

## Chapter II

### Performance Audit relating to Government Companies

#### Rajasthan Rajya Vidyut Utpadan Nigam Limited

#### 2.1 Performance Audit on Fuel Management

##### Executive summary

*The Rajasthan Rajya Vidyut Utpadan Nigam Limited (RRVUNL) operates two coal based thermal power stations at Kota (1,045 MW) and Suratgarh (1,250 MW) and two gas based thermal power stations at Ramgarh (110.5 MW) and Dholpur (330 MW). Fuel comprising of coal and gas were major component for generation of electricity. Fuel cost (Rs. 14,336.59 crore) constituted 88.69 per cent of total generation cost (Rs. 16,165.25 crore) during 2004-05 to 2008-09 in respect of Kota, Suratgarh and Ramgarh power stations. The performance audit was conducted to ascertain fuel efficiency in power generation, economy in procurement and transportation, effectiveness of quality assurance and energy audit, actual consumption against norms, inventory management and financial management with reference to fuel.*

##### *Procurement of fuel*

*Coal is allotted by Standing Linkage Committee (SLC) from different collieries. As against required quantity of 647.53 lakh MT, SLC allotted 691.50 lakh MT but the actual receipt thereagainst was only 592.68 lakh MT during 2004-09. Since RRVUNL had projected the requirement above the Central Electricity Authority targets for generation, there was no shortfall. The cost of coal was Rs. 7,584.73 crore. There was decrease in linkages from superior coal fields. The beneficiation of coal was not 100 per cent resulting in savings of Rs. 24.79 crore not achieved.*

*The tie-up with GAIL for supply of gas was not for adequate quantity. This resulted in loss of generation of 1,426.64 MUs as the Plant Load Factor ranged between 36 and 45 as against 70 per cent fixed by Rajasthan Electricity Regulatory Commission (RERC).*

##### *Transportation of fuel*

*The coal is transported through Railway wagons. Out of total cost of Rs. 13,847.14 crore on coal fuel, transportation accounted for*

*Rs. 6,262.41 crore (over 45 per cent). No norm for transit loss was fixed. Taking the norm of 1.5 per cent fixed for contractor of beneficiated coal, the excess transit loss worked out to Rs. 49.95 crore. The RRVUNL did not follow the proper quality assurance procedures. The claims for Rs. 94.12 crore for under loading and over loading were not preferred/adjusted.*

##### *Consumption of fuel*

*The actual consumption of coal and gas was higher than the norms fixed by RERC.*

*The excess consumption of coal due to higher Station Heat Rate than the norms was valued at Rs. 245.10 crore.*

##### *Inventory management*

*Safe and critical level of coal stock was prescribed at 15 days and 7 days respectively. On several occasions the coal level remained critical during 2006-07 to 2008-09.*

##### *Financial management*

*The financial management was deficient as instances of delay in realisation of claims, payment for coal supplies etc. were noticed.*

##### *Energy audit*

*Energy audit was not undertaken for reducing the heat losses.*

##### *Conclusion and Recommendations*

*Fuel management system of RRVUNL did not meet the expectation of being operated economically and efficiently. System of procurement and transportation of fuel was deficient and the actual consumption of coal and gas was higher. There was considerable scope for improvement in performance of fuel management system to enhance overall operational performance. The review contains eight recommendations which includes close monitoring of transit losses and analysis of reasons for excess consumption of coal for taking remedial measures.*

## Introduction

**2.1.1** The Government policy on power generation is intended to meet the galloping demand in the power deficit State by providing quality power to all, at reasonable rates. The conventional process of generation of the power consumes a large volume of fuel, both coal and gas, which are scarce, non renewable and fast depleting resources. Coal is concentrated in a particular zone of the country and the gas is available in the remote areas. The natural resources are state owned with complex allocation process and their transportation is costly affair for the remotely located thermal stations. Fuel management is important in financial terms also as it constitutes major component of the cost of the power generated. Hence minimization of the transit losses and consumption as per the norms are the key drivers for effective fuel management.

The Rajasthan Rajya Vidyut Utpadan Nigam Limited (RRVUNL) operates two coal based thermal power stations (TPSS) - Kota Super Thermal Power Station (KSTPS) at Kota (1,045 MW) and Suratgarh Super Thermal Power Station (SSTPS) at Suratgarh (1,250 MW) for which coal is procured from South Eastern Coalfields Limited (SECL) and Northern Coalfields Limited (NCL). The RRVUNL also operates two gas based power stations viz; Ramgarh Gas Thermal Power Station (RGTPS) at Ramgarh (110.5 MW) and Dholpur Combined Cycle Power Project (DCCPP) at Dholpur (330 MW) for which gas is procured from GAIL (India) Limited and Oil and Natural Gas Corporation (ONGC) Limited respectively. One lignite based power station viz; Giral Lignite Thermal Power Station (GLTPS) at Giral (125 MW) was installed (February 2007). Power generation also involves use of light diesel oil (LDO), high speed diesel oil (HSD) and furnace oil (FO) as secondary fuels to light up the boiler and impart stability to flame. These are procured from oil companies.

During 2004-09, KSTPS, SSTPS and RGTPS incurred an expenditure of Rs. 14,336.59 crore (Coal Rs. 13,846.74 crore, Gas Rs. 276.74 crore and oil Rs. 213.11 crore) towards fuel cost representing 88.69 *per cent* of total generation cost (Rs. 16,165.25 crore) during the same period.

## Scope of Audit

**2.1.2** A Performance audit was conducted during February to April, 2009 covering the RRVUNL activities relating to assessment of requirement, procurement, transportation, quality assurance and financial management including claim management of fuel for period from 2004-05 to 2008-09\* at KSTPS, SSTPS and RGTPS. The performance of DCCPP and GLTPS was not covered in the present performance audit as DCCPP commenced commercial

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\* Figures for the year 2008-09 are as provided by the Management based on provisional unaudited accounts.

operation between March and December 2007, whereas the commercial operation at GLTPS was yet to be commenced. The audit findings are based on test check of records at RRVUNL Headquarter at Jaipur and at KSTPS, SSTPS and RGTPS.

### **Audit objectives**

**2.1.3** The performance audit of fuel management was carried out to assess whether:

- the procurement and transportation of fuel was done economically and efficiently;
- the quality and quantity of fuel received was inspected as per the laid down procedure and deviations were timely and adequately claimed from the suppliers;
- the actual consumption of coal, gas and oil was in line with the norms fixed by Rajasthan Electricity Regulatory Commission (RERC);
- an effective and efficient financial management system exists;
- an effective and efficient inventory management mechanism exists; and
- the energy audit was undertaken and recommendations for reducing the heat losses implemented.

### **Audit criteria**

**2.1.4** The performance audit with regard to fuel management by the RRVUNL was assessed against the:

- targeted generation fixed by Central Electricity Authority (CEA) and allocation of coal quantities by the Standing Linkage Committee (SLC) of Government of India, and directions of the Government for import of coal;
- agreements with coal, gas and oil supplier companies, transport agency as well as with liaison agents;
- norms of consumption of coal, gas and oil fixed by CEA/RERC; and
- norms of station heat rate (SHR) fixed by RERC.

### **Audit Methodology**

**2.1.5** Audit adopted a mix of the following methodologies for achieving the audit objectives keeping in view the audit criteria:

- examination of agenda and minutes of the Board of Directors (Board) meeting for awarding of work, procurement of fuel and appraisal of the performance of the plants;
- scrutiny and analysis of fuel related guidelines of CEA/RERC and Ministry of Environment and Forest (MOEF);
- scrutiny of records relating to SLC, procurement, receipt and consumption of fuel, plant outages reports, fuel cost reports, coal and fuel efficiency reports;
- scrutiny and analysis of agreements with coal suppliers, oil/gas companies, liaison agents and Railways and performance thereof; and
- issue of audit queries and interaction with the Management.

### **Audit Findings**

**2.1.6** Audit findings were reported to the RRVUNL and the Government in June 2009 and were discussed (14 September 2009) in the Exit Conference which was attended by the Chairman and Managing Director along with the Chief Engineers of KSTPS and SSTPS in addition to other officers of auditee unit. The views expressed by them have been considered while finalizing the performance review.

The performance of KSTPS, SSTPS and RGTPS was deficient in the areas of materialization of linkage, fuel consumption, transportation of fuel, quality assurance and financial management.

The Management in the exit conference stated (September 2009) that they were heavily dependent on the coal companies and Railways, who were operating in monopoly environment, for procurement of their fuel requirement and on many occasions were unable to exercise continued pursuance to their advantage in the matter of materialization of linkage, coal quality *etc.*

### **Fuel Management**

**2.1.7** Fuel cost is the major component of the total cost of the power generation. Optimization of the fuel cost by effective planning, procurement and consumption is, therefore, necessary to generate electricity at economical rates. The plant-wise fuel cost and total generation cost for the period of

review is given below:

(Rs. in crore)

Particulars	KSTPS	SSTPS	RGTPS	TOTAL
Fuel cost	5716.83	8247.16	372.60	14336.59
Total generation cost	6277.22	9422.73	465.30	16165.25
Percentage of fuel cost to generation cost	91.07	87.52	80.08	88.69

Fuel cost ranged from 80.08 to 91.07 *per cent* of total generation cost in respect of different plants during the review period.

The material cost *i.e.* the fuel cost per unit of KWH at KSTPS, SSTPS and RGTPS is given below:

(in paisa)

Name of Station	2004-05	2005-06	2006-07	2007-08	2008-09
SSTPS	161	169	177	185	225
KSTPS	143	143	143	153	185
RGTPS	165	188	260	268	NA

It can be seen that fuel cost for SSTPS had increased by 64 paisa per unit, while fuel cost for KSTPS increased by 42 paisa per unit during the review period indicating higher fuel cost increase in the case of SSTPS. While KSTPS units/plants were old but located near to the supply point of fuel, SSTPS plants were new and equipped with latest technology of higher generating capacity (MW) but located far away from the supply point of fuel as compared to the KSTPS. The increase in per unit fuel cost was attributable to failure in materialization of linkage of fuel and loss of generation, inadequate use of washed coal, increased composition of low grade coal, higher incidence of transit losses, failure to improve the productivity in consumption of coal, ineffective contract and financial management, lack of energy audit *etc.*, apart from general rise in price of fuel and freight as discussed in detail in paragraphs 2.1.9 to 2.1.13, 2.1.15 to 2.1.18, 2.1.22 to 2.1.23 and 2.1.28 to 2.1.36.

Fuel cost (Gas and Oil) for RGTPS had increased by 103 paisa per unit from 165 paisa to 268 paisa during 2004-05 to 2007-08. The rise in fuel cost was mainly due to the failure of the RRVUNL to secure full supply of gas. The inability to use enhanced gas supply effectively resulted in substantial under-utilization of one Gas Turbine (GT) and Steam Turbo Generator (STG) *etc.* as discussed in detail in paragraphs 2.1.14 and 2.1.24 to 2.1.26.

