

## **A5: COMMISSION'S ANALYSIS OF THE PETITION FOR FY 2007-08**

- 5.1 The Commission has scrutinized the petition filed by TPCL for FY 2007-08. Component-wise details of the petitioner's submission and the Commission's analysis and approvals applicable for FY2007-08 have been discussed in this section.

### **Basis of Fuel Cost & Fixed cost Determination**

#### *Petitioner's submission*

- 5.2 The petitioner has submitted its proposal for determination of energy and fixed charges as per the terms and conditions of the PPA signed between the petitioner and TSL in 1997.

#### *Commission's analysis*

- 5.3 Since the PPA is legally binding on the petitioner and the effective tariff period is already over, the Commission has decided to issue the tariff for FY 2007-08 in accordance with the provisions of the PPA. For parameters involved in tariff determination that have not been specified in the PPA, the Commission has adhered to parameters prescribed by the 'Generation Tariff Regulations, 2004'.

### **Plant Load Factor (PLF)**

#### *Petitioner's submission*

- 5.4 The petitioner has submitted that the minimum PLF as specified in its PPA with TSL is 62.79% while the guaranteed PLF has been specified as 75%. For FY 2007-08 the petitioner projects the PLF to be 75% for both the Units.

#### *Commission's analysis*

- 5.5 Going by the norms of the petitioner's PPA with TSL, the Commission accepts the proposed PLF and approves 75% as the PLF for both the Units.

### **Gross Generation**

#### *Petitioner's submission*

- 5.6 The petitioner has submitted gross generation of 791 MUs each, for both the Units for FY 2007-08.

*Commission's analysis*

- 5.7 For determining gross generation, the Commission has taken into consideration approved values of PLF for both the Units. Since the approved PLF is same as that proposed by the petitioner, the Commission approves the gross generation of 791 MUs each, for both the Units.

**Auxiliary Consumption**

*Petitioner's submission*

- 5.8 The petitioner has stated that the auxiliary consumption as stipulated in the PPA is 14.99%. However, the PPA has the condition that tariff would be adjusted according to actual auxiliary consumption. Accordingly, for FY 2007-08, the petitioner has proposed an auxiliary consumption of 10.57% for Unit II and 10.55% for Unit III for the purpose of tariff determination.

*Commission's analysis*

- 5.9 Auxiliary consumption refers to the quantum of energy generated that is used up within the plant for the power generation process. A higher auxiliary consumption corresponds to a lower net generation. Since the auxiliary consumption specified in the petition for Unit II as well as Unit III is lower than that specified in the PPA, the Commission approves the auxiliary consumption given in the petition which is 10.57% for Unit II and 10.55% for Unit III.

**Net Generation**

*Petitioner's submission*

- 5.10 The petitioner has projected its net generation for FY 2007-08 to be 707 MUs each for Unit II and Unit III, after taking into account the projections for gross generation and auxiliary consumption.

*Commission's analysis*

- 5.11 Since the Commission has approved the gross generation as well as auxiliary consumption of both Units as given in the petition. Therefore, the net generation computed and approved by the Commission for FY 2007-08 is the same as that proposed by the petitioner which is 707 MUs each, for both the Units.

## **Station Heat Rate**

### *Petitioner's submission*

- 5.12 The petitioner has submitted that the PPA signed with TSL specifies that a SHR of 2800 kcal/kWh will be considered for tariff computation. However, the PPA also mentions that “*the actual cost of coal, calorific value of coal and the heat rate of the plant during the year will be considered for bill adjustment at the end of each year.*” The SHR of both Unit II and Unit III is assumed by the petitioner to be 2600 kcal/kWh in FY 2007-08.

### *Commission's analysis*

- 5.13 The ‘Generation Tariff Regulations, 2004’ specifies the station heat rate of 2600 kcal/kWh for post-stabilization period of coal-based generation stations with capacity between 70 MW and 200 MW. The same has been proposed by the petitioner for FY 2007-08. Moreover, a lower station heat rate results in lower fuel costs. Since the station heat rate specified in the petition for FY 2007-08 is lower than that mentioned in the PPA, the Commission approves the station heat rate of 2600 kcal/kWh for both Units of Jojobera Plant.

