

CHAPTER-III

3 REVIEWS RELATING TO STATUTORY CORPORATION

TAMIL NADU ELECTRICITY BOARD

3.1 SECTORAL REVIEW ON FUEL MANAGEMENT

HIGHLIGHTS

Tamil Nadu Electricity Board (Board) has 160 power generation stations comprising four thermal, three gas based, one naptha based power station, 32 hydel and 120 windmill stations. The installed capacity as on 31 March 2004 was 5,401.035 Mega Watt (MW).

(Paragraph 3.1.1)

The Board has not determined the quantum of shortage of coal to be borne by the handling agencies since 1997.

(Paragraph 3.1.5)

Poor quality of coal received by the Board resulted in loss of generation of 912.39 million units.

(Paragraph 3.1.7)

The Board had incurred Rs.68.35 crore on account of stones and mill rejects contained in coal.

(Paragraph 3.1.8)

There was excess consumption of gas valuing Rs.9.56 crore in two gas turbine power stations due to excessive heat consumption for generation.

(Paragraph 3.1.10)

There was excess consumption of naptha valuing Rs.34.96 crore in Basin Bridge Gas Turbine Power Station due to excessive heat consumption.

(Paragraph 3.1.11)

Introduction

3.1.1 Tamil Nadu Electricity Board (Board) has 160 power generating stations comprising thermal, gas based, naphtha based hydel and windmill. There are four thermal power stations located at Tuticorin, Mettur, North Chennai and Ennore; three gas based power stations at Thirumakottai, Valuthur, Kuthalam and one naphtha based power station at Basin Bridge (Chennai). The hydel and windmill stations (152 numbers) are located in various parts of the State. The installed capacity of the Board as on 31st March 2004 was 5,401.035 Mega Watt (MW). Details of installed capacity and generation achieved by the various power stations, classified on the basis of fuel used, during 1999-2004 are given in **Annexure-19**. The fuels used in the power generation are coal, furnace oil, high speed diesel oil, gas and naphtha. Coal and oil cost constituted 94.54 *per cent* of total fuel cost of the Board in 2003-04. The Board procures coal from Coal India Limited and its subsidiaries, oil and naphtha from Indian Oil Corporation Limited and gas from GAIL (India) Limited.

Organisational set-up

3.1.2 Chief Engineer (Coal), Chief Engineer (Mechanical-Thermal Stations) and Chief Engineer (Projects) reporting to Member (Generation) carry out the activities relating to procurement and consumption of fuel.

Scope of Audit

3.1.3 Purchase and consumption of fuel, as a separate activity was not reviewed in the earlier years. This review covers the activities relating to procurement, transportation, storage and consumption of fuel for the five years ending 31 March 2004. The review conducted during December 2003 to March 2004 covered thermal power stations located at Tuticorin (Tuticorin Thermal Power Station), Mettur (Mettur Thermal Power Station) and North Chennai (North Chennai Thermal Power Station). The gas-based power stations located at Thirumakottai Kovilkalappal Gas Turbine Power Station (TKGTPS), Valuthur (Valuthur Gas Turbine Power Station - VGTPS) and one naphtha-based power station at Basin Bridge (Basin Bridge Gas Turbine Power Station) are covered in the present Review. The performance of Kuthalam gas-turbine power station has not been included in the review since it commenced generation in March 2004 only. Ennore (Ennore Thermal Power Station) was already reviewed and the findings have been included in the Commercial Audit Report for the year ending 31 March 2003.

Audit findings, as a result of test check, were reported to the Government/Board in May 2004 with a specific request to attend the meeting of the Audit Review Committee of State Public Sector Enterprises (ARCPSE), so that view points of the Government/Board are taken into account before finalising the review. The ARCPSE meeting scheduled in July 2004 could not be held due to change in the incumbency of the members of ARC at the Board

as well as Government level. The reply of the Board furnished thereafter in July 2004 has been considered and suitably incorporated in the review.