The fuel cost of RRVUNL to total generation cost increased from 86 *per cent* in 2004-05 to 93 *per cent* in 2007-08.

## Procurement

### *Procurement of Coal*

**2.1.8** The RRVUNL assesses the requirement of fuel on the basis of annual generation targets fixed for KSTPS and SSTPS and approved by the RERC.

KSTPS and SSTPS work out the quarterly requirement on the basis of annual targets. The CEA recommends quarterly requirement of the TPS to the SLC which allots coal linkages from different collieries *i.e.* SECL (Korea-Rewa), SECL (Korba) and NCL and also allows the import of coal as and when necessary.

Coal is purchased from coal companies against proforma invoices. The RRVUNL makes weekly ad hoc payment of coal to coal companies on the basis of the quarterly linkages allocated by the SLC. The rate of coal (grade wise) is determined by the Ministry of Coal. On receipt of coal at TPSs, the grade of coal is assessed by a third party jointly appointed by both TPSs and coal companies and a final bill or grade slippage claim is raised for settlement of coal cost.

The year-wise data of coal procured from different coal fields during review period are given below:

Name of Coal companies	Coal procured (lakh MT)									
	2004-05		2005-06		2006-07		2007-08		2008-09	
	KSTPS	SSTPS	KSTPS	SSTPS	KSTPS	SSTPS	KSTPS	SSTPS	KSTPS	SSTPS
SECL Korea Rewa	21.00	22.39	20.45	22.08	21.47	23.68	24.11	26.16	22.48	22.04
NCL	11.71	8.07	8.92	5.10	4.07	2.36	4.14	1.83	8.55	7.13
<b>Total (superior)</b>	<b>32.71</b>	<b>30.46</b>	<b>29.37</b>	<b>27.18</b>	<b>25.54</b>	<b>26.04</b>	<b>28.25</b>	<b>27.99</b>	<b>31.03</b>	<b>29.17</b>
SECL Korba Raw	19.83	20.91	17.13	22.08	25.36	22.83	13.02	16.86	2.47	6.46
SECL Korba raw (washed)	0	7.14	2.79	7.11	0.77	9.79	11.86	15.48	23.01	24.75
<b>Total (inferior)</b>	<b>19.83</b>	<b>28.05</b>	<b>19.92</b>	<b>29.19</b>	<b>26.13</b>	<b>32.62</b>	<b>24.88</b>	<b>32.34</b>	<b>25.48</b>	<b>31.21</b>
<b>Total (Others)</b>	<b>1.03</b>	<b>3.61</b>	<b>4.11</b>	<b>4.89</b>	<b>3.30</b>	<b>4.03</b>	<b>3.34</b>	<b>3.54</b>	<b>3.54</b>	<b>3.90</b>
<b>Grand Total</b>	<b>53.57</b>	<b>62.12</b>	<b>53.40</b>	<b>61.26</b>	<b>54.97</b>	<b>62.69</b>	<b>56.47</b>	<b>63.87</b>	<b>60.05</b>	<b>64.28</b>
<b>Total value (Rs. in crore)</b>	<b>548.10</b>	<b>586.84</b>	<b>661.02</b>	<b>713.13</b>	<b>638.98</b>	<b>766.77</b>	<b>721.39</b>	<b>925.34</b>	<b>942.24</b>	<b>1080.92</b>

The RRVUNL executed (May 1999) Fuel Supply Agreement (FSA) with SECL for supply of coal to both the TPSs for three years valid up to May 2002. TPSs continued to obtain supply of coal according to terms and conditions of said FSA with coal companies without executing new agreement. The new draft FSA was under evaluation and finalization at various levels for more than seven years and approved belatedly in August 2009. The main reason for delay was disagreement on various clauses of FSA between the coal companies and RRVUNL. Reaching an agreement on such clauses took almost seven years, part of which was avoidable with timely pursuance and follow up.

**Poor linkage materialization**

**2.1.9** The RRVUNL appoints liaison agent for maximum realisation of coal supplies to TPSs against linkage allotted by SLC and/or reduction of shortages in coal supplies received at TPS and accordingly apart from the remuneration, bonus was payable for materialisation of linkage more than specified, while penalty was recoverable for failure to get specified linkage which was prescribed at 92 *per cent* of allocated linkages. Further, as per clause 5.12 of the work order the coal liaison agent was responsible to ensure that supply is dispatched against approved linkages and the required quantity of coal is moved by Railway from the allocated collieries to TPS.

The year-wise targeted generation as reported to SLC, actual generation, requirement of coal as per the targeted generation, linkage allotment, actual receipt of coal and excess/shortage with reference to required coal for standard generation during the review period have been shown below:

Year	Power stations	Targeted generation as reported to SLC (MUs)	Actual generation (MUs)	Coal requirement for targeted generation as reported to SLC (lakh MT)	Linkage quantity (lakh MT)	Actual Receipt (lakh MT)	Excess(+)/ Short(-) receipt of coal (lakh MT) (7-5)
1	2	3	4	5	6	7	8
2004-05	KSTPS	8440	7430.72	57.34	60.45	53.57	-3.77
	SSTPS	9891	9362.32	64.94	70.50	62.12	-2.82
<b>Total</b>		<b>18331</b>	<b>16793.04</b>	<b>122.28</b>	<b>130.95</b>	<b>115.69</b>	<b>-6.59</b>
2005-06	KSTPS	8543	8294.15	57.90	60.60	53.40	-4.50
	SSTPS	10475	9951.22	68.09	70.50	61.26	-6.83
<b>Total</b>		<b>19018</b>	<b>18245.37</b>	<b>125.99</b>	<b>131.10</b>	<b>114.66</b>	<b>-11.33</b>
2006-07	KSTPS	8681	8162.63	59.26	67.80	54.97	-4.29
	SSTPS	9984	10205.59	65.17	68.40	62.69	-2.48
<b>Total</b>		<b>18665</b>	<b>18368.22</b>	<b>124.43</b>	<b>136.20</b>	<b>117.66</b>	<b>-6.77</b>
2007-08	KSTPS	8551	8395.46	61.89	68.70	56.47	-5.42
	SSTPS	10707	10222.52	70.66	78.75	63.87	-6.79
<b>Total</b>		<b>19258</b>	<b>18617.98</b>	<b>132.55</b>	<b>147.45</b>	<b>120.34</b>	<b>-12.21</b>
2008-09	KSTPS	8843	8674.16	65.17	70.50	60.05	-5.12
	SSTPS	11151	9740.61	77.11	75.30	64.28	-12.83
<b>Total</b>		<b>19994</b>	<b>18414.77</b>	<b>142.28</b>	<b>145.80</b>	<b>124.33</b>	<b>-17.95</b>
<b>Grand total</b>		<b>95266</b>	<b>90439.38</b>	<b>647.53</b>	<b>691.50</b>	<b>592.68</b>	<b>-54.85</b>

It would be seen that actual receipt of coal was lower than the requirement in all the years of review period and shortfall in coal receipt increased from 6.59 lakh MT in 2004-05 to 17.95 lakh MT in 2008-09. Audit observed that despite allotment of higher linkage of 691.50 lakh MT which was more than the requirement, the RRVUNL could secure actual receipt of only 592.68 lakh MT of coal which constituted 85.71 *per cent* of allotted linkage and 91.53 *per cent* of required linkage during the period under review. The materialization of the linkages was not adequate and contributed to shortfall in actual receipt of 54.85 lakh MT of coal. Despite entrusting the work of ensuring adequate linkage of fuel to a liaison agent and prescribing incentive for improving materialization of linkage beyond 92 *per cent*, actual receipt of coal was inadequate and the RRVUNL did not effectively address the lower

materialization of linkage with timely payment of coal supplies, effective follow up with Railways, Ministry of Coal and liaison agents *etc.* The delay in payment of coal supplies was due to absence of proper fund management of power sector companies by Rajasthan Rajya Vidyut Prasaran Nigam Limited (RRVPNL) upto August 2007 following unbundling of the Rajasthan State Electricity Board (RSEB) and by RRVUNL thereafter. The coal supplies were also adversely affected due to the delay in timely payment for supplies which increased from average delay of 2 days during 2004-05 to 6-7 days during 2005-06 and to 16-17 days during 2006-07.

The RRVUNL failed to take advantage of allotment of higher linkage for improving its performance as well as assisting in turnaround in the working of the Discoms.

The Management in the exit conference, while agreeing to fact of para stated (September 2009) that actual generation was higher than the targets approved by CEA.

The actual generation was higher than the targets approved by CEA except in 2008-09 for SSTPS and there was possibility of higher generation as well as maintaining of safe level of coal by securing higher coal materialisation during review period.

#### ***Decrease in linkages from superior coalfields***

**2.1.10** The SLC allocated linkages of coal from various coal fields having different grade of coal. As freight constitute major cost of total cost of coal, it was required that the RRVUNL made adequate efforts for follow up and pursue with various authorities including SLC, Ministry of Coal *etc.* for allotment of coal linkages from superior coalfields having better grade of coal. It was noticed that the linkages allotted by SLC from the superior coalfields of SECL (Korea-Rewa) and NCL had decreased from 60.30 (2004-05) to 42.55 (2008-09) *per cent* in respect of KSTPS. Decrease in respect of SSTPS was from 44.05 to 37.45 *per cent* during the period under review. It was noticed that the distance of coal field having 'F' grade (*i.e.* lower grade coal) was more by 200 to 300 Kms (1,717 Kms as against 1,400-1,500 Kms) in respect of SSTPS, thus requiring higher payment of freight for lower quality of coal. It was noticed that freight cost was higher by Rs. 300 per MT during 2007-08 affecting cost structure of generation. The impact of higher freight worked out to 20 paise per unit for electricity generated from lower grade coal received from far places which ranged between 8.58 to 11.70 *per cent* of generation cost during review period. The RRVUNL did not take up matter effectively for allotment of higher grade coal from collieries located nearer to the TPS.

The Management in the exit conference stated (September 2009) that it was not within their control and they were helpless in this regard.

#### ***Procurement of Imported coal***

**2.1.11** Ministry of Power, Government of India looking at wide gap between demand and availability of coal, directed (September 2004) the power utilities

to either import the coal or reduce generation to the extent of coal shortages and also suggested to consider services of MMTC (PSU) due to experience in the field of import of coal. The State Government also accorded its approval to import coal from Public Sector Undertakings (PSUs) though the imported coal is two to three times costlier as against the indigenous coal. The imported coal being high calorific value coal which could be used by blending upto 10 per cent with indigenous coal. The RRVUNL imported total of 11.17 lakh MT coal against the total linkage of 15.30 lakh MT utilizing only 73 per cent of linkage allotted in respect of imported coal during the period under review. Lower utilization of linkage of imported coal also affected the generation of power.

