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Chapter: VI

Oil and Natural Gas Corporation Limited

IT Audit of Material Management

Highlights

Inadequacy of input controls resulted in wrong valuation of material and consequently wrong material accounting, lack of data integrity and incorrect MIS.

(Paras 6.7.1.1 to 6.7.1.4 and 6.7.1.7)

Because of a deficient internal control mechanism, stock receipts and issues were not being captured accurately and in a timely manner resulting in wrong material accounting

(Para 6.7.1.5 and 6. 7.1.6)

Material Requirement Planning (MRP) checks were being carried out manually even after implementation of ERP.

(Para 6 7.2.1)

Several reports being generated were incorrect due to inherent design defects.

(Para 6.7.2.2 and 6.7.3)

Legacy data was loaded into the ERP system without adequate data cleaning resulting in incomplete and incorrect data.

(Para 6.7.4)

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There were deficiencies in physical count of inventory items; there was delay in settlement of discrepancies revealed in physical count.

(Para 6.7.5)

6.1 Introduction

In 1980s, the Material Accounting System developed in COBOL was adopted by Oil and Natural Gas Corporation Limited (Company). This was modified to 'Integrated Materials Management System' (IMMS) in 1990s based on ORACLE 7.3 Client Server architecture. In October 2003, the Company implemented a generic Enterprise Resource Planning (ERP) package, the SAP - mySAP Financials and Logistics under project Information Consolidation for Efficiency (ICE). All ten modules[♣] of ICE were utilised along with mySAP Oil & Gas Upstream Solutions consisting of joint venture accounting, production sharing agreement and offshore logistic management. The existing data in the IMMS was migrated into the ERP system. ICE went live across the Company in phases- (Western offshore in October 2003, Western Onshore in April 2004, Southern Onshore in July 2004, Eastern and Central Region in October 2004 and Northern Region, in January 2005).

SAP R/3 release version 4.6C was installed on HP Unix 11.11 operating system and platforms. Oracle database management system was used to store data in SAP. LAN/WAN was used as means to connect to R/3 environment.

6.2 Objectives of Audit

The audit objective was to review performance of Material Management (MM) module in the ERP System and seek assurance that input, processing and output controls were in place ensuring reliability and integrity of data.

6.3 Scope of Audit

Audit covered stores, spares including capital stores handled and managed through the MM module under the ERP system, migrated data in the new system as well as transactions generated from the ERP system till March 2006. MM processes in the sequence from issuance of the indents to final consumption were examined in audit. Data analysis was carried out based on sample data mainly from Mumbai, Western onshore, Central Region, Eastern region, Delhi and Dehradun.

6.4 Audit Criteria

The following constituted the audit criteria:

(i) Best practices in Information Technology (IT) system designing and development;
(ii) Input and internal controls for data entry in purchase and material documents and monitoring thereof;
(iii) Business rules, manuals and procedures.

♣ ***Financial (FI), Controlling (CO), Material Management (MM), Plant Maintenance (PM), Project Systems (PS), Investment Management (IM), Asset Management (AM), Treasury (FM), Sales & Distribution (SD), Business Information Warehouse (BW)***

6.5 Audit Methodology

IT review of MM in ERP environment in the Company was conducted by adopting the following method:

(i) Discussion, correspondence and questionnaire issued to the Management and its feedback.

(ii) Data extraction using the standard in-house reports and analysis thereof using IDEA, EXCEL and ACCESS softwares.

6.6 Limitations

(i) Audit Information System (AIS), a single location data mining tool provided by the SAP developer for real-time auditing in SAP system, was not implemented by the Company.

(ii) Access to a limited transaction codes was available to Audit and access to SAP Query and Data Browser was not available, due to which the issues relating to source data tables, in-house developed transactions and programs, release strategies, authorisations and user administration could not be examined.

6.7 Audit Findings

The main processes in the MM module were material planning and indenting, procurement, inventory management and warehouse management for incoming material.

The MM module was reviewed in audit in the sequence of the process flow and the following points were observed:

6.7.1 Input Controls

Input controls ensured that the data received for processing were genuine, complete, accurate, properly authorised and entered in time and without duplication. Validation checks ensured that the data conforms to the business rules. The input controls and validation checks together ensured the correctness and completeness of data.