Procurement of fuel

Coal

Linkage and supply of coal

3.1.4 The Standing Linkage Committee (SLC) allots coal based on the availability at various collieries, the handling capacity of the ports, nearness of the colliery to the ports and the quarterly requirement of the Board. The coal is allotted from the collieries of Eastern Coal Fields Limited (ECL – Raniganj collieries), Bharat Coking Coal Limited (BCCL) and Mahanadhi Coal Fields Limited (MCL - IB Valley and Talcher collieries) situated in the States of West Bengal, Jharkhand, Orissa and Madhya Pradesh. The Board has not entered into an agreement with the suppliers of coal since 1986. The position of coal linkage, receipts as against consumption of coal during 1999-2004 is given below:

Particulars	1999-2000	2000-01	2001-02	2002-03	2003-04
Targeted Generation (in million units – MU)	19,044	20,074	21,646	20,884	20,972
Quantity of coal requisition sent to SLC to achieve the above target (in lakh MTs)	107.55	156.45	153.15	142.20	161.55
Coal linkage by SLC (in lakh MTs)	110.10	150.45	151.95	148.50	161.85
Coal receipts (in lakh MTs)	115.34	152.52	144.92	135.52	139.97
Coal Consumption (in lakh MTs)	137.58*	144.33	149.03*	148.37*	144.13*

The Board received adequate quantity of coal to meet the entire requirements of the thermal stations. There was no shut down of the power stations for want of coal.

The specific observations noticed in the procurement of coal are discussed in succeeding paragraphs.

Transit loss in movement of coal

3.1.5 For movement and handling of coal from the collieries to the discharge port, the Board, periodically, placed purchase orders on handling agencies. As per conditions of purchase order, the handling agencies were responsible for any shortage of coal between quantities loaded at the collieries and the quantity discharged. Audit observed that the shortage of coal in the contracts have not been periodically determined since 1997 as the contracts have been

The Board has not determined the quantum of shortage of coal to be borne by the handling agencies since 1997.

* The excess consumption over receipts was met from coal reserves maintained in the power stations.

extended year after year without determining the shortage of coal in the previous contracts.

The Board stated (July 2004) that the actual shortage could be arrived at only on closure of purchase orders and shortage, if any, would be recovered from the handling contractor. The reply is not tenable as non-determination of shortages immediately after the end of a year has resulted in delay in recovery of cost of shortages noticed in coal from the handling agencies. Besides, the delay in determination for shortages would pose problems in the correct determination of shortages of coal relating to very old periods.

Lack of agreement with Poompuhar Shipping Company for charter parties

3.1.6 Coal is transported by sea from the loading ports of Haldia, Paradip and Vizag to Chennai and Tuticorin by Poompuhar Shipping Corporation Limited (PSC) - a State Government undertaking through its three vessels. As three vessels were not adequate, PSC chartered additional vessels, on behalf of the Board, for transport of coal. The rights and liabilities of PSC and the Board in respect of these chartered vessels were not defined by way of an agreement.

There were 17 arbitration awards (as on August 2004) aggregating to Rs.10.16 crore against PSC in respect of private charter parties against which PSC has gone on appeal in the High Court of Madras. Audit observed that the Board reimbursed (June 2001) Rs. 2.89 crore in respect of two arbitration cases to PSC in their capacity as principal responsible for the acts of its agent. While sanctioning reimbursement of the above award, the Board noted that PSC did not contest the arbitration effectively due to its inability to produce documentary evidence before the arbitrators and deficiencies in the drafting of charter party agreements

The Board stated (July 2004) that a committee comprising members of the Board and PSC had been constituted to sort out the issues and avoid arbitration cases in future. It was also stated that the agreement with PSC due for renewal in August 2005 would be suitably modified to safeguard the interests of the Board.

Quality of Coal

Poor quality of coal and loss of generation

3.1.7 The following table indicates the loss of generation due to poor quality of coal, as furnished by the Board during 1999-2000 to 2003-04.

Loss in Generation (in MU)

Particulars	1999-2000	2000-01	2001-02	2002-03	2003-04	Total
TTPS	8.44	36.02	14.99	35.82	45.30	140.57
MTPS	134.41	228.61	165.68	18.15	0.16	547.01
NCTPS	16.02	20.56	58.26	68.30	61.67	224.81
Total	158.87	285.19	238.93	122.27	107.13	912.39

Poor quality of coal received by the Board resulted in loss of generation of 912.39 million units.