### ***Procurement of Beneficiated coal***

**2.1.12** The process of washing raw coal of inferior quality at washery in order to remove coal dust, stones and shells and cutting the coal into proper size is called beneficiation. The beneficiated coal is also called washed coal, while saving transportation cost by way of eliminating mud/coal dust, stones and shells transported along with coal from coal fields (between 20 to 22.5 per cent) and yielding better quality of coal, improves calorific value and reduces maintenance of coal handling plant and ash handling plants. It also meets the objective of reduction of ash content in coal, thereby reducing the pollution and enabling clean environment as stipulated by the Ministry of Environment and Forest (MOEF). The MOEF notified (September 1997) that the TPS situated at distance of more than 1,000 KMs from the pitheads and the power stations situated in polluted areas should use beneficiated coal (from June 2002) with ash percentage limited to 34 per cent on annualized basis. In view of the benefits of beneficiation and requirement to comply with the statutory requirement, steps were initiated in May 2001 for awarding the work. It was noticed that despite the directions for use of beneficiated coal by June 2002 as per notification (September 1997), RRVUNL could commence the use of beneficiated coal for SSTPS in December 2002 (delay of six months) and for KSTPS in June 2005 (delay of three years). Thus, the RRVUNL could not comply with the statutory requirement by due dates and also lost out envisaged benefits of beneficiated coal. It was also noticed that the RRVUNL could use only 76.31 to 92.53 per cent of raw coal allotted for beneficiation during period under review. The failure of the Management to take timely action on initiating proposal, calling tenders, awarding work for beneficiation and materialising the linkage of raw coal were the main reasons for lower utilization of allotted raw coal for beneficiation. Thus, due to failure of the RRVUNL to use full quantity of raw coal linkage for beneficiation of coal, the envisaged savings of Rs. 24.79 crore could not be availed during the period under review.

**Due to non-utilisation of full quantity of raw coal linkage for beneficiation of coal, the RRVUNL failed to avail the envisaged savings of Rs. 24.79 crore.**

The Management in the exit conference stated (September 2009) that insufficient washery capacity, non materialization of linkage of raw coal and non availability of rakes from Railways were the main reasons for their inability to avail full benefits of beneficiation and were beyond the control of management.

The contention of the management is not convincing as it could have avoided the instances by adequate planning and proper follow up.

***Acceptance of lower yield beneficiated coal***

**2.1.13** The SLC allotted raw coal (F grade) having ash content upto 42 *per cent* for beneficiation from Korba coal field of SECL to be washed at private washery for which the RRVUNL has to award work order for washing of coal and has to pay washing charges on the coal so washed by washery. The RRVUNL awarded work orders to Aryan Coal Beneficiation Pvt. Ltd. for beneficiation of coal on 23 October 2002 and 25 July 2006 with guaranteed yield of 77.5 *per cent* of raw coal supplied with ash content of 30 *per cent*. The management of the RRVUNL was aware that coal from Korba coal field had easy washability with the average yield of 94.8 *per cent* of washed coal with ash content of 34 *per cent* as per study/reports of Asian Development Bank (ADB). It was observed that despite easy washability with expected high yield, the RRVUNL did not explore any option for prescribing higher yield of beneficiated coal. Thus, acceptance of lower yield was not in the interest of the RRVUNL. Even if the yield was prescribed at 80 *per cent* with 30 *per cent* of ash content which was possible based on the report of ADB, the RRVUNL could have saved an amount of Rs. 27.49 crore comprising of Rs. 10.76 crore in KSTPS and Rs. 16.73 crore in case of SSTPS in the form of lower use of raw coal for the same output of beneficiated coal.

The Management in the exit conference stated (September 2009) that yield was prescribed as per orders finalized by Punjab, which was the first state to finalise tenders for washed coal. It further stated that for higher yield washing charges would be more.

The reply is not convincing as the management did not explore for higher yield of 80 *per cent* and even with higher washing charges the benefit of higher yield could have been more.

***Procurement of Gas***

**2.1.14** Gas Turbine I (GT-1) of 35.5 MW was functioning since January 1996 at Ramgarh, for which gas availability was ensured by agreement with GAIL for purchase and delivery of 0.55 Million Metric Standard Cubic Meter Per Day (MMSCMD) of gas. One additional Gas Turbine (GT-2) of 37.5 MW was commissioned in August 2002 with the provision of operating GT on dual firing of fuel *i.e.* gas and oil. Dual firing was provided to take care of the event of non-availability of required quantum of additional gas. The feed stock for the GT-1 and GT-2 was gas and HSD. Steam Turbo Generator (STG) of 37.5 MW commissioned in April 2003 was using waste steam recovered (left after use in GT-1 and GT-2) as its feed stock. GAIL agreed to enhance supply of gas in August 2003 from 0.55 to 0.75 MMSCMD to the extent of availability. It was noticed that against minimum requirement of 1.0 MMSCMD for the operation of both GTs at the same time, the increased availability of 0.75 MMSCMD of gas from October 2004 was also not sufficient to operate both GTs at the same time, thus continuously underutilizing one GT and STG. Audit noticed that adequate quantity of gas supply was not available for both

the GTs, hence indecisiveness of management in not operating both the GTs on dual fuel using HSD as envisaged in project report resulted in substantially lower utilization of capacity. The position of targeted generation at 70 per cent as fixed by the RERC and actual generation and percentage of actual generation to targeted generation for GT-1, GT-2 and STG as well as overall Plant Load Factor (PLF) is given in the **Annexure-7**. The Plant Load Factor (PLF), a measure of the output of a power plant compared to the maximum output it could produce, was always substantially lower due to failure of the RRVUNL to tie up requirement of fuel *i.e.* gas for the project and not operating plant using HSD except during the Rabi period. The percentage of actual PLF ranged between 36 and 45 against 70 per cent fixed by the RERC in determination of tariff during the review period. Further, the PLF was lower than 20 per cent in 17 months in GT-I, six months in GT-2 and 14 months in STG during the review period. In view of the less availability of gas, the RGTPS continued the operation of both GTs by generating one GT at full load and other on part loads or shutting down the second GT which resulted in shortfall in generation of 602.74 MUs valuing Rs. 137.40 crore in GT-I, 106.54 MUs valuing Rs. 20.52 crore in GT-2 and 717.36 MUs valuing Rs. 159 crore in STG during the review period. The commissioning of the GT-2 and STG without ensuring the requirement of supply of gas and non operation on dual fuel resulted in loss of revenue of Rs. 316.92 crore due to less generation.

It was observed that the RERC considered PLF at 70 per cent as against PLF of 80 per cent envisaged in project report, thus allowing relaxation of 10 per cent in PLF and consequent advantage in the determination of two part tariff *i.e.* fixed charges and variable charges. Fixed charges remain fixed irrespective of increase/decrease in output, and includes depreciation, interest, lease rental, operation and maintenance expenditure *etc.* while variable charges varies proportionately to the level of output and includes cost of gas, oil *etc.* Despite this, the RRVUNL did not even operate the plant at 70 per cent PLF and passed on extra burden of fixed cost of Rs. 72.50 crore being the cost of the underutilized capacity on Discoms (Consumers of Company). This was despite the fact that the RERC also fixed recovery of variable cost for plant using HSD or combined fuel *i.e.* gas and HSD.

**Failure of management to effectively plan the use of gas resulted in loss of generation of 1,426.64 MUs.**

Thus, failure of the management to effectively plan the use of fuel resulted in loss of generation of electricity of 1,426.64 MUs valued at Rs. 316.92 crore and extra burden of Rs. 72.50 crore on the Discoms primarily because of substantial underutilization of plants.

The Management in the exit conference stated (September 2009) that GAIL could not provide the increased amount of gas from the fields of Oil India Limited. Gas arrangements are now being tied up with GAIL from the Focus gas fields.

### Transportation of Fuel

**2.1.15** The coal from different collieries of SECL and NCL is transported through railway wagons. The rate of freight is determined by the Railways. Freight is a major component of cost of coal to the RRVUNL. The transportation of coal through Railways includes the following risks:

- transit losses/shortages due to pilferages and theft which is direct loss to the RRVUNL as neither coal company nor Railways reimburse the transit loss.
- incidence of overloading charges, under loading charges and blockage of funds due to incidence of claims on this account.
- payment of demurrage if the wagons are not unloaded within prescribed time limit.

The RRVUNL received total quantity of 592.68 lakh MT of coal from different collieries through Railways and incurred Rs. 6,262.41 crore towards freight during the period under review. The freight cost to total cost of fuel ranged between 41 and 51 *per cent* during the period under review. The freight cost and total cost of fuel and its percentage are given below:-

(Rs. in crore)

Year	Freight	Total cost	Percentage of freight to total cost
2004-05	1173.35	2308.29	50.83
2005-06	1211.72	2585.87	46.86
2006-07	1279.37	2685.12	47.65
2007-08	1214.33	2861.05	42.44
2008-09	1383.64	3406.81	40.61
<b>Total</b>	<b>6262.41</b>	<b>13847.14</b>	<b>45.23</b>

A liaison agent was appointed for effective coordination between the collieries and authorities of Railways and for smooth transportation of fuel, timely loading and unloading and securing linkages. The observations of audit relating to deficiency in transportation of fuel are discussed in succeeding paragraphs.

#### ***Transit loss of coal***

**2.1.16** Transit loss of coal represents difference between the billed and actual quantity of coal received at the power station. Coal is transported by Railways at consignee's risk and as sale of coal is deemed to have been finalised at pithead, therefore, neither the collieries nor the Railways reimburse the transit loss. Therefore, strict control on the transit loss was essential as excess transit losses affects the generation of electricity and utilization of TPSs and further worsen the power shortage scenario. A statement showing transit losses for both KSTPS and SSTPS in respect of each coal field for the period under

review is given below.

Year	Transit loss (in per cent)									
	NCL		SECL (Korea- Rewa)		SECL (Korba)		SECL (Washed)		Total	
	KSTPS	SSTPS	KSTPS	SSTPS	KSTPS	SSTPS	KSTPS	SSTPS	KSTPS	SSTPS
2004-05	1.67	-0.18	4.32	3.50	2.49	0.72	0	0.68	3.05	1.67
2005-06	3.23	1.31	4.98	4.12	1.53	0.42	1.84	1.09	3.31	2.06
2006-07	1.32	1.49	2.66	2.68	0.52	0.87	-1.42	0.93	1.46	1.64
2007-08	1.89	1.33	1.73	1.41	0.47	1.01	0.96	1.14	1.26	1.22
2008-09	2.92	2.26	1.98	1.46	2.16	1.33	1.17	0.85	1.80	1.29

Note: (-) indicates gain in transit.

