

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Petition No. 145/2009**

**Coram:**

**Shri S. Jayaraman, Member**

**Shri V.S. Verma, Member**

**Shri M. Deena Dayalan, Member**

**Date of hearing: 7.6.2011**

**Date of Order: 3.4.2013**

**In the matter of:**

Approval under Regulation 86 of Central Electricity Regulatory Commission (Conduct of Business) Regulations 1999 and Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations 2009 for determination of transmission tariff for Korba transmission system in Western Region for the period from 1.4.2009 to 31.3.2014.

**And**

**In the matter of:**

Power Grid Corporation of India Ltd., Gurgaon .....**Petitioner**

**Vs**

1. Madhya Pradesh Power Trading Company Ltd., Jabalpur
2. Maharashtra State Electricity Distribution Co. Ltd., Mumbai
3. Gujarat Urja Vikas Nigam Ltd., Vadodara
4. Electricity Department, Govt. of Goa, Panaji
5. Electricity Department, Administration of Daman & Diu, Daman
6. Electricity Department, Administration of Dadra & Nagar Haveli, Silvassa
7. Chhattisgarh State Electricity Board, Chhattisgarh
8. Madhya Pradesh Audyogik Kendra Vikas Nigam (Indore) Ltd., Indore.

.....**Respondents**

**The following were present:-**

1. Shri S.S. Raju, PGCIL
2. Shri M.M. Mondal, PGCIL
3. Shri R.K. Arora, PGCIL
4. Shri A.K. Arora, PGCIL
5. Shri R.R. Patel, PGCIL
6. Shri Manoj Dubey, MPPTCL



## ORDER

This petition has been filed by Power Grid Corporation of India Limited (PGCIL) for determination of transmission tariff for Korba transmission system (hereinafter referred to as "transmission system") in Western Region for the period 1.4.2009 to 31.3.2014 under Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations 2009 (hereinafter referred to as "2009 Tariff Regulations").

2. The transmission charges for the transmission system for the period 2004-09 were approved by the Commission vide order dated 15.12.2005 in Petition No. 117/2004 and its amendment vide order dated 14.2.2008. The various assets in the transmission system were progressively put under commercial operation from 1983 to 1990. The instant petition has been filed for determination of tariff for 2009-14 period for the Korba transmission system in Western Region based on admitted cost of ₹23435.94 lakh. The petitioner has claimed additional capital expenditure incurred and projected to be incurred and de-capitalisation during 2009-10, 2010-11, 2011-12 and 2012-13.

3. The details of assets covered in the petition and their date of commercial operation are given overleaf:-

<b>S. No.</b>	<b>Transmission Line:</b>	<b>Date of commercial operation</b>
1	400 kV S/C (twin) Korba- Korba (W) T/Line	25.1.1983
2	400 kV S/C (twin) Korba- Bhilai-I T/Line	1.1.1984
3	400 kV S/C (twin) Korba- Bhilai-II T/Line	1.1.1984
4	400 kV S/C (twin) Bhilai- Koradi T/Line	1.5.1984
5	400 kV S/C (twin) Koradi- Satpura T/Line	18.4.1987
6	400 kV S/C (twin) Satpura- Itarsi T/Line	13.5.1987
7	400 kV S/C (twin) Itarsi- Indore-II T/Line	3.12.1989
8	400 kV S/C (twin) Itarsi- Asoj-I T/Line	15.4.1987
9	400 kV S/C twin conductor Korba- Bhilai-III, T/Line	8.2.1990
10	400 kV D/C (twin) Bhilai-Bhadrawati (Chandrapur) T/Line (Ckt-I&II)	28.3.1989,22.1.1990
11	400 kV D/C (twin) Bhadrawati-Chandrapur T/Line (Ckt-I&II)	28.3.1989
	<b>Sub Stations/ Bays</b>	<b>Date of commercial operation</b>
	<b>Indore Sub Station:</b>	
1	400 kV Itarsi-II bay	3.12.1989
2	400 kV Asoj-I bay	15.4.1987
	<b>Bhilai Sub Station:</b>	
1	400 kV Korba-I bay	1.1.1984
2	400 kV Korba-II bay	1.1.1984
3	400 kV Itarsi-II bay	1.5.1984
	<b>Koradi Sub Station:</b>	
1	400 kV Bhilai bay	1.5.1984
2	400 kV Satpura bay	18.4.1987
	<b>Itarsi Sub Station:</b>	
1	400 kV Indore II bay	3.12.1989
2	400 kV Satpura bay	13.5.1987
	<b>Satpura Sub Station:</b>	
1	400 kV Itarsi bay	3.12.1989
2	400 kV Koradi bay	18.5.1987
	<b>Asoj Sub Station:</b>	
1	400 kV Indore I bay	15.4.1987
	<b>Bhilai Sub Station:</b>	
1	400 kV Korba-III (Raipur) bay	08.2.1990
2	400 kV Bhadrawati-I bay	22. 1.1990
3	400 kV Bhadrawati-II (Raipur) bay	28.4.1989
	<b>Chandrapur Sub Station (MSEB):</b>	
1	400 kV Bhadrawati-I bay	28.4.1989
2	400 kV Bhadrawati-II bay	28.4.1989
	<b>Bhadrawati Sub Station :</b>	
1	400 kV Bhilai-I bay	22.1.1990
2	400 kV Bhilai-II (Raipur) bay	28.3.1989
3	400 kV Chandrapur-I bay	28.3.1989
4	400 kV Chandrapur-II bay	22.1.1990
5	400 kV HVDC-I bay	1.10.1997
6	400 kV HVDC-II bay	1.3.1998