The following cases showed weakness in the input controls and validation checks:

6.7.1.1 Purchase orders for stores and spares items with wrong valuation types

Split Valuation Procedure (SVP) was configured in the ERP system for stores and spares items where separate weighted average cost was maintained for each 'material type'[♣] based on corresponding 'valuation types' configured in the system. Any wrong entry of 'valuation type' of material in a purchase order impacted recording of cost of material at the time of their receipt and issue and consequently led to incorrect accounting of material consumption and incorrect Management Information System (MIS).

Analysis of purchase orders against foreign vendors, however, revealed that the 'valuation type' of material entered in the purchase requisition by and large continued to be followed in purchase orders, without being corrected to indicate whether the order was placed on indigenous vendor or foreign vendor, leading to creation of purchase orders with incorrect 'valuation type' assigned to a material. Consequently, cost of the items received against such

[♣] ***Different material types were configured depending upon source of supply, nature of use and whether new or used etc.***

purchase orders were also recorded incorrectly at the time of their issue. It was observed that 327 purchase orders were placed with wrong material 'valuation types' during the period April 2004 to March 2006. During the same period, 478 goods receipt documents for receipt against foreign vendors (for 2647 items) were posted with similar wrong material 'valuation types'. The financial impact of the wrong valuation of material was, however, not ascertainable.

The Management attributed this to user ignorance and stated that this problem would be reduced with increased user awareness. The reply was not tenable as the system had neither been configured with necessary data input controls nor were effective compensating controls put in place by having a mechanism to review such errors by the ICE core teams.

6.7.1.2 Purchase orders for capital items with wrong valuation type

Capital goods received from vendors and their subsequent issue were handled by the system based on a unique batch number assigned to the material in the purchase order. Analysis of purchase orders for capital items, however, revealed cases where 'valuation types' applicable to stores and spares items were entered as 'batch number'. Consequently at the time of issue, cost of these capital items was incorrectly generated at moving average cost♣ instead of the cost of the item relevant to the specific purchase order as shown in a few illustrative cases:

Plant	**Material (Material Code)**	**Goods Received Document No.**	**Qty. (Nos.)**	**Unit Rate (Rs.)**	**Unit Issue Rate (Rs.)**
10T3	UPS System (0C3696000)	9000016225	30	2819	
			4	24012	8631
			1	121500	
70R1	Computer/Laptop (0C3800000)	900016673	1	120890	123365
		900016674	1	125840	
10T3	Over head projector (0C9567000)	900022171	1	185000	216712
		900018936	4	224640	
23R1	Bed (0C9820000)	900042540	12	9968	10721
		900042540	2	15239	

♣ ***Stores and spares items were valued at moving average cost.***

The Management stated that validation checks had subsequently been put in place to check such errors.

It was, however, observed in audit that the validation checks were not correctly configured and similar errors occurred in case of capital items procured against purchase orders No. 4010010560 placed on 15 December 2004 and No. 4010019744 placed on 5 December 2005.

6.7.1.3 Delivery date in purchase orders

No input controls were in place for entering the delivery date[♣] of material in the purchase orders created in the ERP system. It was observed in audit that in a large number of cases, the delivery date of material entered in the purchase requisition and defaulted in the purchase orders continued to be followed without being corrected to the purchase order conditions. In 14 cases, the delivery date in the purchase order was even prior to the date of the purchase order (based on sample data for January to March 2006). It was further observed that the date of actual delivery of the supplies was not captured in the system.

Due to capturing of incorrect purchase order delivery date and non capturing of actual delivery date, MIS data on procurement of material and execution of purchase order with respect to the delivery date could not be correctly generated and also liquidated damages due to delay in delivery of material had to be worked out manually outside the system.

The Management stated that there was no provision in SAP for capturing the actual delivery date and there was also no functionality in SAP for calculation of liquidated damages. The Management further stated that they were in the process of exploring the possibility of capturing the date of actual delivery after which necessary MIS data would be generated.

6.7.1.4 Creation of fresh purchase requisitions with earlier requisitions remaining pending

Analysis of purchase requisitions in Mumbai revealed that 107 requisitions involving 876 items created between April 2004 and December 2004 were lying pending in the System without any procurement action being taken. At the same time, fresh purchase requisitions for some of these items were also created and procurement action taken thereon.

The Management accepted the fact and stated that possibility of automatic deletion of all purchase requisitions not requiring any subsequent action at the end of a financial year was being explored.

