available in the invoicing system for the period January 2007 to December 2007. The following were observed:

9.2.1 Physical access controls

The invoices are prepared through the invoicing system at the Electronic Data Processing (EDP) Centre. It was observed that:

- (i) No security guards were provided at the EDP centre. The entry to EDP centre was not restricted to avoid any unauthorised access to the system and to prevent data manipulation, theft of data and hardware; and
- (ii) The EDP centre was not made fire proof and the fire alarm system provided was also found to be not working making the installations at high risk.

The Ministry stated (February 2009) that security is maintained through CISF, entry to Data Centre would further be restricted and controlled through ACCESS Control System with the implementation of ERP. Ministry further stated that fire proof wall and the fire alarm system would also be provided.

9.2.2 Logical access controls

- (i) User identifications of retired employees (two numbers) and the transferred employees (three numbers) continued to exist in the system indicating deficient security control and thus making the system vulnerable.
- (ii) The regular change of passwords could not be ensured as the details were not available in the system.

The Ministry stated (February 2009) that the advice of audit will be implemented.

9.2.3 Change management control

The pricing of the products and their revision as received from CMO Kolkata in hard copies, were fed at invoicing system of BSP manually. This delayed the raising of invoices and also led to risks of incorrect data entry as well.

The Ministry stated (February 2009) that the software at BSL and CMO are on different platform, as such, the price circular information can not be transmitted on line into the invoicing system.

It however, reiterated that both the systems at CMO and BSL should be integrated to avoid manual intervention.

9.2.4 Inadequate connectivity and subsequent manual intervention

- (i) It would be possible to issue invoices within one day if the data was available on line and manual intervention was avoided. This could also result in saving of two days out of three days average time taken for issue of an invoice and subsequent reduction in sales outstanding in debtors. Further, services of employees deployed for collection of DAs manually, could be utilised elsewhere.
- (ii) Since traffic section was not connected to the system the freight details were to be entered into the system manually which led to the risk of input errors.

The Ministry stated (February 2009) that the delay in issue of invoice is not due to inadequate connectivity but due to delay in receipt of DAs/TC. Further, traffic section is well connected to the system.

The contention of the Ministry is not acceptable as DAs/TCs etc. are still manually collected by the traffic department and the abnormal delay in receipt of DA/TC could be avoided if the DA/TCs are transmitted through the system.

9.2.5 Input controls

Input controls ensure that the data received for processing is authentic, complete, correct and without duplication. Data analysis revealed the following discrepancies due to insufficient input controls built in the system.

- (i) There were 74 gaps in invoice numbers though these were generated through the system. Further analysis revealed that deletion was due to diversion of materials to other locations. However, the reasons for deletions were not recorded in the data base.

The Ministry stated (February 2009) that the gaps were due to permanent deletion of invoices due to various reasons and further stated that the system will be rectified to show the status of the deleted invoices instead of deletion.

- (ii) RR numbers were not indicated against 151 out of 79600 invoices prepared during the year 2007-08 though the transport mode was rail.

The Ministry stated (February 2009) that RR Numbers were not required in case of internal consumption, dispatch to Marafari stockyard through own wagons & road dispatch.

The reply of the Ministry is not acceptable since the cases pointed out were related to dispatch of materials through railway wagons for sale through branches of CMO and not intended for internal consumption.

- (iii) In 4363, out of 30656 records, the name of the customer was not indicated though All India Party Code was allotted; and

The Ministry stated (February 2009) that the party codes mentioned by audit are the internal departmental codes relating to various departments/shops of BSL and not the All India Party Codes and hence names are not appearing.

The contention of the Ministry is not acceptable as it required manual interventions at the time of preparing invoices and this could be avoided if the details were available in the database.

- (iv) The invoice numbers were not indicated against 42 DAs though details regarding RR were available in the system. On further analysis it was revealed that due to change of destination, invoices were deleted without deleting the relevant DAs.

The Ministry stated (February 2009) that care would be taken to delete the DAs from the DA Table at the time of permanent deletion of invoices from the Invoice Table due to change of destination.

However, the invoices and related DAs may be rendered inactive and flagged to ensure audit trail instead of deletion.

9.2.6 Validation controls

Absence of connectivity among various sections using the system necessitated repeated manual inputs which due to absence of validation checks resulted in discrepancies and non uniformity of data. It was also noticed that corrections were made manually in the system at the time of issue of invoices which made the system unreliable. The discrepancies were as follows:

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- (i) In 127 cases, different RR numbers with same dates were found to be entered against the same invoice numbers;
- (ii) Normally the date of invoice should not be prior to the date of RR. It was however, observed that in 10 cases of direct sales through CMO, invoice date was prior to the RR date which varied between 1 to 63 days; and
- (iii) Differences in weights of dispatched quantity (net weight) were noticed between DAs and the respective Invoices due to lack of integration and validation controls.

The Ministry stated (February 2009) that these discrepancies were due to non flow of corrected data from invoice data to DA/RR data; left out data at the time of monthly closing and agreed to avoid such discrepancies in future. The Ministry also stated that invoicing system is being utilised effectively and efficiently and however necessary steps were being taken to make the controls effective and to minimise the manual intervention.

Pravin Tripathi

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Dated: 19th May 2009

Countersigned

Vinod Rai

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