Though transit losses (in case of KSTPS) had declined over the period from 3.05 per cent in 2004-05 to 1.80 per cent in 2008-09 and from 1.67 per cent in 2004-05 to 1.29 per cent in 2008-09 for SSTPS, these are still high at 2.92 per cent for NCL- KSTPS and 1.98 per cent for SECL (CIC)-KSTPS. Further, it can be seen from the above table that transit losses for KSTPS were significantly higher than the SSTPS despite SSTPS being located 1,410 to 1,717 Kms away from collieries as against distance of KSTPS being only 666 to 1,013 Kms from the collieries. Transit losses in case of coal received from SECL (Korea- Rewa) were higher at KSTPS as compared to losses at SSTPS during review period except the year 2006-07. The RRVUNL did not analyze the reasons for the higher transit losses in case of KSTPS for taking remedial measures. Further, the RRVUNL had not fixed any norms for transit losses keeping in view the distance from colliery and other factors with a view to exercise control over the losses. It was noticed that the transit loss allowed to the contractor in case of beneficiated coal from October 2002 was fixed at 1.5 per cent which involved road transport from colliery to washery and by rail from washery to TPSs and the losses of less than 1.5 per cent were achieved by the contractor during the review period. Thus, the transit losses for all other coal transported directly by rail from colliery to TPSs should be lower than 1.5 per cent. The excess transit losses (over and above 1.5 per cent) worked out to Rs. 49.95 crore for 2.45 lakh MT of coal during the period under review.

**Transit losses for KSTPS were significantly higher than the SSTPS despite proximity to pithead. The excess transit losses (over and above 1.5 per cent) worked out to Rs. 49.95 crore for 2.45 lakh MT of coal.**

The Management in the exit conference stated (September 2009) that transit losses vary due to weighment tolerance difference, pilferage, sizing of coal, route difference and route of coal for KSTPS is more vulnerable to higher pilferage, however, transit losses had declined generally and more efforts would be made to restrict the transit losses.

***Short recovery of idle freight of Rs. five crore on excess shortages due to weak conditions of contract***

**2.1.17** The objective of the awarding of beneficiation of the coal was to reduce the ash content and improve the quality of coal at lower cost, which was possible to be achieved by determining ash content and quality of coal on rake to rake to basis. The RRVUNL prescribed evaluation of ash content in the beneficiated coal and yield based on weighted average of 20 rakes, which was further increased to 30 rakes (July 2006). The provision of evaluation of ash content in the beneficiated coal and yield based on weighted average of

20 rakes and 30 rakes was at disadvantage to the RRVUNL as impact of rakes supplied with higher ash contents *i.e.* inferior quality coal was neutralized under weighted average method. Determination of average ash content of 20/30 rakes was not a prudent decision as this has provided an opportunity to the firm to supply higher ash content coal in number of rakes without any disincentive.

Similarly, despite payment of freight on rake to rake basis to Railways, the computation and recovery of idle freight on shortages in excess of maximum 1.5 per cent allowed on the basis of weighted average of 20 rakes and 30 rakes instead of rake to rake basis was not in the interest of the RRVUNL. It was noticed that the RRVUNL incurred extra expenditure of Rs. five crore comprising of Rs. 1.73 crore for KSTPS and Rs. 3.27 crore for SSTPS during 2007-09 alone, which could not be recovered due to computation on the basis of weighted average of 20 rakes and 30 rakes instead of rake to rake basis.

The Management in the exit conference stated (September 2009) that recovery was as per contract conditions, they however agreed to look into the matter in future contracts.

**Abnormal increase in overloading and under loading charges**

**2.1.18** As per clause 8.2 of FSA, the proforma invoice was to be prepared on rake to rake basis, charging basic price of coal, sizing charges, and all other statutory charges (the idle freight resulting from under loading of wagons and 50 per cent of overloading charges was to be reduced), shall be delivered to the purchaser's bankers for payment within two banking working days of presentation of proforma invoice. The details of overloading and under-loading charges paid by the RRVUNL to the Railways, share of coal companies and outstanding recovery position during the period under review are detailed below:-

(Rs. in crore)

Year	Overloading charges						Under loading charges					
	Share of overloading charges of coal companies at the rate of 50 per cent			Overloading charges outstanding for recovery			Share of under loading charges of coal companies at the rate of 100 per cent			Under loading charges outstanding for recovery		
	KSTPS	SSTPS	Total	KSTPS	SSTPS	Total	KSTPS	SSTPS	Total	KSTPS	SSTPS	Total
2004-05	1.73	3.79	5.52	0.00	3.79	3.79	0.89	1.54	2.43	0.63	1.54	2.17
2005-06	4.64	10.70	15.34	0.00	10.70	10.70	3.63	7.31	10.94	0.42	7.31	7.73
2006-07	4.61	6.23	10.84	0.00	6.23	6.23	4.60	7.33	11.93	0.69	7.33	8.02
2007-08	2.31	3.78	6.09	0.00	3.78	3.78	11.38	23.31	34.69	0.42	23.31	23.73
2008-09	0.58	0.93	1.51	0.04	0.93	0.97	10.74	20.65	31.39	4.55	20.65	25.20
<b>Total</b>	<b>13.87</b>	<b>25.43</b>	<b>39.30</b>	<b>0.04</b>	<b>25.43</b>	<b>25.47</b>	<b>31.24</b>	<b>60.14</b>	<b>91.38</b>	<b>6.71</b>	<b>60.14</b>	<b>66.85</b>

The RRVUNL appointed Naresh Kumar and Company (coal liaison agent) for supervision of coal rakes consigned to KSTPS and SSTPS. As per clause 5.03 of the work order, it was the responsibility of coal liaison agent to supervise the loading and weightment at all the points and to ensure that the wagons were loaded upto the full carrying capacity and to avoid instances of overloading. These costs were avoidable and controllable to large extent. It could be seen from above table that the share of overloading charges was significantly

higher at Rs. 15.34 crore and Rs. 10.84 crore during 2005-06 and 2006-07 respectively and share of SSTPS of Rs. 25.43 crore constituted 64.71 *per cent* of total overloading charges of Rs. 39.30 crore during the period of review. The whole amount of Rs. 25.43 crore towards overloading charges in respect of SSTPS was outstanding for recovery. It was further observed in audit that neither the SECL was deducting the overloading charges from proforma invoices as per the FSA nor the RRVUNL was deducting the overloading charges while making the payments to SECL. The SSTPS has not taken any concrete action to recover the claims except submitting the claims. The claims of overloading charges in respect of SSTPS had accumulated to the extent of Rs. 27.23 crore (including Rs. 1.80 crore up to 2003-04) as on 31 March 2009. Thus, overloading had significantly increased during 2005-06 and 2006-07 indicating the failure of the coal agent in effective control of the loading of the coal at collieries as there was no clause of penalty for overloading and under loading in the work order of liaison agent. Thus, an amount of Rs. 94.12 crore paid in respect of under loading and overloading claims remained blocked, substantially affecting financial position of the RRVUNL mainly due to inadequate follow up.

The Management in the exit conference stated (September 2009) that they were operating under tough conditions imposed by the Railways and due to non execution of FSA, claims are not being admitted by the coal companies, however, efforts would be made to settle these claims. The reply does not address the role of coal agent.

## Quality assurance

### *Quality assurance and sampling*

**2.1.19** As per clause 6.00 of FSA, sampling and quality analysis for rail fed stations was to be carried at both sending and receiving end by one independent third party/agency. RRVUNL invites tender for appointment of third party agency for sampling analysis but the final decision for such appointment was done by the Joint Tender Committee (JTC) which includes the representative of both RRVUNL and SECL/CIL. The payment of charges for sampling at colliery end was to be made by coal companies and those done at power stations end by the RRVUNL. The sampling analysis should be carried out in accordance with the relevant provisions of the Bureau of Indian Standard specifications/mutually agreed procedure on rake to rake basis. Results of sampling decide the grade of coal. RRVUNL has to make the advance payment for the coal, based on the declared grade of coal by collieries. If receipt of lower grade of coal is reported in third party/referee report, then grade slippage claims are to be lodged with concerned coal companies.

### *Defective sampling procedure*

**2.1.20** Rake-wise sample collection was to be done in accordance with the mutually agreed procedure under the IS 436 (Part-I, Section-I), 1964 and

IS 436 (Part-I, section-II) 1976 modified up to date. As against number of sub-lots to be taken from the wagons received on the basis of the total weight of the rake received, a maximum 25 per cent of the wagons were to be selected at random from the sub-lots. It was observed in audit that the first and last wagon are always selected as sample and the rest of the wagons were divided into four sub-lots and 25 per cent of the wagons were selected at random from sub-lots for drawing the gross sample, thus affecting the randomness of sample and being a departure from laid down procedures. Audit felt that the justification of this procedure was questionable as it sacrifices randomness of sample and correctness of sampling results based on which the grade of coal was decided. RRVUNL did not take sample for analysis at its own laboratory or any other Government recognized laboratory to ascertain the effectiveness of sampling procedure and whether the same was correct and protecting its interest. In absence of energy audit, the role of quality assurance and effective sampling was more important but RRVUNL had not followed proper quality assurance procedures.

#### ***Delayed sampling analysis***

**2.1.21** Timely sample collection, analysis, documentation and preparation of comparative statement of the results of the loading and unloading end were critical essence of quality assurance procedure. As per the work orders for sampling analysis, placed from time to time, the analysis of results of the samples should be submitted within seven days and the comparative statements of the loading and unloading results should be submitted within 10 days. Out of 3,186 sample reports test checked, 798 cases were submitted with the delay which ranged upto one month in 491 cases and one to three months in 307 cases. Similarly, in 729 cases the comparative statements were also submitted with the delay ranging up to one month in 478 cases and one to three months in 93 cases and more than three months in 158 cases. Further out of 3,186 reports, 270 reported receipt of lower grade of coal than declared grade by Collieries. Audit observed that claims of Rs. 27.98 lakh in respect of grade difference for the period of May 2007 to February 2008 could not be lodged as report of referee at loading end were not available with KSTPS. These substantial delays also led to delayed submission of various grade slippage claims as brought out in paragraph 2.1.30.

The Management in the exit conference stated (September 2009) that system of sampling has been changed and according to new FSA signed recently, sampling at the loading point would be final. As regards delayed sampling, management stated that reports were obtained and claims were lodged or were being lodged.

