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.

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* ***ERP: Enterprise Resource Planning***

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.

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, 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.

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[*] ***CAAT: Computer Aided Audit Techniques***

(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 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*.

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

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

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 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.