2.5 Jaipur Vidyut Vitran Nigam Limited

Information Technology Audit review on the High Tension Billing System

Highlights

The Company neither formulated nor documented Information Technology policy/security policy.

(Paragraph 2.5.6)

The Company could not ensure compliance to the provisions of the service level agreement by the vendor.

(Paragraph 2.5.7)

The Company did not formulate a Business Continuity Plan nor could ensure the availability of updated data and the application leading to risk of unavailability of the data in case of any eventuality.

(Paragraph 2.5.8)

Non mapping of business rule into the system led to short realisation of revenue by the Company.

(Paragraph 2.5.10)

Introduction

2.5.1 Government of Rajasthan issued (July 2000) a gazette notification unbundling Rajasthan State Electricity Board into five Companies *i.e.* Rajasthan Rajya Vidyut Utpadan Nigam Limited (generation Company); Rajasthan Rajya Vidyut Prasaran Nigam Limited (transmission Company) and three regional distribution Companies namely Jaipur Vidyut Vitran Nigam Limited, Ajmer Vidyut Vitran Nigam Limited and Jodhpur Vidyut Vitran Nigam Limited.

Jaipur Vidyut Vitran Nigam Limited (Company) was incorporated under the Companies Act, 1956 by Government of Rajasthan, and was created with the principal object of engaging in the business of distribution and supply of electricity in 12 districts[*] of Rajasthan. The operation of Company is managed by eight distribution circles[**].

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[*] Jaipur, Dausa, Alwar, Bharatpur, Dholpur, Kota, Bundi, Baran, Jhalawar, Sawaimadhopur, Tonk and Karauli.

[**] Jaipur City, Jaipur Distt., Dausa, Alwar, Bharatpur, Kota, Jhalawar and Sawaimadhopur.

The consumers of power were mainly divided into two categories *i.e.* High Tension (HT) and Low Tension (LT) consumers. During the year 2005-06, the HT consumers contributed Rs.914.53 crore against the total revenue of Rs.2,523.68 crore of Jaipur Discom. As on December 2006 the Company was billing 1,330 number of consumers. The computerized HT billing system was initially implemented in 1993 in COBOL[*] /Unix platform[**] by BSES computer agency. The computerized billing of the Company was outsourced to M/s Aditi Computer Agency (vendor) in November 2004.

Administrative Structure

2.5.2 The Company is managed by BOD. Chairman and Managing Director is the Chief Executive of the Company and is assisted by various departmental heads at the corporate level.

At present, the IT needs of the Company are seen by Executive Engineer (IT) and Executive Engineer (CRP), who function under the Chief Engineer (RP). However, prior to this (*i.e.* audit period), Superintendent Engineer (Commercial) and Chief Accounts Officer were looking after the implementation and maintenance of HT billing system.

Audit Objectives

2.5.3 IT Audit on the High Tension billing system of the Company was conducted in order to evaluate the effectiveness of the present application software with reference to the requirement of commercial division of the Company and to ensure that the relevant business rules, terms and conditions of the tariff and periodical operational instructions have been correctly embedded in the software and the input control ensure the correctness and completeness of data.

Audit Criteria

2.5.4 The Billing system has been assessed against:

* circulars/orders issued by the Company regarding HT billing;
* tariff rules of Rajasthan Electricity Regulatory Commission (RERC); and
* terms & conditions of the contract with the vendor.

[*] COBOL-Common business oriented language.
[**] Operating system developed by Unix.

Scope and Methodology of Audit

2.5.5 The scope of audit included the evaluation of controls specific to computerised HT billing system and the effectiveness of this system in generating correct billing for the Company. The data of HT bills pertaining to April 2005 to November 2006 of all eight circles of the Company was selected for checking with a view to ascertain completeness, regularity and consistency of data.

The entire data of the above period was obtained in TEXT format (*i.e.* converted from COBOL to TEXT) and was analysed using Computer Assisted Audit Technique.

Audit Findings

Lack of IT policy

2.5.6 The Company have not formulated a formal IT policy and a long-term/medium-term IT strategy for monitoring the implementation of IT application in a systematic manner with clear roles and responsibilities.

The Government stated (August 2007) that there is no IT Policy for HT billing system.

