

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

PETITION No. 133/TT/2015

Coram:

Shri A. S. Bakshi, Member

Dr. M. K. Iyer, Member

Date of Hearing: 16.11.2015

Date of Order : 28.01.2016

In the Matter of:

Truing up of transmission tariff for 2009-14 tariff block under Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations 2009 and determination of transmission tariff for 2014-19 tariff block for Rihand Transmission System (DOCO 1.4.1992) in Northern Region under Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations 2014 and Regulation-86 of Central Electricity Regulatory Commission (Conduct of Business) Regulations 1999.

And in the Matter of:

Power Grid Corporation of India Ltd,
SAUDAMINI, Plot No.-2, Sector-29,
Gurgaon-122001 (Haryana)

.....Petitioner

Versus

1. Rajasthan Rajya Vidyut Prasaran Nigam Limited,
Vidyut Bhawan, Vidyut Marg, Jaipur - 302005
2. Ajmer Vidyut Vitran Nigam Limited,
400 kV GSS Building (Ground Floor),
Ajmer Road, Heerapura, Jaipur
3. Jaipur Vidyut Vitran Nigam Limited,
400 kV GSS Building (Ground Floor),
Ajmer Road, Heerapura, Jaipur
4. Jodhpur Vidyut Vitran Nigam Limited,
400 kV GSS Building (Ground Floor),
Ajmer Road, Heerapura, Jaipur
5. Himachal Pradesh State Electricity Board,



Vidyut Bhawan, Kumar House Complex Building II,
Shimla-171 004

6. Punjab State Electricity Board,
Thermal Shed TIA,
Near 22 Phatak, Patiala-147001
7. Haryana Power Purchase Centre,
Shakti Bhawan, Sector-6,
Panchkula, Haryana - 134109
8. Power Development Department,
Govt. Of Jammu & Kashmir,
Mini Secretariat, Jammu
9. Uttar Pradesh Power Corporation Limited,
(Formerly Uttar Pradesh State Electricity Board),
Shakti Bhawan, 14, Ashok Marg,
Lucknow - 226 001
10. Delhi Transco Limited,
Shakti Sadan, Kotla Road,
New Delhi-110002
11. BSES Yamuna Power Limited,
BSES Bhawan, Nehru Place, New Delhi.
12. BSES Rajdhani Power Limited,
BSES Bhawan, Nehru Place, New Delhi
13. North Delhi Power Limited,
Power Trading & Load Dispatch Group Cennet Building,
Adjacent To 66/11 kV Pitampura-3,
Grid Building, Near PP Jewellers Pitampura,
New Delhi - 110034
14. Chandigarh Administration,
Sector -9, Chandigarh
15. Uttarakhand Power Corporation Limited,
Urja Bhawan, Kanwali Road, Dehradun
16. North Central Railway,
Allahabad
17. New Delhi Municipal Council,
Palika Kendra, Sansad Marg,
New Delhi-110002

The following were present:

.....Respondent(s)



For Petitioner: Shri S.K. Niranjana, PGCIL
Shri S.S. Raju, PGCIL
Shri Jasbir Singh, PGCIL
Shri A.K. Arora, PGCIL
Shri R.K. Arora, PGCIL
Smt. Sangeeta Edwards, PGCIL
Shri S.C Taneja, PGCIL
Shri Rakesh Prasad, PGCIL
Shri M.M. Mondal, PGCIL
Shri S.K. Venkatesan, PGCIL
Shri Shashi Bhushan, PGCIL
Shri Ved Prakash Rastogi, PGCIL

For Respondents: Shri R. B. Sharma, Advocate, BRPL
Shri Pramod Kumar, Advocate, Rajasthan Discoms
Shri Tarun Ahuja, Rajasthan Discoms
Shri B.L. Sharma, Rajasthan Discoms

ORDER

The petition has been preferred by Power Grid Corporation of India Limited (hereinafter referred to as "the petitioner"), a transmission licensee, for revision of tariff under Regulation 6 of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009 (hereinafter referred to as "the 2009 Tariff Regulations") based on trueing up of capital expenditure for the period 1.4.2009 to 31.3.2014 and for determination of tariff under Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2014 (hereinafter referred to as "the 2014 Tariff Regulations") for the period from 1.4.2014 to 31.3.2019 in respect of Rihand Transmission System (DOCO 1.4.1992) in North Region (hereinafter referred to as "the transmission assets").

2. The respondents are distribution licensees, who are procuring transmission service from the petitioner, mainly beneficiaries of Northern Region.



3. The brief facts of the case are as follows:-

a) The investment approval for the transmission system was accorded by Ministry of Power vide its letter dated 31.5.1989 at an estimated cost of ₹1063.00 crore including IDC of ₹38.50 crore. Subsequently, approval for the revised cost estimate was accorded by Ministry of Power letter dated 19.4.1995 for capital investment of ₹146058 lakh including IDC of ₹13097 lakh.

b) The assets covered in the present petition are as under:-

(i) Asset - 1: HVDC Portion of Rihand Transmission System

(ii) Asset – 2: AC Portion of Rihand Transmission System

c) The transmission assets were put to commercial operation on 1.4.1992. The Commission vide its order dated 7.9.2012 in Petition No. 326/2010 for 2009-14 tariff period approved the capital cost of ₹71522.15 lakh and ₹57855.95 lakh as on 1.4.2009 in respect of Asset-I and Asset-II respectively as under:-

Asset-I		
Admitted as on 31.3.2009	Amount (₹ in lakh)	Percentage (%)
Debt	37042.72	51.79
Equity	34479.43	48.21
Capital Cost	71522.15	100.00

Asset-II		
Admitted as on 31.3.2009	Amount (₹ in lakh)	Percentage (%)
Debt	29964.72	51.79
Equity	27891.23	48.21
Capital Cost	57855.95	100.00

d) The Commission approved an additional capitalisation and de-capitalisation during 2014-19 tariff period as under:-

Additional capital expenditure					
	2009-10	2010-11	2011-12	2012-13	2013-14
Asset-I	-	-	-	-	340.16
Asset -II	-	-	371.20	189.98	701.03
De-capitalization					
	2009-10	2010-11	2011-12	2012-13	2013-14
Asset-I	-	-	-	-	-
Asset -II	-	-	-	-	-125.19

e) Subsequently, an additional capitalisation and de-capitalisation on account of replacement of porcelain insulator with polymer insulator were allowed vide Commission's order dated 7.2.2013 in Petition No. 305/2010.

(₹ in lakh)

Additional capital expenditure			
	2009-10	2010-11	2011-12
Asset-I	754.71	377.50	-
Asset -II	2512.69	788.29	-
De-capitalization			
	2009-10	2010-11	2011-12
Asset-I	-995.85	-464.60	-
Asset -II	-2246.24	-573.39	-

f) The Commission vide order dated 7.9.2012 in Petition No. 326/2010 and order dated 7.2.2013 in Petition No. 305/2010 approved the following additional capital expenditure and de-capitalisation in respect of the transmission assets:-

(₹ in lakh)

Additional capital expenditure					
	2009-10	2010-11	2011-12	2012-13	2013-14
Asset-I	754.71	377.50	-	-	340.16
Asset -II	2512.69	788.29	371.2	189.98	701.03
De-capitalization					
	2009-10	2010-11	2011-12	2012-13	2013-14
Asset-I	-995.85	-464.60	-	-	-
Asset -II	-2246.24	-573.39	-	-	-125.19

- g) The Commission approved the transmission tariff for 2009-14 tariff period in respect of Asset-I and Asset-II respectively as given below:-

(₹ in lakh)

Asset-I					
Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation	1021.19	1021.19	1021.19	1021.19	1040.32
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Return on Equity	6027.35	6027.35	6027.35	6027.35	6036.27
Interest on Working Capital	258.69	265.10	271.88	278.99	287.10
O & M Expenses	2234.72	2362.77	2498.37	2640.46	2791.05
Total	9541.95	9676.41	9818.79	9967.99	10154.75

Asset-II					
Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation	826.07	826.07	842.77	870.83	925.23
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Return on Equity	4875.67	4875.67	4885.40	4900.11	4920.20
Interest on Working Capital	228.75	235.01	242.23	250.16	259.12
O & M Expenses	2197.33	2322.41	2455.86	2596.50	2744.62
Total	8127.81	8259.15	8426.26	8617.60	8849.17

4. As per Regulation 6 of the 2009 Tariff Regulations, the Commission shall carry out truing up exercise along with the tariff petition filed for the next tariff period, with respect to the capital expenditure including additional capital expenditure incurred up to 31.3.2014, as admitted by the Commission after prudence check at the time of truing up. Further, as per Regulation 15 of the 2009 Tariff Regulations, the petitioner is required to adjust the yearly impact of MAT rate in the truing up petition for 2009-14 tariff period.

5. In this context, the petitioner has filed the instant petition on 29.4.2015, for revision of tariff for the tariff period 2009-14 in accordance with Regulation 6 of the 2009 Tariff Regulations.