### **Consumption of fuel**

#### ***High incidence of consumption of coal***

**2.1.22** The position of excess coal consumption against the norms fixed by

the RERC in determination of tariff for the review period is given in the **Annexure-8**. It could be seen that actual consumption of coal at KSTPS (0.650 to 0.684 Kg per KWH) and at SSTPS (0.5642 to 0.6098 Kg per KWH) was higher in all the years of review period. Poor quality of coal (paragraphs 2.1.10 and 2.1.30), receipts of stone and shale along with coal (paragraph 2.1.31), use of coal without proper sampling (paragraph 2.1.20), excess heat in process of generation (paragraph 2.1.23) *etc.* were the reasons for excess consumption of coal.

The Management in the exit conference stated (September 2009) that these norms of RERC were for determination of tariff and were based on specific gross calorific value of coal, while gross calorific value of actual coal received was less.

The reply is not convincing as even after considering the gross calorific value of actual coal received on yearly basis, the coal consumption was higher by Rs. 135.14 crore. Further excess heat used in process of generation worked out on monthly basis led to excess consumption of coal amounting to Rs. 245.10 crore as brought out in succeeding paragraphs. The management did not take other measures such as better blending of imported coal, improved storage to reduce loss of calorific value of coal to optimise specific coal consumption.

***Excess consumption of coal due to high incidence of heat rate***

**2.1.23** Gross Station Heat Rate (SHR) refers to the heat energy input in Kcal required for generating one KWH of electrical energy at generating terminals. The norms of SHR for each unit of the power stations have been prescribed by the RERC in accordance with Terms and Conditions for Determination of Tariff Regulations, 2004. The RERC prescribed the SHR of 3,100 Kcal/KWH for 110 MW thermal units for 2004-05 with reduction of 25 Kcal per annum to achieve targeted SHR of 3,000 Kcal/KWH. The SHR of 2,500 Kcal/KWH was prescribed for above 110 MW thermal units (KSTPS and SSTPS). It was observed in audit that there was wide disparity in heat used for per KWH unit generation of electricity from month to month basis. It was noticed during the audit that heat used for unit II (110 MW) of KSTPS per KWH unit of electricity generated ranged between 2,497 Kcal/KWH to 3,597 Kcal/KWH as against the prescribed norm/standard of 3,100 Kcal/KWH to 3,000 Kcal/KWH for the period of 2004-05 to 2008-09. This indicated that 2,497 Kcal was used for producing one unit of electricity in one month, while 3,597 Kcal was used in another month, reflecting wide variation in consumption of heat rate. Similarly wide variation existed in other units of KSTPS and SSTPS. High variation upto 27 *per cent* from standard prescribed by the RERC required analysis of reasons for high variation for taking remedial measures to improve the use of heat in the process of generation. RRVUNL did not analyze the reasons for such wide variation in use of heat on month to month basis. The excess consumption of coal based on monthly average basis due to higher SHR than the norms in respect of both KSTPS and SSTPS was valued at Rs. 245.10 crore, which indicated that there was adequate scope for improvement by effective use of heat. RRVUNL needs to take steps and create systems and infrastructure for optimizing use of heat based on outcome of energy audit.

**The excess consumption of coal based on monthly average basis due to higher SHR than the norms in respect of both KSTPS and SSTPS was valued at Rs. 245.10 crore.**

Thermal efficiency is the aggregate of boiler and turbine efficiency. RRVUNL did not work out the thermal efficiency of each unit as well as for whole TPS in respect of KSTPS and thereby could not compare the same with the thermal efficiency guaranteed by the manufacturer or the supplier of the plant. The SSTPS worked out the thermal efficiency without comparing with the standard as well as with that guaranteed by the manufacturer.

***Excess consumption of gas of Rs. 50.76 crore***

**2.1.24** The RERC prescribed the SHR of 3,000 Kcal/KWH for 2004-05 with annual reduction of 15 Kcal/KWH in open cycle of RGTPS *i.e.* operation of one GT without operation of STG. Further, the SHR of 2,000 Kcal/KWH for 2004-05 with annual reduction of 10 Kcal/KWH was prescribed in combined cycle *i.e.* operation of one or two GT with combined operation of STG. Audit analysis of the consumption of gas *vis-à-vis* units generated for the review period revealed that actual heat rate ranged between 2,017 Kcal per unit (against norms of 1,980 Kcal per unit) to 3,313 Kcal per unit (against the norms of 1970 Kcal per unit) which was in excess of norms ranging between 37 Kcal per unit to 1,343 Kcal per unit of electricity. Excess heat consumed during review period in RGTPS worked out to 87,319 Million Kilo Calories (MKcal) equivalent to 210 Million Metric Standard Cubic Meter (MMSCM) of gas valued at Rs. 50.76 crore. The reasons for excess consumption of heat rate against the norms were not analyzed by the management.

**Excess heat consumed in RGTPS worked out to 87,319 MKcal equivalent to 210 MMSCM of gas valued at Rs. 50.76 crore.**

The Management in the exit conference stated (September 2009) that it was due to operating plants on partial load instead of rated load.

***Infructuous expenditure of Rs. 3.25 crore due to less draws of gas***

**2.1.25** In terms of article 5.02 of the agreement, RRVUNL was required to pay for monthly minimum guaranteed off take (MGO) fixed at 80 *per cent* of the monthly contracted quantity or actual quantity of gas supplied, whichever was higher. The GT 1 of the RGTPS was operated with supply of gas agreement of 0.55 MMSCMD and GAIL agreed (August 2003) to enhance the supply by 0.2 MMSCMD gas. As against the requirement of 1.0 MMSCMD for the operation of both the GTs at same time, the enhanced supply to 0.75 MMSCMD was not sufficient. Audit noticed that RGTPS failed to even draw 80 *per cent* of the 0.55 MMSCMD upto September 2004 and 0.75 MMSCMD from October 2004 in total period of 15 months\* resulting in payment of Rs. 3.25 crore for MGO charges for which the gas was not drawn.

The Management in the exit conference stated (September 2009) that it was due to breakdown of the Gas plant. On pointing out that it was related to period of fifteen months, the Management assured to give detailed reply after verification of facts.

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\* April to September 2005, August 2006 to October 2006, April to June 2008, September 2008 to October 2008 & March 2009.

### ***Excess auxiliary consumption***

**2.1.26** The norms relating to allowable auxiliary consumption were fixed by the RERC while approving annual revenue requirement and determining tariff. It was noticed that auxiliary consumption in RGTPS was high ranging from 6.77 to 9.55 *per cent* as against 5 *per cent* allowed by the RERC during 2004-05 to 2008-09. The excess consumption was equivalent to 65.91 MUs valued at Rs. 14.78 crore. Thus, there was need to analyse the specific reasons contributing to higher auxiliary consumption for taking remedial measure.

The Management in the exit conference informed (September 2009) that it was due to operating plants on partial load instead of rated load.

### **Inventory Management**

**2.1.27** RRVUNL had prescribed safe and critical level of coal stock at 15 days and seven days respectively as a part of inventory management. RRVUNL was required to maintain safe level of stock at all the times. RRVUNL was also required to prescribe periodical system of physical verification for effective accounting and control purposes. The availability of right quality fuel in adequate quantity for meeting production targets and the procedure prescribed for exercising controls on wastages or losses of material, proper accounting, safe and critical level of coal in terms of days prescribed were reviewed in audit. It was noticed that inventory level of coal had fallen below critical level very often during 2007-08 and 2008-09. Coal stock level had remained below critical level (less than 7 days of requirement) for 168 days in 2007-08 and 247 days in 2008-09 for SSTPS. Similarly, coal stock remained below critical level on 56 days in 2007-08 and 70 days in 2008-09 in case of KSTPS. The safe level of stock prescribed at 15 days of requirement was available only on 35 days for SSTPS and 59 days for KSTPS during two years period ending 2008-09. As brought out in paragraph 2.1.9, due to non materialization of linkages, the material required was not sufficient to meet the targeted generation. RRVUNL admitted that the measurement of coal on monthly and quarterly basis and reconciliation of receipt, issue (consumption) and balance *etc.* were done on provisional basis. Adequate system of monthly and quarterly measurement of coal did not exist. Proper physical verification of coal was conducted only once in a year and therefore the performance may be evaluated on yearly average basis instead of month to month or quarter to quarter. Thus verification system for inventory assessment, planning, control on shortage, accounting and reconciliation of receipt, issue (consumption) and balance *etc.* was not effective. There was need to improve the infrastructure to ascertain reliable information in respect of all parameters on monthly basis and to improve inventory control.

The Management in the exit conference confirmed (September 2009) the position brought out in paragraph.

## **Financial Management**

**2.1.28** Effective financial management ensures smooth cash flow for optimizing the performance of all functions of an organization and includes arranging timely funds from realizations of sales and other income and gaps of cash flow either by investing to earn return or from borrowing at competitive interest rate with a view to meet need of all its operational requirements including purchase of adequate fuel. The systems and procedures should be so organized that there are no delays in realizations of funds from various sources including claims from coal companies, Railway *etc.* as well as no delay in payments which attracts penalty or affects procurement of fuel and other resources. There is separate wing to cater the financial needs and RRVUNL was able to arrange the short term loans at reasonable rates for procurement for coal, payment of Railway freight *etc.* RRVUNL prepares the cash flow statement to optimise use of cash. However, deficiencies in financial management as noticed in audit are discussed in succeeding paragraphs with particular reference to fuel management.

### ***Guidance of functional directors***

**2.1.29** RRVUNL did not have any full time functional directors such as Director (Fuel), Director (Technical) and Director (Finance). It was noticed that considering the size and operations of the RRVUNL, there was need for full time functional directors particularly Director (Finance) for efficient and effective operations of the Company. The Government, however, nominated full time functional Director (Finance) in April 2007 to take care of needs of finance side.

### ***Delay in realization of claim against coal companies***

#### ***Claims of grade difference***

**2.1.30** The FSA stipulated that in case receipt of lower grade of coal is reported in third party/referee report, then grade slippage claims are to be lodged with concerned coal companies. It was observed that claims included the basic value of coal plus Central Sales Tax (CST) and claims of Rs. 15.96 crore as on 31 March 2009 were outstanding. Audit observed that claims on account of difference in the amount of CST arising due to decrease of cost of coal of grade slippage were outstanding on the ground that claims of particular financial year were not submitted during the same financial year. It was noticed that Rs. 1.15 crore out of Rs. 1.46 crore in respect of SSTPS and Rs. 1.65 crore in respect of KSTPS were on account of CST that were not reimbursed due to non submission of claims during the same financial year. Other reason for delay in submission of claims was also attributable to delay in receipt of sampling reports. Audit noticed that the chances of recovery of CST claims (Rs. 2.80 crore) and old claims pertaining to period prior to 2004-05 (Rs. 8.21 crore) appeared to be bleak.