Non-implementation of service level agreement

2.5.7 As per the service agreement, the vendor was to develop the software and provide flow chart of the programme as well as the system design document. The vendor was also to provide back up of the database and training to the employees of the Company. It was observed that the provisions of the service level agreement were not implemented by the vendor and the Company failed to enforce the same as brought out below:

- It was observed that vendor did not develop the required software as per terms of the work order and worked on the platform (COBOL/UNIX) used by the earlier vendor (M/s BIPS, Jaipur) which was basic and involved simple computation of the bill amount and the printing of the bills**.** As per terms of contract, the vendor neither documented the application software nor provided the flow chart, SDD and source code to the Company.

  The Management stated (April 2007) that system documentation will be provided by the vendor on completion of the work order.

- Audit further observed that the Company awarded the work of calculating security deposit to another vendor (Mahima Marketing) at a cost of 80 paise per entry despite it was the part of the contract awarded to the vendor M/s Aditi computer. This led to creation of another database as well. Creation of duplicate database could lead to inconsistencies in the data between the two databases apart from additional expenditure*.

The Management accepted (April 2007) the audit observation.

* As per terms of contract, the vendor did not provide training to the personnel nominated by the Company.

Thus, the inability of the Company in enforcing the provisions of the service level agreement on the vendor led to a basic and primitive application software in place.

Inadequate Business Continuity Plan

2.5.8 The HT billing system was a critical system as the bills were being generated through the system based on which the revenue was realised by the Company. Although backup of HT billing data was taken at periodical intervals, there was no formal policy regarding the frequency of test checking the backup for recovery. Moreover the backups received from the vendor were never tested by the Company. Further, the vendor was to provide utility programme for use of the backup database. However, the Company replied that no utility programme was provided by the vendor for use of the database.

Audit also observed that the back up data made available by the earlier vendor (M/s BIPS, Jaipur) could not be used as the vendor did not hand over the application programme as well as source code. The Management stated (May 2007) that backup provided by the vendor could not be checked due to non-availability of the person/official accustomed or well versed with the software. Further, it was also noticed that the Company did not have any disaster recovery plan or a business continuity plan either.

Thus the Company was not in a position to ensure the continuity of the billing function in case of any eventuality.

Non-mapping of business rules

2.5.9 As the billing system is the most important aspect of revenue realisation for the Company, it is imperative that the business rules are mapped completely in the application with all the necessary controls to ensure that the amount billed and collected according to the prescribed rules. Audit observed that the relevant business rules had not been fully and correctly mapped into the application, which had an impact on the revenue realisation. The deficiencies noticed are discussed in the succeeding paragraphs.

Incorrect rounding off of power factor (PF)

2.5.10 As per the "Tariff for Supply of Electricity-2004" (clause V(e) of part II of Tariff Structure), consumers having sanctioned connected load more than

* The claim by the new vendor has not been submitted so far (September 2007).

150 HP had to maintain an average power factor of not less than 0.90. In case the average power factor falls below 0.90, a surcharge at one *per cent* of energy charges for every 0.01 fall in average power factor below 0.90, is leviable. Otherwise an incentive of one *per cent* of energy charges is to be provided if average power factor is above 0.95 for each improvement of power factor by 0.01 above 0.95.

On analysis of bills generated for the year 2005-07 (up to November 2006), it was observed that due to adoption of incorrect method for rounding off the power factor, an amount of Rs.6.80 crore was either granted as excess incentive or short levied as surcharge, as the case may be **(Annexure-27).**

On being pointed out, the Company referred (December 2006) the matter to RERC for clarification for the method used by them for rounding off of the power factor. RERC clarified (December 2006) that rounding off method as adopted by the Company to calculate the average power factor was incorrect.

The Government stated (August 2007) that pursuant to RERC clarification, the practice of rounding of average power factor has been modified from the billing month (April 2007). The fact remains that by grant of excess incentive/short levy of surcharge, the Company sustained loss of revenue of Rs.6.80 crore.

Incorrect adoption of the power factor

2.5.11 As per the direction of RERC, the Company vide its Commercial order number JPR-5-188 (10 May 2004) directed that whenever any change in contract demand/connected load is affected in the middle of the month, bills for each period should be prepared separately considering all the charges like demand charges, fixed charges, minimum billing, power factor surcharge/incentive on *pro rata* basis, separately for each period.