6.7.1.5 Non clearance of stock in transfers

Stock Transport Orders (STO) were created for internal transfer of material from one location to another. To complete the documentation of internal stock transfers, goods issue document posted by the issuing store was complemented by a goods receipt document by the receiving store. Till the goods receipt document was not posted, the material transfers remained as ‘stock in transfer’ under inventories.

[♣] ***Delivery dates are the dates on which the goods are to be delivered by the vendors***

Analysis of balances in 'stock in transfer' revealed instances of delayed posting and non-posting of goods receipt documents in respect of internal transfer of goods resulting in accumulation of large balances in 'Stock in transfer'. In a test check in July 2006, stock transfers worth Rs.53.58 crore lying uncleared for over three months were noticed out of which stock transfers worth Rs.9.60 crore had not been cleared for more than a year.

The above indicated lack of internal controls in ensuring that all stocks received were captured by the system accurately and in time in the correct period. This adversely impacted the reliability and correctness of inventory balances as physical existence of items under 'Stock in transfer' remained unverified and unconfirmed as such items were not covered in the physical count process. In a test check in audit, 349 cases of stock transfers were found where the items were included as 'Stock in transfer' in the system even though materials amounting to Rs.11.94 lakh, were already posted as material consumed in financial records. Further, the objective of accounting of inventories and its consumption on actual and online basis was also not achieved and correctness of accounting of the consumption of inventories, therefore, could not be ensured.

The Management accepted the fact and stated that materials remaining in transit for long periods had been put up in the intranet of the Company.

6.7.1.6 Delay in recording of material consumption

Analysis of goods issue documents for material issued for consumption revealed deficiency in internal controls to ensure that all stock issues were captured by the system accurately and in a timely manner in the correct period. Delays upto 202 days in posting 77 goods issue documents for consumption of casing pipes in 21 wells involving material value of Rs.16.32 crore were observed in drilling of wells in Assam and Agartala during 2005-06. Out of these, 43 documents were posted after delay of 30 days or more involving material value of Rs. nine crore. Similar delays upto 156 days were found in posting of 273 goods issue documents in respect of consumption of material valuing Rs.8.20 crore in 19 wells, out of which 92 documents were posted after delay of 30 days or more involving material value of Rs.1.84 crore. Due to the delay in posting of the material documents referred to above, material consumption amounting to Rs.2.24 crore prior to 31 March 2006 was actually accounted for in the following financial year resulting in accounting of material consumption in the wrong period. This showed that the objective of online and real-time accounting of material consumption had also not been achieved with the ERP implementation.

6.7.1.7 Insurance spares

Capital spares/insurance spares i.e. the machinery spares specific to a particular item of fixed asset the use of which was expected to be irregular, were to be capitalised at the time of their purchase whether procured along with the fixed asset concerned or subsequently.

It was observed that as of March 2006, 811 insurance spares of value Rs.12.29 crore were included as part of inventories instead of being capitalised, consumption of which was accounted as and when issued. It was further observed that out of these 811 items, details of the related capital equipment in the Material Master were available for only 411 items costing Rs.9.40 crore.

The Management stated that the data migration was done as per data available from the legacy system and in most of the spares, details of the capital item to which it belonged were not available. It further stated that efforts were still on to locate all the details.

6.7.2 Mapping of business rule

6.7.2.1 Material procurement planning

Analysis of inventory holding of material vis-à-vis consumption to find out the extent to which the stock holding was in consonance with the actual requirement or consumption revealed that there existed 6512 items (material codes) each of average stock value exceeding Rs.one lakh, consumption of which during 2005-06 was nil. Based on the value of the average stock holding during 2005-06, funds invested on these inventory items amounted to Rs.523.09 crore. Included in these items were 47 stores items costing Rs.177.38 crore and six spares items costing Rs.11.52 crore of average stock value over Rs.one crore. Further month-wise stock analysis, since implementation of the ERP system, of items with average stock value over Rs.50 lakh revealed 62 items with nil consumption during the entire period. The average stock value of these items amounted to Rs 139.66 crore in March 2006.

In case of capital items also, which were required to be issued to the users immediately on their receipt, items valuing Rs.19.15 crore were lying unused in stores for more than one year. These included even general purpose items valuing Rs.1.13 crore.

The Management stated that it was the responsibility of MRP♣ controller to release the purchase requisition taking into account the stock position, current consumption and quantity on order. Once the MRP controller was of the view that material was to be purchased, it was the decision of the business units and that a report on age analysis of CIOS♠ was being generated by the system.