4. Details of the transmission charges claimed by the petitioner are given as under:-

(` in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation	382.39	410.81	427.13	474.44	515.77
Interest on Loan	1.69	33.58	39.62	60.57	71.29
Return on equity	2026.67	2039.16	2047.57	2072.39	2091.65
Interest on Working Capital	150.22	157.41	164.14	172.48	180.69
O & M Expenses	1998.52	2112.17	2233.65	2361.57	2496.17
<b>Total</b>	<b>4559.49</b>	<b>4753.13</b>	<b>4912.11</b>	<b>5141.45</b>	<b>5355.57</b>

5. The details submitted by the petitioner in support of its claim for interest on working capital are given hereunder:-

(` in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Maintenance Spares	299.78	316.83	335.05	354.24	374.43
O & M expenses	166.54	176.01	186.14	196.80	208.01
Receivables	759.91	792.19	818.69	856.91	892.59
<b>Total</b>	<b>1226.23</b>	<b>1285.03</b>	<b>1339.88</b>	<b>1407.94</b>	<b>1475.03</b>
Interest	150.21	157.42	164.13	172.47	180.69
Rate of Interest	12.25%	12.25%	12.25%	12.25%	12.25%

6. No comments or suggestions have been received from the general public in response to the notices published by the petitioner under section 64 of the Electricity Act, 2003. Madhya Pradesh Power Trading Company Limited (MPPTCL), Respondent No. 1 has raised the issue of additional capital expenditure and de-capitalisation, in its reply dated 21.5.2011. The petitioner has filed the rejoinder to the reply of MPPTCL.

7 Having heard the representatives of the parties and perused the material on record, we proceed to dispose of the petition. While doing so, we also take care of the

submissions of the respondent and the clarifications given by the petitioner in the relevant paragraphs of this order.

### **Capital cost**

8. As regards capital cost, Regulation 7(2) of the 2009 Tariff Regulations provides that:-

“(2) The capital cost admitted by the Commission after prudence check shall form the basis for determination of tariff:

Provided that in case of the thermal generating station and the transmission system, prudence check of capital cost may be carried out based on the benchmark norms to be specified by the Commission from time to time:

Provided further that in cases where benchmark norms have not been specified, prudence check may include scrutiny of the reasonableness of the capital expenditure, financing plan, interest during construction, use of efficient technology, cost over-run and time over-run, and such other matters as may be considered appropriate by the Commission for determination of tariff:

Provided also that the Commission may issue guidelines for vetting of capital cost of hydro-electric projects by independent agency or expert and in that event the capital cost as vetted by such agency or expert may be considered by the Commission while determining the tariff for the hydro generating station:

Provided also that the Commission may issue guidelines for scrutiny and approval of commissioning schedule of the hydro-electric projects of a developer, not being a State controlled or owned company as envisaged in the tariff policy as amended vide Government of India Resolution No 23/2/2005-R&R (Vol. IV) dated 31st March 2008:

Provided also that in case the site of a hydro generating station is awarded to a developer (not being a State controlled or owned company), by a State Government by following a two stage transparent process of bidding, any expenditure incurred or committed to be incurred by the project developer for getting the project site allotted shall not be included in the capital cost:

Provided also that the capital cost in case of such hydro generating station shall include:

- (a) cost of approved rehabilitation and resettlement (R&R) plan of the project in conformity with National R&R Policy and R&R package as approved; and
- (b) cost of the developer's 10% contribution towards Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) project in the affected area:

Provided also that where the power purchase agreement entered into between the generating company and the beneficiaries or the implementation agreement and the transmission service agreement entered into between the transmission licensee and the

long-term transmission customer, as the case may be, provide for ceiling of actual expenditure, the capital expenditure admitted by the Commission shall take into consideration such ceiling for determination of tariff:

Provided also that in case of the existing projects, the capital cost admitted by the Commission prior to 1.4.2009 and the additional capital expenditure projected to be incurred for the respective year of the tariff period 2009-14, as may be admitted by the Commission, shall form the basis for determination of tariff."

9. Capital cost of `23435.94 lakh of the transmission system, as admitted on 31.3.2009, has been considered for the purpose of tariff calculation.

### **Additional capital expenditure and de-capitalisation**

10. With regard to additional capital expenditure, clause 9(2) of the 2009 Tariff Regulations provides as under:-

"(2) The capital expenditure incurred on the following counts after the cut-off date may, in its discretion be admitted by the Commission, subject to prudence check:

- (i) Liabilities to meet award of arbitration or for compliance of the order or decree of a court;
- (ii) Change in law;
- (iii) Deferred works relating to ash pond or ash handling system in the original scope of work;
- (iv) In case of hydro generating stations, any expenditure which has become necessary on account of damage caused by natural calamities (but not due to flooding of power house attributable to the negligence of the generating company) including due to geological reasons after adjusting for proceeds from any insurance scheme, and expenditure due to any additional work which has become necessary for successful and efficient plant operation; and
- (v) In case of transmission system any additional expenditure on items such as relays, control and instrumentation, computer system, power line carries communication, DC batteries, replacement of switchyards equipment due to increase of fault level, emergency restoration system, insulators cleaning infrastructure, replacement of damaged equipment not covered by insurance and any other expenditure which has become necessary for successful and efficient operation of transmission system.

