

## Chapter II

### 2. Performance Audit relating to Government Company

#### 2.1 Fuel Management in Telangana State Power Generation Corporation Limited

##### Executive Summary

###### ***Introduction***

*In the combined state of Andhra Pradesh, generation of power was carried out by Andhra Pradesh Power Generation Corporation Limited (APGENCO). After the formation of Telangana State as per the Andhra Pradesh Reorganisation Act, 2014, Telangana State Power Generation Corporation Limited (TSGENCO) was incorporated under Companies Act, 2013 on 19 May 2014 and it commenced operations from 2 June 2014. It has a capacity of 2282.5 MW at three thermal power plants viz. Kothagudem Thermal Power Stations (KTPS, 1720 MW), Paloncha (Khammam district), Kakatiya Thermal Power Station (KTPP, 500 MW), Bhuppalapalli (Warangal district), and Ramagundam Thermal Power Station (RTS-B, 62.5 MW), Ramagundam (Karimnagar district). The power generation increased from 10783 MU (Million Units) in 2010-11 to 16057 MU in 2014-15 and the total cost per unit increased from ₹ 2.01 in 2010-11 to ₹ 3.58 in 2014-15.*

###### ***Linkage less than the requirement***

*Though the New Coal Distribution Policy (NCDP) of GoI provides for 100 per cent supply as per norms, the Company did not approach the GoI to bridge the gap between the normative requirement and linkage already obtained. Due to this the Company had to procure coal at higher price over and above the linkage quantity and thus incurred an additional expenditure of ₹ 170.56 crore which was avoidable.*

###### ***Abnormal difference in average GCV of invoiced coal and bunkered coal***

*The abnormal difference in the Gross Calorific Value (GCV) as per the invoiced coal and the bunkered coal resulted in excess consumption of coal of 76.02 Lakh MT valued ₹ 2,082.44 crore.*

###### ***Lack of adequate unloading facilities led to delay in unloading of coal***

*For transportation of coal, Railways changed their fleet from 'N' type to 'BOBR' wagons. Lack of adequate unloading facilities for these wagons led to delay in unloading of coal. The Company had paid ₹ 12.33 crore in the form of demurrages during 2010-15.*

***Excess payment of freight on diversion of rakes due to lack of timely action***

*The Company, though being aware that the supplies from Mahanadi Coalfields Limited (MCL) were not meeting the requirement of KTPS, had not planned in advance nor taken any steps to reallocate the coal to KTPS. This has resulted in payment of additional freight charges of ₹ 7.53 crore for diversions from KTPP to KTPS.*

***Excess unburnt carbon in ash***

*The high quantum of unburnt coal in fly ash and bottom ash resulted in wastage of 3.53 Lakh MT of coal valued ₹ 66.73 crore (being the cost of unburnt coal) in the ash.*

***Deficient internal control***

*Internal control system was found deficient as - there was no proper mechanism to review the coal supplies and their utilisation according to the requirement; no mechanism to review the inventory levels of coal; transit loss/demurrage charges were not monitored.*

## 2.1 Introduction

In the combined state of Andhra Pradesh, generation of power was carried out by Andhra Pradesh Power Generation Corporation Limited (APGENCO). After the formation of Telangana State as per the Andhra Pradesh Reorganisation Act, 2014, Telangana State Power Generation Corporation Limited (TSGENCO) (Company) was incorporated under Companies Act, 2013 on 19 May 2014 and it commenced operations from 2 June 2014. It has a capacity of 2,282.5 MW at three thermal power plants viz. Kothagudem Thermal Power Stations (KTPS, 1,720 MW)<sup>8</sup>, Paloncha (Khammam district), Kakatiya Thermal Power Station (KTPP, 500 MW), Bhuppalapalli (Warangal district), and Ramagundam Thermal Power Station (RTS-B, 62.5 MW), Ramagundam (Karimnagar district). The details of installed capacity, actual generation and cost for the years 2010-11 to 2014-15 (2010-15) is stated in **Annexure-2.1**. The power generation increased from 10,783 MU (Million Units) in 2010-11 to 16,057 MU in 2014-15 and the total cost per unit increased from ₹ 2.01 in 2010-11 to ₹ 3.58 in 2014-15.

Fuel forms a major component of the cost of the power generated and therefore has a direct impact on consumers. Fuel, for the purpose of this report, mainly refers to coal which was used to generate nearly 84 *per cent* (**Annexure-2.2**) of the total power generated in Telangana in 2014-15.

The price of coal is based on its GCV (Gross Calorific Value) which is a measure of its quality. The coal is purchased at a 'basic price' determined by the coal company for normal (ROM<sup>9</sup>) coal.

As per the Electricity Act, 2003, the SERC (State Electricity Regulatory Commission) determines various norms [Plant Availability Factor (PAF)<sup>10</sup>, Gross Station Heat Rate (SHR)<sup>11</sup>, Transit Loss, etc.] for operation of power stations. Central Electricity Authority (CEA) also fixes targets for power generation for Thermal Power Stations (TPSs) considering capacity of plant, average plant load factors, past performance. The company works out the requirement of coal on the basis of the targets so fixed and submits the proposals for coal linkage to Government of India. Based on the company's requirement, the CEA recommends to Standing Linkage Committee (SLC) of Ministry of Coal, Government of India which allots coal based on the availability at various collieries.

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<sup>8</sup> KTPS includes: KTPS – O&M consisting of KTPS-A (4 x 60 MW), KTPS-B (2 x 120 MW) and KTPS-C (2 x 120 MW) and KTPS – V&VI consisting of KTPS V (2 x 250 MW) and KTPS-VI (1 x 500 MW).