### ***Claims in respect of Stones***

**2.1.31** As per clause 3.2.2 of FSA, the coal supplied by the seller shall generally be free from oversize stones, stones above 200mm shall be segregated by the purchaser and equivalent cost of the same along with 50 *per cent* freight (except surcharge) royalty and taxes will be paid by the seller. The purchaser shall notify the seller for inspection of stones. The size of more than 200 mm stones shall be ascertained by joint weighment after which the stones will be disposed of away from the site of stacking. On review of the claims of stones, it was noticed that huge amount is outstanding against coal companies on account of oversize stones received by SSTPS along with coal. Claims of Rs. 2.01 crore lodged on account of oversize stones received at SSTPS were outstanding for settlement against coal companies as on 31 March 2009. SSTPS also could not lodge claims for 12,387.47 MT stones (claimable amount of Rs. 1.54 crore) accumulated during the period June 2007 to March 2009 due to non assessment/inspection of the stones by the representative of coal companies. Thus, an amount of Rs. 3.55 crore was outstanding for settlement of these claims which pertained to the review period.

### ***Delay in payment for coal supplies***

**2.1.32** It was observed that RRVUNL was not paying for coal supplies on schedule due to improper management of its financial resources. The payments were made weekly on ad-hoc basis without any reference to due dates of various bills. It was noticed that in most of the cases, due dates were not mentioned in the bill cum payment register of coal supplies and there was no monitoring of payment on the basis of due dates. It was noticed that large amount of funds were blocked in number of claims, where the recovery efforts were not adequate and there was delay in payment of coal supplies which resulted in not getting full linkage of coal for both KSTPS and SSTPS as brought out in para 2.1.9. The demand of interest in terms of provision of FSA at the rate of 12 *per cent* per annum for delay beyond the provision of FSA was raised by the coal companies, while short term borrowing rates were lower than 12 *per cent* ranging from 7 *per cent* to 10 *per cent* during review period. It was noticed that SECL demanded (January 2006 and December 2007) interest of Rs. 19.01 crore (KSTPS- Rs. 9.98 crore and SSTPS Rs. 9.03 crore) for the period from 2003-04 to 2006-07 for the delay in release of payment of coal. The Coal India Limited (CIL) stated (July 2006) that extent of delay in release of payment had increased to 16-17 days during 2006-07 from 6-7 days in 2005-06 and 2 days in 2004-05. It was also observed that the RRVUNL deposited an interest free advance of Rs. 6.45 crore during 2004-05 and Rs. 5.95 crore during November 2004 to May 2005 with NCL towards monthly linkage of one lakh MT each for KSTPS and SSTPS respectively. Audit noticed that though the linkage has been reduced progressively to 30,000 MT for KSTPS and 15,000 MT for SSTPS in 2007-08, RRVUNL did not seek refund or adjustment against supply in phased manner in accordance with the reduction in the linkage, thus carrying higher than required interest free advance with NCL, while delaying payment in respect of SECL. However, the excess amount of advance of Rs. 2.60 crore in respect of KSTPS and Rs. 1.74 crore in respect of was SSTPS was adjusted belatedly during

August 2008. Thus, non adjustment of excess funds lying with NCL adversely affected its fund position in paying other dues in time. RRVUNL is yet to settle the demand of interest of Rs. 19.01 crore.

***Non pursuance for refund of deposits of Rs. 7.50 crore***

**2.1.33** A surcharge of 10 *per cent* of freight is payable on booking wagon on 'To Pay' basis. Railways under its scheme exempt levy of surcharge on maintaining the deposit for transportation charges equal to the monthly linkage of coal rakes. RRVUNL maintained Rs. 40.10 crore as advance payment equal to the monthly linkage of coal rakes (30 December 2004) which was increased to Rs. 48 crore in March 2007. The Railway insisted on e-payment of freight following improvement in the banking system. The Board decided (13 October 2005) to adopt the e-banking scheme of rail freight towards movement of coal. Tripartite agreement has been executed with Railways and banks for e-payment of coal freight charges account in respect of SSTPS on 14 December 2007 and 1 January 2008 with South East Central Railways (SECR), Bilaspur and East Central Railways (ECR), Hajipur respectively by providing bank guarantees (BG) of Rs. six crore issued (9 January 2008) in favour of SECR and Rs. 1.50 crore in favour of ECR but without adjusting deposit of Rs. 48 crore of the SSTPS lying with Railway under the advance freight payment scheme. It was observed that non pursuance of the issue relating to refund or adjustment resulted in blocking of funds of Rs. 7.50 crore and avoidable interest charges were incurred while RRVUNL was availing short term loans and overdraft facilities for working capital requirements. The adjustment or refund was still pending.

***Non recovery for change in price of coal from contractor***

**2.1.34** The provision of contract (Clause 5.23 of the work order of 25 July 2006) awarded for beneficiation of coal, stipulated that on failure in lifting the coal within the prescribed period and if the price is revised in between, then the differential price should be recovered from the contractor. The CIL revised (12 December 2007) the prices of coal of 'F' grade from Rs. 606.16 per MT to Rs. 675.68 per MT. RRVUNL, however, had borne the expenditure of Rs. 1.03 crore instead of recovering the amount for increased price on the quantity from the contractor, as the coal was not lifted timely by him.

***Extra expenditure due to furnishing bank guarantee to Railways instead of Government guarantee***

**2.1.35** The KSTPS provided BG of Rs. six crore for opting for credit note cum cheque facility from Railways by paying guarantee commission during February 2004 to February 2006 despite practice of availing Government guarantee for obtaining the funds from various banks from 2000-01 as the Government charges commission at the rate of 0.1 *per cent* only instead of one *per cent* charged by bank. Similarly, the SSTPS furnished (January 2008) BG to Railways (Rs.1.50 crore and Rs. six crore) instead of approaching them for acceptance of Government guarantee. Thus, RRVUNL incurred extra expenditure of Rs. 39.72 lakh for guarantee commission as compared to Government guarantee.

On various observations relating to financial management, the Management in the exit conference stated (September 2009) that despite its efforts, the claims and refunds were not granted by coal companies and Railways. It further stated that payments are being made on time as far as possible and they were forced to maintain advance deposit with Railway and coal companies.

### Energy Audit

**2.1.36** Energy Audit is an important step towards identifying the factors contributing to inefficient operation of a power station, thus, improving overall productivity of fuel. It was noticed that Energy Audit was required to be conducted in compliance with Energy Conservation Act, 2001 and such audit was being conducted at generating stations of other various entities such as NTPC Limited and West Bengal Power Development Corporation Limited *etc.* Studies carried out in the course of energy audit involve review of the design and actual operational values of equipment and auxiliaries. It is intended to ensure that the performance of each section of generation process is as near as possible to the designed specification. Energy Audit offers valuable inputs in form of remedial measures for improving the efficiency in use of fuel. It was noticed that no Energy Audit was conducted either internally or by out side specialized agency despite objection raised during the hearing of tariff petition filed in the RERC for the year 2004-05. As discussed in paragraphs 2.1.23, 2.1.24 and 2.1.26, the KSTPS, SSTPS and RGTPS failed to maintain the norms of SHR and norms of auxiliary consumption were also not adhered to in case of RGTPS during the period under review.

The Management in the exit conference while confirming the facts stated (September 2009) that there was no formal system of Energy Audit and efforts were made to identify areas of heat losses with the help of experts and certified energy engineers whenever possible and assured Energy Audit would be strengthened.

**The above matters were referred to the Government in June 2009, their reply had not been received (September 2009).**

### Conclusion

**Fuel management system did not meet the expectation of being operated economically and efficiently as follows:-**

- **failure to procure required coal despite allotment of higher linkage of coal resulting in loss of generation of electricity;**
- **envisaged saving could not be realised due to not using full quantity of washed coal linkages and acceptance of lower yield;**
- **due to failure to tie up required gas, under utilisation and non-**

operation of gas based plants on dual fuel resulted in loss of generation;

- higher incidence of transit losses of coal led to avoidable losses;
- the quality of fuel received was not inspected as per the laid down sampling procedure;
- the actual consumption of coal, gas was higher than the norms fixed by the RERC;
- inadequate inventory management system for coal caused coal stock falling below critical level on several occasions;
- inefficient financial management led to non-realization of claims and delayed payments of fuel supplies; and
- energy audit was not undertaken despite huge heat losses, higher consumption of coal and higher auxiliary consumption.

#### **Recommendations**

The RRVUNL needs to-

- evolve effective control mechanism on coal liaisoning agents to procure allotted linkages;
- enhance the use of beneficiated coal to reduce the generation cost;
- ensure operation of gas based plant on dual fuel to maximise utilization of envisaged capacity;
- closely monitor the transit losses and take up the matter at highest level with the Railways so that these losses are reimbursed by Railways;
- devise system to ensure quality assurance as per laid down procedure of sampling;
- analyse and if necessary – investigate, the reasons of consumption of coal above norms and take remedial measures to ensure the consumption within the norms;
- devise more strengthened financial management system for timely submission and monitoring/realisation of various dues including claims lodged with coal companies and other parties; and
- implement the energy audit system expeditiously to reduce incidence of heat losses and excess consumption of fuel.

## Ajmer Vidyut Vitran Nigam Limited

### 2.2 IT Audit on Computerisation of revenue billing system by Ajmer Vidyut Vitran Nigam Limited

#### Executive summary

*Ajmer Vidyut Vitran Nigam Limited (Company) outsourced (May 2005) the work of design, development and maintenance of billing software, data processing of billing data, printing of bills and preparation of various management reports in respect of various circles to two service providers viz; Business Information and Processing Services (BIPS) and Aditi Computers. An Information Technology Audit on billing system of the Company was attempted to ascertain that the Company, before awarding the work of its core activity of revenue realisation, has adequately addressed the associated risks of outsourcing. Further, the audit was also conducted to examine, analyse and to assess adequacy and effectiveness of billing process and revenue realisation.*

*Computerisation of revenue billing of the Company was assessed against the Tariff for supply of electricity-2004, and Terms and Conditions of Supply (TCOS) - 2004, Rules, notifications, directions issued by the Rajasthan*

*Electricity Regulatory Commission (Commission) and orders and circulars issued by the Company. The data available with the Company was analysed with the help of Computer Assisted Audit Techniques.*

*Though the system developed by both the service providers was adequate as regards to processing of billing data and generation of electricity bills yet there were many shortcomings leading to incorrect billing as well as not achieving full potential of IT applications. In a broader way, observations of audit have been categorised as deficiencies of general controls, system design deficiencies, deficient mapping of business rules, application controls such as deficient input controls and validation checks etc. Besides, some contractual deficiencies, non-reconciliation of data available in the system with financial statements of the Company were also noticed. Need to establish an effective internal control mechanism as regards to IT applications was also felt.*

## Introduction

**2.2.1** Ajmer Vidyut Vitran Nigam Limited (Company) was incorporated on 20 July 2000 after unbundling of erstwhile Rajasthan State Electricity Board (RSEB). The activity of the Company is spread over nine\* circles. The Company is distributing electricity to different categories of consumers and collecting revenue from them for the electricity supplied as per tariff orders issued by the Rajasthan Electricity Regulatory Commission (Commission). The Company outsourced (May 2005) the work of generation of electricity bills of all High Tension (HT) consumers and seven\*\* circles in respect of Low Tension (LT) consumers to Business Information Processing Services (BIPS). The work of remaining two circles *i.e.* Sikar and Jhunjhunu was outsourced to Aditi Computers for LT consumers. Aditi Computers developed the software using Oracle 9i as RDBMS and UNIX & LINUX as operating system while BIPS developed and maintained the data of the HT consumers in Visual Basic and data of the LT consumers in FOXPRO.