6. The petitioner has served the petition to the respondents and notice of this application has been published in the newspaper in accordance with Section 64 of the Electricity Act 2003. No comments/objections have been received from the public in response to the notice in newspaper. BRPL, Respondent no. 12, has submitted its reply vide affidavit dated 9.11.2015. The hearing in this matter was held on 16.11.2015. The petitioner was directed to submit the NAPAF and outage data of the HVDC bipole links, HVDC back to back stations and AC System for last two years; detailed ABB report; and copy of the minutes of the deliberations of the petitioner's Board wherein the proposed additional capital expenditure was approved. The petitioner submitted the reply vide affidavit dated 9.12.2015.

7. Having heard the representatives of the parties and perused the material on record, we proceed to dispose of the petition.

TRUING UP OF ANNUAL FIXED CHARGES FOR 2009-14 TARIFF PERIOD:-

8. Clause (3) of the Regulation 6 of the 2009 Tariff Regulations provides as under:-

“(3) The generating company or the transmission licensee, as the case may be, shall submit for the purpose of truing up, details of capital expenditure and additional capital expenditure incurred for the period from 1.4.2009 to 31.3.2014, duly audited and certified by the auditors”.

9. The petitioner has submitted the information as required under the 2009 Tariff Regulations for truing up of annual fixed charges for 2009-14 tariff period. The tariff for 2009-14 tariff period has been trued up in the subsequent paragraphs.



Capital Cost

10. The petitioner has claimed admitted capital cost of ₹71522.15 lakh and ₹57855.95 lakh as on 31.3.2009 in respect of Asset-I and Asset-II respectively, for the purpose of tariff determination.

11. The last proviso to Regulation 7(2) of the 2009 Tariff Regulations provides that:-

“Provided also that in case of the existing projects, the capital cost admitted by the Commission prior to 1.4.2009 duly trued up by excluding un-discharged liability, if any, as on 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”.

12. The admitted capital cost of ₹71522.15 lakh and ₹57855.95 lakh in respect of Asset-I and Asset-II respectively as on 31.3.2009 has been considered as opening capital cost as on 1.4.2009 for determination of trued up tariff in accordance with Regulation 7 of the 2009 Tariff Regulations.

Additional Capital Expenditure

13. Regulation 6(1) of the 2009 Regulations provides that:-

“The Commission shall carry out truing up exercise along with the tariff petition filed for the next tariff period, with respect to the capital expenditure including additional capital expenditure incurred up to 31.3.2014”

14. The petitioner has submitted the following details of actual additional capital expenditure incurred by it during 2009-14:-

(₹ in lakh)

Additional capital expenditure					
	2009-10	2010-11	2011-12	2012-13	2013-14
Asset-I	754.71	377.50	-	-	-
Asset -II	2512.69	788.29	-	262.14	40.02
De-capitalization					
	2009-10	2010-11	2011-12	2012-13	2013-14
Asset-I	-995.85	-464.60	-	-	-
Asset -II	-2146.24	-573.39	-	-	-

15. Additional capital expenditure has been claimed under clause 9(2)(v) of the 2009 Tariff Regulations on account of replacement of old porcelain insulators with new polymer insulators and tower strengthening. Projected additional capital expenditure on account of tower strengthening was allowed vide Commission's order dated 7.9.2012 in Petition No. 326/2010. Similarly, approval for replacement of insulators was granted vide Commission's order dated 7.2.2013 in Petition No. 305/2010. The petitioner has submitted that execution of the above works could commence only after the issue of the Commission's orders dated 7.9.2012 and 7.2.2013 and hence there was some delay in completion.

16. We have considered the submissions of the petitioner with regard to the actual capital expenditure during 2009-14. It is observed that the petitioner in the instant petition, vide Auditor's Certificate dated 11.2.2015, has claimed the de-capitalization amount of ₹2146.24 lakh for Asset II in 2009-10 for replacement of insulators, however the Commission vide order dated 7.2.2013 in Petition 305/2010 had approved a de-capitalization of ₹2246.24 lakh. Since the capital additions and de-capitalization for the year 2009-10, 2010-11 and 2011-12 for replacement of insulators are based on above said order, the amount of capital additions and decapitalisation approved by the Commission are taken up for truing up and the same are allowed for the purpose of revision of tariff in accordance with Regulation 6 of the 2009 Tariff Regulations.

17. The actual capital expenditure claimed by the petitioner for Asset I and Asset II are within the approved additional capital expenditure and hence the same is considered for the purpose of truing up. The approved additional capital expenditure for 2009-14 tariff period is as under:-

(₹ in lakh)

Additional capital expenditure					
	2009-10	2010-11	2011-12	2012-13	2013-14
Asset-I	754.71	377.50	-	-	-
Asset -II	2512.69	788.29	-	262.14	40.02
De-capitalization					
	2009-10	2010-11	2011-12	2012-13	2013-14
Asset-I	-995.85	-464.60	-	-	-
Asset -II	-2246.24	-573.39	-	-	-

Debt: Equity

18. Regulation 12 of the 2009 Tariff Regulations provides as under:-

“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:

(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.”

19. The debt:equity ratio of 51.79:48.21 admitted by the Commission vide order dated 7.9.2012 in Petition No. 326/2010 as on 31.3.2009 has been considered as on 1.4.2009 for determination of tariff in accordance with the Regulation 12 of the 2009 Tariff Regulations. In respect of the additional capital expenditure, debt: equity ratio of 70:30 has been considered in line with the 2009 Tariff Regulations.

20. The details of the debt: equity considered for the purpose of tariff for 2009-14 tariff period is as follows:-



(₹ in lakh)

Asset-I						
Funding	Capital cost as on 31.3.2009	(%)	Additional capital expenditure during 2009-14	(%)	Total Cost as on 31.3.2014	(%)
Debt	37042.72	51.79	-229.77	70.00	36812.95	51.71
Equity	34479.43	48.21	-98.47	30.00	34380.96	48.29
Total	71522.15	100.00	-328.24	100.00	71193.91	100.00

Asset-II						
Funding	Capital cost as on 31.3.2009	(%)	Additional capital expenditure during 2009-14	(%)	Total Cost as on 31.3.2014	(%)
Debt	29964.72	51.79	548.46	70.00	30513.18	52.04
Equity	27891.23	48.21	235.05	30.00	28126.28	47.96
Total	57855.95	100.00	783.51	100.00	58639.46	100.00

Return on Equity (ROE)

21. Clause (3), (4) and (5) of the Regulation 15 of the 2009 Tariff Regulations provide that

“(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 year during the tariff period shall be trued up in accordance with Regulation 6 of these regulations.”



22. The variation in the tax rate during the 2009-14 tariff period applicable to the petitioner as per the Finance Act of the relevant year for the purpose of grossing up of return on equity (ROE) has been furnished as follows:-

Year	MAT Rate claimed in the current petition (%)	Grossed up ROE (Base Rate/(1-t)) claimed in the current petition (%)
2009-10	16.995	18.674
2010-11	19.931	19.358
2011-12	20.008	19.377
2012-13	20.008	19.377
2013-14	20.961	19.610

23. The petitioner has claimed the additional capital expenditure in the debt:equity ratio of 70:30, which is in line with Regulation 12 of the 2009 Tariff Regulations.

24. The ROE as trued up and allowed is as follows:-

(₹ in lakh)

Asset –I					
Return on Equity	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 7.9.2012	6027.35	6027.35	6027.35	6027.35	6036.27
Claimed by the petitioner	6431.93	6658.00	6662.00	6662.00	6742.11
Allowed after truing up in this order	6431.79	6658.10	6661.98	6661.98	6742.26

Asset –II					
Return on Equity	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 7.9.2012	4875.67	4875.67	4885.40	4900.11	4920.20
Claimed by the petitioner	5218.67	5426.71	5438.28	5445.90	5520.27
Allowed after truing up in this order	5215.75	5420.98	5432.45	5440.07	5514.51

De-capitalization of ₹2246.24 lakh approved in case of Asset-II, vide order dated 7.2.2013 in Petition No.305/2010, has been considered for truing up instead of



₹2146.24 lakh claimed by the petitioner for 2009-10 and hence there is difference in ROE claimed and approved. Further, the difference in the approved ROE and that allowed in case of both the assets, after truing up is on account of actual grossed up ROE based on actual MAT rate and the change in gross block during the tariff period 2009-14.

Interest on Loan (IoL)

25. The petitioner has not claimed any IoL for Asset I and Asset II.

Depreciation

26. The depreciation has been worked out as per the methodology provided in the Regulation 17 of the 2009 Tariff Regulations. The depreciation allowed is as follows:-

(₹ in lakh)

Asset-I					
Depreciation	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 7.9.2012	1021.19	1021.19	1021.19	1021.19	1040.32
Claimed by the petitioner	1072.21	1089.65	1085.74	1085.71	1085.75
Allowed after truing up in this order	1072.20	1089.65	1085.73	1085.73	1085.73

Asset-II					
Depreciation	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 7.9.2012	826.07	826.07	842.77	870.83	925.23
Claimed by the petitioner	969.23	1029.98	1039.65	1052.75	1069.75
Allowed after truing up in this order	965.48	1022.20	1031.87	1044.97	1061.97

The difference in the approved depreciation and that allowed after truing up is on account of change in gross block during the 2009-14 tariff period.