<sup>9</sup> Run of mine coal: ROM coal refers to Coal as extracted from the coal mine in its natural and unprocessed state.

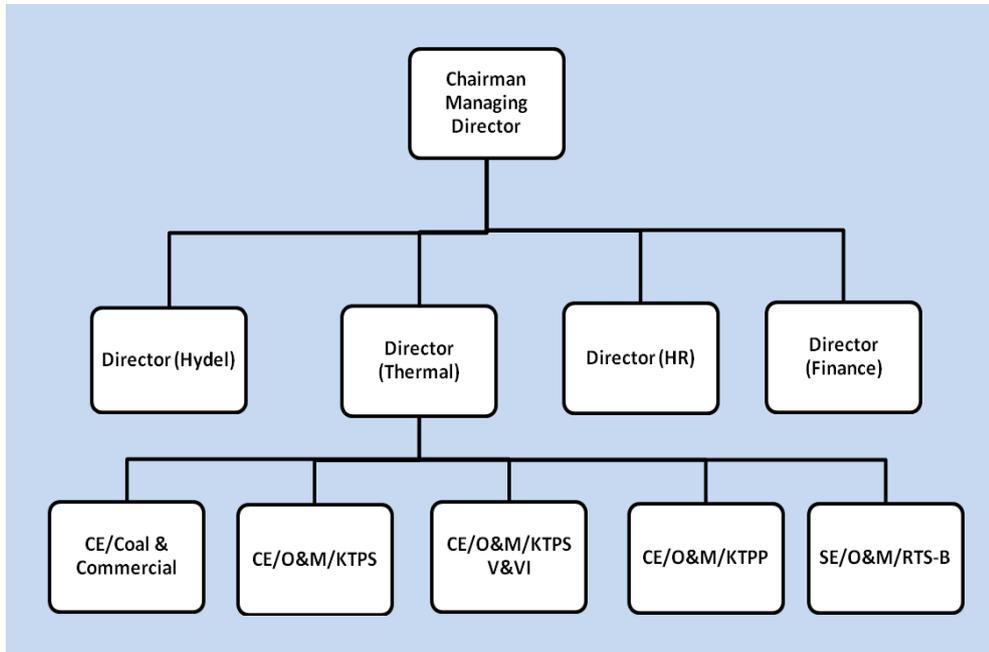
<sup>10</sup> PAF is the ratio of actual hours of operation of the power station to the maximum hours available during a certain period.

<sup>11</sup> SHR is the energy (kCal) used/required to produce one unit (kWh) of electricity in a power plant.

## 2.2 Organisation Structure

The organisation structure of the company (relating to purchase and transportation of fuel) is detailed below

### Organisational chart



The Management of the Company is vested in Board of Directors (Board) comprising of five Directors. The day-to-day operations are carried out by the Chairman & Managing Director, who is the Chief Executive of the Company and functions with the assistance of Director (HR), Director (Finance), Director (Thermal) and Director (Hydel). Matters relating to purchase and transportation of fuel are looked after by Chief Engineer (Coal & Commercial) at Corporate office who reports to Director (Thermal). At field level, each thermal station is headed by a Chief Engineer/ Superintendent Engineer who functions under the overall control and supervision of Director (Thermal).

## 2.3 Scope of Audit & Methodology

The Performance Audit covered all issues relating to purchase, transportation and consumption of fuel (coal and oil) including coal ash management in all the three thermal power generation stations (KTPS, KTPP and RTS-B) of TSGENCO, covering the period from 2010-11 to 2014-15.

The audit methodologies included

- i. Scrutiny of records relating to procurement, receipt and consumption of fuel, fuel cost reports, performance efficiency reports and ash generation and disposal reports.
- ii. Examination of agenda and minutes of the Board meetings.

- iii. Scrutiny of agreements with fuel suppliers and guidelines of Central Electricity Authority (CEA)/ State Electricity Regulatory Commission (SERC) and Ministry of Environment and Forest (MoEF).
- iv. Interaction with Audited entity and analysis of the data with reference to audit criteria.

## **2.4 Audit Objectives**

The performance audit aimed to assess whether:

- i. The procurement of fuel was done economically, efficiently and effectively,
- ii. The terms and conditions of agreements with the fuel suppliers were adhered to and penalties were levied in case of non compliance/adherence thereof,
- iii. The consumption of fuel in power generation and disposal of ash was in line with the norms fixed by SERC and MoEF,
- iv. An efficient and effective mechanism for inventory management and internal control exists to ensure adequate fuel availability as per prescribed norms.

## **2.5 Audit Criteria**

**2.5.1** The audit criteria were as follows:

- i. Guidelines issued by the CEA/Electricity Act/SERC/MoEF/ Company's policies and decisions,
- ii. Provisions contained in agreements with coal companies, Oil companies, Railways, transport agencies and other contractors/agents, and
- iii. Norms of CEA and SERC for holding of inventory of coal and oil respectively.

**2.5.2** Audit objectives and criteria were explained to the Company during the Entry Conference (June 2015). Subsequently, the audit findings were reported to the Management and the State Government (September 2015). Replies to the audit findings received from the Management and discussed in the Exit Conference (November 2015). Replies to the audit findings from the Government were received in December 2015. The views expressed by Management/Government have been considered while finalising the Performance Audit Report.

## **2.6 Audit Findings**

### **Procurement of coal**

Coal linkage means annual allotment of specific quantity of coal from a coal company to a power generation company. Based on GoI New Coal Distribution Policy (NCDP), coal linkage is obtained by the power generation

company from the GoI, Ministry of Coal, as per the requirement of coal in its power stations.