However, on analysis of the bills generated it was observed that the power factor in such cases was worked out by the system on average basis (*i.e.* by combining consumption of both the period) instead of separate calculation for each period indicating that the business rule was incorrectly mapped. However, as the energy reading database was not made available to audit, the impact of this deficiency could not be worked out by audit.

Application of incorrect tariff

2.5.12 The Company prescribed the current transformer/potential transformer rent and transformer rent with reference to their voltage supply and contract demand respectively for different categories of consumers of electricity. Any changes in the contract demand and the voltage supply was communicated to the vendor by the Company. A review of current transformer/potential transformer (CT/PT) rent revealed that the application software did not have provision to apply correct CT/PT rent rate on the consumers as per their voltage supply and the transformer rent rate as per their contract demand. Thus the Company also had to provide the rates of tariff applicable along with the contract demand/ voltage supply and energy usage to the vendor. Audit observed that the CT/PT rent was not charged correctly from six HT consumers during 2005-07 (up to November 2006) whose voltage supply had changed and the transformer rent was incorrectly charged from three consumers whose contract demand had changed when the Company did not intimate the rates of tariff along with these changes to the vendor.

The Government stated (August 2007) that the programme to charge the CT/PT rent according to the voltage of supply has now modified. As regards to incorrect charging of transformer rent, the Government stated that in case the consumers having contract demand more than 160 KVA it is hardly feasible for the software to incorporate the inbuilt provisions. The reply of the Government in respect of short collection of transformer rent was not acceptable since it involved mapping of business rules by incorporating necessary validation checks. Moreover the contract demand in respect of cases pointed out were less than 160 KVA only.

Non/short recovery of transformation losses

2.5.13 As per the provisions of Tariff the Company may, provide metering equipments on low voltage side of consumer's transformer and in such a case; an amount equal to 3 *per cent* (three *per cent*) shall be added to the recorded energy consumption and demand to cover transformation losses.

A review of computation of the tariff calculation including the transformation losses revealed that the application software did not have provision to apply correct rate of tariff as per the contract demand. Audit observed that due to this deficiency the required transformation losses were not charged correctly, as prescribed in the tariff in case of four consumers (having contract demand more than 5,000 KVA but metering equipment on 33 KV instead of 132 KV) which resulted in under recovery of Rs.96.21 lakh towards energy charges and Rs.9.60 lakh towards electricity duty and in case of five consumers (having contract demand of more than 1,500 KVA & up to 5,000 KVA, but metering equipment was on 11 KV instead of 33 KV) which resulted in under recovery of Rs.1.18 crore towards energy charges and Rs.11.76 lakh towards the electricity duty.

Other points of interest

Undue benefit allowed to Large Industrial Consumers

2.5.14 As per the provisions of Terms and conditions for supply of Electricity (TCOS) – 2004 security to be deposited with the Company against electricity to be supplied to large industrial consumers applying for supply of electricity was equivalent to two month's average consumption of electricity for the preceding twelve months for fortnightly billing consumer.

On scrutiny of bills generated, it was observed that in case of 25 consumers, the required security deposit was short recovered to the tune of Rs.7.09 crore during 2006-07, which also resulted in loss of interest of Rs.9.31 lakh*.

The Management stated (July 2007) that they had approached the State Government for guidance. The Government instead of providing guidance/instructions endorsed (August 2007) the reply of the management.

Conclusion

The Company did not ensure the implementation of service level agreement with the vendor. Incorrect mapping of business rules resulted in deficient billing application software. This led to incorrect billing of the consumers, especially in cases of changes in the consumer parameters leading to financial loss to the Company.

The Company did not have adequate back up policy nor a disaster recovery plan. Thus continuation of the billing function in case of any eventuality was not ensured.

Thus, the Company was vulnerable to the risk of loss of revenue apart from disruption of important function of the revenue realisation.

Recommendations

- **Management should enforce the Service level agreement.**
- **An internal control mechanism should be developed to monitor the working of the billing system through the outsourced vendor.**
- **A comprehensive business continuity plan has to be formulated and implemented.**
- **Spread awareness of initiatives undertaken by the Company through various media and create a strong active public sentiment.**

* (Interest = Rs.7,09,45,897 x 1.75 *per cent* (interest 7.75 *per cent* - 6 *per cent*) x 9 months/12 months =Rs.9.31 lakh)