

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Coram**

1. **Shri A.K.Basu, Chairman**
2. **Shri K.N.Sinha, Member**
3. **Shri. Bhanu Bhushan, Member**
4. **Shri A.H.Jung, Member**

**Petition No.191/2004**

**In the matter of**

Approval of tariff for Series Compensation on Panki-Muradnagar 400 kV S/C line of UPPCL in Northern Region for the period 1.2.2004 to 31.3.2004.

**And in the matter of**

Power Grid Corporation of India Ltd.

**.... Petitioner**

**Vs**

- 1.Rajasthan Rajya Vidyut Prasaran Nigam Ltd., Jaipur
- 2.Ajmer Vidyut Vitran Nigam Ltd., Ajmer
- 3.Jaipur Vidyut Vitran Nigam, Jaipur
- 4.Jodhpur Vidyut Vitran Nigam Ltd.,Jodhpur
- 5.Himachal Pradesh State Electricity Board, Shimla
- 6.Punjab State Electricity Board, Patiala
- 7.Haryana Vidyut Prasaran Nigam Ltd, Panchkula
- 8.Power Development Department, Govt. of J&K, Jammu
- 9.Uttar Pradesh Power Corporation Ltd., Lucknow
- 10 Delhi Vidyut Board, New Delhi
- 11.Chief Engineer, Chandigarh Administration, Chandigarh
- 12.Uttranchal Power Corporation Ltd, Dehradun
13. Northern Railway, Baroda House, New Delhi

**.....Respondents**

**The following were present:**

1. Shri M.M. Mondal CM, PGCIL
2. Shri U.K. Tyagi, DGM, PGCIL
3. Shri C. Kannan, CM (Fin), PGCIL
4. Shri Anand Mohan, PGCIL
5. Shri K.K.Mittal, XEN (ISD), RVPN
6. Shri A.K. Tandon, EE, UPPCL
7. Shri T.K.Srivastava,EE, UPPCL
8. Shri T.P.S. Bawa, OSD (Comm.), PSEB
9. Shri R.K. Arora, XEN, HVPN
10. Shri S.R.G. Sabal, AVVNL, JPR

**ORDER**  
**(DATE OF HEARING: 16.6.2005)**

In this petition, the petitioner, Power Grid Corporation of India Ltd has sought approval for tariff for Series Compensation on Panki- Muradnagar 400 kV inter-connection in Northern Region for the period 1.2.2004 to 31.3.2004. The tariff is to be regulated based on the terms and conditions of tariff contained in the Commission's notification dated 26.3.2001, (hereinafter referred to as "the notification dated 26.3.2001").

2. The investment approval for the construction of Series Compensation on Panki- Muradnagar 400 kV S/C transmission line was accorded by the Board of Directors of the petitioner company as per Memorandum dated 30.8.2001 at an estimated cost of Rs. 2588.00 lakh, including IDC of Rs.149.00 lakh, based on 4th quarter 2000 price level.

3. The transmission line has been declared under commercial operation w.e.f. 1.2.2004. The estimated completion cost of these assets is stated to be Rs. 1301.95 lakh.

4. The actual expenditure up to date of commercial operation, that is, 1.2.2004 is Rs. 1257.30 lakh. Based on the estimated completion cost, the petitioner has claimed transmission tariff for the period from 1.2.2004 to 31.3.2004 as per the following details:

(Rs. in lakh)	
Interest on Loan	8.15
Interest on Working Capital	0.73
Depreciation	7.58
Advance against Depreciation	0.00
Return on Equity	10.07
O & M Expenses	2.44
<b>Total</b>	<b>28.97</b>

5. The petitioner has claimed interest on working capital as per the details given below:

(Rs in lakh)	
Maintenance Spares	12.65
O & M expenses	1.22
Receivables	28.97
Total	42.84
Rate of Interest	10.25%
<b>Interest</b>	<b>4.39</b>
<b>Interest (pro rata)</b>	<b>0.73</b>

### **CAPITAL COST**

6. As laid down in the notification dated 26.3.2001, the project cost, which includes capitalised initial spares for the first 5 years of operation, as approved by CEA or an appropriate independent agency, other than Board of Directors of the generating company, as the case may be, shall be the basis for computation of tariff. The notification dated 26.3.2001 further provides that the actual capital expenditure incurred on completion of the project shall be criterion for the fixation of tariff. Where the actual expenditure exceeds the approved project cost the expenditure as approved by the CEA or an appropriate independent agency, as the case may be, shall be deemed to be the actual capital expenditure for the purpose of determining the tariff, provided that excess expenditure is not attributable to the `Transmission Utility` or its suppliers or contractors and provided further that where a transmission services agreement entered into between the Transmission Utility and the

beneficiary provides a ceiling on capital expenditure, the capital expenditure shall not exceed such ceiling.