Operation & Maintenance Expenses (O&M Expenses)

27. Clause (g) of Regulation 19 of the 2009 Tariff Regulations specifies the norms for O&M Expenses for the transmission system. The normative O&M Expenses are not required to be trued up. Accordingly, the total allowable O&M expenses for the instant assets have been worked out based on norms of O&M Expenses and the details are as follows:-

(₹ in lakh)

Asset-I					
O&M Expenses	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 7.9.2012	2234.72	2362.77	2498.37	2640.46	2791.05
Claimed by the petitioner	2234.72	2362.77	2498.37	2640.46	2791.05
Allowed after truing up in this order	2234.72	2362.77	2498.37	2640.46	2791.05

Asset-II					
O&M Expenses	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 7.9.2012	2197.33	2322.41	2455.86	2596.50	2744.62
Claimed by the petitioner	2197.33	2322.41	2455.86	2596.50	2744.62
Allowed after truing up in this order	2197.33	2322.41	2455.86	2596.50	2744.62

Interest on Working Capital (IWC)

28. The IWC has been worked out as per the methodology provided in the Regulation 18 of the 2009 Tariff Regulations and allowed as under:-

(₹ in lakh)

Asset-I					
Interest on Working Capital	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 7.9.2012	258.69	265.10	271.88	278.99	287.10
Claimed by the petitioner	268.19	279.67	286.45	293.56	302.76
Allowed after truing up in this order	268.17	279.66	286.44	293.55	302.75



Asset-II					
Interest on Working Capital	2009-10	2010-11	2011-12	2012-13	2013-14
Approved vide order dated 7.9.2012	228.75	235.01	242.23	250.16	259.12
Claimed by the petitioner	238.88	250.74	257.86	265.33	274.64
Allowed after truing up in this order	238.73	250.45	257.57	265.03	274.35

The difference in the approved IWC and that allowed after truing up is on account of change in the receivables and the gross block during the 2009-14 tariff period.

APPROVED ANNUAL FIXED CHARGES FOR 2009-14 TARIFF PERIOD

29. The detailed computation of the various components of the trued up annual fixed charges for the instant transmission assets for the tariff period 2009-14 is summarised below:-

(₹ in lakh)

Asset-I					
Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation					
Opening Gross Block	71522.15	71281.01	71193.91	71193.91	71193.91
Additional Capitalization	-241.14	-87.10	0.00	0.00	0.00
Closing Gross Block	71281.01	71193.91	71193.91	71193.91	71193.91
Average Gross Block	71401.58	71237.46	71193.91	71193.91	71193.91
Rate of Depreciation (%)	5.24	5.24	5.24	5.24	5.24
Depreciable Value	63902.27	63754.56	63715.37	63715.37	63715.37
Balance useful life of the asset	12	11	10	9	8
Elapsed life	18	19	20	21	22
Remaining Depreciable Value	12866.42	11986.14	10857.30	9771.57	8685.84
Depreciation during the year	1072.20	1089.65	1085.73	1085.73	1085.73
Cumulative depreciation (incl. of AAD)	52108.05	52858.07	53943.80	55029.53	56115.26
Interest on Loan					
Gross Normative Loan	37042.72	36873.92	36812.95	36812.95	36812.95
Cumulative Repayments upto Previous Year	37042.72	36873.92	36812.95	36812.95	36812.95



Asset-I					
Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Net Loan-Opening	0.00	0.00	0.00	0.00	0.00
Additions	-168.80	-60.97	0.00	0.00	0.00
Repayment during the year	-168.80	-60.97	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
Weighted Average Rate of Interest on Loan (%)	7.1827	8.7450	8.9548	8.9738	8.6800
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Return on Equity					
Opening Equity	34479.43	34407.09	34380.96	34380.96	34380.96
Additions	-72.34	-26.13	0.00	0.00	0.00
Closing Equity	34407.09	34380.96	34380.96	34380.96	34380.96
Average Equity	34443.26	34394.02	34380.96	34380.96	34380.96
Return on Equity (Base Rate) (%)	15.500	15.500	15.500	15.500	15.500
MAT Rate for respective year (%)	16.995	19.931	20.008	20.008	20.961
Rate of Return on Equity (%)	18.674	19.358	19.377	19.377	19.610
Return on Equity	6431.79	6658.10	6661.98	6661.98	6742.26
Interest on Working Capital					
O & M Expenses	186.15	196.82	208.11	219.95	232.49
Maintenance Spares	335.21	354.41	374.75	396.07	418.66
Receivables	1667.81	1731.70	1755.42	1780.29	1820.30
Total Working Capital	2189.17	2282.93	2338.29	2396.31	2471.45
Rate of Interest (%)	12.25	12.25	12.25	12.25	12.25
Interest of working capital	268.17	279.66	286.44	293.55	302.75
Annual Transmission Charges					
Depreciation	1072.20	1089.65	1085.73	1085.73	1085.73
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Return on Equity	6431.79	6658.10	6661.98	6661.98	6742.26
Interest on Working Capital	268.17	279.66	286.44	293.55	302.75
O & M Expenses	2234.72	2362.77	2498.37	2640.46	2791.05
Total	10006.88	10390.17	10532.51	10681.71	10921.80



Asset-II

(₹ in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation					
Opening Gross Block	57855.95	58122.40	58337.30	58337.30	58599.44
Additional Capitalisation	266.45	214.90	0.00	262.14	40.02
Closing Gross Block	58122.40	58337.30	58337.30	58599.44	58639.46
Average Gross Block	57989.18	58229.85	58337.30	58468.37	58619.45
Rate of Depreciation	5.24	5.24	5.24	5.24	5.24
Depreciable Value	51899.73	52116.34	52213.04	52331.00	52466.98
Balance Useful life of the asset	12	11	10	9	8
Elapsed Life	18	19	20	21	22
Remaining Depreciable Value	11585.80	11244.15	10318.66	9404.76	8495.76
Depreciation during the year	965.48	1022.20	1031.87	1044.97	1061.97
Cumulative depreciation (incl. of AAD)	41279.41	41894.38	42926.24	43971.22	45033.19
Interest on Loan					
Gross Normative Loan	29964.72	30151.24	30301.67	30301.67	30485.16
Cumulative Repayment upto Previous Year	29964.72	30151.24	30301.67	30301.67	30485.16
Net Loan-Opening	0.00	0.00	0.00	0.00	0.00
Additions	186.52	150.43	0.00	183.50	28.01
Repayment during the year	186.52	150.43	0.00	183.50	28.01
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 (%)	7.6493	8.7593	8.7726	8.7395	8.7058
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Return on Equity					
Opening Equity	27891.23	27971.17	28035.64	28035.64	28114.28
Additions	79.94	64.47	0.00	78.64	12.01
Closing Equity	27971.17	28035.64	28035.64	28114.28	28126.28
Average Equity	27931.20	28003.40	28035.64	28074.96	28120.28
Return on Equity (Base Rate) (%)	15.500	15.500	15.500	15.500	15.500
MAT rate for the respective year (%)	16.995	19.931	20.008	20.008	20.961
Rate of Return on Equity (%)	18.674	19.358	19.377	19.377	19.610
Return on Equity	5215.75	5420.98	5432.45	5440.07	5514.51
Interest on Working Capital					
O & M expenses	183.04	193.46	204.57	216.29	228.63
Maintenance Spares	329.60	348.36	368.38	389.47	411.69
Receivables	1436.22	1502.67	1529.62	1557.76	1599.24
Total	1948.85	2044.49	2102.58	2163.52	2239.56
Rate of Interest	12.25%	12.25%	12.25%	12.25%	12.25%
Interest on Working Capital	238.73	250.45	257.57	265.03	274.35
Annual Transmission					



Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Charges					
Depreciation	965.48	1022.20	1031.87	1044.97	1061.97
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Return on Equity	5215.75	5420.98	5432.45	5440.07	5514.51
Interest on Working Capital	238.73	250.45	257.57	265.03	274.35
O & M Expenses	2197.33	2322.41	2455.86	2596.50	2744.62
Total	8617.30	9016.04	9177.74	9346.57	9595.45

DETERMINATION OF ANNUAL FIXED CHARGES FOR 2014-19 TARIFF PERIOD

30. The petitioner has claimed the tariff charges for 2014-19 tariff period as under:-

(₹ in lakh)

Asset-I					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Depreciation	1105.00	1127.48	2351.35	7114.72	12385.64
Interest on Loan	0.00	0.00	217.06	892.30	1060.62
Return on Equity	6750.92	6759.74	7068.71	8120.27	9102.68
Interest on Working Capital	313.27	322.57	372.08	531.40	689.85
O & M Expenses	2397.54	2552.79	2719.86	2899.56	3092.12
Total	10566.73	10762.58	12729.06	19558.25	26330.91

Asset-II					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Depreciation	1130.12	1309.32	1517.74	1641.95	1684.44
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Return on Equity	5543.54	5605.62	5666.3	5695.32	5703.66
Interest on Working Capital	292.54	302.75	313.72	322.15	328.41
O & M Expenses	2514.80	2599.08	2685.56	2774.33	2866.50
Total	9481.00	9816.77	10183.32	10433.75	10583.01

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

(₹ in lakh)

Asset-I					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
O & M Expenses	199.80	212.73	226.66	241.63	257.68
Maintenance Spares	359.63	382.92	407.98	434.93	463.82
Receivables	1761.12	1793.76	2121.51	3259.71	4388.49



Asset-I					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Total	2320.55	2389.41	2756.15	3936.27	5109.99
Rate of Interest (%)	13.50	13.50	13.50	13.50	13.50
Interest	313.27	322.57	372.08	531.40	689.85

Asset-II					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
O & M Expenses	209.57	216.59	223.80	231.19	238.88
Maintenance Spares	377.22	389.86	402.83	416.15	429.98
Receivables	1580.17	1636.13	1697.22	1738.96	1763.84
Total	2166.96	2242.58	2323.85	2386.30	2432.70
Rate of Interest (%)	13.50	13.50	13.50	13.50	13.50
Interest	292.54	302.75	313.72	322.15	328.41

Capital Cost

32. Clause (3) and (6) of Regulation 9 of 2014 Tariff Regulation provide as follows:-

“(3) The Capital cost of an existing project shall include the following:

- (a) the capital cost admitted by the Commission prior to 1.4.2014 duly trued up by excluding liability, if any, as on 1.4.2014;
- (b) additional capitalization and de-capitalization for the respective year of tariff as determined in accordance with Regulation 14; and
- (c) expenditure on account of renovation and modernisation as admitted by this Commission in accordance with Regulation 15.”