## **Specific oil consumption**

### *Petitioner's submission*

- 5.14 The petitioner has taken the value of specific oil consumption for both Unit II and III as 2.0 ml/kWh.

### *Commission's analysis*

- 5.15 The Specific oil consumption gives the amount of secondary fuel (in ml) consumed in the process of energy generation, per unit power produced (in kWh). A lower specific oil consumption lowers the consumption of the secondary fuel in the generation process, and hence lowers the secondary fuel cost.
- 5.16 The ‘Generation Tariff Regulations, 2004’ specify a maximum secondary fuel consumption of 2.0 ml/kWh. Since the same value of 2.0 ml/kWh is proposed for both Units in the petition for FY 2007-08, it is approved by the Commission.

## **Gross Calorific Value (GCV) of primary and secondary fuel**

### *Petitioner's submission*

- 5.17 The petitioner has submitted that coal for Units II and III is sourced from two sources, viz. MCL (IB Valley) and West Bokaro. For FY 2007-08, for the purpose of calculation, the GCV of coal from MCL and West Bokaro has been assumed as 3250 kcal/kg and 4775 kcal/kg respectively. The GCV of secondary fuel is considered as 9100 kcal/kl.

*Commission's analysis*

- 5.18 Calorific value of a fuel refers to the amount of heat released on burning one unit of the fuel. Thus, a higher GCV indicates better quality of fuel and also lowers fuel cost, since it lowers the consumption of fuel needed for producing the requisite amount of energy.
- 5.19 The PPA between the petitioner and TSL mentions that the GCV of coal be assumed as 2800 kcal/kg, subject to the condition that the fuel cost would be grossed up at the end of the year on the basis of the actual GCV of consumed coal.
- 5.20 Since the actual GCV of consumed coal for FY 2007-08 is not available with the petition of FY 2007-08, the Commission allows the petitioner's submission of GCV subject to the condition that the same would be true-up once the actual GCV of coal used in FY 2007-08 becomes available.
- 5.21 Moreover, the GCV of coal from both MCL and West Bokaro as proposed in the petition is greater than that mentioned in the PPA. Hence, the Commission approves the petitioner's proposed GCV of 3250 kcal/kg for MCL coal and 4775 kcal/kg for West Bokaro coal.
- 5.22 The proposed GCV of secondary fuel (9100 kcal/kl) has also been accepted by the Commission.

**Price of primary and secondary fuel**

*Petitioner's submission*

- 5.23 The petitioner has taken the price of MCL coal to be Rs. 1000 per MT and that of West Bokaro coal to be Rs. 1600 per MT. The price of secondary fuel is taken to be Rs. 29000/kilolitre.

*Commission's analysis*

- 5.24 Fuel price is an uncontrollable factor for the petitioner and thus the Commission is of the view that the actual rate of fuel paid by the petitioner should be accepted. However, the actual price of the coal and secondary oil consumed by Units II and Unit III are not available with the petition of FY 2007-08. Hence the Commission approves the rates of coal and secondary fuel proposed by the petitioner for FY 2007-08 subject to a subsequent true-up when the actual prices of coal and secondary oil for FY 2007-08 would be available.

## Transit Loss

### *Petitioner's submission*

5.25 As per the petitioner, the PPA with TSL specifies that fuel costs shall mean the actual landed cost of primary and secondary fuel consumed by power station, including all agreed transport losses.

### *Commission's analysis*

5.26 Since the fuel price submitted by the petitioner is the actual landed cost of fuel, this implies that all calculations involving the given fuel price are already grossed up. Hence the Commission has not considered transit loss separately since the actual landed cost of fuel is inclusive of any transit losses that may have incurred.