7. As per the auditor's certificate furnished by the petitioner in September 2004, the actual cost of the transmission assets on the date of commercial operation is Rs 1257.30 lakh. Based on the audited expenditure submitted by the petitioner, the gross block, including IDC of Rs 48.23 lakh (indicated in the auditor's certificate), is worked out as under:

Expenditure up to date of commercial operation (1.2.2004):	Rs 1257.30 lakh
Gross block on date of commercial operation:	Rs 1257.30 lakh
Expenditure from date of commercial operation to 31.3.2004:	Rs 16.35 lakh
Gross block as on 31.3.2004 :	Rs 1273.65 lakh
Expenditure from 1.4.2004 to 31.6.2004:	Rs. 1.64 lakh
Balance estimated expenditure :	Rs 26.66 lakh
Estimated completion cost :	Rs1301.95 lakh

(Initial spares included on date of commercial operation is nil)

8. The petitioner has recovered an amount of Rs. 62708/- as liquidated damages from M/s Techno Associates on account of delay in delivery of current transformer. Therefore, this amount has been adjusted against the capital cost of Rs. 1257.30 lakh, as on the date of commercial operation. Accordingly, for the purpose of tariff, the capital cost of Rs. 1256.67 lakh has been considered.

### **TIME OVERRUN**

9. As per the original investment approval dated 30.8.2001 accorded by Board of Directors of the petitioner company, the assets were scheduled for commissioning within fifteen months from that date, that is, by December 2002. However, these assets have been declared under commercial operation w.e.f 1.2.2004. Thus, there has been a delay of about 13 months. The petitioner has furnished the detailed explanation. It has submitted that the land acquisition (for

extension Muradnagar sub-station) was proposed to be done through faster procedures i.e. through private negotiations with the land owners for timely completion of the project. However, the District Revenue Authorities denied permission for the above procedure in December 2001. Thereafter, the normal land acquisition procedures were followed and the land could only be acquired on 9.9.2002 resulting in a delay of eight months. The petitioner also submitted that there were very heavy and an almost incessant rains from May 2003 to October 2003 and subsequent water logging left the site uncondusive to work, resulting in a further delay of around two months.

10. The justification given by the petitioner to support of delay from May 2003 to October 2003 was disputed by the representative of Respondent No.9, UPPCL who has filed on affidavit on the meteorological data for the period 1.5.2003 to 15.6.2003 and 16.9.2003 to 31.6.2003. Normally, heavy rains occur in the months of July and August in Northern Region for which UPPCL has not supplied any information. On consideration of the details available on record, we are generally satisfied that the reasons for delay are not directly attributable to the petitioner.

#### **SOURCES OF FINANCING. DEBT – EQUITY RATIO**

11. As per Para 4.3 of the notification-dated 26.3.2001, capital expenditure of the transmission system shall be financed as per approved financial package set out in the techno-economic clearance of CEA or as approved by an appropriate independent agency, as the case may be.

12. As per the approval of petitioner’s Board of Directors, the transmission assets have been funded with domestic borrowings and the petitioner’s internal resources, without specifying the exact debt-equity ratio. The loan worth Rs.635.00 lakh, as against Bonds XV, has been contracted by the petitioner on 23.2.2004 and allocated after the date of commercial operation. The petitioner has claimed the tariff of the assets on the basis of debt and equity actually employed, which are in the ratio of 70.66:29.34. Accordingly, an amount of Rs.368.67 lakh has been considered towards equity and an amount of Rs. 888.00 lakh on account of loan, which includes the amount of Rs. 635.00 lakh borrowed on 23.2.2004.