“(6) The following shall be excluded or removed from the capital cost of the existing and new project:

- (a) The assets forming part of the project, but not in use; (b) Decapitalisation of Asset;”

33. The capital cost of ₹71193.91 lakh and ₹58639.46 lakh worked out by the Commission as on 31.3.2014 have been considered as opening capital cost as on 1.4.2014 in respect of Asset-I and Asset-II respectively for determination of tariff in accordance with Regulation 9 of the 2014 Tariff Regulations.



Additional Capital Expenditure

34. Clause (3) of Regulation 14 of the 2014 Tariff Regulations provides as under:-

“(3) The capital expenditure, in respect of existing generating station or the transmission system including communication system, incurred or projected to be incurred on the following counts after the cut-off date, may 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 of law;
- (ii) Change in law or compliance of any existing law;
- (iii) Any expenses to be incurred on account of need for higher security and safety of the plant as advised or directed by appropriate Government Agencies or statutory authorities responsible for national security/internal security;
- (iv) Deferred works relating to ash pond or ash handling system in the original scope of work;
- (v) Any liability for works executed prior to the cut-off date, after prudence check of the details of such undischarged liability, total estimated cost of package, reasons for such withholding of payment and release of such payments etc.;
- (vi) Any liability for works admitted by the Commission after the cut-off date to the extent of discharge of such liabilities by actual payments;
- (vii) Any additional capital expenditure which has become necessary for efficient operation of generating station other than coal/lignite based stations or transmission system as the case may be. The claim shall be substantiated with the technical justification duly supported by the documentary evidence like test results carried out by an independent agency in case of deterioration of assets, report of an independent agency in case of damage caused by natural calamities, obsolescence of technology, up-gradation of capacity for the technical reason such as increase in fault level;
- (viii) 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) and due to geological reasons after adjusting the proceeds from any insurance scheme, and expenditure incurred due to any additional work which has become necessary for successful and efficient plant operation;
- (ix) In case of transmission system, any additional expenditure on items such as relays, control and instrumentation, computer system, power line carrier communication, DC batteries, replacement due to obsolescence of technology, replacement of switchyard equipment due to increase of fault level, tower strengthening, communication equipment, emergency restoration system, insulators cleaning infrastructure, replacement of porcelain insulator with polymer insulators, replacement of damaged equipment not covered by insurance and any other expenditure which has become necessary for successful and efficient operation of transmission system; and
- (x) Any capital expenditure found justified after prudence check necessitated on account of modifications required or done in fuel receiving system



arising due to non-materialisation of coal supply corresponding to full coal linkage in respect of thermal generating station as result of circumstances not within the control of the generating station:

Provided that any expenditure on acquiring the minor items or the assets including tools and tackles, furniture, air-conditioners, voltage stabilizers, refrigerators, coolers, computers, fans, washing machines, heat convectors, mattresses, carpets etc. brought after the cut-off date shall not be considered for additional capitalization for determination of tariff w.e.f. 1.4.2014:

Provided further that any capital expenditure other than that of the nature specified above in (i) to (iv) in case of coal/lignite based station shall be met out of compensation allowance:

Provided also that if any expenditure has been claimed under Renovation and Modernisation (R&M), repairs and maintenance under O&M expenses and Compensation Allowance, same expenditure cannot be claimed under this regulation.

35. Clause 13 of Regulation 3 of the 2014 Tariff Regulations defines

“Cut - off Date” means 31st March of the year closing after two years of the year of commercial operation of whole or part of the project, and in case the whole or part of the project is declared under commercial operation in the last quarter of a year, the cut - off date shall be 31st March of the year closing after three years of the year of commercial operation.”

36. The petitioner has claimed additional capital expenditure during 2014-15 under Regulation 14(3)(vii) and (ix) of 2014 Tariff Regulations on account of works which have become necessary for efficient operation of transmission system and O&M additional capital expenditure. Details of additional capital expenditure and corresponding de-capitalisation claimed by the petitioner are as under:-

(₹ in lakh)

Additional capital expenditure					
	2014-15	2015-16	2016-17	2017-18	2018-19
Asset-I	299.72	-	12210.23	29346.60	9477.33
Asset -II	837.91	1520.99	850.01	350.00	-
De-capitalization					
	2014-15	2015-16	2016-17	2017-18	2018-19
Asset-I	-	-	-1706.34	-4101.10	-1324.43
Asset -II	-86.74	-161.76	-146.52	-66.60	-

37. The petitioner's claim for capitalisation of additional expenditure towards up-gradation of HVDC Rihand Dadri system (Asset-I) is discussed hereunder:-

The petitioner has claimed additional expenditure and de-capitalisation during the 2014-19 tariff period towards proposed upgradation of the 500 kV, 2X750 MW HVDC system under Asset-I. The petitioner has submitted that Rihand-Dadri HVDC system is an important link of Northern Region and is responsible for evacuation of major power out of 3000 MW generated at Rihand Generating Station. Reliable operation of Rihand-Dadri HVDC is of most importance for smooth operation of Northern Grid as power interruption in the link results in back down of generators in Rihand-Singrauli generating complex and also affects power supply to Delhi/Punjab. The system has become almost 25 years old and due to various O&M issues, it is proposed to upgrade HVDC Rihand-Dadri Station. The petitioner has submitted following major problems being faced during the operation of the system:-

Valve Hall:

i) Light Guide:

The Light Guide in operation for Rihand-Dadri has worked well for quite a long period, however, the problems started arising due to damage of light guides from last few years. Now the failure of Light Guides has been observed more frequently and it has increased considerably in the recent past. As a result the Spare Light Guides (10% of the population) installed almost got exhausted and it is imminent to replace all the light guides immediately to avoid any prolonged outages. The frequent light guide failure has been observed since 2008. Inspection during the annual maintenance work in the same year revealed that some fibres are in damaged condition in Pole-1 and Pole-2 valve halls at HVDC Rihand and Dadri. Therefore, it was decided that thorough inspection of

the fibre optic may be carried out during the shutdown in 2009 by the OEM i.e. M/s ABB AB Sweden. After carrying out the inspection in November, 2009, M/s ABB submitted the report dated 9.12.2009, strongly recommending replacement of all the light guides except the one that was already replaced in the year 2008. The petitioner has, therefore sought replacement of all the light guides for remaining quadruples i.e.

- i) Balance two Quadruples of Pole-2 at HVDC Rihand
- ii) Balance one quadruple of Pole-7 at HVDC Rihand
- iii) All the three Quadruples of Pole-2 at HVDC Dadri
- iv) Balance one quadruple of Pole-7 at HVDC Dadri

ii) Thyristor Control Units (TCU):

TCU is an electronic device consisting elements like capacitors, resistors, transistors mounted on circuit boards. These elements have their own life and the performance of these elements degrade with time and high temperature environment which prevails in the Valve Hall and therefore, the failure of such electronic device increases with ageing. The healthiness of TCU is essential as it gives protective firing to thyristor in case of failure of any light guide/firing channel in controls etc. In absence of protective firing from TCU, the thyristor goes on self-firing every time and the chance of its failure is high. The TCUs in operation for Rihand-Dadri has worked well for quite a long period. However, the problems started arising from last few years probably due to ageing. The petitioner has further mentioned that the cost of TCU is quite less in comparison to the cost of thyristor. Since the TCUs in service have served for almost 25 years and the failure of TCU may lead to failure of thyristor, and the cost of TCU is quite low in comparison to the cost of thyristor, hence it is proposed to replace the same with new TCU for smooth operation of HVDC (384 Modules at Rihand and 384 Modules at Dadri).



iii) Valve Hall Snubber Capacitors

In HVDC Rihand-Dadri system, three types of capacitors i.e. 0.82pF, 6.8pF and 0.68pF are used in valve hall for protection and triggering of the thyristors. These capacitors are in service since commissioning of the project in 1990s. The failure rate of these capacitors has been increasing year by year. Thyristor failure indication is observed under two circumstances:-

- Actual failure of thyristor
- Due to failure of snubber capacitor giving auxiliary power to TCU, the TCU could not generate Firing Pulse as well as Indication Pulse and gives a false indication of thyristor failure.