## Summary of Plant parameters & fuel cost determinants

5.27 The summary of plant parameters and fuel cost determinants for the two Units of Jojobera plant of TPCL submitted by the petitioner and approved by the Commission is given below:

**Table 10 Plant parameters & Fuel cost determinants (petition-FY 2007-08)**

| Parameters                               | Unit     | Unit II           |                   | Unit III          |                   |
|--|----------|-------------------|-------------------|-------------------|-------------------|
|  |          | Submitted by TPCL | Approved by JSERC | Submitted by TPCL | Approved by JSERC |
| Capacity                                 | MW       | 120               | 120               | 120               | 120               |
| Plant Load Factor                        | %        | 75%               | 75%               | 75%               | 75%               |
| Auxiliary Consumption                    | %        | 10.57%            | 10.57%            | 10.55%            | 10.55%            |
| Station Heat Rate                        | Kcal/Kwh | 2600              | 2600              | 2600              | 2600              |
| GCV of Coal<br>(IB Valley/West Bokaro)   | Kcal/Kg  | 3250/4775         | 3250/4775         | 3250/4775         | 3250/4775         |
| GCV of oil                               | Kcal/Kg  | 9100              | 9100              | 9100              | 9100              |
| Specific oil consumption                 | ml/Kwh   | 2.0               | 2.0               | 2.0               | 2.0               |
| Coal consumption                         | Kwh      | 478375            | 478375            | 478375            | 478375            |
| Oil consumption                          | Kwh      | 1581              | 1581              | 1581              | 1581              |
| Price of Coal<br>(IB Valley/West Bokaro) | Rs/MT    | 1000/1600         | 1000/1600         | 1000/1600         | 1000/1600         |
| Price of Oil                             | Rs/KL    | 29000             | 29000             | 29000             | 29000             |
| Total Coal Cost                          | Rs. Cr   | 66.97             | 66.97             | 66.97             | 66.97             |

|                |         |              |              |              |              |
|----------------|---------|--------------|--------------|--------------|--------------|
| Total Oil cost | Rs. Cr  | 4.59         | 4.59         | 4.59         | 4.59         |
| Net Fuel Cost  | Rs. Cr  | <b>71.56</b> | <b>71.56</b> | <b>71.56</b> | <b>71.56</b> |
| Energy Charges | Rs/Unit | <b>1.01</b>  | <b>1.01</b>  | <b>1.01</b>  | <b>1.01</b>  |

## Operation & Maintenance (O&M) Expenses

### *Petitioner's submission*

5.28 The petitioner has estimated the O&M expenses of Unit II and Unit III according to the terms of its PPA. As per the PPA, O&M expenditure inclusive of insurance is considered at 3% of the project cost, escalated at 7% per annum. The project cost for Unit II is Rs. 431.34 Cr and the same for Unit III is Rs. 418.14 Cr. The operation of Unit II commenced in February 2001 and Unit III in February 2002. The O&M expenses for FY 2007-08 as per the terms of the PPA have been proposed by the petitioner to be Rs. 19.51 Cr for Unit II and Rs. 18.21 Cr for Unit III.

### *Commission's analysis*

5.29 Accepting the terms and conditions of the PPA, the Commission approves the O&M norms followed by the petitioner for determination of O&M expenses.

5.30 The capital cost of the two Units as per the petitioner's submission has been accepted by the Commission. The O&M expenses approved by the Commission as per the norms of the PPA come to Rs. 19.42 Cr and Rs. 17.59 Cr for Unit II and Unit III respectively.

## Depreciation

### *Petitioner's submission*

5.31 According to the petitioner, the depreciation rate used for cost computation is 7.84% on plant and machinery (the most dominant fraction of the asset base) as per the PPA. The petitioner submitted that this rate of depreciation of 7.84% is as per the rates specified by the Government of India under the erstwhile Electricity (Supply) Act, 1948 and was the prevalent rate when the PPA was signed in 1997.