**INTEREST ON LOAN**

13. As provided in the notification dated 26.3.2001, interest on loan capital is to be computed on the outstanding loans, duly taking into account the schedule of repayment, as per financial package approved by CEA or any independent agency.

14. The methodology prescribed under the notification dated 26.3.2001 has been adopted for computation of interest of loan. The details of calculation of interest on loan are as given below:

**Calculation of Interest on Loan**

(Rs. in lakh)	
<b>Details of Loan</b>	<b>2003-04</b>
No. of days in the Year	366
<b>Bonds X</b>	
Gross Loan -Opening	29.00
Cumulative Repayment up to date of commercial operation	0.00
Net Loan-Opening	29.00
Repayment during the year	0.00

Net Loan-Closing	29.00
Rate of Interest	10.90%
Interest	0.52
Repayment Schedule	12 Annual Installments from 21.06.2004
<b>Bond XI Option I</b>	
Gross Loan -Opening	31.00
Cumulative Repayment up to date of commercial operation	0.00
Net Loan-Opening	31.00
Repayment during the year	0.00
Net Loan-Closing	31.00
Rate of Interest	9.80%
Interest	0.50
Repayment Schedule	12 Annual Installments from 07.12.2005
<b>Bonds XII</b>	
Gross Loan -Opening	2.00
Cumulative Repayment up to date of commercial operation	0.00
Net Loan-Opening	2.00
Repayment during the year	0.00
Net Loan-Closing	2.00
Rate of Interest	9.70%
Interest	0.03
Repayment Schedule	12 Annual Installments from 28.03.2006
<b>Bond XIII Option I</b>	
Gross Loan -Opening	160.00
Cumulative Repayment up to date of commercial operation	0.00
Net Loan-Opening	160.00
Repayment during the year	0.00
Net Loan-Closing	160.00
Rate of Interest	8.63%
Interest	2.26
Repayment Schedule	12 Annual Installments from 31.07.2006
<b>Bond XV (Drawn on 23.02.2004)</b>	
Gross Loan -Opening	635.00
Cumulative Repayment up to date of commercial operation	0.00
Net Loan-Opening	635.00
Repayment during the year	0.00
Net Loan-Closing	635.00
Rate of Interest	6.68%
Interest	4.40
Repayment Schedule	12 Annual Installments from 23.02.2008

<b>PNB-II</b>	
Gross Loan -Opening	17.00
Cumulative Repayment up to date of commercial operation	0.00
Net Loan-Opening	17.00
Repayment during the year	0.00
Net Loan-Closing	17.00
Rate of Interest	8.60%
Interest	0.24
Repayment Schedule	12 Annual Installments from 08.03.2005
<b>OBC</b>	
Gross Loan -Opening	14.00
Cumulative Repayment up to date of commercial operation	0.00
Net Loan-Opening	14.00
Repayment during the year	0.00
Net Loan-Closing	14.00
Rate of Interest	8.60%
Interest	0.20
Repayment Schedule	12 Annual Installments from 22.03.2005
<b>Total Loan</b>	
Gross Loan -Opening	888.00
Cumulative Repayment up to Previous Year	0.00
Net Loan-Opening	888.00
Repayment during the year	0.00
Net Loan-Closing	888.00
Interest	8.15

## **DEPRECIATION**

15. Based on the notification dated 26.3.2001, the petitioner is entitled to claim depreciation. The salient provisions for calculation of depreciation as per the notification dated 26.3.2001 are reproduced below:

- (i) The value base for the purpose of depreciation shall be the historical cost of the asset.

- (ii) Depreciation shall be calculated annually as per straight-line method at the rate of depreciation as prescribed in the Schedule attached to the notification dated 26.3.2001:

Provided that the total depreciation during the life of the project shall not exceed 90% of the approved original cost. The approved original cost shall include additional capitalisation on account of foreign exchange rate variation also.

- (iii) On repayment of entire loan, the remaining depreciable value shall be spread over the balance useful life of the asset.
- (iv) Depreciation shall be chargeable from the first year of operation. In case of operation of the asset for part of the year, depreciation shall be charged on pro-rata basis.
- (v) Depreciation against assets relating to environmental protection shall be allowed on case-to-case basis at the time of fixation of tariff subject to the condition that the environmental standards as prescribed have been complied with during the previous tariff period.