Provided that in respect of sub-clause (iv) and (v) above, any expenditure on acquiring the minor items or the assets like tools and tackles, furniture, air-conditioners, voltage stabilizers, refrigerators, coolers, fans, washing machines, heat convectors, mattresses, carpets, etc. brought after the cut-off date shall not be considered for additional capitalisation for determination of tariff w.e.f. 1.4.2009."

11. The petitioner has claimed projected additional capital expenditure and proposed de-capitalisation during 2009-10 and 2012-13 under Regulation 9(2) (v) of the 2009 Tariff Regulations on account of replacement of several sub-station equipment and tower strengthening. The details of the same are given below:-

(` in lakh)

Admitted capital cost as on 1.4.2009	Decapitalisation during 2009-14		Additional capitalisation proposed during 2009-14				Total estimated capital cost as on 31.3.2014
	2009-10	2010-11	2009-10	2010-11	2011-12	2012-13	
23435.94	176.74	41.70	543.78	150.97	211.57	734.75	24858.57

12. The petitioner has proposed additional capital expenditure of `543.78 lakh during 2009-10, `150.97 lakh for 2010-11, `211.57 lakh for 2011-12 and `734.75 lakh for 2012-13 on account of replacement of circuit breakers, LAs, strengthening of towers for 400 kV Itarsi- Indore ckt-II and reactors for Korba transmission system.

13. The MPPTCL, vide their affidavit dated 21.5.2011, has submitted that the equipment, which are proposed to be replaced have already completed their useful life of 25 years. The replacement of equipment therefore amounts to extension of life beyond the useful life of the equipment and hence the replacement should be done under the provision of renovation and modernization clause of the 2009 Tariff Regulations. The respondent has also submitted that the petitioner should submit a detailed scheme of replacement of assets which have completed their useful life for approval. The additional capital expenditure claimed by the petitioner is not in accordance with the 2009 Tariff Regulations and hence should not be allowed.

14. The petitioner in its rejoinder, vide affidavit dated 28.7.2011 has submitted that under this transmission system a number of transmission line elements were commissioned with large no of sub-station equipments spread in different sub-stations. The replacement of a few problematic equipments in sub-station ensures smooth operation of the system within the useful life of the transmission system but cannot ensure the enhancement of the life of whole transmission system beyond the useful life of the transmission system, where majority of the equipments/assets are still very old. Problematic equipments had to be replaced because of non-availability of spare parts and service support from OEM because of obsolescence/ phased out by manufacturer etc. Continuing with problematic equipments runs the risk of malfunction/ sudden failure which not only pose a threat to the stability to the grid but may also result larger loss in the form of consequential damages to the associated equipments/assets. The petitioner has also submitted that replacement of these problematic equipments had become necessary for successful and efficient operation of this transmission system which is in line with the additional capitalisation provided under Regulation 9(2)(v) of the 2009 Tariff Regulations.

15. The petitioner's claim for capitalisation of additional expenditure has been discussed item-wise as under:-

**Replacement of ABCB Circuit Breakers:-** The petitioner has submitted that the Air Blast Circuit Breakers (ABCB) was manufactured by M/s. ABB (erstwhile M/s. HBB Ltd, Baroda) during early 1980s. The petitioner has proposed replacement of ten (10) numbers of ABCBs for Bhilai (CSPTCL) sub-station. Majority of the ABCBs supplied have completed nearly 25 years of service life. The technology of EHV CBs has changed and SF-6 gas operated CBs are being manufactured. The manufacturer has



phased out the regular production of this ABCB design. Due to product obsolescence M/s. ABB has not been able to provide regular repair support and supply spare parts of these old type of CBs. Non-availability of spares for these ABCBs is hampering the timely restoration of failure of ABCBs. It is observed that 5 nos. ABCBs were commissioned during 1984 and 5 nos. of ABCBs were commissioned during 1990. In view of non-availability of spares, replacement of 10 nos. of ABCBs by SF-6 circuit breakers is allowed. However, the petitioner should ensure that these ABCBs are replaced only when they become non-usable and they should not be replaced just because they have completed 25 years of life.

**Replacement of Lightning Arresters (LAs):-** The petitioner has submitted that 27 nos. of gapped type LAs are to be replaced by the metal oxide arresters. As per IEEE paper on the life of gap-type LAs, the useful life of the gapped type LAs are 12-15 years. The LAs have already completed the useful life of 15 years. The replacement of LAs is allowed as the LAs have completed their useful life.

**Replacement of Protection Coupler System (NSD-60):-** The petitioner has submitted that the supplier M/S ABB has already phased out the regular production of the old design NSD – 60 protection couplers in view of the technological advancements involving surface mounted devices (SMDs) over the period of time. The petitioner has submitted that because of the non-availability of discrete components, repairing and replacement of the faulty cards of old protection couplers has become difficult. It is submitted that these NSD – 60 protection coupler replacements were for the problematic PLCC systems of the Bhilai, Raipur, Koradi & Chandrapur lines. In view of the problems faced by the petitioner, the replacement of NSD – 60 protection couplers is allowed.