### **2.6.1 Coal linkage less than the requirement**

Coal linkage is based on targets fixed by CEA for power generation for thermal power station considering the capacity of plant, average plant load factor and past performance. The Company works out the requirement of coal on the basis of targets so fixed and submits the proposal and coal linkage to CEA. Based on the company's requirement, CEA recommends to Standing Linkage Committee of Ministry of Coal, GoI. As per NCDP of GoI 100 *per cent* of the quantity as per the norms would be considered for supply through Fuel Supply Agreement (FSA).

Audit worked out the coal requirement of power stations as per SERC norms. The details of coal requirement as per SERC norms, coal linkage obtained with The Singareni Collieries Company Limited (SCCL), total quantity of coal procured, coal procured in excess of linkage and actual consumption is given in **Annexure-2.3**. Audit observed that the Company did not compute/submit the requirement of coal linkage according to the SERC norms. As a result the linkage approved was less than the requirement during the period 2011-12 to 2014-15 by 9.60 LMT (Lakh Metric Tonnes) per annum. Though the NCDP provides 100 *per cent* supply as per norms, the Company did not approach the GoI to bridge the gap between the requirement as per norms and linkage already obtained.

Due to this the company had to procure coal over and above the linkage quantity at an additional price of ₹ 444 per MT for 38,41,364 MT during the period 2011-12 to 2014-15. The company thus incurred an additional expenditure of ₹ 170.56 crore which was avoidable.

Management / Government stated (December 2015) that the company entered into FSAs with coal companies as per coal linkage sanctioned by the Ministry of Coal. Further, it was stated that SCCL is supplying coal over and above FSA quantity to the company's power stations as per the actual requirement.

The reply was not tenable as the company did not so far approach the Ministry of Coal for revising the linkage quantity based on SERC norms, though the NCDP provided for such revision. Supplying of coal by SCCL over and above FSA quantity resulted in purchase of additional quantities of coal at higher price with consequent increase in fuel cost.

### **2.6.2 Abnormal difference in average GCV of invoiced coal and average GCV of bunkered coal**

As per Central Power Research Institute (CPRI), the difference in GCV between the received coal (invoiced) and at the time of consumption (bunkered) coal should be within 150 kCal/kg.

Audit observed that in the TPSs the difference in average GCV of invoiced and average GCV of bunkered coal was very high. During the five year period, the difference in GCV at RTS-B ranged from 1,080-1,473 kCal/kg, at KTHP 632-854, KTHP O&M 466-942, KTHP V 413-1,018 and KTHP VI it was 850-1,329 kCal/kg which was far above the limit of CPRI.

It was noticed that the abnormal difference in the GCV as per the invoiced coal and the bunkered coal was on account of manual sampling. SCCL had not installed automatic samplers at loading points and where installed, they were not working. In the absence of automatic samplers, sample collection is done manually at the loading points of SCCL, which leaves scope for results being inaccurate. The Management has not analysed the difference in GCV and had not taken any steps to bring it down within the CPRI limit. Audit worked out the consumption of excess coal due to more than 150 kCal/kg difference in GCV (invoiced and bunkered) and found that excess coal of 76.02 LMT valued ₹ 2,082.44 crore was consumed during the period 2010-15.

Management / Government, while accepting the facts, stated (December 2015) that there was a variation in quality of coal between loading and unloading ends. This would be due to different methods of sampling of coal at loading end and unloading end, variation in moisture and size of the coal. The grade slippage was a common phenomenon for all the customers of Coal India and SCCL, however, the coal companies were being constantly pursued to minimise the grade variation to the extent possible.

Audit suggests that Company should pursue with SCCL for installation of auto sampling at all loading points and eliminate human intervention which was the main cause for difference in GCV.

## 2.7 Transportation of coal

Freight is one of the major components of cost of coal. Coal from different mines of SCCL and MCL is transported through railway rakes to the thermal stations (KTPS and KTHP) for which the Company entered into agreements with Railways. For RTS-B and KTHP road transportation is done through transport contractors. For KTHP, after rail transportation, the coal is transported to the TPS by road and also directly from mines by road. The road transportation contractor bears the demurrages and transit loss, if any.

### 2.7.1 Inaction over abnormal transit loss of coal

The difference between the invoiced quantity and the Stores Receipt Book (SRB) quantity is termed as transit loss. Apart from the transit loss, loss could also occur because of windage and shrinkage during stocking of coal in coal yard. As per SERC norms, maximum loss of coal during transit and on account of windage and shrinkage shall be 0.8 *per cent* of the quantity of coal dispatched every month. The details of coal losses over and above the SERC norms during 2010-15 are given in *Annexure -2.4*.

It was noticed that

(i) at KTPS V & VI, though the transit loss was within the norms in the years 2010-11 and 2011-12, the transit loss exceeding the norms during the years 2012-13 to 2014-15 was 1.68 LMT representing 0.73 *per cent* of total quantity despatched amounting to ₹ 63.67 crore. The reasons for extra transit loss were non-working of in-motion weighbridge at SCCL and difference in weighing systems available at loading point of SCCL and unloading end of KTPS V & VI.

(ii) at KTPS O&M, after the break down of weighment bridge -BOBR (November 2007), the transit loss was not being recorded. Audit worked out the transit loss at KTPS O&M, considering the percentages of loss at KTPS V & VI, as the distance between these power stations and mines is the same. Transit loss exceeding the norms during the period 2010-15 were 2.09 LMT representing 0.93 per cent of total quantity despatched amounting to ₹ 40.00 crore.