16. The petitioner has claimed depreciation of Rs. 7.58 lakh in accordance with the above principles.

17. Based on the above, depreciation for individual items of capital expenditure has been calculated on the capital cost of Rs. 1256.67 lakh as considered by us for the purpose of tariff at the rates as prescribed in the notification dated 26.3.2001. While approving depreciation component of tariff, the weighted average depreciation

rate of 3.59% has been worked out. The calculations in support of weighted average rate of depreciation of 3.59% are appended hereinbelow:

(Rs. in lakh)				
	Capital Cost	Approved cost	Rate of Depreciation	Depreciation
<b>Capital Expenditures as on 1.2.2004</b>				
Land	2.47	0.05	0%	0.00
Building & Other Civil Works	0.00	0.00	1.80%	0.00
Sub-Station Equipment	1254.20	2587.95	3.60%	45.15
Transmission Line	0.00	0.00	2.57%	0.00
PLCC	0.00	0.00	6.00%	0.00
<b>Total</b>	<b>1256.67</b>	<b>2588.00</b>		<b>45.15</b>
<b>Weighted Average Rate of Depreciation</b>			<b>3.59%</b>	

18. Accordingly, depreciation of Rs. 7.53 lakh has been allowed as calculated below:

(Rs. in lakh)		
		2003-04
Rate of Depreciation	3.59%	
Depreciable Value (90% of the Gross Block)	1131.01	
Balance Useful life of the asset		
Remaining Depreciable Value		1131.01
<b>Depreciation</b>		<b>7.53</b>

### **ADVANCE AGAINST DEPRECIATION**

19. In addition to allowable depreciation, the petitioner becomes entitled to Advance Against Depreciation when originally scheduled loan repayment exceeds the depreciation allowable as per schedule to the notification. Advance Against Depreciation is computed in accordance with the following formula:

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 petitioner has claimed Advance Against Depreciation on the basis of
- (i) 1/12th of gross loan worked out as per the gross block admitted by the Commission in the petition for previous tariff setting,
  - (ii) Repayment of loans during the year and in case of foreign currency loan multiplying the repayment with exchange rate as on 31.3.2001 and depreciation on FERV as repayment during the year in the case of notional loan, and
  - (iii) Depreciation as claimed in the petition.

21. The entitlement of the petitioner has been considered in accordance with the notification dated 26.3.2001. In the calculation, Advance Against Depreciation has been worked out on the basis of gross loan, repayment and depreciation as worked out above. The petitioner is not entitled to Advance Against Depreciation as calculated below:

(Rs. in lakh)

<b>Advance Against Depreciation</b>	<b>2003-04</b>
1/12th of Gross Loan(s)	74.00
Scheduled Repayment of the Loan(s)	0.00
Minimum of the above	0.00
Depreciation during the year	7.53
<b>Advance Against Depreciation</b>	<b>0.00</b>

### **OPERATION & MAINTENANCE EXPENSES**

22. In accordance with the notification, Operation and Maintenance expenses, including expenses on insurance, if any, are to be calculated as under:

- i) Where O&M expenses, excluding abnormal O&M expenses, if any, on sub-station (OMS) and line (OML) are separately available for each

region, these shall be normalised by dividing them by number of bays and line length respectively. Where data as aforesaid is not available, O&M expenses in the region are to be apportioned to the sub-station and lines on the basis of 30:70 ratio and these are to be normalised as below:

$$\text{O\&M expenses per Unit of the line length in Kms (OMLL)} = \frac{\text{Expenses for lines (OML)}}{\text{Average line length in Kms (LL)}}$$

$$\text{O\&M expenses for sub-stations (OMBN)} = \frac{\text{O\&M expenses for substations (OMB)}}{\text{Average number of bays (BN)}}$$

- ii) The five years average of the normalised O&M expenses for lines and for bays for the period 1995-96 to 1999-2000 is to be escalated at 10% per annum for two years (1998-99 and 1999-2000) to arrive at normative O&M expenses per unit of line length and per bay for 1999-2000.
- iii) The normative O&M per unit length and normative O&M per bay for the year 1999-2000 for the region derived in the preceding paragraph is to be escalated @ 6% per annum to obtain normative values of O&M expenses per unit per line length and per bay in the relevant year. These normative values are to be multiplied by line length and number of bays (as the case may be) in a given system in that year to compute permissible O&M expenses for the system.
- iv) The escalation factor of 6% per annum is to be used to revise normative base figure of O&M expenses. Any deviation of the

escalation factor computed from the actual inflation data that lies within 20% of the notified escalation factor of 6% shall be absorbed by utilities/beneficiaries.