**Procurement of 2 spare reactors against 3 reactors:-** The petitioner has submitted that the three reactors have been in service continuously for 25 years. Due to imbalance in demand and supply during the operation of the reactors, the voltages were equal to or more than 420 kV. Higher voltages have stressed the reactors and reduced their life and sudden failure of these reactors at any point of time is not ruled out. The issue was raised during the hearing on 7.6.2011 and the Commission directed the petitioner to submit the CPRIs observations and recommendations on the degradation of the reactors. The petitioner has submitted a copy of the preliminary report of CPRI dated 12.3.2012, vide its reply dated 15.3.2012. The details given in the CPRIs report regarding degradation of three reactors are as follows:-

- (i) Condition Assessment of Itarsi – II Line Reactor at Indore sub-station
  - (a) The reactor is not healthy. DGA indicates symptoms of local overheating and sparking.
  - (b) The NGR bushing is not healthy. It is recommended for replacement.
- (ii) Condition Assessment of Indore – I Line Reactor at Asoj sub-station
  - (a) The reactor is not healthy. DGA indicates symptoms of local overheating and sparking.
  - (b) The bushings are healthy.
- (iii) Condition Assessment of Asoj – I Line Reactor at Indore sub-station
  - (a) The reactor is not healthy. DGA indicates symptoms of local overheating and sparking.
  - (b) The bushings are healthy.

16. As far as the reactor at Indore sub-station for Itarsi-II line is concerned, the CPRI report shows that NGR bushings exhibit high di-electric loss and that the tan delta value is higher than the permissible value of 0.07. Hence, the petitioner is allowed to replace only the NGR bushings and the expenditure towards replacement of bushings shall be capitalized at the time of truing-up. The CPRI's report also indicates that the reactor at Asoj sub-station and other two reactors at Indore sub-station are also not healthy. As per the report, the DGA indicates local overheating and sparking. However, the bushings in respect of Asoj –I line reactor at Indore sub-station and Indore-I Line Reactor at Asoj sub-station are healthy. The petitioner shall monitor the condition of these reactors regularly and if required, may replace the reactors if so recommended by CPRI. The petitioner is at liberty to approach the Commission, in accordance with law, after replacement of the same. The replacement cost of bushings, if incurred, would also be capitalized at the time of truing-up.

17. **Tower Strengthening:-** The petitioner has proposed additional capital expenditure for tower strengthening for 400 kV S/C (twin) Itarsi- Indore (Circuit –II) transmission line. It has been submitted that the earlier towers were designed on the basis of provisions of IS:802-1977, which was based on the deterministic approach i.e. factor of safety was being applied on working loads. In line with international standards major changes were incorporated in the revised IS:802-1995 which is now based on the probabilistic approach with different reliability levels. Wind patterns in the country have changed over the years and earlier concept of three wind zones (Light, medium and heavy) have been changed to six wind zones with enhanced wind pressures. The towers of 400 kV S/C (twin) Itarsi- Indore (Circuit –II) transmission line was designed for medium wind zone. Presently, this line falls under zone-4 (47m/sec). With the

revised wind zone, the wind pressure on conductor has increased to 161 kg/m<sup>2</sup> from 90 kg/m<sup>2</sup>. It has been further submitted that the expert committee constituted by CEA to investigate tower failure during the period from January to June 2009 has observed that the tower failures occurred due to high velocity wind acting on towers and recommended to provide hip bracing on all the suspension towers upto bottom cross arm.

18. The petitioner, vide affidavit dated 28.2.2011, has submitted that there were two incidents of tower damage on 400 kV S/C Itarsi-Indore ckt-II line in 1997 and 1999. 400 kV S/C (twin) Itarsi- Indore (Circuit –II) transmission line was designed as per IS: 802 – 1977 in medium wind zone and as per IS: 802 – 1995, the line falls in wind zone-2. As per the map prepared by SERC this line falls in wind zone-4.

19. Based on the calculations submitted by the petitioner, indicating that the wind load on towers as per IS 802:1995 is more than the wind load on towers as per the IS 802:1977, we agree for the tower strengthening and accordingly allow the additional capital expenditure towards tower strengthening.

20. Replacement of ABCB Circuit Breakers, LAs and Protection Coupler System (NSD-60), tower strengthening is allowed under Regulation 9(2)(v) of the 2009 Tariff Regulations, as these items are necessary for successful and efficient operation of transmission system. Replacement of NGR bushing of one reactor at Indore sub-station for Itarsi-II line is also allowed but its cost would be capitalised at the time of truing up. The details of the capital cost as on 1.4.2009, de-capitalisation and

additional capital expenditure allowed during 2009-14 for the purpose of tariff calculation are given hereunder:-

(` in lakh)

Admitted capital cost as on 1.4.2009	De-capitalization during 2009-14		Additional capitalisation proposed during 2009-14				Total estimated capital cost as on 31.3.2014
	2009-10	2010-11	2009-10	2010-11	2011-12	2012-13	
23435.94	176.74	41.70	543.78	150.97	211.57	0.00	24123.82

21. Details of the additional capital expenditure being considered are given hereunder:-

(` in lakh)

Year	Work / Equipment	Justification / Purpose	Amount
2009-10	Sub Station	Circuit Breakers, LAs, Relays	543.78
<b>Total</b>			<b>543.78</b>
2010-11	Sub Station	Circuit Breakers, LAs, Relays	24.78
	PLCC	PLCC	126.19
<b>Total</b>			<b>150.97</b>
2011-12	Transmission Line	Tower Strengthening	211.57
<b>Total</b>			<b>211.57</b>

22. Details of the de-capitalization being considered are as below:-

(` in lakh)

Year	Work / Equipment	Justification / Purpose	Amount
2009-10	Sub Station	Circuit Breakers, LAs, Relays	176.74
<b>Total</b>			<b>176.74</b>
2010-11	PLCC	PLCC	41.70
<b>Total</b>			<b>41.70</b>

## Debt- equity ratio

23. Regulation 12 of the 2009 Tariff Regulations provides that,-

“12. **Debt-Equity Ratio.** (1) For a project declared under commercial operation on or after 1.4.2009, if the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan:

Provided that where equity actually deployed is less than 30% of the capital cost, the actual equity shall be considered for determination of tariff:

Provided further that the equity invested in foreign currency shall be designated in Indian rupees on the date of each investment.