The poor quality of coal during 1999-04 resulted in loss of generation of 912.39 million units (MUs).

The Board stated (July 2004) that the quality of coal had improved and loss of generation had been reduced. Audit observed that the loss of generation in respect of TTPS and NCTPS for the last three years ending March 2004 (as indicated in the above table) did not indicate improvement in quality of coal as claimed by the Board.

Stones, shale, foreign material (mill rejects) in coal receipts

3.1.8 As the Board has not entered into an agreement with the suppliers of coal since 1986, no agreement for reimbursement of cost for the stones, shale and foreign material contained in coal was also reached. Audit observed that as per model agreement existing in 1985, the supplier was to take adequate steps to ensure that pickable shales, stones are removed. The quantity of the stones, mill rejects received and the consequent loss incurred by the Board during the last five years ended 31 March 2004 are given below:

Name of the Thermal Power Station (TPS)	Quantity of coal received at TPS (in lakh MT)	Quantity of stones and mill rejects contained in coal (in lakh MT)	Cost of stones and mill rejects (Rupees in lakh)
NCTPS	165.91	1.40	2125.27
MTPS	238.54	1.18	2002.44
TTPS	246.51	1.55	2847.64
Total	650.96	4.13	6975.35

The Board had incurred Rs.68.35 crore on account of stones and mill rejects contained in coal.

The Board stated (March 2004) that as per mutual consensus between TNEB and Coal India Limited (CIL), the latter reimburses cost, based on joint assessment by TNEB and CIL for the quantity of (+) 200 mm stones only. It was also stated (July 2004) that deduction of (+)200 mm stones, shales had already been taken care of while collecting samples for ascertaining the grade. The reply of the Board needs to be viewed from the fact that the reimbursement for the quantity of (+) 200 mm stones received by the Board during the period was only Rs.1.40 crore as against the cost of Rs.69.75 crore of stones and mill rejects supplied by CIL.

Excess ash content in coal

3.1.9 Higher ash content in coal is one of the main reasons for excess consumption of coal in thermal power stations. The following table indicates the percentage of ash content in coal received at the thermal stations during 1999-2004:

Power Station	1999-2000	2000-01	2001-02	2002-03	2003-04
TTPS	41.59	43.47	40.67	39.32	41.62
MTPS	45.20	46.51	44.96	43.70	42.35
NCTPS	46.60	46.40	45.40	40.20	42.70

The ash content of coal received ranged from 39.32 to 46.60 *per cent* as indicated in the above table. Ministry of Environment and Forest, Government of India (May 2001) stipulated a maximum ash content of 34 *per cent* in coal for thermal stations located beyond 1,000 KMs from the coal pithead. The Board, however, continued to get coal with high ash content.

It is relevant to point out that NCTPS suggested (July 2001) usage of washed coal, which would bring down the ash content to 36.4 *per cent*. As against the average calorific value of 3258 Kcal[♥]/kg for Run Of Mine coal, washed coal was expected to have a calorific value of 4198.4 Kcal/Kg. The use of washed coal was expected to transform into an annual saving of 8.22 lakh MT of coal valuing Rs.61.39 crore for NCTPS alone. As the generating stations of Electricity Boards of Gujarat, Punjab, Rajasthan have already switched over to washed coal by engaging private coal washeries at the coal pithead, use of washed coal in the thermal stations of Tamil Nadu assumes greater importance particularly in view of substantial saving in the cost of coal. The Board, however, is yet to take a decision in this regard (August 2004).

The Board stated (July 2004) that the quantification of benefits of the project could be ascertained only if washed coal was used for a sustained period of two to three years in a particular unit or the whole power station. It was also expressed that they were not able to venture into any project without ascertaining its pros and cons and they proposed to get washed coal and use in one thermal station for six months on trial basis.

Consumption of fuel

Excess consumption of gas

3.1.10 The following table indicates the designed heat rate of the stations, generation achieved, actual heat rate reached at the stations, excess heat rate consumed, excess consumption of gas and the value of excess gas consumed during 2001-04:

Sl. No.	Particulars	T (K) GTPS			VGTPS
		2001-02	2002-03	2003-04	2003-04
A	Installed capacity in MW	107.88	107.88	107.88	95
B	Generation in MU	697.342	727.409	723.72	665.55
C	Stipulated heat rate by Original Equipment Manufacturer (Kcal/Kwhr [♦])	1,670	1,670	1,670	1,671.6
D	Actual heat rate achieved (Kcal/Kwhr)	1,697.37	1,697.37	1,823.82	1,929.62

♥ Kilo calories.