**Table 11 Depreciation schedule submitted by the petitioner**

| Asset Class               | Asset Class Rate | Acquisition Value (Rs. Cr) | Depreciation for FY 2007-08 |
|---------------------------|------------------|----------------------------|-----------------------------|
| Land                      | 0.00%            | 0                          | 0                           |
| Plant & machinery         | 7.84%            | 405.105                    | 31.76                       |
| Building & Civil works    | 3.02%            | 2.971                      | 0.09                        |
| Vehicles, Battery & Acs   | 33.40%           | 0.966                      | 0                           |
| Office furniture & others | 12.77%           | 2.92                       | 0.37                        |

|                             |        |       |      |
|-----------------------------|--------|-------|------|
| Fixed Tools ( 3 years life) | 18.00% | 0     | 0    |
| Fixed Tools ( 5 years life) | 30.00% | 0.058 | 0    |
| Cable & Other works         | 5.27%  | 6.117 | 0.32 |

5.32 The proposed depreciation for FY 2007-08 is Rs. 35.88 Cr for Unit II and Rs. 29.25 Cr for Unit III.

*Commission's analysis*

5.33 Depreciation is calculated on the historical cost of the asset at the straight-line method over the useful life of the asset. According to the 'Generation Tariff Regulations, 2004', depreciation is allowed up to a maximum of 90% of the historical cost of the asset. As for the rate of depreciation, keeping in mind the fact that the PPA was signed in 1997, the Commission has referred to the depreciation schedule notified by the Ministry of Power (MoP) in 1994 since it was the schedule prevalent at the time of PPA execution. Accordingly, the Commission has computed and approved the depreciation charges of Rs. 32.91 Cr for Unit II and Rs. 32.59 Cr for Unit III for FY 2007-08.

**Interest on Loan**

*Petitioner's submission*

5.34 The petitioner has submitted that the required debt funding for the project has been met through various loans. The petitioner stated that the opening balances of all loans have been computed as per the billing method specified in the PPA. As per the PPA, repayment of debt is considered on half yearly basis. The PPA also states that: "*Interest on loans is estimated at 8.0% for foreign loan and 13.5% for local loans. Interest is calculated on loans less accumulated deemed repayment. Accumulated deemed repayment is calculated to match claim of accumulated Electricity Act depreciation at the end of each year.*"

5.35 Based on this method of calculation, the petitioner has proposed the interest payable for FY 2007-08 to be Rs. 14.70 Cr for Unit II and Rs. 12.20 Cr for Unit III.

*Commission's analysis*

5.36 For calculation of interest on loans, the Commission has taken the weighted average of the actual interest rates of loans from different sources. It has arrived at 13.02% as the rate of interest applicable for Unit II. Since the actual loan amount taken for Unit III did not add up to 70% of its capital cost as is the requirement as per the 'Generation Tariff Regulations, 2004' as well as specified in the PPA, the difference between the two has been treated as a normative debt amount at an interest rate of 13.02% which is the interest rate mentioned in the PPA for domestic loans. Along with the interest rate on the actual loan taken for Unit III, the weighted average interest rate for Unit III works out to 12.33%.

- 5.37 The Commission has accepted the treatment of each year's depreciation as the deemed loan repayment for that year, as proposed by the petitioner.
- 5.38 Consequently, for FY 2007-08, the Commission has prepared a loan schedule and has calculated the interest on loan to be Rs. 10.39 Cr for Unit II and Rs. 13.90 Cr for Unit III.

### **Interest on Working Capital**

#### *Petitioner's submission*

- 5.39 The petitioner has calculated working capital requirements after considering following norms for generating stations:
- (a) Cost of coal for one month corresponding to target availability;
  - (b) Two months' stock of secondary fuel oil, corresponding to the target availability,
  - (c) Operation & Maintenance (O&M) expenses for one month;
  - (d) Receivables equivalent to two months of fixed and variable charges for sale of electricity calculated on target availability.
- 5.40 Based on the above, the petitioner requests the Commission to approve Rs. 3.16 Cr for Unit II and Rs. 3.19 Cr for Unit III, as the interest on working capital for FY 2007-08.