**Explanation.-** The premium, if any, raised by the generating company or the transmission licensee, as the case may be, while issuing share capital and investment of internal resources created out of its free reserve, for the funding of the project, shall be reckoned as paid up capital for the purpose of computing return on equity, provided such premium amount and internal resources are actually utilised for meeting the capital expenditure of the generating station or the transmission system.

(2) In case of the generating station and the transmission system declared under commercial operation prior to 1.4.2009, debt-equity ratio allowed by the Commission for determination of tariff for the period ending 31.3.2009 shall be considered.

(3) Any expenditure incurred or projected to be incurred on or after 1.4.2009 as may be admitted by the Commission as additional capital expenditure for determination of tariff, and renovation and modernisation expenditure for life extension shall be serviced in the manner specified in clause (1) of this regulation.”

24. The details of debt-equity ratio for the transmission system as on 1.4.2009 and 31.3.2014 are given hereunder:-

( ` in lakh)

Particulars	Cost as on 1.4.2009	
	Amount	%
Debt	11897.43	50.77%
Equity	11538.51	49.23%
<b>Total</b>	<b>23435.94</b>	<b>100.00%</b>

( ` in lakh)

Particulars	Cost as on 31.3.2014	
	Amount	%
Debt	12378.95	51.31
Equity	11744.87	48.69
<b>Total</b>	<b>24123.82</b>	<b>100.00</b>

## Return on equity

25. Regulation 15 of the 2009 Tariff Regulations provides that:-

“15. (1) Return on equity shall be computed in rupee terms, on the equity base determined in accordance with regulation 12.

Provided that in case of projects commissioned on or after 1st April, 2009, an  
(2) Return on equity shall be computed on pre-tax basis at the base rate of 15.5% for thermal generating stations, transmission system and run of the river generating station, and 16.5% for the storage type generating stations including pumped storage hydro generating stations and run of river generating station with pondage and shall be grossed up as per clause (3) of this regulation:

Provided that in case of projects commissioned on or after 1st April, 2009, an additional return of 0.5% shall be allowed if such projects are completed within the timeline specified in **Appendix-II**:

Provided further that the additional return of 0.5% shall not be admissible if the project is not completed within the timeline specified above for reasons whatsoever.

(3) The rate of return on equity shall be computed by grossing up the base rate with the Minimum Alternate/Corporate Income Tax Rate for the year 2008-09, as per the Income Tax Act, 1961, as applicable to the concerned generating company or the transmission licensee, as the case may be:

(4) Rate of return on equity shall be rounded off to three decimal points and be computed as per the formula given below:

Rate of pre-tax return on equity = Base rate / (1-t)

Where t is the applicable tax rate in accordance with clause (3) of this regulation.

(5) The generating company or the transmission licensee as the case may be, shall recover the shortfall or refund the excess Annual Fixed charge on account of Return on Equity due to change in applicable Minimum Alternate/ Corporate Income Tax Rate as per the Income Tax Act, 1961 (as amended from time to time) of the respective financial year directly without making any application before the Commission.

Provided further that Annual Fixed charge with respect to the tax rate applicable to the generating company or the transmission licensee, as the case may be, in line with the provisions of the relevant Finance Acts of the respective financial year during the tariff period shall be trued up in accordance with Regulation 6 of these regulations"

26. The petitioner has computed return on equity on pre- tax basis on 11.33% MAT in accordance with the tax rate applicable for 2008-09 and has claimed return on equity @ 17.481%. The petitioner has prayed to allow grossing up of base rate of

return with the applicable rate as per the Finance Act for the relevant year and direct settlement of tax liability between the generating company/transmission licensee and the beneficiaries/long term transmission customers on year to year basis.

27. The petitioner's request to allow grossing up the base rate of return on equity based on tax rates viz., MAT, surcharge, any other cess, charges, levies etc., as per relevant Finance Act, shall be settled in accordance with the provisions of Regulation 15 of 2009 Tariff Regulations.

28. The return on equity works out to `2026.67 lakh, `2039.16 lakh, `2047.57 lakh, `2053.12 lakh and `2053.12 lakh for the years 2009-10, 2010-11, 2011-12, 2012-13 and 2013-14 respectively.

