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

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[*] ***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;

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* ***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).