In any of the above cases, if the failure indication exceeds than three thyristor, forced shut down of Poles is to be taken for verification of the same. The details of forced outages due to failure of Valve Hall Capacitors during 2014 are as follows:-

Srl. No	Date of outage	Period	Pole	Type	Station	Cause for outage
1	15.7.2014	15.55 hrs	P2	Forced	Rihand	Thyristors/capacitors replacement at Rihand
2	8.10.2014	17.44 hrs	P2	Forced	Rihand	Thyristors/capacitors replacement at Rihand

The failure of valve hall capacitors also resulted in fire in valve hall at few occasions. The petitioner has submitted the instances of fire along with the capacitor failure. Since the failure rate of the capacitors at Rihand-Dadri Stations is too high and the failure of capacitors may result in fire in valve hall causing huge loss, it is important to replace the snubber capacitors in the valve hall of Pole-I and Pole-2 at HVDC Rihand and Dadri stations so as to increase the reliability and availability of the Rihand-Dadri HVDC system (384 Modules in Rihand and 192 Modules in Dadri).



Valve Cooling System:

The present Valve Cooling System has two water flow circuits viz. raw water system and fine water system. During last 25 years of operation, lot of scaling and corrosion has formed in the heat exchangers, pipelines, raw water tank etc. This has resulted in loss of efficiency in the cooling system leading to reduction of power flow of HVDC Rihand-Dadri System during peak summers. This type of cooling system (Wet Type) has become obsolete because of various reasons like evaporation of water, environmental hazard due to use of water, high maintenance etc. There have been instances where the fault in raw water system resulted in operational constraint for smooth operation of HVDC System. The present Valve Cooling System has completed its useful life and needs immediate replacement. In new dry type cooling system, fine water is used in closed loop dry cooling system where the requirement of water is negligible.

Yard Equipments:

HVDC System is having AC Switchyard and DC Switchyard. All the equipments have completed their life of 25 years, and being electro-mechanical in nature, operational difficulties have been faced in Circuit Breakers, Isolators, Grounding Switches. The Circuit Breaker and Neutral Bus Switch have completed their operational life of 25 years and imminent overhauling and replacement of operating rod and the operating mechanism is required. The details of failure of Circuit Breakers have been submitted. In view of operation difficulties faced due to ageing of circuit breakers and DC Neutral Bus Switch, overhauling of all the 400 kV main bay circuit breakers (18 sets), DC Neutral Bus Switch (08 Sets) and replacement of 400 kV Circuit Breakers of Filter Banks (18 Sets) is required.



The Isolators and Grounding Switches have already completed the life of approximately 25 years and therefore it needs complete refurbishment and replacement of Motor Drive of Isolators and Grounding Switches for smooth & reliable operation. In view of operation difficulties being faced due to ageing of Isolators and Ground Switches, complete refurbishment of all the Isolators and Grounding switches in AC yard and DC Yard is necessary (121 Sets).

HVDC Valve Hall Ventilation:

The Valve Hall Ventilation System has completed its life of 25 years and operational difficulties like failure of motors, air leakages in the system and decrease in efficiency to trap the dust entering the valve per sealing of ventilation system is of great importance for maintaining air pressure inside the valve hall as well as to supply dust free air to valve hall as the presence of dust inside the valve hall may result in flashover on the insulation portion causing interruption in power flow. In view of operation difficulties faced due to ageing of Ventilation system equipment and decrease in efficiency, replacement of valve hall ventilation system with a new system with modern design is necessary for smooth operation of Rihand-Dadri HVDC.

HVDC Control Equipments:

The Control System used in Rihand-Dadri was designed somewhere around 1980s and Commissioned in 1990. The present controller of HVDC System is based on Intel based 8085/8086 Single Board Computers. Thereafter, lot of development has taken place in Controllers of HVDC System and at present MACH3 is the latest Control System which is used in recent ABB Make HVDC Stations. The control System is in operation for Rihand-Dadri has worked well for 25 years. However the problems started arising in various control areas in last few years. Some of the major failures of control system are as follows:-



- a) Stall of ACCB/DCCB computers. This has resulted in the total failure of operation from Dadri station during the common wealth games in 2010. The Dadri station was running in the opaque condition and whole control was taking place from Rihand station.
- b) Protection system is based on single board computers of 8086 based microprocessors, which have sluggish control action.
- c) The communication of data between Rihand and Dadri is based on 2400 baud which is also restricting the faster switching/controls.

ABB has declared that these HVDC Cards have now become obsolete and they are in no position to provide any support for this Control System. ABB suggested up-gradation of existing Intel Based Controller with latest control system MACH-3 with Modular 110. This has been the practice adopted by ABB for all HVDC upgrade carried out by them for similar HVDC Systems Installed worldwide. Thus, it is necessary to upgrade the existing Control system to the latest control system available i.e. MACH-3, for smooth and reliable operation of HVDC (01 Set).

Converter Transformers/Smoothing Reactor Bushings:

There have been several incidences of failure of joint of these bushings resulting in leakage of oil which in turn causes tripping of pole. The oil leakage may also result in fire. The history of failure of bushings at Rihand-Dadri has been submitted. With advent of technology, these bushings are now being manufactured with Polymer housing without any joints resulting in reduction of weight. All the bushings procured after 2007 are with Polymer housing. In view of failure history of joint in XIM2 bushings of converter transformer and to avoid interruption in power flow due to tripping of Poles and to avoid fire incidence which may happen in case of failure of above mentioned indoor bushings, replacement of XIM2 Bushings of Converter Transformers and XI

Indoor Bushing of Smoothing Reactor with polymer bushings is imminent for smooth operation of HVDC. The requirement of bushings are as follows:-

- i) H01/H02 Bushings as spare: 03 Nos.
- ii) H1 bushing as spare: 02 Nos.
- iii) X3/X4 Bushings as spare: 02 Nos.
- iv) X1/X2 Bushings for replacement in Transformer: 21 Nos,
- v) X1 Bushing for replacement in Smoothing Reactor: 07 Nos.
- vi) X2 Bushing for Smoothing Reactor as Spare: 02 Nos.

Replacement of Electronic Unit DCCT (DC Current Transformer) in DC Yard

The electronic unit of DCCT consists of elements like capacitors, resistors, transistors mounted on circuit boards. These elements have their own life and the performance of these elements degrade with ageing resulting in malfunction of the DCCT. The equipment is in smooth operation for last 25 years, however, frequent failure of DCCT has been faced in the recent past. All the measures for trouble shooting like changing the direction of CT, Terminal tightening in electronic unit and outdoor panel etc. were taken; however, the frequent failure still persists. It is to mention that the Electronic Unit of the DCCT is of 1980s technology and is obsolete and thus it is to be replaced with present State of Art, new DCCT Electronic Unit. (24 Nos.)

38. We have gone through the submissions made by the petitioner regarding the instant HVDC system. The petitioner has provided the equipment wise analysis report for replacement of the equipments and various O&M issues. The petitioner has not submitted any document regarding board approval or the cost estimate/RCE for the upgradation of complete HVDC Rihand Dadri Project. In response to query of the Commission, the petitioner has submitted, vide affidavit dated 17.11.2015, that the



replacement of problematic and defective equipments was approved by the Commission under additional capital expenditure during 2009-14 tariff period. The petitioner has submitted a copy of LOA for purchase of DG set during the 2009-14 period.

38. During the hearing of the petition, the petitioner was directed to furnish the following:-

- (a) NAPAF and outage data of the HVDC bipole links HVDC back to back stations and AC System for last two years
- (b) Detailed ABB (OEM) report; and
- (c) Copy of the minutes of the deliberations of the petitioner's board wherein the proposed additional capital expenditure was approved.

39. In response, the petitioner vide its affidavit dated 9.12.2015 has clarified the above points. Gist of the submissions made by the petitioner are as under:-

- (a) The petitioner has furnished data pertaining to monthly availability of HVDC Rihand – Dadri Bi-pole link and Vindhyachal HVDC back to back for the past two years.
- (b) Submitted the detailed report of ABB (OEM) in support of its proposal for replacement of the elements.
- (c) As regards the deliberations regarding approval of the revised cost by the Board of Directors, the petitioner has submitted that the approval of the competent authority is taken for execution of new projects being undertaken by the petitioner from time to time. All the new transmission projects agreed in Standing Committee Meeting of Regional Planning and the Regional Power

Committee are taken up with the board for approval for execution. In the present case, the matter is not capitalisation of new project, it is one of replacement of problematic equipments due to aging effect through additional capitalisation. These equipments are in service for 20 to 25 years or more and replacement of the same is required to be carried out for smooth operation of grid with reliability and stability without any untoward incident. The petitioner has stated that during 2009-14 tariff period, the replacement of problematic equipments for some projects for which the proposal was submitted to the Commission after technical approval of the competent authority, was approved by this Commission under Regulation 9(2) of Tariff Regulations, 2009 through additional capitalisation in the tariff. It has been stated by the petitioner that board approval for expenditure towards replacement of these equipments was taken only after approval received by this Commission. Thus, the replacement activities are considered only after approval of the competent authority and subsequently by this Commission and these activities are spread over the tariff period. This is put up to the board under the head of "Non plan capital expenditure" in the Annual Revenue Budget of the company. On approval of the budget by the board, the activities are carried out. The proposal for O&M capitalisation submitted to the Commission for 2014-19 tariff period will be put up to the board under non-plan capital expenditure budget on yearly basis.