29. The following amount of equity has been allowed for calculation of return of equity:-

(` in lakh)					
Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Opening Equity	11538.51	11648.62	11681.40	11744.87	11744.87
Addition due to Additional Capital expenditure	110.11	32.78	63.47	0.00	0.00
Closing Equity	11648.62	11681.40	11744.87	11744.87	11744.87
Average Equity	11593.57	11665.01	11713.14	11744.87	11744.87
Return on Equity (Base Rate )	15.50%	15.50%	15.50%	15.50%	15.50%
Tax rate for the year 2008-09 (MAT)	11.33%	11.33%	11.33%	11.33%	11.33%
Rate of Return on Equity (Pre Tax)	17.481%	17.481%	17.481%	17.481%	17.481%
<b>Return on Equity (Pre Tax)</b>	<b>2026.67</b>	<b>2039.16</b>	<b>2047.57</b>	<b>2053.12</b>	<b>2053.12</b>



## Interest on loan

30. Regulation 16 of the 2009 Tariff Regulations provides that-

"16. (1) The loans arrived at in the manner indicated in regulation 12 shall be considered as gross normative loan for calculation of interest on loan.

(2) The normative loan outstanding as on 1.4.2009 shall be worked out by deducting the cumulative repayment as admitted by the Commission up to 31.3.2009 from the gross normative loan.

(3) The repayment for the year of the tariff period 2009-14 shall be deemed to be equal to the depreciation allowed for that year:

(4) Notwithstanding any moratorium period availed by the generating company or the transmission licensee, as the case may be the repayment of loan shall be considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed,.

(5) The rate of interest shall be the weighted average rate of interest calculated on the basis of the actual loan portfolio at the beginning of each year applicable to the project:

Provided that if there is no actual loan for a particular year but normative loan is still outstanding, the last available weighted average rate of interest shall be considered: Provided further that if the generating station or the transmission system, as the case may be, does not have actual loan, then the weighted average rate of interest of the generating company or the transmission licensee as a whole shall be considered.

(6) The interest on loan shall be calculated on the normative average loan of the year by applying the weighted average rate of interest.

(7) The generating company or the transmission licensee, as the case may be, shall make every effort to re-finance the loan as long as it results in net savings on interest and in that event the costs associated with such re-financing shall be borne by the beneficiaries and the net savings shall be shared between the beneficiaries and the generating company or the transmission licensee, as the case may be, in the ratio of 2:1.

(8) The changes to the terms and conditions of the loans shall be reflected from the date of such re-financing.

(9) In case of dispute, any of the parties may make an application in accordance with the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999, as amended from time to time, including statutory re-enactment thereof for settlement of the dispute:

Provided that the beneficiary or the transmission customers shall not withhold any payment on account of the interest claimed by the generating company or the transmission licensee during the pendency of any dispute arising out of re-financing of loan."

31. In these calculations, interest on loan has been worked out as per details given hereunder:-

- (i) Gross amount of loan, repayment of instalments and rate of interest and weighted average rate of interest on actual average loan have been considered as per the petition.
- (ii) Tariff is worked out considering normative loan and normative repayments. Depreciation allowed has been taken as normative repayment for the tariff period 2009-14.
- (iii) Weighted average rate of interest on actual loan worked out as above has been applied on the notional average loan during the year to arrive at the interest on loan.
- (iv) Petitioner has considered separate loan portfolio for de-capitalisation and additional-capitalisation in order to work out the weighted average rate of interest. As per prevailing practice we have considered a combined loan portfolio for calculating the weighted average rate of interest.
- (v) As additional capitalisation proposed during 2012-13 has been disallowed, pro-rata actual loan in respect of allowed add cap during 2009-14 has been considered. The normative loan of the transmission system has already been repaid; and in view of above interest on loan during the period 2009-14 is Nil.

32. Detailed calculations of the weighted revised average rate of interest are given in Annexure to this order.

33. Details of the interest on loan worked on the above basis are given hereunder:-

(` in lakh)					
Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Gross Normative Loan	11897.43	12154.36	12230.85	12378.95	12378.95
Cumulative Repayment upto Previous Year	11897.43	12154.36	12230.85	12378.95	12378.95
Net Loan-Opening	0.00	0.00	0.00	0.00	0.00
Addition due to Additional Capital expenditure	256.93	76.49	148.10	0.00	0.00
Repayment during the year	256.93	76.49	148.10	0.00	0.00
Net Loan-Closing	0.00	0.00	0.00	0.00	0.00
Average Loan	0.00	0.00	0.00	0.00	0.00
Weighted Average Rate of Interest on Loan	0.00%	8.64%	8.64%	8.64%	8.64%
Interest	0.00	0.00	0.00	0.00	0.00

#### **Depreciation**

34. Regulation 17 (4) of the 2009 Tariff Regulations provides as under:-

"Depreciation shall be calculated annually based on Straight Line Method and at rates specified in Appendix-III to these regulations for the assets of the generating station and transmission system:

Provided that, the remaining depreciable value as on 31th March of the year closing after a period of 12 years from date of commercial operation shall be spread over the balance useful life of the asset".

35. In the instant petition, the transmission assets were put under commercial operation progressively from 1983 to 1990. Accordingly, balance useful life of the assets was 17 years as on 1.4.2004 vide order dated 15.12.2005 in Petition No. 117/2004. The remaining depreciable value in the current petition is spread over the balance useful life of the assets.

36. The Depreciation works out to `377.63 lakh, `408.55 lakh, `425.95 lakh, `436.53 lakh and `436.53 lakh for the years 2009-10, 2010-11, 2011-12, 2012-13 and 2013-14 respectively. Cumulative depreciation up to 31.3.2009 amounting to `16669.50 lakh vide order dated 14.2.2008 in Petition No. 117/2004 has been considered in the tariff calculations.