Management/Government, while admitting the facts (December 2015), stated that steps had been initiated to contain the loss within the norms and that periodical joint calibration at all the loading points was being carried out to ensure the accuracy of the weighbridges.

The reply was not tenable as the Company had failed to keep the loss within the norms and periodical joint calibration was also not done.

### 2.7.2 Lack of adequate unloading facilities led to delay in unloading of coal

KTPS O&M and KTPS V & VI depend on railways for supply of coal. The Railways allowed seven hours of free time for unloading of BOX N<sup>12</sup> wagons type rakes and two and half hours for BOBR<sup>13</sup> type rakes, beyond which demurrages are levied. The details of number of rakes received, number of rakes demurred and demurrage charges paid to Railways during the period 2010-15 are as follows:

Table 1: Demurrage charges paid to Railways

Year	Power Station	Rakes received -BOBR	Rakes received -BOXN	Total Rakes received	Total Rakes demurred	Percent of rakes demurred	Demurrages paid (₹ in crore)
2010-14	KTPS O&M	3,532	1,251	4,783	2,009	42	2.77
2014-15	KTPS O&M	1,197	69	1,266	897	71	2.26
Sub-Total		4,729	1,320	6,049	2,906	48	5.03
2010-14	KTPS V&VI	3,959	873	4,832	1,807	37	4.13
2014-15	KTPS V&VI	1,324	217	1,541	1,292	84	3.17
Sub-Total		5,283	1,090	6,373	3,099	49	7.30
Grand Total		10,012	2,410	12,422	6,005	48	12.33

Source: Company records

As seen from the above, there was abnormal increase in the number of rakes demurred during 2014-15. The Company had paid ₹ 12.33 crore in the form of demurrages during 2010-11 to 2014-15 of which ₹ 5.43 crore was incurred in 2014-15. Audit noticed that the Railways had changed their fleet

<sup>12</sup> BOX N-High sided open wagon with side discharge arrangement.

<sup>13</sup> BOBR-Bottom Open and Bottom Reverse-open hopper car with rapid bottom discharge doors.

(September 2010) from 'N' type to 'BOBR' wagons for transporting coal, especially for short distance transportation. The Coal handling arrangements for BOBR wagons at KTPS O&M consisted of one track hopper for unloading 24 BOBR wagons with capacity of 1500 MT at a time. It was observed that at KTPS O&M, the demurrages mostly occurred on BOBR rakes. During 2014-15, 90 per cent of the rakes received were BOBR (2,521 BOBR rakes out of 2,807 rakes). No action was initiated to increase the unloading facilities for BOBR wagons.

The capacity of coal handling arrangements for BOBR wagons at KTPS V&VI was 12,000 MT i.e., 8 times the capacity of the BOBR wagons at KTPS. However, it was observed that the instances of demurrages in KTPS V&VI were also high despite having a much higher capacity. The high percentage of rakes demurred as compared to KTPS O&M lacked justification.

Management/Government stated (December 2015) that during recent times Railways had increased the supply of BOBR wagons over BOX 'N' type. The delay in unloading of rakes was mainly due to bunching of rakes and wet coal/oversized coal. Management further stated that in earlier years BOX 'N' /BOBR rake consisted of only 25 to 30 wagons. Railways had increased the rake capacity to 58 to 60 wagons in all type of coal rakes. Rate of demurrage charges were increased from ₹ 100 to ₹ 150 per hour per wagon which, along with the imposition of service tax, were the main reasons for increase in demurrages. During customer meetings with South Central Railways, TSGENCO had requested Railways to supply both BOBR and N type rakes to KTPS Complex to avoid delay in unloading of coal rakes. Management further stated that the augmentation of coal handling plant had been taken up at KTPS V & VI including modification of marshalling yard for handling of required coal.

However, high demurrage was noticed on days even when there was no bunching. Though the Railways changed the rakes for short distance of transportation from Box 'N' to BOBR from September 2010, the company did not take any action to modify the unloading facilities of BOBR rakes at KTPS O&M so far. The Company keeping in view the increased size of the rakes, did not pursue with railways for revision of time for unloading.

### ***2.7.3 Excess payment of freight on diversion of rakes due to lack of timely action***

Due to shortage of coal supply from MCL, the Company diverted an aggregate quantity of 6.35 lakh MT of premium coal (10 June 2014 to 20 January 2015) from SCCL (meant for KTPP) to KTPS V & VI by way of rebooking. Though this coal was transported by railways directly from mines to the diverted destinations (SCCL to KTPS), Railways, due to rebooking, had levied freight charges from mine to original destination (KTPP) and from there to diverted destination (KTPS) as per the Tariff Rules, resulting in additional freight charges of ₹ 7.53 crore. The Company, though being aware that the supplies from MCL were not meeting the requirement of KTPS, had neither planned in advance nor taken any steps to reallocate the coal to KTPS.

Management/Government, while admitting the facts stated (December 2015), that the boiler of KTPS-VI was designed for use of coal with higher calorific value and it was found difficult to operate this unit to their rated capacity within the available grade of coal in nearby mines of SCCL. The additional expenditure incurred by way of rebooking was less when compared to the loss of generation which would have been occurred on account of shortage of coal. However, from January 2015 onwards, rebooking of coal rakes had been avoided.

Though the dispatch schedule of SCCL was intimated to the Company in advance, the Company failed to seek reallocation before the schedule was finalised. The Company should have had a system whereby on receipt of monthly dispatch schedule from coal supplier, timely assessment of requirement and request for diversion, if required, was made. It is evident that lack of timely action and proper planning in assessing the requirement of coal by the TPS resulted in rebooking of rakes, thereby incurring an extra expenditure of ₹ 7.53 crore.