#### *Commission's analysis*

- 5.41 The Commission has computed the working capital base for both Units for FY 2007-08 as per the petition, which is in accordance with the PPA between the TPCL and TSL. The rate of interest on working capital is taken to be the short-term Prime Lending Rate of State Bank of India as on 1st April of the year for which the tariff is determined.
- 5.42 Accordingly, the Commission has computed and approved the interest on working capital to be Rs. 3.15 Cr each for Unit II and Unit III for FY 2007-08.

### **Return on Equity (RoE)**

#### *Petitioner's submission*

- 5.43 The petitioner has submitted that it is entitled to a RoE of 16% at a base PLF of 68.5%. The petition states that RoE of 16% at a base PLF of 68.5% was a standard practice at the time of signing of the PPA and was also the prevalent norm as per the Central Electricity Authority (CEA). Further, the PPA gives incentives on improved PLF. It specifies the following mechanism for incentive in the RoE vis-à-vis PLF achieved in a financial year: For each 1.0% (or fraction thereof, on pro-rata basis) that the PLF is greater than the guaranteed PLF of 75%, the RoE for such year shall be increased by:

- (a) 0.5% if the PLF is between 68.5% and 73.5%;
- (b) 0.6% if the PLF is between 73.5% and 75.5%; and
- (c) 0.7% if the PLF is between 75.6% and 95%.

The PPA also contains a disincentive clause for poor performance on this parameter. For each 1.0% that the PLF is below the Minimum Plant Load Factor, the RoE for such year shall decrease by 0.25% as per the PPA.

- 5.44 The petitioner has proposed to maintain a PLF of 75.0% in both Units in FY 2007-08. Accordingly, the petitioner submitted that it is entitled to RoE (including incentive) of Rs. 25.08 Cr for Unit II and Rs. 24.39 Cr for Unit III for FY 2007-08.

*Commission's analysis*

- 5.45 Since the Commission has decided to consider the PPA between the petitioner and TSL, the Commission has approved the PLF-linked incentive on RoE as proposed by the petitioner. As per the Commission's own calculation of the RoE in accordance with the provisions of the PPA, it has approved Rs. 25.03 Cr as the RoE for Unit II and Rs. 24.26 Cr for Unit III for FY 2007-08.

**Summary of Fixed Cost determinants and Generation Tariff**

- 5.46 The summary of Fixed cost determinants and Generation Tariff for the two Units of Jojobera plant of TPCL is submitted by the petitioner and approved by the Commission for FY 2007-08 is given below

**Table 12 Fixed cost determinants and Generation Tariff (petition- FY2007-08) (Rs. Cr)**

| Parameters                  | Unit   | Unit II           |                   | Unit III          |                   |
|-----------------------------|--------|-------------------|-------------------|-------------------|-------------------|
|                             |        | Submitted by TPCL | Approved by JSERC | Submitted by TPCL | Approved by JSERC |
| O&M charges                 | Rs. Cr | 19.51             | 19.42             | 18.21             | 17.59             |
| Depreciation                | Rs. Cr | 35.88             | 32.91             | 29.25             | 32.59             |
| Interest on Loan            | Rs. Cr | 14.70             | 10.39             | 12.20             | 13.90             |
| Return on Equity            | Rs. Cr | 25.08             | 25.03             | 24.39             | 24.26             |
| Interest on Working Capital | Rs. Cr | 3.16              | 3.15              | 3.19              | 3.15              |
| Total Fixed cost            | Rs. Cr | 98.34             | 90.90             | 87.23             | 91.49             |
| Energy Cost                 | Rs. Cr | 71.56             | 71.56             | 71.56             | 71.56             |
| Total Cost                  | Rs. Cr | 169.90            | 162.46            | 158.79            | 163.05            |
| Net generation              | MUs    | 707.00            | 707.00            | 707.16            | 707.16            |

|                          |                 |             |             |             |             |
|--------------------------|-----------------|-------------|-------------|-------------|-------------|
| <b>Generation Tariff</b> | <b>Rs./Unit</b> | <b>2.40</b> | <b>2.30</b> | <b>2.25</b> | <b>2.31</b> |
|--------------------------|-----------------|-------------|-------------|-------------|-------------|