37. Details of the depreciation worked out are given below:-

(` in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Opening Gross Block	23435.94	23802.98	23912.25	24123.82	24123.82
Addition during 2009-14 due to Projected additional Capital expenditure	367.04	109.27	211.57	0.00	0.00
Closing Gross Block	23802.98	23912.25	24123.82	24123.82	24123.82
Average Gross Block	23619.46	23857.62	24018.04	24123.82	24123.82
Rate of Depreciation	5.23%	5.23%	5.23%	5.23%	5.23%
Depreciable Value	21201.12	21415.46	21559.83	21655.04	21655.04
Weighted balance Useful life of the asset	12	11	10	9	8
Remaining Depreciable Value	4531.62	4494.03	4259.52	3928.78	3492.25
Depreciation	<b>377.63</b>	<b>408.55</b>	<b>425.95</b>	<b>436.53</b>	<b>436.53</b>
Adjusted cumulative depreciation/advance against depreciation after taking into account the pro-rata adjustment of decapitalized assets during 2009-14	16921.42	17300.31	17726.26	18162.79	18599.32

(` in lakh)

Calculation of cumulative depreciation to be deducted on account of deletion of assets/assets in use					
Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Decapitalisation	176.74	41.70	0.00	0.00	0.00
Cumulative depreciation as on 31.3.2009	16669.50	16669.50	16669.50	16669.50	16669.50
Capital cost as on 31.3.2009	23435.94	23435.94	23435.94	23435.94	23435.94
Pro-rata cumulative depreciation against decapitalised Asset/Assets not in use	125.71	29.66	0.00	0.00	0.00

### Operation & maintenance expenses

38. Clause (g) of Regulation 19 of the 2009 Tariff regulations prescribes the norms for operation and maintenance expenses based on the type of sub-station and line. Norms prescribed in respect of the elements covered in the instant petition are as under:-

( ` in lakh)					
Element	2009-10	2010-11	2011-12	2012-13	2013-14
400 kV, S/C (twin) T/Line (` lakh per kms.)	0.358	0.378	0.400	0.423	0.447
400 kV, D/C (twin) T/Line (₹ lakh per kms.)	0.627	0.663	0.701	0.741	0.783
400 kV Bays (₹ lakh per bay)	52.40	55.40	58.57	61.92	65.46

39. As per the existing norms of 2009 Tariff Regulations, allowable O&M expenses for the assets covered in this petition are as under:-

( ` in lakh)					
Element	2009-10	2010-11	2011-12	2012-13	2013-14
1617 km (14+197+192+272+149+79+214+ 289+211), 400 kV S/C (twin) T/Line	578.89	611.23	646.80	683.99	722.80
342 (322+20) km, 400 kV D/C (twin) T/Line	214.43	226.75	239.74	253.42	267.79
23 Nos. 400 kV bay	1205.20	1274.20	1347.11	1424.16	1505.58
<b>Total O&amp;M for Assets</b>	<b>1997.52</b>	<b>2112.18</b>	<b>2233.65</b>	<b>2361.57</b>	<b>2496.17</b>

40. The petitioner has submitted that the O&M expenses for 2009-14 tariff block had been arrived on the basis of normalized actual O&M expenses of the petitioner during the year 2003-04 to 2007-08. The wage hike of 50% on account of pay revision of the employees of public sector undertaking was also considered while calculating the

O&M expenses for tariff period 2009-14. The petitioner has also submitted that it would approach Commission for suitable revision in the norms for O&M expenses in case the impact of wage hike w.e.f 1.1.2007 is more than 50%.

41. The Commission has given effect to the impact of pay revision in the 2009 Tariff Regulations by factoring 50% on account of pay revision of the employees of PSUs after extensive stakeholders' consultation. We do not see any reason why the admissible amount is inadequate to meet the requirement of the employee cost. However, in case the petitioner approaches with any such application, the same shall be dealt with in accordance with law.

#### **Interest on working capital**

42. The components of the working capital and the interest there are discussed thereon:-

##### **(i) Maintenance spares:**

Regulation 18(1)(c)(ii) of the 2009 Tariff Regulations provides for maintenance spares @ 15% per annum of the O & M expenses from 1.4.2009. The value of maintenance spares has accordingly been worked out.

##### **(ii) O & M expenses:-**

Regulation 18(1) (c) (iii) of the 2009 Tariff Regulations provides for operation and maintenance expenses for one month as a component of working capital. The petitioner has claimed O&M expenses for 1 month of the respective year as claimed in the petition. This has been considered in the working capital.

##### **(iii) Receivables:-**

As per Regulation 18 (1) (c) (i) of the 2009 Tariff Regulations, receivables will be equivalent to two months of fixed cost. The petitioner has claimed the receivables on the basis of 2 months transmission charges claimed in the petition. In the tariff being allowed, receivables have been worked out on the basis of 2 months transmission charges.

**(iv) Rate of interest on working capital:-**

In the calculations, the SBI PLR as on 1.4.2009 (i.e. 12.25%) is considered as the rate of interest on working capital.