#### **2.7.4 Transportation of coal by road: Non-payment of service tax on transportation charges**

According to Section 65 (105) of Finance Act, 1994, service tax is required to be paid on services provided for transport of goods by road in a goods carriage. As per Notification issued in March 2008, service tax was payable at the rate of 25 per cent of the amount of freight i.e., 75 per cent of amount of freight is provided as abatement. The service tax was being paid at KTPP.

It was observed that RTS-B had procured 13,57,176 MT coal by road through goods carriages operated by private road transporters during the period 2010-15 for which an amount of ₹ 8.23 crore was paid as transportation charges. However, the Unit did not pay service tax amounting to ₹ 23.77 lakh so far (April 2015).

Incidentally, RTS-B was also liable to pay simple interest thereon under Section 75 and penalty equal to one per cent of such tax, for each month, for the period during which the default continues, up to a maximum of twenty five per cent of the tax amount.

Management/Government stated (December 2015) that Service tax on transportation of coal by road is exempt where the gross charges on consignments transported does not exceed ₹ 1,500 or on an individual consignment does not exceed ₹ 750 and the Service Tax was being paid as per the service tax rules.

The reply is not acceptable because the transportation charges in case of RTS-B were always greater than ₹ 1,500 thereby attracting Service Tax which was not paid by the Unit.

## 2.8 Quality Assurance

### 2.8.1 Delay in commencement of joint sampling

Coal is classified into different grades on the basis of Gross Calorific Value (GCV). Accordingly, the prices of coal, based on the grade/ quality of coal are notified by the collieries. The quality of coal supplied by the coal companies is determined on the basis of joint sampling at loading points.

The KTPP (Unit) commenced its commercial operations from 14 September 2010. The Company had signed FSA with SCCL (22 August 2012) for supply of coal to KTPP and other power projects with effect from 1 April 2012.

Clause 6 of the FSA entered into between the Company and SCCL provides for joint sampling of coal and in case of dispute, referees' (third party) decision would be final. The clause further states that in case representatives of either the purchaser or the seller fails to be present, the sampling will be carried out unilaterally by the representative of the other party and such sample will be deemed to have been jointly collected and will be binding on both the parties. The joint sample shall be as per the Bureau of Indian Standards (BIS) procedures and the quantity offered for disposal at a time will be considered as a lot till the automatic sampling arrangements are made by the seller.

FSA (clause 16) stipulates that the seller shall raise regular bills on rake-to-rake basis for the coal supplied to the purchaser at the applicable price for the declared grade for the quantity as recorded in Railway Receipt (RR). The seller shall give debit/credit note on account of grade slippage to the extent of the difference in the base price of declared grade and analysed grade of coal. Thus, the grade slippage could be claimed by the Company only when there was a difference in the declared grade of the mine and the grade declared by joint sampling at the loading end.

The KTPP received coal from nine different mines of SCCL for which SCCL claimed grade variation bills from 1 April 2013. It was observed in audit that:

- i) There was no joint sampling from April 2012 though the agreement was effective from that date. The Unit commenced joint sampling only from November 2013 from one mine and for the remaining eight mines, the same had commenced between June 2014 and September 2014.
- ii) In the absence of joint sampling, Company paid all the claims preferred by SCCL (₹ 73.06 lakh) towards grade variation and did not prefer any claim on SCCL for poor quality of coal despatched during the period April 2013 to July 2014. As such, the Company lost the advantage of refereed samples and could not get the price advantage towards grade variation on coal supplied, but had to pay all the claims of SCCL towards grade variation.

Management/Government, while admitting the facts stated (December 2015), that due to lack of infrastructure facilities at mine area, the joint sampling protocol could not be observed at all the loading points from the date of commencement of coal supplies.

The Company should introduce an adequate internal control mechanism whereby it is ensured that provisions of FSA are adhered to at all times.

**2.8.2 Non-stacking and non-inspection of oversize stones supplied in violation of FSA norms**

Coal received from coal mines is stocked in the coal yard. As per Clause 17 of the FSA, the coal supplied by the seller shall generally be free from stones with sizes (total surface area) above 250 mm. As per FSA, till auto samplers are installed at Coal Handling Plants of SCCL, the stones/shale found shall be segregated by the purchaser and equivalent cost along with railway freight and surface transportation charges will be paid by the seller. The purchaser should demarcate a site for stacking of shale/stones segregated and quantify the same. The purchaser shall thus notify the seller for inspection of stones of more than 250 mm within 15 days, and after joint inspection the stones can be disposed off.

It was observed that during the period from 2010 to 2013, KTPP identified 5,100 MT of stones/foreign material from the coal received, and intimated SCCL for joint inspection. The SCCL committee inspected the site (26 September 2013 and 10 January 2014) and stated that the material was not stacked as per FSA terms and conditions and that the claim was rejected. This had resulted in loss of ₹ 1.44 crore in respect of 5,100 MT of stones. No action was taken in respect of the oversized stones for the period 2013-15.

Similarly, during the period from 2010 to 2013, RTS-B identified 5,752 MT of stones/foreign material. The Unit also requested SCCL in June 2013, July 2013 and November 2013 for a joint inspection. Though SCCL did not respond to the requests, the Company did not follow up the matter further, which resulted in non realisation of ₹ 1.45 crore. In respect of KTPS also though stones/shales were present, but they were not quantified.

Thus there was a total loss of ₹ 2.89 crore in respect of KTPP and RTS-B due to not complying with the terms of the FSA on stacking of such stones/shale.