40. We have considered the submissions of the petitioner. It is seen from the data submitted in respect of monthly availability of HVDC Rihand-Dadri Bi-pole link and Vindhyachal HVDC back to back that the availability of the system is less than the normative target availability during a number of months. Further, on perusal of the ABB

(OEM) report submitted by the petitioner and submissions in respect of the deliberations of the petitioner's board regarding the proposed additional capital expenditure, we are convinced that there is a need for replacement of the elements.

41. The petitioner has claimed additional capital expenditure for Asset-II (AC Portion) during 2014-19 for replacement/retro-fitting of the following equipments:-

Retro-fitment of M&G and BHEL breakers at Kanpur, Agra, Ballabgarh and Mandola

i) M&G breakers at Ballabgarh, Kanpur and Mandola Sub-station:-

The M&G make breakers are very old & obsolete. No spares and service supports of these breakers are available in India. Every-time service support is required and the same is arranged from M&G-France and the repair and maintenance charges are very high. Further, the Tan Delta Values of Grading Capacitor for all the 3 phases are beyond their permissible limit. These breakers are in service for about 25 years and need overhauling.

ii) BHEL breakers at Agra Sub-station:-

The BHEL breakers at Agra Sub-station have problems like hydraulic pressure switch operating mechanism, high SF6 gas leakage, higher difference in operating time of one pole to other pole of the breaker which may trip due to pole discrepancy and may affect grid reliability and stability. These breakers also have problems of PIR (non-operation of PIR) which has resulted in breaker failures in some cases. In view of above it is proposed to replace these CBs with new CBs for smooth and reliable operation of the grid.

Retro-fitment of S&S make isolator at Agra, HAPPAM make at Kanpur & RK make at Mandola & Ballabgarh SIS:



The isolators proposed to be retrofitted/replaced are of RK make, S&S or Happam make. RK make isolators were manufactured by Rade Konkar of Yugoslavia and supplied during 1988-89. As the company is closed now, proper rectification is not possible due to non-availability of spares and technical supports from OEM. Due to wear & tear, the hinge assembly of finger-arms of this make isolator is getting heated up resulting in development of hot-spots. In exigencies the isolators are used by providing bypass parallel connection for the hinges. However this contingent arrangement forbids the functional operation of isolators. Similarly, both S&S and Happam have already phased out these isolators. S&S has already been closed and Happam being a foreign company, no spares and service support are available in India. Hot spots have also been observed due to ageing and pitting of contacts and arms. Further, the main contacts have become faulty and no spare arms are available, hence the replacement of these isolators is required. Moreover, these isolators are mechanically gang operated giving frequent trouble during maintenance as the alignment of these isolators also gone out and as such has already changed the specification for all 400 kV isolators to individual pole operation instead of mechanical gang due to the problem observed in mechanically gang operated isolators. The S&S, Happam and RK make isolators are very old and hot spot problems at hinge due to wear and tear are also being faced frequently from time to time in these isolators. Replacement of similar isolator problem has already been allowed by the Commission during 2009-14 tariff period through add-cap. In view of various operational problems, non-availability of spares, service support from manufacturer, these isolators are no more suitable and needs to be replaced with new isolators for smooth operation of the system with reliability and stability of the grid.



Replacement of WSI make CTs at Agra, Kanpur, Ballabgarh, Mandola and Muradnagar Sub-station:-

These CTs are prone to failure and any failure of these CTs may result consequential damages of nearby equipments. Since it is connected to important stations, sudden failure will affect power supply and may also affect the stability of the grid. Hence it is proposed to replace the same to ensure smooth and reliable operation of the grid. Further, some of the WSI make CTs has already been replaced at Mandola, Agra and Kanpur Sub-station due to high concentration of DGA gases ($C_2H_2 > 20ppm$).

Replacement of WSI make CVTs at Kanpur, Ballabgarh and Mandola Sub-station

These are very old CVTs and based on condition monitoring replacement of various faulty components like damping resistor, removal of LA in EMU tank, replacement of bellows and oil in EMU tank have been carried out in some CVTs. Even after carrying out the condition monitoring measures, recently 2 nos. WSI make CVTs failed at Agra Sub-station, one of the CVTs caught fire.

Fire Fighting System:

As per the practice in vogue at the time of construction (25 years back) of Kanpur Sub-station, the pipe lines in the fire fighting system were buried under ground. These systems are completing 25 years of useful service life. Due to ageing, the anti-rusting coat on the pipes has worn out due to which the pipes have started to rust causing frequent and perennial leakages in the pipe lines. In the latest design the pipe lines are put above ground level to avoid rusting. Identification and rectification of these leakages is tedious and time consuming process. The pumps, motors, deluge valves, sluice valves etc have got rusted due to ageing. The existing fire fighting system is not reliable and it may affect the safety aspects of major vital equipments such as ICT/Reactors in

the system. In view of the above it is proposed to replace the old fire fighting system at Kanpur Sub-station.

Spare Air Core Reactor at Kanpur Sub-station:-

Two air core reactors have been installed in SVC at Kanpur Sub-station. These air core reactors are imported equipment. These reactors are in service for more than 22 years and there are incident of failure of these reactors earlier. Since lead time of procurement of the same is one and half to two years. Therefore, one air core reactor is proposed to be procured to be kept as spare to take care of any eventuality.

42. In response to the query of Commission, the petitioner has submitted, vide affidavit dated 16.11.2015, the reasons towards the claims of additional capital expenditure for the transmission assets. The petitioner has stated that under the Rihand transmission system, various M&G, BHEL make circuit breakers are proposed to be replaced. These equipments are in service for more than 25 years and most of these equipments have been phased out by OEMs or have become obsolete. In case of M&G make breakers, M&G has been taken over by Siemens, which quoted an exorbitant price of ₹366.23 lakh for supply of spares and supervision of overhauling work for 4 nos. of circuit breakers (CBs). For retro-fitment of CBs (supply and service), expenditure towards the retro-fitment of 1 CB works out to be approximately ₹49 lakh. The petitioner has submitted the LOA and relevant documents to support the above price quotes. From the above, it is seen that for overhauling of M&G CBs, cost implication per breaker is around ₹91.50 lakh while for retro-fitment, it is around ₹49 lakh. Hence, retro-fitment is cost effective and it is prudent to replace the same. Further, BHEL make CBs are also more than 25 years old and problems related to hydraulic



operating system, non operation of PIR, time discrepancy has been observed in past. Similar BHEL make CBs failed in Agra Sub-station in 2012.

43. The petitioner has submitted the incident reports of CVT failure along with the reasons to justify replacement of WSI make CVTs at Kanpur, Ballabgarh and Mandola Sub-station. Further, to support the claims towards damages caused due to rusting of fire fighting system, the petitioner has submitted the photographs of the rust on the pipes that have caused severe leakages. The petitioner has also stated that the identification and rectification of these leakages is a tedious and time consuming process due to which the fire fighting system has been kept out of service for a prolonged period.

44. The petitioner has submitted that two instances of failure of air core reactors have been experienced at Kanpur Sub-station on 5.5.2002 and on 28.10.2013, when the air core reactors failed and caught fire. The photographic evidence towards the same has been submitted by the petitioner, vide affidavit dated 16.11.2015. The petitioner has also submitted the copies of LOA to support his claim for cost over-run of the scheme of sub-station equipment replacement in Rihand TS during 2009-14.

45. The petitioner has submitted reasons to support his claim of delay occurred due to ROW issues in respect of tower strengthening works of 400 kV D/C Kanpur-Ballabgarh line. Tower strengthening works requires mobilisation of man and material, welding machine etc. to each location leading to damage of crops. This kind of work is usually taken up during the construction stage, and farmers are compensated for their loss of crops. Since there is no provision of compensation towards loss of crop during O&M stage, it leads to a lot of resentment among the farmers and they hinder the work.



This caused the work to come at halt during the entire year. Accordingly, the work could be taken up only when the fields were empty after resolving ROW issues with the farmers. To resolve this issue amicably, it is done by the line (field) personnel and not at the administrative level. The work could be completed with continuous follow ups and total expenditure made against the tower strengthening works in 2014-15 is ₹12.77 lakh and balance expenditure of ₹96.82 lakh expected during 2015-16.

46. The petitioner has further submitted the revised element wise and year wise break-up of the total actual and proposed additional capital expenditure and de-capitalization for Asset-I and Asset-II during 2009-14 and 2014-19 tariff period vide affidavit dated 8.1.2016. The petitioner has also submitted that actual additional capital expenditure for the period 2014-19 shall be submitted at the time of true up for 2014-19 tariff period.