43. Necessary computations in support of interest on working capital are given hereunder:-

( ` in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Maintenance Spares	299.78	316.83	335.05	354.24	374.43
O & M expenses	166.54	176.01	186.14	196.80	208.01
Receivables	758.82	786.09	811.74	836.87	860.43
Total	1225.14	1278.93	1332.93	1387.91	1442.87
Interest	<b>150.08</b>	<b>156.67</b>	<b>163.28</b>	<b>170.02</b>	<b>176.75</b>

**Transmission charges**

44. The transmission charges being allowed for the transmission lines are summarized below:-

( ` in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation	377.63	408.55	425.95	436.53	436.53
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Return on Equity	2026.67	2039.16	2047.57	2053.12	2053.12
Interest on Working Capital	150.08	156.67	163.28	170.02	176.75
O & M Expenses)	1998.52	2112.17	2233.65	2361.57	2496.17

<b>Total</b>	<b>4552.91</b>	<b>4716.55</b>	<b>4870.46</b>	<b>5021.24</b>	<b>5162.57</b>
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### **Filing fee and the publication expenses**

45. The petitioner has sought reimbursement of fee paid by it for filing the petition and publication expenses. In accordance with the Commission's order dated 11.1.2010 in Petition No. 109/2009 applicable for the tariff period 2009-14, the petitioner shall be entitled to recover the filing fee directly from the beneficiaries on pro-rata basis. The petitioner shall also be entitled for reimbursement of the publication expenses in connection with the present petition, directly from the beneficiaries on pro-rata basis.

### **Licence fee**

46. The petitioner has submitted that in O&M norms for tariff block 2009-14 the cost associated with license fees had not been captured and the license fee may be allowed to be recovered separately from the respondents. BRPL has submitted that licence fee is part of the O&M expenses and there is no separate provision for reimbursement for licence fee in 2009 Tariff Regulations and hence petitioner's request for reimbursement of licence fee should be rejected. The petitioner shall be entitled for reimbursement of licence fee in accordance with Regulation 42A(1)(b) of the 2009 Tariff Regulations.

### **Service tax**



47. The petitioner has made a prayer to be allowed to bill and recover the service tax on transmission charges separately from the respondents if it is subjected to such service tax in future. We consider petitioner's prayer pre-mature and accordingly this prayer is rejected.

**Sharing of transmission charges**

48. The transmission charges allowed shall be recovered on monthly basis in accordance with Regulation 23 and shared by the beneficiaries in accordance with Regulation 33 of the 2009 Tariff Regulation up to 30.6.2011. With effect from 1.7.2011, the billing, collection & disbursement of the transmission charges shall be governed by the provision of Central Electricity Regulatory Commission (Sharing of inter-state transmission charges and losses) Regulations, 2010 as amended from time to time.

49. This order disposes of Petition No. 145/2009.

sd/-

**(M. Deena Dayalan)**  
**Member**

sd/-

**(V.S. Verma)**  
**Member**

sd/-

**(S. Jayaraman)**  
**Member**

**CALCULATION OF WEIGHTED AVERAGE RATE OF INTEREST ON LOAN**

(₹ in lakh)

	<b>Details of Loan</b>	<b>2009-10</b>	<b>2010-11</b>	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>
<b>1</b>	<b>Bond-I</b>					
	Gross loan opening	<b>7669.59</b>	<b>7669.59</b>	<b>7669.59</b>	<b>7669.59</b>	<b>7669.59</b>
	Cumulative Repayment upto DOCO/previous year	<b>7669.59</b>	<b>7669.59</b>	<b>7669.59</b>	<b>7669.59</b>	<b>7669.59</b>
	Net Loan-Opening	0.00	0.00	0.00	0.00	0.00
	Additions during the year	0.00	0.00	0.00	0.00	0.00
	Repayment during the year	0.00	0.00	0.00	0.00	0.00
	Net Loan-Closing	0.00	0.00	0.00	0.00	0.00
	Average Loan	0.00	0.00	0.00	0.00	0.00
	Rate of Interest	0.00%	0.00%	0.00%	0.00%	0.00%
	Interest	0.00	0.00	0.00	0.00	0.00
	Rep Schedule					
<b>2</b>	<b>Bond-XXXIII</b>					
	Gross loan opening	<b>0.00</b>	<b>0.00</b>	<b>486.33</b>	<b>634.43</b>	<b>634.43</b>
	Cumulative Repayment upto DOCO/previous year	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
	Net Loan-Opening	0.00	0.00	486.33	634.43	634.43
	Additions during the year	0.00	486.33	148.10	0.00	0.00
	Repayment during the year	0.00	0.00	0.00	0.00	0.00
	Net Loan-Closing	0.00	486.33	634.43	634.43	634.43
	Average Loan	0.00	243.17	560.38	634.43	634.43
	Rate of Interest	0.00%	8.64%	8.64%	8.64%	8.64%
	Interest	0.00	21.01	48.42	54.81	54.81
	Rep Schedule	12 Annual instalments from 08.07.2014				
	<b>Total Loan</b>					
	Gross loan opening	<b>7669.59</b>	<b>7669.59</b>	<b>8155.92</b>	<b>8304.02</b>	<b>8304.02</b>
	Cumulative Repayment upto DOCO/previous year	7669.59	7669.59	7669.59	7669.59	7669.59
	Net Loan-Opening	0.00	0.00	486.33	634.43	634.43
	Additions during the year	0.00	486.33	148.10	0.00	0.00
	Repayment during the year	0.00	0.00	0.00	0.00	0.00
	Net Loan-Closing	0.00	486.33	634.43	634.43	634.43
	Average Loan	0.00	243.17	560.38	634.43	634.43
	Rate of Interest	<b>0.00%</b>	<b>8.64%</b>	<b>8.64%</b>	<b>8.64%</b>	<b>8.64%</b>
	<b>Interest</b>	0.00	21.01	48.42	54.81	54.81