Management/Government stated (December 2015) that for KTPS the coal was being received by rail wagons from the mines of Rudrampur and Manuguru area of SCCL where Auto samplers were installed. However, in case of receipt of more than 250 mm size shale/stones the matter was being immediately brought to the notice of the concerned SCCL authorities to rectify the problem. In respect of KTPP and RTS-B, coal was being received by road transport from Bhupalapalli and Ramagundam mines of SCCL. Claims were being lodged with SCCL in respect of stones and joint inspection was also conducted at site. The settlement of claim was under correspondence.

The reply is not correct since the Company did not follow the prescribed procedure of stacking the stones as per norms and did not also follow up with SCCL for joint inspection in KTPP and RTS-B respectively. In case of KTPS which received coal from Rudrampur and Manuguru areas, the Auto samplers, though installed by SCCL, were not working. Thus, the Company should have lodged claim for stones/shale received for KTPS also.

## 2.9 Ash Management

Ash management assumes significance as ash generated from the power plant is a threat to the environment. However, it has some value due to its various uses.

### 2.9.1 Inefficient boilers caused wastage of coal due to excess un-burnt carbon in ash

Coal is crushed in grinding mills and fed into the boiler in the powder (pulverised) form where it is burnt. Incomplete combustion of coal leads to discharge of unfired powdered coal along with ash, resulting in wastage of fuel. The decrease in boiler efficiency causes increase of unburnt carbon in ash. About 80 per cent of ash goes out as flyash and the remaining 20 per cent is collected as bottom ash.

It was observed that due to inefficient operations of boilers, furnaces, and due to excess consumption of coal, the unburnt carbon in ash was more than the norms of 5 per cent (bottom ash) and 1 per cent (fly ash) in respect of the following power stations:

Table 2: Excess unburnt carbon in ash

Presence (in per cent) of unburnt carbon in fly ash and bottom ash			Quantity of coal wasted above the norms (LMT)	Value (₹ in crore)
Name of the Power Station	Fly ash (per cent)	Bottom ash (per cent)		
RTS-B	1.70 to 5.62	4.50 to 7.27	0.22	5.47
KTPS (O&M)	1.01 to 3.26	As per norm	2.23	41.28
KTPS-V	As per norm	3.77 to 32.57	1.08	19.98
		<b>Total</b>	<b>3.53</b>	<b>66.73</b>

Source: Operational review report and other company records

As seen above, the high quantum of unburnt coal in fly ash and bottom ash resulted in wastage of 3.53 LMT of coal valued ₹ 66.73 crore (being the cost of unburnt coal) in the ash during the period from 2010-15.

Management/Government, while accepting the observation stated (December 2015), that the annual overhauls were deferred during 2010-11 due to high grid demand. However, to reduce the unburnt carbon, works were carried out for effective pulverisation and daily monitoring was being done for grinding mills.

### **2.9.2 Loss of revenue on Cenosphere**

A small proportion of the pulverized fuel ash produced from the combustion of coal in power stations is formed as Cenosphere<sup>14</sup>. It is estimated that Cenosphere is present to the extent of one *per cent* in fly ash from thermal plants as per an article of Andhra Pradesh Industrial Technological Consultancy Organisation (APITCO). It is commercially useful as an extender for plastic compounds, being compatible with plastisols, thermoplastics, latex, polyesters, epoxies, phenolic resins, and urethanes. Synthetic foams are also made with cenosphere. It is compatible with cement and other building materials such as coatings and composites. It is used in a wide variety of other products, including sports equipment, insulators, automobile bodies, marine craft bodies, paints and fire and heat protection devices.

During 2010-15, the three TPSs produced 253.13 LMT of ash, which should have contained 2.53 LMT (one *per cent*) of cenosphere, based on the estimations made by APITCO. Review of related records revealed that the Company sold only 1,525 MT of cenosphere (at KTPS) and realised an amount of ₹ 2.19 crore (average rate ₹ 14,360 per MT). The West Bengal Power Development Corporation Limited, Kolkata (a PSU) had sold it at a rate of ₹ 72,000 per MT through MSTC (Metal Scrap Trade Corporation Limited, a PSU) in September 2013. There was no sale of cenosphere at KTRP and RTS-B. The Company did not make any arrangements for collection of cenosphere, which has high demand and rate in the market, and could have earned more revenue to the company.

In view of the utility and the high market demand of cenosphere, a system may be evolved for collection and sale to get optimum revenue and to use it for the promotion of utilisation of fly ash as per MoEF notification of 2009.

Management/Government accepted the observation and stated (December 2015) that possible steps will be initiated for sale of Cenosphere.

### **2.9.3 Fly ash not used within the stipulated period of five years as per MoEF notification**

Bottom ash is disposed of by using the wet system i.e., in the form of slurry whereas dry fly ash is collected / disposed of by using either 'the wet' or 'the dry' system.

Dry fly ash is a valuable resource and raw material for cement, concrete and many other high value added applications. The utilisation of fly ash for part substitution of cement in concrete/mortar etc. necessitates setting up of an efficient system of fly ash collection which is economic, effective and eco-friendly.

As per MoEF notification (November 2009), 100 *per cent* fly ash generated from the existing Units is to be utilized within five years from the date of

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<sup>14</sup> Cenosphere – is a light weight, hollow sphere produced as a by-product of coal combustion at thermal power plants.

notification i.e., by October 2014 and within four years by new Units, i.e., by September 2014 and June 2015 for KTPP and KTPS VI respectively.