47. Based on analysis of the documents furnished by the petitioner and the facts discussed above, we are convinced about the need for replacement of elements. However, it is seen that as a result of the proposed additional capital expenditure, the capital cost of the transmission system as on 31.3.2019 will be ₹177132.37 lakh (Asset-I: ₹115395.62 lakh and Asset-II: ₹61736.75 lakh). This exceeds the revised cost estimate of ₹146058.00 lakh approved vide Ministry of Power letter dated 19.4.1995 by ₹31074.37 lakh. However, considering the requirement of the up gradation and its impact on operational efficiency, the additional capital expenditure is allowed under Regulation 14(3)(ix) read along with Regulation 14(3)(vii) of the 2014 Tariff Regulations. However, the petitioner is directed to submit the approval of its Board for replacement of these equipments at the time of true-up.

Debt: Equity

48. Clause (1) and (3) of Regulation 19 of the 2014 Tariff Regulations provide as under:-*

“19. Debt-Equity Ratio: (1) For a project declared under commercial operation on or after 1.4.2014, the debt-equity ratio would be considered as 70:30 as on COD. If the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan:”

“(3) In case of the generating station and the transmission system including communication system declared under commercial operation prior to 1.4.2014, debt equity ratio allowed by the Commission for determination of tariff for the period ending 31.3.2014 shall be considered.”

“(5) Any expenditure incurred or projected to be incurred on or after 1.4.2014 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.”

49. The petitioner has considered the debt:equity ratio of 51.71:48.29 in respect of Asset-I and 52.04:47.96 in respect of Asset-II as on 31.3.2014, which is in line with the 2014 Tariff Regulations.

50. In respect of the additional capital expenditure, debt:equity ratio of 70:30 has been adopted as mandated by clause (5) read with clause (1) of Regulation 19 of the 2014 Tariff Regulations. The details of the debt:equity considered for the purpose of tariff for 2014-19 tariff period is as follows:-

(₹ in lakh)

Funding	Asset-I					
	Total Cost as on 31.3.2014	(%)	Additional Capital Expenditure during 2014-19	(%)	Total Cost as on 31.3.2019	(%)
Debt	36812.95	51.71	30941.20	70.00	67754.15	58.71
Equity	34380.96	48.29	13260.51	30.00	47641.47	41.29
Total	71193.91	100.00	44201.71	100.00	115395.62	100.00



Asset-II						
Funding	Total Cost as on 31.3.2014	(%)	Additional Capital Expenditure during 2014-19	(%)	Total Cost as on 31.3.2019	(%)
Debt	30513.18	52.04	2168.10	70.00	3268.28	52.94
Equity	28126.28	47.96	929.19	30.00	29055.47	47.06
Total	58739.46	100.00	3097.29	100.00	61836.75	100.00

Return on Equity (ROE)

51. Clause (1) and (2) of Regulations 24 and Clause (2) of Regulation 25 of the 2014 Tariff Regulations specify as under:-

“24. Return on Equity: (1) Return on equity shall be computed in rupee terms, on the equity base determined in accordance with regulation 19.

(2) Return on equity shall be computed at the base rate of 15.50% for thermal generating stations, transmission system including communication system”

“25. Tax on Return on Equity:

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

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

Where “t” is the effective tax rate in accordance with Clause (1) of this regulation and shall be calculated at the beginning of every financial year based on the estimated profit and tax to be paid estimated in line with the provisions of the relevant Finance Act applicable for that financial year to the company on pro-rata basis by excluding the income of non-generation or non-transmission business, as the case may be, and the corresponding tax thereon. In case of generating company or transmission licensee paying Minimum Alternate Tax (MAT), “t” shall be considered as MAT rate including surcharge and cess.”

52. The petitioner has submitted that the additional capital expenditure during 2014-15 is based on estimates. The actual expenditure for 2014-19 tariff period along with actual funding shall be submitted at the time of truing up for 2014-19 tariff period.

53. The petitioner has submitted that MAT rate is applicable to the petitioner's company. Accordingly, the MAT rate applicable during 2013-14 has been considered

for the purpose of ROE, which shall be tried up with actual tax rate in accordance with Clause (3) of Regulation 25 of the 2014 Tariff Regulations. The ROE has been worked out and allowed as follows:-

(₹ in lakh)

Asset-I					
Return on Equity	2014-15	2015-16	2016-17	2017-18	2018-19
Opening Equity	34380.96	34470.87	34470.87	37622.04	45195.60
Additions	89.92	0.00	3151.17	7573.56	2445.87
Closing Equity	34470.87	34470.87	37622.04	45195.60	47641.47
Average Equity	34425.92	34470.87	36046.46	41408.82	46418.54
Return on Equity (Base Rate) (%)	15.500	15.500	15.500	15.500	15.500
MAT Rate for respective year (%)	20.961	20.961	20.961	20.961	20.961
Rate of Return on Equity (%)	19.610	19.610	19.610	19.610	19.610
Return on Equity	6751.08	6759.89	7068.87	8120.46	9102.88

Asset-II					
Return on Equity	2014-15	2015-16	2016-17	2017-18	2018-19
Opening Equity	28126.28	28351.63	28759.40	28970.45	29055.47
Additions	225.35	407.77	211.05	85.02	0.00
Closing Equity	28351.63	28759.40	28970.45	29055.47	29055.47
Average Equity	28238.96	28555.52	28864.93	29012.96	29055.47
Return on Equity (Base Rate) (%)	15.500	15.500	15.500	15.500	15.500
MAT Rate for respective year (%)	20.961	20.961	20.961	20.961	20.961
Rate of Return on Equity (%)	19.610	19.610	19.610	19.610	19.610
Return on Equity	5537.79	5599.87	5660.54	5689.57	5697.91

Interest on Loan (IoL)

54. Clause 5 and Clause 6 of Regulation 26 of the 2014 Tariff Regulations provides that:-

“(5) The rate of interest shall be the weighted average rate of interest calculated on the basis of the actual loan portfolio after providing appropriate accounting adjustment for interest capitalized:



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.”

55. The weighted average rate of IoL has been considered on the basis of rate prevailing as on 1.4.2014. The petitioner has prayed that the change in interest rate due to floating rate of interest applicable, if any, during 2014-19 tariff period will be adjusted. Accordingly, the floating rate of interest, if any, shall be considered at the time of true up or next revision of tariff. By considering above, the IoL has been worked out in accordance with Regulation 26 of the 2014 Tariff Regulations. The details of weighted average rate of interest for 2014-19 tariff period are placed in Annexure 2 and the IoL has been worked out and allowed as follows:-

(₹ in lakh)

Asset-I					
Interest on Loan	2014-15	2015-16	2016-17	2017-18	2018-19
Gross Normative Loan	36812.95	37022.76	37022.76	44375.48	62047.12
Cumulative Repayment upto Previous Year	36812.95	37022.76	37022.76	39374.10	46488.82
Net Loan-Opening	0.00	0.00	0.00	5001.38	15558.30
Additions	209.80	0.00	7352.72	17671.64	5707.03
Repayment during the year	209.80	0.00	2351.34	7114.72	12385.66
Net Loan-Closing	0.00	0.00	5001.38	15558.30	8879.67
Average Loan	0.00	0.00	2500.69	10279.84	12218.98
Weighted Average Rate of Interest on Loan (%)	8.6800	8.6800	8.6800	8.6800	8.6800
Interest on Loan	0.00	0.00	217.06	892.29	1060.61

56. The petitioner has not claimed any IOL for Asset-II.

Depreciation

57. Clause (2), (5) and (6) of Regulation 27 of the 2014 Tariff Regulations provide that:-

"27. Depreciation:

...(2) The value base for the purpose of depreciation shall be the capital cost of the asset admitted by the Commission. In case of multiple units of a generating station or multiple elements of transmission system, weighted average life for the generating station of the transmission system shall be applied. Depreciation shall be chargeable from the first year of commercial operation. In case of commercial operation of the asset for part of the year, depreciation shall be charged on pro rata basis"

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

Provided that the remaining depreciable value as on 31st March of the year closing after a period of 12 years from the effective date of commercial operation of the station shall be spread over the balance useful life of the assets.

(6) In case of the existing projects, the balance depreciable value as on 1.4.2014 shall be worked out by deducting the cumulative depreciation as admitted by the Commission upto 31.3.2014 from the gross depreciable value of the assets."

58. The depreciation has been worked out considering the admitted capital expenditure as on 31.3.2014 and accumulated depreciation up to 31.3.2014. The assets have completed 12 years as on 31.3.2004. Therefore the depreciation has been calculated based on the remaining depreciable value to be recovered in the balance useful life in accordance with the clause 27 of the 2014 Tariff Regulations.