♦ Kilowatt hour.

Sl. No.	Particulars	T (K) GTPS			VGTPS
		2001-02	2002-03	2003-04	2003-04
E	Excess heat consumed (Kcal/Kwhr) (D-C)	27.37	27.37	153.82	258.02
F	Excess heat consumed (in Mcal) (E x B)	19,086.25	19,909.18	87,662.02	1,71,725.21
G	Excess consumption of gas in Standard Cubic Meter(SCM) (F x 10 ⁶ /10 ⁴)	19,08,625	19,90,918	87,66,202	1,71,72,521

There was excess consumption of gas valuing Rs.9.56 crore in two gas turbine power stations due to excessive heat consumption for generation.

The total excess consumption of 29.84 million SCM of gas resulted in extra expenditure of Rs.9.56 crore in the above two stations. The Board stated (July 2004) that the performance of gas turbines was entirely dependent on the ambient temperature and hence, the air played a major role. It was also stated that whenever the ambient temperature was more than the design value, the rated performance could not be obtained and that the gas turbine would always be designed based on the annual average temperature of the area.

The reply of the Board is not tenable as the designed parameters themselves were fixed based on the field conditions including average temperature in the area. It is also relevant to point out that the two stations did not achieve even the relaxed norm fixed at 1720 Kcal/Kwhr by Tamilnadu Electricity Regulatory Commission for 2003-04.

Excess consumption of naphtha due to enhanced heat rate at BBGTPS

There was excess consumption of naphtha valuing Rs.34.96 crore in Basin Bridge Gas Turbine Power Station due to excessive heat consumption.

3.1.11 Similarly, for generating one Kwhr of electricity in BBGTPS, the designed heat rate prescribed by the manufacturer of generating equipment was 3,005 Kcal. As against the designed heat rate, the actual heat rate of the station was always higher during April 1999 to March 2004 and ranged between 3,182 to 3,620 Kcal/Kwhr. This resulted in excess consumption of 22,337.23 MT of naphtha valued at Rs.34.96 crore.

The Board stated (March 2004) that the station was used as a peak hour generating station only and the gas turbines had to be started and stopped as per the direction of the Load Despatch Centre resulting in excess consumption of fuel. It was also stated that the loading of the units were also restricted depending upon the grid condition and as such heat loss could not be controlled at BBGTPS.

The reply is not tenable since the designed heat rate itself was fixed as applicable to peak hour station only.

Excess consumption of coal due to excess heat consumed

3.1.12 In respect of thermal power stations also the suppliers of the generating machinery have fixed norms for consumption of coal with reference to the designed heat rate of the unit and thermal efficiency. A review of three power stations (TTPS, MTPS and NCTPS) revealed that the actual coal consumed was more than the norms fixed for these stations due to consumption of excess

heat by these power stations. This resulted in excess consumption of 35.65 lakh MT of coal valuing Rs.610.50 crore during 1999-2004.

The Board attributed (July 2004) excess consumption of coal mainly to lesser calorific value of coal, more ash content and variation in moisture in different grades of coal. The reply is not tenable as the point raised was excess consumption of heat in relation to actual generation, independent of the quality of coal. Further, based upon the calorific value of coal actually received, norms fixed have not been reviewed for making suitable corrections for adoption in future.

The matter was reported to the Government in August 2004. The reply is, however, awaited (September 2004).

Conclusion

The Board has not entered into agreement with the suppliers of coal. In absence of agreement, issues regarding poor quality of coal, presence of shales, stones and foreign materials in coal could not be settled with the suppliers. The Board has not determined the shortages of coal and as such early recovery of the shortages from handling agencies could not be carried out.

The Board is required to enter into agreement with the suppliers of the coal to settle these issues regarding quality of coal, etc. Shortages noticed in the handling of coal need to be determined early to avoid the chances of future disputes with the handling agencies.