23. The normalized O & M expenses for Northern Region have been considered in a number of other petitions based on the above noted methodology. Following table gives a comparison of the normative O&M expenses as calculated by the petitioner and as allowed by the Commission in the past for the base year i.e. 1999-2000 and afterwards:

## NORMALISED O&M EXPENSES FOR NORTHERN REGION

(Rs. in Lakh)

S. NO.	Items	1995-96	1996-97	1997-98	1998-99	1999-2000	Total for five years 95-96 to 99-00	99-00	2000-01	2001-02	2002-03	2003-04
1	Total O&M expenses(Rs. in lakh)	4147.48	4336.62	6100.85	6676.57	7137.32						
2	Abnormal O&M expenses	0.00	0.00	57.64	107.13	99.08	263.85					
3	Normal O&M expenses (S.No. 1 -S.NO. 2)	4147.48	4336.62	6043.21	6569.44	7038.24						
4	<b>OML</b> (O&M for lines)= 0.7 X S. NO.3	2903.24	3035.63	4230.25	4598.61	4926.77	<b>19694.50</b>					
5	<b>OMS</b> (O&M for substation) = 0.3XS.NO.3	1244.24	1300.99	1812.96	1970.83	2111.47	<b>8440.49</b>					
6	Line length at beginning of the year in Kms.	9622.13	9622.13	9743.48	10561.88	10819.55						
7	Line length added in the year in Kms.	0.00	121.35	818.40	257.67	1705.07						
8	Line length at end of the year in Kms.	9622.13	9743.48	10561.88	10819.55	12524.62						
9	LL (Average line length in the Region)	9622.13	9682.81	10152.68	10690.72	11672.09	<b>51820.43</b>					
10	NO. of bays at beginning of the year	157	157	161	183	185						
11	NO. of bays added in the year	0	4	22	2	31						
12	NO. of bays at the end of the year	157	161	183	185	216						
13	BN (Average number of bays in the Region)	157.0	159.0	172.0	184.0	200.5	<b>872.50</b>					
14	AVOMLL(OML/LL)	0.302	0.314	0.417	0.430	0.422	1.884					
15	AVOMBN(OMS/BN)	7.925	8.182	10.540	10.711	10.531	47.890					
16	<b>NOMLL(allowable O&amp;M per unit of line length)</b>			<b>0.3768</b>	<b>0.4145</b>	<b>0.4560</b>		<b>0.4560</b>	<b>0.4833</b>	<b>0.5123</b>	<b>0.5431</b>	<b>0.5756</b>
17	<b>NOMBN(Allowable O&amp;M per bay)</b>			<b>9.5780</b>	<b>10.5358</b>	<b>11.5894</b>		<b>11.5894</b>	<b>12.2847</b>	<b>13.0218</b>	<b>13.8031</b>	<b>14.6313</b>
	<b>NOMLL(as calculated by petitioner)</b>			<b>0.42</b>				<b>0.51</b>	<b>0.54</b>	<b>0.57</b>	<b>0.60</b>	<b>0.64</b>
	<b>NOMBN(as calculated by petitioner)</b>			<b>10.75</b>				<b>13.01</b>	<b>13.79</b>	<b>14.62</b>	<b>15.50</b>	<b>16.43</b>

24. The differences in NOMLL and NOMBAN as calculated by the petitioner and as allowed are mainly on account of certain expenses disallowed by the Commission. Using these normative values, O&M charges have been calculated.