The reply was not tenable as even after implementing the ERP system the checks were carried out by MRP controller manually as was being done in the legacy system and these remained subjective in the absence of any laid down minimum, maximum and reorder levels of inventory holding.

6.7.2.2 Purchase requisition release dates

It was observed that the release♥ date field in the purchase requisitions in the system automatically captured the date as one day prior to the date of delivery of material indicated in the purchase requisition instead of actual date of release. Capturing of wrong date of release, which was a vital key indicator resulted in vitiating any analysis or MIS generation involving date of release of the PR due to wrong capture of data in the SAP reports.

The Management stated that since purchase order processing time, goods receipt processing time and delivery period were not maintained in the system, by default the system took one day prior to delivery date as the release date. It also stated that actual date of release could be

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♣ ***Material Requirement Planning.***

♠ ***Capital item on Stock***

♥ ***Date when purchase requisition is approved by the relevant authority***

viewed from the change history. The reply of the Management was not tenable as the change history did not form part of any SAP/MIS reports.

6.7.2.3 Open purchase orders with small residual quantity

In case where the finally delivered quantity of material against a purchase order was marginally less than the ordered quantity and the remaining ordered quantity was not expected to be delivered, the purchase order was to be closed as completed so that funds attached therewith were freed for other use. The ERP system had neither been configured to close or trigger the closing of such purchase orders nor did the MM function generate periodical reports from the system to close such open purchase orders. Due to non closing of such type of open purchase orders, the material and funds attached to such quantities remained blocked during the year.

Analysis of open purchase orders for the period October 2003 to March 2005 with delivery date before 30 September 2005 and residual quantity of less than 10 *per cent* of the ordered quantity as in July 2006 revealed that 240 purchase orders of this nature involving funds of Rs.3.39 crore were yet to be closed.

ICE group accepted that closing of such purchase orders was a manual activity and the system had not been configured to close or trigger closing of such purchase orders and no data validation controls had been put in place. This showed management reporting control failure as it was not ensured that the relevant data was being collected for the creation of management information reports and exception reports on open purchase orders.

6.7.3 Discrepancies in in-house developed report

For generating MIS data on the status of in-transit inventory and monitoring the clearance of in-transit items, an in-house 'MIT[♣] Report' had been developed in the system. Test check of MIT Reports in audit revealed the following inconsistencies and incorrect reporting of information:

6.7.3.1 The MIT report calculated wrong values of in-transit inventory where stock keeping unit[♦] of measurement was not used in the Stock transport orders (STO) for internal transfer of material. In a test check it was observed that the MIT Report for Mumbai plants on 25 July 2006 reported stock value of in-transit High Speed Diesel as Rs.9297.37 against actual value of Rs 9297374. Similarly, the MIT report for onland plants on 31 July 2006 reported stock value of in-transit inventory of High Speed Diesel as Rs.4936 against actual value of Rs.4936080.

The Management accepted the facts and stated that action will be taken to rectify the errors.

6.7.3.2 The MIT report for Mehsana Asset on 31 July 2006 erroneously reported 180 litre of Formaldehyde solution as in-transit item though the goods receipt document for the full quantity was already posted on 19 May 2005. Moreover, the report captured the goods receipt document in the column for goods issue document. In another instance, the MIT report for Drilling Services Kolkata on 29 May 2006 did not capture the in-transit value of

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♣ ***Material in transit***

♦ ***The unit for recording stock balance and maintaining price in material Master***

chain for chain tong issued on 13 April 2006, which however was captured in the MIT report on 2 June 2006.

6.7.4 Data migration

Analysis of data revealed gaps in the data migration processes run by the organisation during implementation of the ERP system as indicated below:

Material master data ♦

6.7.4.1 It was observed that 16780 master records were migrated into the ERP system without complete codification details out of which 3880 records were not associated with any material in the master table. As the primary details of the material were missing in these records, transactions concerning these materials could not be made. The inventory lying against these material codes since October 2004 amounted to Rs.3.52 crore. It was also observed that subsequent to the data migration, ICE MM core teams, responsible for creation and maintenance of the Material Master data further blocked♥ 4043 discrepant master records to prevent the users from making any procurement against these material codes.

The Management accepted the fact of uploading of master records without complete codification details and stated that these materials could be issued from stores if identified by the users. It further stated that cleaning♠ of Material Master was an on-going job and the codification cell had been interacting with the users for getting information on these blocked material codes.