As on 31 March 2008, the Company had 21,61,861 consumers comprising of domestic, non-domestic, agricultural and industrial consumers. During 2007-08, the total revenue realised by the Company from all categories of the consumers was Rs. 2,569.37 crore as given in the **Annexure-9**.

## Scope and methodology of audit

**2.2.2** The entire billing system pertaining to HT and LT consumers of the Company was reviewed by the Audit during the period from February to August 2009. The data as maintained by the billing agencies *i.e.* by BIPS and Aditi Computers for the period 2007-08 in respect of all HT consumers and data relating to LT consumers of two circles# was analysed using Interactive Data Extraction and Analysis (IDEA), a Computer Assisted Audit Technique (CAAT). However, the payment details of LT consumers of Jhunjhunu circle could not be reviewed as the same were not made available to audit.

Audit methodologies comprising issue of questionnaire and Management's response/clarification there upon, scrutiny and verification of manual records, collection of data and analysis thereof with the help of CAAT, issue of preliminary audit observations to the management for response with a view to firming up the audit conclusion, discussion and interaction with the officers of the Company and billing agencies were adopted. The Government replied (August 2009) to the audit observation relating to HT billing system and the response in respect of LT billing was yet to be received (September 2009).

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\* Ajmer, Bhilwara, Nagaur, Udaipur, Rajsamand, Chittorgarh, Banswara, Jhunjhunu and Sikar.

\*\* Ajmer, Bhilwara, Nagaur, Udaipur, Rajsamand, Chittorgarh and Banswara

# Ajmer Circle (billing agency - BIPS) and Jhunjhunu Circle (billing agency- Aditi Computers)

### **Audit objectives**

**2.2.3** Information Technology (IT) audit of computerisation of revenue billing of the Company was carried out to evaluate the adequacy and effectiveness of IT policy of the Company, mapping of business rules, completeness and correctness of the data and achievement of overall objectives of the Company.

### **Audit criteria**

**2.2.4** IT audit of computerisation of revenue billing of the Company was assessed against the following parameters:

- Tariff for supply of electricity-2004, Terms and Conditions of Supply (TCOS)-2004, Rules, notifications and directions issued by the Commission;
- Orders and circulars issued by Commercial wing of the Company; and
- Best practices pertaining to IT Systems.

### **Audit findings**

Audit findings based on review of the IT System are as under:

#### ***Organizational set up***

**2.2.5** The Chief Engineer (Commercial) of the Company had the overall responsibility for monitoring the Billing system, while Superintending Engineers (SEs) of the Circle offices were responsible for their respective circles. It was, however, noticed that the Company did not have separate mechanism for co-ordinating and monitoring IT Applications as well as for liaising with the billing agencies which led to various deficiencies as detailed below.

### **General Controls**

#### ***IT policy***

**2.2.6** A formulated and documented IT policy is essential to assess the time frame, key performance indicators and cost benefit analysis for developing and integration of various systems. The Company, however, is yet to formulate a formal IT policy. Further, the Company did not constitute a planning/steering committee with clear roles and responsibilities to monitor each functional area in a systematic manner.

The Government stated (August 2009) that the newly posted SE (IT) has been asked to formulate IT policy and to monitor each functional area in a systematic manner.

***Business continuity and disaster recovery plan***

**2.2.7** The billing system is a critical system as it has a direct impact on the revenue realisation of the Company. If there is any untoward incident or disaster and the consumer's bills are not generated in time or done incorrectly, earnings of the Company may be substantially affected and also can cause lot of inconvenience to the consumers. It is, therefore, essential for the entity to have a documented disaster recovery and business continuity plan to be implemented such that information processing capability can be resumed at the earliest in case of any disaster. It was observed that

- There was no designated mechanism in the Company for the business continuity and disaster recovery and there was no documented business continuity plan either.
- There was no offsite storage of backups.
- Retrieval of data from backup had not been tested.
- The backup file of HT consumer database for the year 2006-07 could not be made available to Audit by the Company.

The Government stated (August 2009) that the newly posted SE (IT) will formulate the business continuity and disaster recovery plan also. It further stated that the back up of data of previous years would be obtained.

**System Design Deficiencies**

***Capture of Permanent Account Numbers (PAN)***

**2.2.8** The Company was required to deduct the tax at source (TDS) on interest paid exceeding certain amount on security deposit of a consumer and PAN of HT consumers were required to be mentioned while filing TDS return with the Income Tax Department. It was noticed that the system did not have provision for entering PAN of consumer and TDS certificates were issued manually.

The Government assured (August 2009) to take corrective action from the billing month of September 2009 onwards.

***Power factor incentive/surcharge***

**2.2.9** As per provisions of tariff-2004, an incentive/surcharge is to be given/charged for improvement/fall in power factor as the case may be. Instead of ascertaining the power factor separately in case of a consumer

having an HT connection and using the power for domestic, non-domestic or for mixed load category, the power factor at the main HT Meter was considered and incentive was allowed even when the power factor of these consumers in domestic, non-domestic or mixed load connection was found to be less than 0.95 (95 per cent). Further, in case the individual power factor falls below 0.90, a surcharge at one per cent fall in power factor below 0.90 was also not charged. The excess incentive allowed or short levy of surcharge has been tabulated below:

(Rs. in lakh)

Category	No. of cases	Excess Incentive	No. of cases	Short levy of Surcharge
Domestic	12-18	15.71	2-6	3.65
Non-domestic	4-5	2.57	1	0.87
Mix load	5-7	2.26	1	2.76
<b>Total</b>		<b>20.54</b>		<b>7.28</b>

Thus, the Company allowed irregular incentive amounting to Rs. 20.54 lakh and also did not levy surcharge of Rs. 7.28 lakh.

The Government stated (August 2009) that cases pointed out would be reviewed.

#### ***Adjustment of excess/short billing***

**2.2.10** As per the agreements with billing agency, the adjustment of excess/short billing of earlier month through debits/credits was to be accounted for both in terms of units of energy as well as in amounts. Scrutiny of LT database of Jhunjhunu circle, however, revealed that the Aditi Computers had the provision to indicate the adjustment of debits/credits in respect of amounts alone. Due to absence of provision in terms of units of energy, the figures of energy sold shown in the MIS and financial statements of the Company were incorrect to that extent.

#### **Mapping of business rules**

#### ***Compliance of Commissions' directions***

**2.2.11** The Commission issued (May 2004) instructions to calculate the power factor separately for the broken periods where the contract demand/connected load of a HT consumer was changed during the month.

Scrutiny of data for the month of April and May 2007, revealed that due to non-mapping the Commission's instruction, separate power factor was not calculated in case of 12 consumers\* though their contract demand changed

\* ID number 170, 216, 243, 271,358, 404, 444, 1426, 1437, 1453, 1501 and 1535.

during the month. Consequently, the power factor incentive/surcharge was allowed/levied for the complete month. In absence of the dates on which the contracts demand/connected load was changed, impact of power factor incentive/surcharge could not be ascertained.

The Government stated (August 2009) that the power factor was calculated on the basis of provisions of TCOS. However, it is reiterated that Commission's instruction in this regard need to be followed by the Company.

### ***Voltage Rebate***

**2.2.12** As per the tariff, a voltage rebate at the rate of 0.75 or 1 *per cent* (as amended from 1 October 2007) was to be allowed to HT consumers on the billed amount for the month if the supply is at 33 KV. The Company withdrew (August 2007) this rebate where the supply was given to such consumers whose contract demand was less than 1500 KVA. Audit noticed that these changes were not mapped in the system. As a result, the system allowed voltage rebate of Rs. 18.77 lakh during the period from August 2007 to March 2008 to such consumers also whose contract demand was less than 1500 KVA.

The Government stated (August 2009) that such rebate was withdrawn for new consumers only. However, the fact remained that this rebate was withdrawn for existing consumers also.

### ***Computation of fixed charges***

**2.2.13** Tariff -2004 provides for collection of 'Fixed Charges' in respect of domestic services (LT) on the basis of average monthly consumption of previous financial year at the rate of Rs. 80 per month upto 50 units and Rs. 105 per month above 50 units. However, scrutiny of data revealed that due to non mapping of such rules in the system, the average consumption and fixed charges were manually fed and the fixed charges in respect of 2,708 and 1,808 consumers of Ajmer and Jhunjhunu circle respectively were charged more than the prescribed tariff.

### ***Rebate for LT consumers***

**2.2.14 (a)** Clause 30(2) of TCOS-2004 stipulates that in case a stopped/defective meter is not replaced within a period of two months of its detection, a rebate of five *per cent* on the total bill of the LT consumer shall be allowed from third monthly bill in case of monthly/fortnightly billing and second bill in case of bi-monthly billing after such detection till the meter is replaced.

Scrutiny of billing data of Jhunjhunu circle revealed that 603 LT consumers were billed on average basis during 2007-08 indicating that the meters were defective during the period. The admissible rebate of Rs. 3.88 lakh at the rate of five *per cent* was, however, not allowed to these consumers.

**2.2.14 (b)** Tariff -2004 provides for a rebate of 5 paisa per unit in the “Energy Charges” for usage of “Solar Water Heating System”. Scrutiny of data, however, revealed that this rule was not mapped in the system and as a result, the rebate was not given to 399 consumers using “Solar Water Heating System”.

***Short recovery of fixed voltage charges***

**2.2.15** As per Tariff -2004, fixed charges for HT consumers at the rate of Rs. 90 per KVA per month of billing demand *i.e.* the maximum demand actually recorded in KVA during the month or 75 per cent of contract demand, whichever was higher, were to be recovered.

Audit, however, noticed that in the absence of mapping of such rules in the system, wherever the reading of energy consumption was recorded twice in a month due to change in meter/Current Transformer Potential Transformer (CTPT) or change in contract demand, the fixed charges were levied on average demand. Thus, the fixed charges worked out by the system were short recovered by Rs. 9.82 lakh in 9 to 24 cases during 2007-08.