25. In the Commission's calculations the escalation factor of 6% per annum has been used. In accordance with the notification dated 26.3.2001, if the escalation factor computed from the observed data lies in the range of 4.8% to 7.2%, this variation shall be absorbed by the petitioner. In case of deviation beyond this limit, adjustment shall be made on by applying actual escalation factor arrived at on the basis of weighted price index of CPI for industrial workers (CPI\_IW) and index of selected component of WPI (WPI\_TR).

26. Based on the above methodology, the Commission has allowed O&M expenses per unit of line length and per bay for Northern Region for 2003-04 as under which have been considered for computation of the petitioner's entitlement to O&M expenses:

( Rs. in lakh)	
Allowable O&M per km (of line length)	0.58
Allowable O&M per Bay	14.63

27. The petitioner has claimed O & M expenses for 1 bay, which has been considered for calculation of O & M expenses. O&M expenses allowed are given hereunder:

	<b>2003-04</b> <b>[2 Months]</b> <b>(1.2.2004 to 31.3.2004)</b>
	(Rs. in lakh)
Allowable O&M for 1 No. bay	2.44

### **RETURN ON EQUITY**

28. In accordance with the notification dated 26.3.2001, the petitioner is entitled to return on equity at the rate of 16% per annum. For the purpose of tariff equity of Rs. 368.67 lakh has been considered. On the above basis, the petitioner shall be entitled to return on equity of Rs. 9.83 lakh during 2003-04.

### **INTEREST ON WORKING CAPITAL**

29. As provided in the notification, the interest on working capital shall cover:

- (a) Operation and maintenance expenses (cash) for one month;
- (b) Maintenance spares at a normative rate of 1% of the capital cost less 1/5<sup>th</sup> of the initial capitalised spares. Cost of maintenance spares for each subsequent year shall be revised at the rate applicable for revision of expenditure on O & M of the transmission system; and
- (c) Receivables equivalent to two months' average billing calculated on normative availability level, which is 98%.

30. In keeping with the above methodology, working capital has been worked out, on the basis of capital expenditure as on the date of commercial operation. Deduction of the initial capitalised spares has not been considered in the calculations, as these were not included in the capital cost. The petitioner has claimed interest on working capital at the rate of 10.25%, as applicable on the date of commercial operation, which has been allowed. The detailed calculations in support of interest on working capital are as under:

### Interest on Working Capital

(Rs. in lakh)

		<b>2003-04</b>
Maintenance Spares	1%	12.57
Less Capitalised Initial Spares		0.00
		12.57
O & M expenses		1.22
Receivables		28.67
Total		42.46
Rate of Interest		10.25%
<b>Interest (1.2.2004 to 31.3.2004)</b>		<b>0.73</b>

### TRANSMISSION CHARGES

31. In the light of above discussion, we approve the transmission charges as given in the Table below:

**TABLE**

(Rs. in lakh)

<b>Transmission Tariff</b>	<b>2003-04 (1.2.2004 to 31.3.2004)</b>
Interest on Loan	8.15
Interest on Working Capital	0.73
Depreciation	7.53
Advance against Depreciation	0.00
Return on Equity	9.83
O & M Expenses	2.44
<b>Total</b>	<b>28.67</b>

32. There is a difference of Rs.30, 000/- between the petitioner's claim and the transmission charges being allowed. This is on account of the difference in the capital cost considered by us for computation of tariff.

33. In addition to the transmission charges, the petitioner shall be entitled to other charges like income-tax, incentive, surcharge and other cess and taxes in accordance with the notification dated 26.3.2001 subject to directions if any, of the superior courts. The petitioner shall also be entitled to recovery of filing fee of Rs 5 lakh, which shall be

recovered from the respondents in ten monthly installments of Rupees fifty thousand each and shall be shared by the respondents in the same ratio as other transmission charges.

34. The petitioner is already billing the respondents on provisional basis in accordance with the Commission's interim order. The provisional billing of tariff shall be adjusted in the light of final tariff now approved by us.

35. The transmission charges approved by us shall be included in the regional transmission tariff for Northern Region and shall be shared by the regional beneficiaries in accordance with the notification dated 26.3.2001.

36. This order disposes of Petition No.191/2004.

**Sd/-  
(A.H.JUNG)  
MEMBER**

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

**Sd/-  
(K.N.SINHA)  
MEMBER**

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

**New Delhi dated the 27th July 2005**