The details of ash generation and utilization in respect of all the thermal power stations of the Company during the period from 2010-15 are as detailed below:

*Table 3: Generation and utilization of fly ash*

(Figures in LMT)

Year	Coal consumed	Ash generated	Ash utilised	Ash utilisation in percentage
2010-11	83.44	34.93	3.52	10.08
2011-12	101.47	41.84	6.42	15.35
2012-13	128.60	56.83	10.13	17.82
2013-14	126.76	60.49	12.40	20.49
2014-15	125.59	59.04	12.18	20.64
<b>Total</b>	<b>565.86</b>	<b>253.13</b>	<b>44.65</b>	<b>17.64</b>

Source: Operational review reports and other company records

It can be seen that the Company on the whole utilized only 17.64 *per cent* of fly ash during 2010-15 and the utilization increased from 10.08 *per cent* in 2010-11 to 20.64 *per cent* in 2014-15. The ash was being offered free of cost at KTPP and the ash utilisation increased from 10 *per cent* to 54 *per cent* during 2010-15. The company may take further steps to promote utilisation of ash.

#### **2.9.4 Fly ash not used for filling of mines as per MoEF notification**

As per MoEF Notification (November 2009), at least 25 *per cent* of fly ash must be used in open cast mines within 50 kilometers (KMs) from coal based thermal power plants. It was observed that though the coal received from the SCCL mines were within the radius of 50 KMs of all three TPSs, the Company has not initiated any action for using fly ash for back filling of SCCL mines.

Management/Government stated (December 2015) that order was placed for the work of ash utilization at KTPP for stowing of underground mines and back filling of open cast mines and stabilization of over burden dumps<sup>15</sup> for achieving 100 *per cent* utilization. The contractor had carried out trial run for underground mine stowing of operations of SCCL mines with bottom ash, but the activity could not be continued due to technical problems. SCCL intimated the TSGENCO that mine stowing operation could be taken up only after removal of fines in the bottom ash. To remove fines<sup>16</sup> in the bottom ash

<sup>15</sup> Stabilisation of over burden dump: over burden is the material that lies above a coal seam, which is removed before mining of coal and stacked in dumps. Fly ash is used for stabilisation of these dumps preventing them from spilling / sliding.

<sup>16</sup> Fines refer to those particles of bottom ash which are smaller in size than the normal particle.

separate classifiers<sup>17</sup> were required. Hence mine stowing operation was not continued.

The reply was not tenable as the company was bound by the said notification (of 2009) to use the funds from sale of fly ash for development of infrastructure or facilities, promotion and facilitation activities for use of fly ash. Therefore, separate classifiers should have been installed to facilitate utilization of fly ash. The Company did not initiate action for using fly ash at KTPS and RTS-B for back filling of mines though coal mines were within a radius of 50 KMs from the TPSs.

## 2.10 Inventory Management

Inventory management seeks to ensure enough inventories so as to aid unimpeded generation on the one hand and avoiding excessive inventory on the other hand to reduce blocking up of funds. It also seeks to maintain the quality of stock.

### 2.10.1 Lack of policy

The Company did not have an inventory policy on fuel to achieve the aforesaid objectives. The Company should frame a policy on inventory of fuel (coal and oil). It was noticed that inventory assessment, planning and procurement was inadequate and ineffective which resulted in loss of generation and also abnormal high stock of coal and oil stock levels as discussed in the following paragraphs.

### 2.10.2 Loss of generation due to low stock levels of coal

The Coal stock levels are decided for each power station by CEA based on pit head/non pit head power stations. Overstocking may cause reduction/deterioration in the GCV and loss on account of windage and shrinkage, apart from utilisation of additional space and blocking of funds. Under stocking may lead to loss of generation due to non availability of required fuel on time. As per the CEA Coal Report (March 2015), a stock level of 20 days for KTPS and 15 days for RTS-B and KTPP need to be maintained.

The extreme inventory levels of coal and loss of generation on account of lack of coal during 2010-15 in the three power plants are given below:

Table 4: Inventory levels of coal

TPS	Loss of Generation (MU)	Lowest level		Highest level	
		No. of days inventory	Month	No. of days inventory	Month
KTPP	127.21	1	May 2014	47	September 2010
KTPS	68.33	1 to 5	June 2011	47	March 2015

<sup>17</sup> Classifier is a sieving equipment.

TPS	Loss of Generation (MU)	Lowest level		Highest level	
		No. of days inventory	Month	No. of days inventory	Month
RTS-B	12.20	2	June 2010	48	February 2014
<b>Total</b>	<b>207.74</b>				

Source: Company records

Low stock and shortage of coal resulted in loss of generation of 207.74 MU at the three TPSs. This shows lack of monitoring and planning by the Management in maintaining sufficient stock of coal. The excess coal stock of 47/ 48 days was due to excessive coal procurement and non-regulation of coal supplies during planned and forced outages. The Company needs to plan maintenance of required stock of coal considering the lead time for procurement and quantum of consumption.

Management/Government stated (December 2015) that prior to the formation of TSGENCO, the coal supplies from MCL to erstwhile APGENCO stations were poor because of less materialisation, that is supply against coal linkage. Short supplies used to be supplemented from SCCL by way of diversion of coal rakes to meet the coal requirement. Further, it was stated that the coal stocks would be maintained more than the norms during the peak production period of coal mines to meet the requirement during monsoon period. After formation of TSGENCO, coal stocks in all the TPSs were being maintained as per the norms.

The reply was not acceptable as excessive stock levels were observed during 2014 and 2015. The norms for holding of inventory of coal have been prescribed after considering all parameters and the Company needs to plan and monitor the stock levels to ensure that the stock is within the norms.