**Application controls**

***Input controls and Validation checks***

**2.2.16** To ensure correctness, completeness and reliability of the database, it is necessary to ensure appropriate input control and data validation during the data entry. This would help in reduction in duplication of efforts and redundancy. The following deficiencies were noticed in audit in this regard.

**Input Controls**

***Completeness of database***

**2.2.17** The system did not have adequate input controls to ensure complete data capture. Analysis of HT/LT database revealed that the database was incomplete as vital details, were left blank as detailed below:

***HT billing system***

- date of connection (168 cases)/disconnection (96 cases), date of agreement (736 cases), sanctioned load (1,361 cases), connected load (1,380 cases), reference to security deposit (134 cases), date on which the security amount deposited (355 cases), industrial code (267 cases) and area code (246 cases) were found blank.

### ***LT billing system***

- meter number (551 cases), sanctioned load (170 cases)/connected load (172 cases), bill number (15,113 cases), username involved in generation of bill (15,113 cases), periodicity of outstanding dues (7,769 cases) were not indicated.

### ***Status of defective meters***

**2.2.18** As per clause 27 of TCOS in case of non-functioning of meter, the bills of energy consumption are to be prepared on average basis. Analysis of data of HT consumers revealed that in many cases though the consumption of a consumer in different months continuously remained same yet the system did not indicate any alert about non-functioning of the meters as the field indicating status of meter was found blank. It was further noticed that in such cases the assessment was made manually instead of through system.

The Government stated (August 2009) that instructions have now been issued to the billing agencies to indicate the status of the meters.

### ***Observance of provisions of TCOS***

**2.2.19** Clause 27 of the TCOS provided that if the meter installed at the LT consumer's premises is stopped/lost/stolen/burnt, the consumption of electricity for this period shall be assessed on the basis of consumption of the corresponding period of the previous year or the average monthly consumption of the previous six months, whichever is higher. Audit, however, noticed that adequate input controls were not in-built in the system. As a result of it, the following discrepancies were noticed:

- in Jhunjhunu circle, the consumption details for the corresponding period of the previous year had been shown as 'nil' in respect of 11,351 consumers in April 2007;
- database depicted negative consumption of previous corresponding period in respect of 249 consumers;
- in Ajmer and Jhunjhunu circle, average monthly consumption of the previous six months in the database was also shown as 'nil' in 3,538 and 11,952 cases respectively.

As a result, the data could not be utilised for billing during the period of non-functioning of the meter and the same were assessed manually.

### ***Duplicate meter numbers***

**2.2.20** Each energy meter installed at the premises of the consumers has a unique serial number. The system, however, accepted the same meter numbers for different consumers. Data analysis revealed 58 and 251 duplicate serial numbers of energy meters in case of HT and LT consumers respectively.

The Government assured (August 2009) to take corrective action.

***Rebate for domestic connections in rural areas***

**2.2.21** Tariff -2004 provides for a rebate of 10 *per cent* of energy charges for domestic connections (LT) in rural areas only. This rebate was, however, not to be allowed in such villages where round the clock supply of electricity was being provided. Such villages were identified in the system with the tariff code '1500'. As per the management information system (MIS) of the Company, out of total 1,025 villages under Ajmer circle, 949 villages have been electrified upto March 2008 and round the clock supply of electricity was provided in these villages.

Scrutiny of database, however, revealed that

- status of 444 such villages have not been updated in the system and therefore the rebate was allowed to domestic connections which were not eligible for this rebate,
- in the absence of provision in the system, the rebate of 10 *per cent* was directly reduced from the tariff/energy charges instead of showing it separately,
- in the absence of necessary validation checks, the system indicated tariff code '1500' in case of urban connections also.

***Security Deposit from HT consumers***

**2.2.22** As per TCOS provisions, the Company assessed the requirement of security deposit from a consumer at the beginning of each financial year on the basis of actual average consumption for the preceding twelve months to cover the risk towards the Company's dues. In case the security deposit given by a consumer is found insufficient or in excess, the difference so worked out shall be adjusted accordingly. Audit noticed that security deposit amount shown in the system was not reconciled with the records compiled by the Commercial Section and there was a difference of Rs. 3.20 crore as on March 2008. The differences were due to non-communicating the data relating to recovery or refund of security deposit to service provider on regular and timely basis for data entry. The differences in amounts of security deposit of individual consumers noticed during test check are given in **Annexure-10**.

The Government assured (August 2009) to take corrective action to update the security deposit records.

**Validation checks**

***Disparity between agreement date and connection date***

**2.2.23** An agreement is required to be executed by the consumer before release of HT connection. Audit noticed that the system did not have a check to validate the date of agreement with reference to date of release of

connection. As a result, in 33 cases the database displayed agreement date subsequent to the date of release of connection.

The Government stated (August 2009) that necessary instructions will be issued to the service providers.

***Multiplication factor***

**2.2.24** For computation of consumption, the units recorded in the KWH meters are being multiplied by the Multiplication Factor (MF) having numerator and denominator as indicated on the Current Transformer Potential Transformer (CTPT) installed at the consumers' premises. Audit, however, noticed that in case of HT consumers, the system did not validate the denominator while calculating the consumption as in some cases though the MF denominator indicated zero value yet it calculated the consumption and generated the bills indicating manual intervention. Thus, the system was deficient to this extent. Besides above, the system also did not have the provision to indicate the CTPT numbers installed at the consumers' premises, in absence of which the system was not able to validate the change in MF in case the CTPT installed at consumers' premises was replaced.

The Government assured (August 2009) to take corrective action.

***Discrepancies in serial numbers and date of generation of bills***

**2.2.25** The system was deficient and also lacked validation checks. Audit while analysing HT consumers' data, noticed that:

- the serial numbers of electricity bills were not being given by default and therefore the bills generated on subsequent dates have the serial numbers prior to bills which had already been generated on an earlier date;
- bill issue date and the bill generation date were not validated in the system. Instances were noticed wherein the bill generation date *i.e.* the date of printing of the bill was subsequent to the date of bill issue. Such discrepancies in the system may lead to consumer grievances and legal disputes.

The Government assured (August 2009) to issue necessary directions to the service providers.

***Manual intervention in generation and issue of bills***

**2.2.26** As per the work order, BIPS was required to generate bills on the very same date on which the inputs were provided to them. In case of HT consumer, the reading of the electricity consumed was being recorded on first date of the month and the bills were to be realised within 12 days of issue. Audit, however, noticed the following discrepancies:

- even after allowing six days grace period for generation and distribution of bills, most of bills were realised from twentieth to last day of the month resulting in delay of 2 to 12 days;
- delay in generation and issue of bills for 2 to 12 days consequently delayed the realization of revenue to the tune of Rs. 351.66 crore\* during 2007-08 affecting already strained financial position of the Company;
- manual intervention in checking of all the bills defeated the very purpose of using IT facilities.

Despite improvements in IT facilities and infrastructure and also availability of trivector meters capable of taking readings directly from meters through hand held devices and transferring input data directly to the service provider, the Company did not initiate action to reduce the revenue realisation cycle. The delay in generation and distribution of bills could not be assessed by Audit in absence of records of time taken in the each activity of processing of bills.

#### **Compliance of provisions of contract**

##### ***Terms and conditions of the work order***

**2.2.27** The service providers were required to submit deliverables such as:

- flow chart of programme and source code before commencement of work;
- getting the HT billing data insured for safety of data;
- enabling the billing software web/net enabled for viewing of consumer wise billing status/outstanding/securities and other consumer related information;
- providing requisite operational and other training to the personnel nominated by the Company.

It was noticed that both the service providers failed to comply with the requisite provisions of the contractual agreement as mentioned above.

The Government replied (August 2009) that the matter is being taken up with the service providers.

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\* Revenue after 18th day of the respective months.

### **Utilisation of system**

**2.2.28** The system was also designed to provide details of outstanding against various consumers, adjustment of security deposits in case of Permanent Disconnected Consumers (PDCs) and to take effective measure on MIS being generated through it.

Scrutiny of database of 1,385 HT consumers revealed that Rs. 15.90 crore was outstanding against 197 PDCs as on March 2008, comprising of Board Dues (BD) of Rs. 13.56 crore, Electricity Duty (ED) of Rs. 0.41 crore and Late Payment Surcharge (LPS) of Rs. 1.93 crore. Among these, Rs.14.55 crore (154 consumers) were outstanding for more than three years.

Audit further noticed that the outstanding dues of Rs. 48.48 lakh consisting of BD (Rs. 44.20 lakh), ED (Rs. 3.22 lakh) and LPS (Rs. 1.06 lakh) were not shown adjusted from the available security deposit (Rs. 80.08 lakh) of 27 PDCs disconnected during the period between July 2004 and March 2007. No periodical reconciliation of regular dues between the figures shown in the database of system and accounting records was done to ascertain the effectiveness of system and reliability of information.

The Government stated (August 2009) that action has been initiated to adjust the dues of the consumers in order of priority and steps are being taken to recover the dues from PDCs under relevant Act.

### **Internal Control**

**2.2.29** The activity of billing system comprising of processing and generation of bills for HT/LT consumers was very important as the timely assessment, billing and realization of revenue is critical for survival for the Company and can be considered as backbone system of the Company. This mission critical activity has been outsourced. The Company was expected to exercise prudent controls over the outsourcing activity as well as on outsourced agency to which this activity was assigned. It was noticed that:

- the Company has never checked the activities of the billing system, infrastructure of service provider, adequacy and security of infrastructure;
- the competency of staff deployed for data entry by billing agencies was never verified by the Company. This may lead to a risk of copying/manipulation/deleting the critical data of the Company;
- monitoring of access controls employed by the billing agencies has never been done to protect the database and to avoid any miscreant activity;

- the Company did not have any system to review the correctness of mapping of tariff/business rules in the system and to ensure the reliability of outsourced billing system.

Thus, the internal control in respect of IT application was non-existent. The Company also could not address the associated risks of outsourced billing system.

### **Conclusion**

**The Company does not have an IT policy or a business continuity plan. The design deficiencies and inadequate input controls resulted in allowance of inadmissible incentives. The outputs generated by the system were not reconciled with financial statements of the Company. The Company could not improve the reliability of system by including outsourced billing system under the scope of internal control/audit to ensure its reliability and effectiveness. Despite strained fund position, the Company could not reduce duplication of efforts and reduce the cycle of revenue collection period. Thus, the Company could not leverage the use of technology to its maximum potential. The Company assured to take effective steps in this direction to improve the system.**

### **Recommendations**

**The Company should:**

- **formulate and implement a clear and comprehensive IT policy and periodically review it in view of changing scenario;**
- **conduct periodical reconciliation of system data and financial statements;**
- **build in input controls and validation checks into the system to prevent duplicate entries and to ensure complete and correct data entries; and**
- **cover the outsourced IT application under the scope of internal control/audit to enhance the reliability and effectiveness of billing system.**