The reply was not acceptable as data cleaning process should have preceded implementation of a new system to ensure that the current system maintained and processed correct and reliable data. Further, the System did not provide any information on these materials to enable users to identify and issue the same.

6.7.4.2 There were 801 records of spares items in the master table without details of part numbers. So, these records provided insufficient details to the users for placing indent on inventory management and for MIS generation. Similarly, 56741 records with missing manufacturer name were also found among the spares items.

The Management accepted the fact and attributed the same to non-availability of data during the Material Master clean up exercise prior to going live at various locations.

6.7.4.3 Stores and spares balances

In order to check the correctness of data during the data migration from the legacy system into the new system, Audit analysed sample data that was uploaded into the MM module. Comparative study of the migrated unit price vis-à-vis the current moving average prices

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♦ ***Material master file is the central repository of information used to store details of materials that are purchased by an organization. Information like accounting data, purchasing data, production data, classification details, storage information, etc. are maintained in the material master file.***

♥ ***1555 material codes were blocked with status as 'duplicate record'. 2488 codes were blocked with status as 'temporary codes'.***

♠ ***Cleaning of data involves removing mismatch of description/material codes, verification of balances, completing details on missing data, identifying/resolving errors found during conversion***

revealed that the former was abnormally higher than the latter. This indicated that the data migrated from legacy system was unreliable.

6.7.5 Physical count process

Physical count of inventory items is an important control procedure for periodical updating of the book balances to ensure conformity with actual physical balances. Test check of data for 2005-06 in audit revealed the following deficiencies:

6.7.5.1 Physical count was not being conducted regularly and completely. In five♣ units no physical count of category A and B capital assets was carried out in the first quarter of 2005-06 and bulk of the verification took place in the third and fourth quarters of the year. In respect of other inventory items it was observed that no verification of capital items was conducted in five locations♦ and incompletely conducted in seven of the 14 locations♥ since implementation of the Warehouse Management Module. Similarly, in respect of Category 'A' stores and spares items which were to be verified every year, no verification was done in four locations♠ and it was incompletely done in the remaining locations. No verification of category B and C items was conducted at all in three• units.

6.7.5.2 The System did not provide any report or facility for age analysis of discrepancies in stock verification. Also, despite the improved availability of information after ERP implementation, large number of discrepancies in stock verification was outstanding for want of final settlement. As on 31 March 2006, shortages in stock verification amounting to Rs.7.60 crore and excess of stock verification amounting to Rs.2.48 crore were outstanding.

6.8 Conclusions

From the audit conducted it could be concluded that adequate data input controls and internal control procedures had not been put in place to ensure accurate and timely capture of data. The deficiencies observed in the master data indicated weaknesses in data conversion plan, methods of collecting and verifying the data to be converted and identifying and resolving any errors found during conversion. The maintenance of incomplete data in the master tables undermined the effectiveness and efficiency of the system and created scope for errors at the user level. There was a risk of defective decision making based on the incomplete data presented by the MIS reports. Due to absence of any prescribed minimum, maximum and reorder levels of stock and carrying out of MRP controlling activity manually, the organisation was yet to achieve the benefits provided by the ERP system for material planning and inventory control.

♣ ***Mumbai, Dehradun, Baroda, Assam Asset and RO, Agartala***

♦ ***Baroda, Central Workshop Baroda, Dehradun, Dhansiri Valley Project and Uran***

♥ ***The Warehouse Management Module was implemented across the Company except in five units during 2005-06, hence data on verification of stores and spares items after implementation of WM module was analysed***

♠ ***Baroda, Dhansiri Valley Project, CBM project, and Uran***

• ***Baroda, Dhansiri Valley Project and Uran***

6.9 Recommendations

The Management needed to take measures in the following areas to optimize the use of and benefits from the investment made in the ERP system:

- Strengthening input controls, validation controls and internal control procedures to ensure accurate and timely capture of data;
- Strengthening the role of the MRP controller through the system and optimising system use by fixing minimum, maximum and reorder levels in respect of spares;
- Cleaning of migrated master data to rectify the errors that have crept into the ERP system and establishing comprehensive procedures for periodical review of master data;
- Organising regular training programmes to raise the level of user awareness and minimise errors of data input and making available updated operational documentation to the end users.

The matter was reported to the Ministry in December 2006; reply was awaited (December 2006).

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Dated:

Countersigned

(VIJAYENDRA N. KAUL)
Comptroller and Auditor General of India

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Dated: