

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Coram:**

1. **Shri Ashok Basu, Chairman**
2. **Shri Bhanu Bhushan, Member**

**Petition No.1/2003**

**In the matter of**

Petition for approval of tariff of Unit 1& II of Talcher STPS Stage-II (4x500MW)

**And in the matter of**

National Thermal Power Corporation Ltd.

... **Petitioner**

Vs

1. Transmission Corporation of Andhra Pradesh Ltd., Hyderabad
2. Tamil Nadu Electricity Board, Chennai
3. Karnataka Power Transmission Corporation Ltd., Bangalore
4. Kerala State Electricity Board, Trivandrum
5. Electricity Department, Govt. of Pondicherry, Pondicherry,

... **Respondents**

**The following were present:**

1. Shri M.G. Ramachandran, Advocate, NTPC
2. Shri V.B.K.Jain, GM(Comml.), NTPC
3. Shri Pranav Kapoor, NTPC
4. Ms.Rachna Mehta, Manager, NTPC
5. Shri A.K.Juneja, DGM, NTPC

**ORDER  
(DATE OF HEARING : 7.10.2004)**

This petition has been filed by the petitioner, NTPC, a generating company owned by the Central Govt. for approval of tariff in respect of Talchar STPS, Stage-II, Unit I for the period 1.8.2003 to 29.2.2004 and for Units I & II (combined) from 1.3.2004 to 31.3.2004. The tariff is to be regulated under the terms and conditions contained in the

Commission's notification dated 26.3.2001(hereinafter referred to as the "notification dated 26.3.2001.)

2. Talcher STPS Stage II comprises of four units of 500 MW each. The dates of commercial operation of first two units in respect of which tariff is claimed in the present petition are as under:

Unit I: 1.8.2003, Unit II: 1.3.2004.

3. The details of fixed charges claimed by the petitioner in the present petition are given hereunder:

(Rs. in lakh)

	<b>Particulars</b>	<b>1.8.2003 to 29.2.2004</b>	<b>1.3.2004 to 31.3.2004</b>
1	Interest on Loan	12069	21411
2	Interest on Working Capital	1429	2645
3	Depreciation	5352	9496
4	Advance Against Depreciation	0	0
5	Return on Equity	7038	12486
6	O & M Expenses	3666	6503
	<b>Total</b>	<b>29553</b>	<b>52542</b>

4. In addition, the petitioner in the amended petition has claimed energy charges based on prices and GCV of coal and secondary fuel oil, at the rate of 47.91 paise / kWh and 43.78 paise/kWh for stabilization period and post-stabilization periods respectively.

5. The details of working capital furnished by the petitioner and its claim for interest thereon are summarized hereunder:

<b>Interest on Working Capital</b>	(Rs. in lakh)	
	1.8.2003 to 29.2.2004	1.3.2004 to 31.3.2004
Fuel Cost	1264	2456
Coal Stock	516	1020
Oil stock	428	766
O & M expenses	305	542
Spares <sup>1</sup>	1172	2166
Receivables- 2 months	8106	14825
<b>Total Working Capital</b>	<b>11792</b>	<b>21775</b>
Interest rate on working capital	11.79%	11.79%
Interest on Working Capital	1429	2645

### **CAPITAL COST**

6. As per the notification dated 26.3.2001, the capital expenditure of the project shall be financed as per the approved financial package set out in the TEC of CEA or as approved by an appropriate independent agency, as the case may be. The notification further lays down that the actual capital expenditure incurred on completion of the generating station shall be the basis for fixation of tariff and where actual expenditure exceeds the approved project cost, the excess expenditure as approved by CEA or an appropriate agency shall be deemed to be the actual capital expenditure for the purpose of determining the tariff.

7. The administrative approval for the generating stations was accorded by the Board of Directors of the petitioner company in its meeting held on 5.1.1999 at a cost of Rs.6532.61 crore based on TEC accorded by CEA vide letter dated 23.10.1997. According to the petitioner, the anticipated capital cost as per annual plan of the petitioner at 3<sup>rd</sup> Quarter 2003 price level was Rs. 6600.97 crore, including IDC and FC.

8. The petitioner has claimed the tariff based on the actual expenditure on the respective date of commercial operation of Unit-1 and Unit-II as under:

1.8.2003 -- Rs.1466.16 crore

1.3.2004 -- Rs.2601.28 crore

9. The actual capital expenditure on the respective date of commercial operation of Unit-I and Unit-II is less than the cost apportioned in proportion to capacity corresponding to 25% and 50 % respectively. We, therefore, admit the actual capital expenditure given in para 8 above for the purpose of tariff.

#### **DEBT-EQUITY RATIO**

10. As per the notification dated 26.3.2001, the interest on loan capital and return on equity are to be computed, as per the financial package approved by CEA or an appropriate independent agency, as the case may be. The petitioner has claimed the tariff by considering debt and equity in the ratio of 70:30. The petitioner vide its affidavit dated 14.10.2004 has submitted that financing has been done for the generating station as a whole and not unit-wise. The petitioner has submitted that financing of expenditure on annual basis is available as under:

<b>Description</b>	<b>(Rs. in lakh)</b>	
	<b>Up to 31.3.2003</b>	<b>Up to 31.3.2004</b>
<b>Cumulative Expenditure (for all units)</b>	337876	417511
Total borrowing	233635	293108
Internal resources/Equity	104241	124403
<b>Debt-equity ratio</b>	<b>69:31</b>	<b>70:30</b>

11. The actual debt-equity ratio is generally in accord with the petitioner's claim. Therefore, we have adopted the debt-equity ratio of 70:30 as claimed by the petitioner for working of the fixed charges.

### **TARGET AVAILABILITY**

12. In accordance with the notification dated 26.3.2001 the petitioner is entitled to recovery of full capacity charges at target availability of 80 % for the tariff period 1.8.2003 to 31.3.2004. Accordingly, target availability of 80% has been considered.

### **RETURN ON EQUITY**

13. As per the notification dated 26.3.2001 return on equity shall be computed on the paid up and subscribed capital and shall be 16% of such capital.

14. As debt-equity ratio of 70:30 has been adopted in the present petition, the equity amount has been worked out accordingly and the return has been worked out on average equity at the rate of 16 % per annum. The amount of equity considered and the return allowed are given hereunder:

	(Rs. in lakh)	
	1.8.2003 to 29.2.2004	1.3.2004 to 31.3.2004
Equity	43985	78038
Return on equity @ 16% p.a.	7038	12486

### **INTEREST ON LOAN**

15. As per the notification dated 26.3.2001, the interest on loan capital shall be computed on the outstanding loans, duly taking into account the schedule of repayment,

as per the financial package approved by CEA or an appropriate independent agency, as the case may be. While considering the interest on loan, the methodology has given below, has been adopted:

- (a) Normative loan amount has been worked out based on debt-equity ratio of 70:30.
- (b) Loan draws up to the date of commercial operation of Unit-II, that is, 1.3.2004 have been considered.
- (c) Annual repayment amount for the year 2003-2004 has been worked out as per the methodology followed by the Commission in the other cases for the tariff period 2001-04, which is as follows:

*Actual repayment during the year or repayment as worked out as per the following formula:*

*Actual repayment during the year x normative net loan at the beginning of the year/ actual net loan at the beginning of the year,*

*whichever is higher.*

- (d) Some of the loans, namely SBI-I, SBI-II and HDFC-III carry floating rates of interest. Therefore, the interest rates considered have been worked out on weighted average basis considering the applicable interest rates and number of days for which they were applicable. As latest floating rates of interest available in the petition is for the period 1.1.2004 onwards, the same has been considered for working out the weighted average interest rates. However, the interest on loan would be subject to adjustment on the

basis of actual rates of interest in case there will be any change in floating interest rates during the period 1.1.2004 to 29.2.2004 and 1.3.2004 to 31.3.2004.

- (e) Financial charges in case of Bonds – XII and XVIII series have not been considered for working out the interest rate as the Bonds have been drawn prior to the expected date of commercial operation of the generating station as a whole which would fall after 31.3.2004. This is in line with clarification given by the petitioner in Petitions No. 1/2000 and 99/2002 wherein it had clarified that the financial charges for those loans which were drawn prior to date of commercial operation were capitalised.

16. The statement in support of computation of interest on loan is appended hereunder:

<b>Loan</b>	<b>(Rs. in lakh)</b>	
	<b>1.8.2003 to 29.2.2004</b>	<b>1.3.2004 to 31.3.2004</b>
Gross Loan -Opening	102631	182090
Cumulative Repayment upto the previous year/period	1483	4983
Net Loan-Opening	101149	177107
Increase/ Decrease due to FERV	0	0
Increase/ Decrease due to ACE	0	0
<b>Total</b>	<b>101149</b>	<b>177107</b>
Repayment	3500	2625
Net Loan-Closing	97649	174482
Average loan	99399	175795
Rate of Interest	11.43%	11.21%
<b>Interest</b>	<b>11357</b>	<b>19715</b>

## **DEPRECIATION**

17. The notification dated 26.3.2001 prescribes that the value base for the purpose of depreciation shall be historical cost of the asset and the depreciation shall be calculated

annually as per straight line method at the rates of depreciation prescribed in the schedule thereto.

18. Depreciation for the tariff period has been calculated by taking the individual assets and their depreciation rates as per the notification dated 26.3.2001. Accordingly, the weighted average rate of depreciation as on 1.8.2003 and 1.3.2004 works out to 3.63% and 3.64% respectively as against weighted average rate of 3.65% claimed in the petition. Depreciation has been considered at the average opening and closing gross block during the respective. The petitioner's entitlement to depreciation has been worked out as under:

Period	1.8.2003 to 29.2.2004	1.3.2004 to 31.3.2004
Capital (Historical) cost (Rs. in lakh)	146616	260128
Depreciation rate	3.63%	3.64%
<b>Depreciation (Rs. in lakh)</b>	<b>5321</b>	<b>9465</b>

### **ADVANCE AGAINST DEPRECIATION**

19. As per the notification dated 26.3.2001, Advance Against Depreciation shall be permitted wherever originally scheduled loan repayment exceeds the depreciation allowable and shall be computed as follows:—

AAD = Originally scheduled loan repayment amount subject to a ceiling of 1/12<sup>th</sup> of original loan amount minus depreciation as per schedule.

20. The actual gross loan and actual repayments during the year have been considered for computing Advance Against Depreciation. The petitioner is not entitled to claim any Advance Against Depreciation as shown below:

<b>Advance against Depreciation</b>	1.8.2003 to 29.2.2004	1.3.2004 to 31.3.2004
1/12th of Loan(s)	8553	15174
Scheduled Repayment of the Loan(s)	3500	2625
Minimum of above	3500	2625
Depreciation during the year	5321	9465
<b>Advance against Depreciation</b>	<b>0</b>	<b>0</b>

### **O&M EXPENSES**

21. As per the notification dated 26.3.2001, the base O&M expenses for the generating stations commissioned during the tariff period 2001-02 to 2003-04 shall be fixed at 2.5% of the actual capital cost as approved by the Authority or an appropriate year.

22. In the present case, since both Units-I & II of the generating station have been put under commercial operation in the year 2003-04, O&M expenses have been worked out @ 2.5% of the capital cost considered in the tariff. The petitioner shall be entitled to Rs. 3665 lakh and Rs. 6503 lakh per year for the periods 1.8.2003 to 29.2.2004 and 1.3.2004 to 31.3.2004 respectively on account of O&M expenses.

### **INTEREST ON WORKING CAPITAL**

23. Working capital has been calculated considering the following elements:

- (a) **Fuel Cost:** As per the notification dated 26.3.2001, fuel cost for one month corresponding to normative plant load factor/ Target Availability is

permissible. Accordingly, the fuel cost for the relevant tariff period has been worked out for one month.

- (b) **Coal Stock**: As per the notification dated 26.3.2001, reasonable fuel stock as actually maintained but limited to 15 days for pit head station and thirty days for non-pit head generating stations, corresponding to target availability of 80% is permissible. Accordingly, the coal stock for the relevant tariff period has been worked out for 15 days.

As accounts of Talcher STPS are available on consolidated basis and separate audited accounts of Talcher STPS, Stage-II as on 31.7.2003 and 29.2.2004 are not available, the actual coal stock as on 31.7.2003 and 29.2.2004 in respect of Talcher STPS, Stage-II has been worked out from the actual coal stock figure as per consolidated audited accounts of Talcher STPS, Stage-I and Stage-II combined as on 31.7.2003 and 29.2.2003 on the basis of corresponding installed capacity. However, for tariff purpose, the lower of two values, that is, actual coal stock figure as worked out for Talcher STPS, Stage-II based on consolidated audited accounts of Talcher STPS and as worked out based on operational parameters and price of coal has been considered.

- (c) **Oil Stock**: As per the notification dated 26.3.2001, 60 days stock of secondary fuel oil, corresponding to target availability of 80% is permissible. Accordingly, the oil stock for the relevant tariff period has been worked out for 60 days.

- (d) **O&M Expenses:** As per the notification dated 26.3.2001, operation and maintenance expenses for one month is permissible as a part of working capital. Accordingly, O&M expenses for working capital has been worked out for 1 month of O&M expenses considered in tariff of the respective period.
- (e) **Spares:** As per the notification dated 26.3.2001, maintenance spares at actual subject to a maximum of 1% of the capital cost but not exceeding 1 years requirements less value of 1/5<sup>th</sup> of initial spares already capitalised for first years is permissible. Accordingly, the spares requirement for the purpose of working capital has been worked out @ 1% of the capital cost less value of 1/5<sup>th</sup> of initial spares already capitalized . The amount of initial spares stated to be capitalized by petitioner as on 1.8.2003 and 1.3.2004 is Rs.1470 lakh and Rs.2177 lakh respectively.
- (f) **Receivables:** As per the notification dated 26.3.2001, receivables will be equivalent to two month's average billing for sale of electricity calculated on normative plant load factor/target availability. The receivables have been worked out on the basis of two months of fixed and variable charges.
- (g) **Working Capital Margin:** The notification dated 26.3.2001 is silent on Working Capital Margin. Therefore, the return and interest have not been calculated separately on working capital margin but interest on the total working capital has been worked out.
- (h) **Rate of interest on working capital:** The SBI PLR of 10.50% and 10.25% applicable as on 1.8.2003 and 1.3.2004 respectively has been considered for working out the interest on working capital.

24. The necessary details in support of calculation of interest on Working Capital are appended below:

(Rs. in lakh)

<b>Calculation of interest on working capital</b>	<b>1.8.2003 to 29.2.2004</b>	<b>1.3.2004 to 31.3.2004</b>
Days in the Year	<b>366</b>	<b>366</b>
Period (days)	213	31
Fuel Cost	1267	2463
Coal Stock	290	1020
Oil stock	429	766
O & M expenses	305	542
Spares	1172	1872
Receivables- 2 months	7286	13295
Total Working Capital	10751	19958
Interest rate on working capital	10.50%	10.25%
<b>Interest on Working Capital</b>	<b>1129</b>	<b>2046</b>

### **ANNUAL FIXED CHARGES**

25. The annual fixed charges for the period 1.8.2003 to 31.3.2004 allowed in this order are summed up below:

(Rs. in lakh)

	<b>Particulars</b>	<b>2003-04</b>	
		<b>1.8.2003 to 29.2.2004</b>	<b>1.3.2004 to 31.3.2004</b>
1	Interest on Loan	11357	19715
2	Interest on Working Capital	1129	2046
3	Depreciation	5321	9465
4	Advance Against Depreciation	0	0
5	Return on Equity	7038	12486
6	O & M Expenses	3665	6503
	<b>Total</b>	<b>28510</b>	<b>50215</b>

### **ENERGY/VARIABLE CHARGES**

26. The notification dated 26.3.2001 in para 2.4 lays down in detail the norms of operation, including target availability and plant load factor. The explanation below para 2.4 further specifies that for the purpose of calculating tariff, the operating parameters,

namely, Station Heat Rate, Secondary Fuel Oil consumption and Auxiliary Energy Consumption shall be determined on the basis of actual or norms, whichever is lower. The fuel price and GCV as furnished by the petitioner have been considered for the computation of base energy charge. The base energy charge (BEC) computed is summarized below:

Description	Unit	1.8.2003 to 27.1.2004, that is, date of completion of Stabilisation period of Unit-I (180 days)	28.1.2004 to 29.2.2004 (33 days)	1.3.2004 to 31.3.2004 (31 days)
Capacity	MW	500.00	500.00	1000.00
PLF corresponding to Target availability of 80%	%	80.00	80.00	80.00
Gross Station Heat Rate	kCal/kWh	2600.00	2500.00	2550.00
Specific Fuel Oil Consumption	ml/kWh	5.00	3.50	4.25
Aux. Energy Consumption	%	8.50	8.00	8.25
Weighted Average GCV of Oil	kCal/l	9500.00	9500.00	9500.00
Weighted Average GCV of Coal	kCal/Kg	3360.67	3360.67	3360.67
Weighted Average Price of Oil	Rs./KL	15640.10	15640.10	15640.10
Weighted Average Price of Coal	Rs./MT	474.21	474.21	474.21
<b>Rate of Energy Charge from Secondary Fuel Oil</b>	<b>Paise/kWh</b>	<b>7.82</b>	<b>5.47</b>	<b>6.65</b>
Heat Contributed from SFO	kCal/kWh	47.50	33.25	40.38
Heat Contributed from Coal	kCal/kWh	2552.50	2466.75	2509.63
Specific Coal Consumption	Kg/kWh	0.76	0.73	0.75
<b>Rate of Energy Charge from Coal</b>	<b>Paise/kWh</b>	<b>36.02</b>	<b>34.81</b>	<b>35.41</b>
<b>Rate of Energy Charge ex-bus per kWh</b>	<b>Paise/kWh</b>	<b>47.91</b>	<b>43.78</b>	<b>45.84</b>

27. The base energy charges have been calculated on the base value of GCV, base price of fuel and normative operating parameters as indicated in the above table. The notification dated 26.3.2001 provides for fuel adjustment for variation in fuel price and GCV of fuel. Accordingly, the base energy charges approved shall be subject to adjustment as per following formula:

$$\text{FPA} = A + B$$

Where,

- FPA** – Fuel price Adjustment for a month in Paise/kWh Sent out  
**A** – Fuel price adjustment for Secondary Fuel oil in Paise/kWh sent out  
**B** – Fuel price adjustment for Coal in Paise/kWh sent out

And,

$$A = \frac{10 \times (\text{SFC}_n)}{(100 - \text{AC}_n)} \left\{ (P_{om}) - (P_{os}) \right\}$$

$$B = \frac{10}{(100 - \text{AC}_n)} \left[ (\text{SHR}_n) \left\{ (P_{cm}/K_{cm}) - (P_{cs}/K_{cs}) \right\} - (\text{SFC}_n) \left\{ (k_{om} \times P_{cm}/K_{cm}) - (k_{os} \times P_{cs}/K_{cs}) \right\} \right]$$

Where,

- SFC<sub>n</sub>** – Normative Specific Fuel Oil consumption in l/kWh  
**SHR<sub>n</sub>** – Normative Gross Station Heat Rate in kCal/kWh  
**AC<sub>n</sub>** – Normative Auxiliary Consumption in percentage  
**P<sub>om</sub>** – Weighted Average price of fuel oil as per PSL for the month in Rs./KL.  
**K<sub>om</sub>** – Weighted average GCV of fuel oils fired at boiler front for the month in Kcal/Litre  
**P<sub>os</sub>** – Base value of price of fuel oils as taken for determination of base energy charge in tariff order in Rs. / KL.  
**K<sub>os</sub>** – Base value of gross calorific value of fuel oils as taken for determination of base energy charge in tariff order in Kcal/Litre  
**P<sub>cm</sub>** – Weighted average price of coal as per PSL for the month at the power station in Rs. / MT.

- $K_{cm}$  – Weighted average gross calorific value of coal fired at boiler front for the month in Kcal/Kg
- $P_{cs}$  – Base value of price of coal as taken for determination of base energy charge in tariff order in Rs. /MT
- $K_{cs}$  – Base value of gross calorific value of coal as taken determination of base energy charge in tariff order in kCal/Kg

28. The energy charges shall be finally adjusted on annual basis as per actual annual average values of operating parameters achieved for the station i.e. station heat rate, auxiliary energy consumption and specific fuel oil consumption provided any or all of the actual operating parameters are lower than their respective normative values indicated in the table. The annual energy charge adjustment shall be done as per the formula given below: -

$$AECA = (P - Q - R) \times 10^{-9}$$

**Where,**

**AECA** - Annual Energy Charge Adjustment in Rs. Crore

**P** - Energy charge payable for the year based on operational parameters (Actual or normative whichever is lower) and weighted average price and GCV of fuels for the year in paise

**Q** - Total amount recovered as monthly fuel price adjustment for the year in Paise

**R** - Total amount recovered as base energy charge for the year in Paise

**And,**

$$\left[ \{(SFC_A) \times P_O\} + \{(SHR_A) - (SFC_A) \times K_O / 1000\} \times P_C / K_C \right]$$

$$P = (ESO_{\text{Annual}}) \times 10 \times \frac{\quad}{\{100 - (AC_A)\}}$$

$$Q = \sum_{mi=1}^{12} (FPA_{mi}) \times (ESO_{mi})$$

$$R = (ESO_{\text{Annual}}) \times \text{BEC}$$

**Where,**

$ESO_{\text{Annual}}$  - Energy sent out in the year in kwh sent out based on actual drawls for the tariff period up to 31.3.2001 and based on generation schedules given by RLDC for the tariff period 1.4.2001 to 31.3.2004

$SFC_A$  - Actual average secondary fuel oil consumption of the station for the year in l/kWh sent out

$K_o$  - Weighted average GCV of secondary fuel oil for the year in kCal/Litre

$P_o$  - Weighted average price of secondary fuel oil for the year in Rs./KL

$SHR_A$  - Actual yearly weighted average gross station heat rate in kCal/kWh generated

$P_c$  - Weighted average price of coal for the year in Rs./MT

$K_c$  - Weighted average GCV of coal for the year in kCal/kg

$FPA_{mi}$  - Fuel price adjustment for the  $i^{\text{th}}$  month in paisa/kWh sent out

$ESO_{mi}$  - Energy sent out for the  $i^{\text{th}}$  month in kWh sent out based on actual drawls for the tariff period up to 31.3.2001 and based on generation schedules given by RLDC for the tariff period 1.4.2001 to 31.3.2004

$BEC$  - Base Energy Charge as per tariff order in Paise/kWh sent out

$AC_A$  - Actual average Auxiliary Consumption of the station for the year in percentage

Where the adjustment period is less than a year, adjustment shall be done for the actual period.

29. In addition to the charges approved above, the petitioner is entitled to recover other charges also like reimbursement of income tax, other taxes, cess levied by a statutory authority, and other charges in accordance with the notification dated 26.3.2001, as applicable. The petitioner shall also be entitled to recover the filing fee of Rs. 10 lakh paid in the present petition from the respondents in ten equal monthly instalments of Rs. One lakh each, payable by the respondents in proportion of the fixed charges. This is subject to confirmation that the amount has not been included in O & M expenses.

30. The tariff approved is subject to the orders, if any, of the superior courts.

31. This order disposes of Petition No. 1/2003.

Sd/-  
**(BHANU BHUSHAN)**  
**MEMBER**

Sd/-  
**(ASHOK BASU)**  
**CHAIRMAN**

**New Delhi dated the 13<sup>th</sup> June 2005**