### 2.10.3 Excess holding of Oil stock

Oils are mainly used for start-up of the unit and to maintain the required heat in case of low quality coal. For procurement of these oils, the Company entered into agreements with Public Sector Oil Companies viz., BPCL, IOCL and HPCL. Oil companies raise the bills at the prevailing rates of oil at the time of delivery.

SERC fixed a norm of two months' consumption for stock holding for the purpose of reimbursement of interest on working capital. On a review of the oil receipts, consumption and stock levels, it was noticed that the thermal stations were procuring the oils without any assessment.

As against the norm of two months' consumption, it was observed that the thermal stations were maintaining oil stocks ranging between one to twenty two months. Further, the Company had not fixed minimum, maximum and re-ordering levels based on the requirements of the plants to enable them to keep the stock levels as prescribed. Lack of proper management of receipts and

consumption and balance stock of oils not only resulted in overstocking but also in blocking up of funds to the tune of ₹ 33.44 crore as of March 2015.

Management/Government stated (December 2015) that in order to meet the unprecedented oil consumption during the unit start-ups and in the rainy season due to wet coal problems, and also keeping in view the long lead distances from the source of supplies, sufficient stocks of fuel oils were being maintained at various thermal power stations.

The reply was not acceptable because the consumption of oil was less than the norm fixed (two months) and the average stock of oil held at the TPSs was always more than the average quantity consumed. To monitor the quantity of stocks the Company needs to formulate a proper inventory policy.

#### ***2.10.4 High generation of coal mill rejects and delay in its disposal***

During crushing/grinding, the low quality or ungrinded coal is generated from the coal mills. This is known as coal mill rejects. The reasons for high mill rejects are insufficient air to mills, poor quality of coal, excess wear and tear of grinding media and exhaust fan blades and overfeeding of mills which indicates poor maintenance of mills, besides lack of regular overhauls resulting in excess mill rejects. These rejects are stacked in adjacent yards near the plants and are sold when accumulated. The company had set a target of 2 per cent.

During 2010-15, RTS-B had generated unusually high coal mill rejects which was 7.65 per cent of the quantity of coal consumed. Audit further noticed that during 2010-15, RTS-B had generated 1,13,833 MT of coal mill rejects of which the company sold 49,229 MT for an amount of ₹ 8.80 crore. The company, during physical verification, noticed that 5,281 MT of rejects were short. Audit observed that these rejects pertained to the period 2010-13 and delays in their disposal resulted in loss of ₹ 84.44 lakh.

Management/Government stated (December 2015) that a minimum time was needed for placing the sale orders after due fulfilment of the procedural formalities associated with the matter and the purchaser would be gradually lifting the sale order quantities. It stated that every possible effort was being made to reduce the accumulations of the mill rejects in the dump yard. The Company should take steps to improve the performance of coal mill at RTS-B in order to reduce the quantity of coal mill rejects. The Company should dispose the coal mill rejects immediately to avoid loss on account of natural spontaneous combustion.

### **2.11 Energy Audit**

#### ***Energy audit not conducted***

As per Energy Conservation Act, 2001, all the power stations are required to carry out energy audit on regular basis for conservation of energy, detection of wastages and excess consumption of fuel and other consumables for taking remedial action. It was, however, observed that KTPP and KTPS-O&M had not conducted any energy audit during 2010-15. Further, the recommendations

of Energy Audit conducted in respect of RTS-B (July 2011) and KTPS-V (May 2011) were not implemented in full.

Management/Government stated (December 2015) that tenders had been called from energy auditors for conducting Energy Audit, whose findings would be implemented during forthcoming annual overhauls as and when the system permits.

The reasons for non-compliance with earlier Energy Audits have not been stated by the management.

## **2.12 Internal Control**

### ***Deficient internal control***

Internal control is a process and a tool designed for providing reasonable assurance for efficiency of operations, reliability of financial reporting and compliance with applicable laws and statutes to ensure effective functioning as well as effectiveness of the internal control system and detection of errors and frauds.

Audit observed that internal control system of the Company was deficient in that:

- i. There was no proper mechanism to review the coal supplies and its utilization according to the requirement.
- ii. There was no mechanism to review the inventory levels of coal.
- iii. Transit loss/demurrage charges were not monitored for taking remedial action to reduce them.

## **Acknowledgement**

Audit acknowledges and appreciates the co-operation and assistance extended by the staff and the Management of the Company at various stages of conducting the Performance Audit.

## **Conclusion**

The Company failed to get Coal linkage from SCCL revised in accordance with their requirement. In the absence of an effective sampling system, the Company continued to receive inferior grade of coal from the coal companies which also contained oversized stones and foreign material. The Company incurred avoidable expenditure on account of demurrages due to delays in unloading of coal wagons. It incurred transit loss of coal in excess of the SERC norms. The Company was not monitoring its inventories of coal and oil, resulting in holding of much higher/lower stock level than the norms. Further, due to poor maintenance of equipment, large quantity of coal was being wasted as it remained unburnt in ash due to imperfect combustion. The

Company did not comply with the directions of the Ministry of Environment and Forest on utilisation of fly ash. It is yet to conduct energy audit in respect of two power stations. In respect of power stations where Energy Audit was conducted, the recommendations were not implemented in full.

### **Recommendations**

*The Company needs to:*

- *review its coal requirement and approach GoI for right amount of coal linkage based on proper assessment of requirement.*
- *design a proper inventory management system to maintain optimal stocks as per norms and prevent loss of generation;*
- *get energy audit conducted in respect of all the TPSs and implement the recommendations in full.*