59. The detailed calculations for depreciation for the transmission asset are worked out and allowed as follows:-

(₹ in lakh)

Asset-I					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Opening Gross Block	71193.91	71493.63	71493.63	81997.52	107242.72
Additional Capitalisation	299.72	0.00	10503.89	25245.20	8152.90



Asset-I					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Closing Gross Block	71493.63	71493.63	81997.52	107242.72	115395.62
Average Gross Block	71343.77	71493.63	76745.58	94620.12	111319.17
Freehold Land (Av. Cost)	399.06	399.06	399.06	399.06	399.06
Rate of Depreciation (%)	5.24	5.24	5.24	5.25	5.25
Depreciable Value	63850.24	63985.11	68711.86	84798.95	99828.10
Balance useful life of the asset	7	6	5	4	3
Elapsed life	23	24	25	26	27
Remaining Depreciable Value	7734.98	6764.86	11756.72	28458.89	37156.97
Depreciation during the year	1105.00	1127.48	2351.34	7114.72	12385.66
Depreciation upto previous year	56115.26	57220.25	56955.14	56340.06	62671.13
Cumulative depreciation (incl. of AAD)	57220.25	58347.73	59306.49	63454.78	75056.79

(₹ in lakh)

Asset-II					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Opening Gross Block	58639.46	59390.63	60749.86	61453.35	61736.75
Additional Capitalisation	751.17	1359.23	703.49	283.4	0
Closing Gross Block	59390.63	60749.86	61453.35	61736.75	61736.75
Average Gross Block	59015.045	60070.245	61101.605	61595.05	61736.75
Freehold Land (Av. Cost)	322.81	322.81	322.81	322.81	322.81
Rate of Depreciation (%)	5.24	5.24	5.24	5.24	5.24
Depreciable Value	52823.01	53772.69	54700.92	55145.02	55272.55
Balance useful life of the asset	7	6	5	4	3
Elapsed life	23	24	25	26	27
Remaining Depreciable Value	7856.44	7809.30	7549.97	6536.81	5030.14
Depreciation during the year	1122.35	1301.55	1509.99	1634.20	1676.71
Depreciation upto previous year	44966.57	45963.39	47150.95	48608.20	50242.41
Cumulative depreciation (incl. of AAD)	46088.92	47264.94	48660.94	50242.41	51919.12



Operation & Maintenance Expenses (O&M Expenses)

60. Clause 3(a) of Regulation 29 of the 2014 Tariff Regulations specify the norms for O&M Expenses for the transmission system. The total allowable O&M Expenses for the instant assets have been worked out and allowed are as follows:-

Asset-I					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Line: S/C Twin/Triple Conductor					
Line Length (km)	52	52	52	52	52
Norms (₹ lakh/km)	0.404	0.418	0.432	0.446	0.461
Line: D/C Bundled (4 or more Sub Conductors):					
Line Length (km)	815	815	815	815	815
Norms (₹lakh/km)	0.606	0.627	0.647	0.669	0.691
Rihand Dadri HVDC Bi-pole Scheme					
Number	1	1	1	1	1
Norms (₹ in lakh)	1511	1637	1774	1922	2082
Total O&M Expenses (₹ lakh)	2397.53	2552.79	2719.85	2899.55	3092.12

Asset-II					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Line: S/C Twin/Triple Conductor					
Line Length (km)	1484.95	1484.95	1484.95	1484.95	1484.95
Norms (₹ lakh/km)	0.404	0.418	0.432	0.446	0.461
Line: D/C Bundled (4 or more Sub Conductors):					
Line Length (km)	99.7	99.7	99.7	99.7	99.7
Norms (₹ lakh/km)	0.606	0.627	0.647	0.669	0.691
400 kV Bay					
No. of Bays	30	30	30	30	30
Norms (₹ lakh/bay)	60.30	62.30	64.37	66.51	68.71
Total O&M Expenses (₹ lakh)	2514.80	2599.08	2685.56	2774.33	2866.50

61. The petitioner has further submitted that the wage revision of the employees of the petitioner company is due during 2014-19 and actual impact of wage hike which will be effective from a future date has also not been factored in fixation of the normative O&M rate specified for the 2014-19 tariff period. The petitioner has also prayed that it will approach the Commission for suitable revision in the norms of O&M Expenses for claiming the impact of such increase. The respondent, vide affidavit dated 9.11.2015, has submitted that the increase in employee cost, if any, due to wage revision must be taken care by improvement in their productivity levels by the petitioner company so that beneficiaries are not unduly burdened over and above the provisions made in tariff regulations.

62. We have taken into consideration the submission of the petitioner and respondent and we would like to clarify that any application filed by the petitioner for revision of O&M Expenses on account of wage revision will be dealt with in accordance with the appropriate provisions of the 2014 Tariff Regulations. The O&M Expenses are allowed for the instant transmission asset as per prevailing norms.

Interest on Working Capital (IWC)

63. Clause 1 (c) of Regulation 28 and Clause 5 of Regulation 3 of the 2014 Tariff Regulations specifies as follows:

“28. Interest on Working Capital

- (c) (i) Receivables equivalent to two months of fixed cost;
- (ii) Maintenance spares @ 15% of operation and maintenance expenses specified in regulation 29; and
- (iii) Operation and maintenance expenses for one month”

“(5) ‘Bank Rate’ means the base rate of interest as specified by the State Bank of India from time to time or any replacement thereof for the time being in effect plus 350 basis points;”



64. The petitioner has submitted that it has computed interest on working capital for the tariff block 2014-19 considering the SBI Base Rate plus 350 basis points as on 1.4.2014. The rate of interest on working capital considered is 13.50%.

65. The interest on working capital is worked out in accordance with Regulation 28 of the 2014 Tariff Regulations. The rate of interest on working capital considered is 13.50% (SBI Base Rate of 10% plus 350 basis points). The components of the working capital and interest thereon have been worked as follows:-

(₹ in lakh)

Asset-I					
Interest on Working Capital	2014-15	2015-16	2016-17	2017-18	2018-19
O & M expenses	199.71	212.65	226.56	241.53	257.57
Maintenance Spares	359.63	382.92	407.98	434.93	463.82
Receivables	1761.15	1793.79	2121.53	3259.74	4388.52
Total	2320.49	2389.35	2756.08	3936.20	5109.91
Rate of Interest (%)	13.50	13.50	13.50	13.50	13.50
Interest on Working Capital	313.27	322.56	372.07	531.39	689.84

Asset-II					
Interest on Working Capital	2014-15	2015-16	2016-17	2017-18	2018-19
O & M expenses	209.48	216.50	223.71	231.10	238.78
Maintenance Spares	377.22	389.86	402.83	416.15	429.97
Receivables	1577.86	1633.82	1694.91	1736.66	1761.53
Total	2164.56	2240.18	2321.46	2383.91	2430.29
Rate of Interest (%)	13.50	13.50	13.50	13.50	13.50
Interest on Working Capital	292.22	302.42	313.40	321.83	328.09

ANNUAL FIXED CHARGES FOR THE 2014-19 TARIFF PERIOD

66. The transmission charges allowed for the instant transmission assets for the 2014-19 tariff period are summarised below:-



(₹ in lakh)

Asset-I					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Depreciation					
Opening Gross Block	71193.91	71493.63	71493.63	81997.52	107242.72
Additional Capitalisation	299.72	0.00	10503.89	25245.2	8152.9
Closing Gross Block	71493.63	71493.63	81997.52	107242.72	115395.62
Average Gross Block	71343.77	71493.63	76745.575	94620.12	111319.17
Rate of Depreciation (%)	5.24	5.24	5.24	5.25	5.25
Depreciable Value	63850.24	63985.11	68711.86	84798.95	99828.10
Balance useful life of the asset	7	6	5	4	3
Elapsed life	23	24	25	26	27
Remaining Depreciable Value	7734.98	6764.86	11756.72	28458.89	37156.97
Depreciation during the year	1105.00	1127.48	2351.34	7114.72	12385.66
Cumulative depreciation (incl. of AAD)	57220.25	58347.73	59306.49	63454.78	75056.79
Interest on Loan					
Gross Normative Loan	36812.95	37022.76	37022.76	44375.48	62047.12
Cumulative Repayments upto Previous Year	36812.95	37022.76	37022.76	39374.10	46488.82
Net Loan-Opening	0.00	0.00	0.00	5001.38	15558.30
Additions	209.80	0.00	7352.72	17671.64	5707.03
Repayment during the year	209.80	0.00	2351.34	7114.72	12385.66
Net Loan-Closing	0.00	0.00	5001.38	15558.30	8879.67
Average Loan	0.00	0.00	2500.69	10279.84	12218.98
Weighted Average Rate of Interest on Loan (%)	8.6800	8.6800	8.6800	8.6800	8.6800
Interest on Loan	0.00	0.00	217.06	892.29	1060.61
Return on Equity					
Opening Equity	34380.96	34470.87	34470.87	37622.04	45195.60
Additions	89.92	0.00	3151.17	7573.56	2445.87
Closing Equity	34470.87	34470.87	37622.04	45195.60	47641.47
Average Equity	34425.92	34470.87	36046.46	41408.82	46418.54
Return on Equity (Base Rate) (%)	15.500	15.500	15.500	15.500	15.500
MAT Rate for respective year (%)	20.961	20.961	20.961	20.961	20.961
Rate of Return on Equity (%)	19.610	19.610	19.610	19.610	19.610
Return on Equity	6751.08	6759.89	7068.87	8120.46	9102.88
Interest on Working Capital					
O & M Expenses	199.71	212.65	226.56	241.53	257.57
Maintenance Spares	359.63	382.92	407.98	434.93	463.82
Receivables	1761.15	1793.79	2121.53	3259.74	4388.52
Total Working Capital	2320.49	2389.35	2756.08	3936.20	5109.91



Asset-I					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Rate of Interest (%)	13.50	13.50	13.50	13.50	13.50
Interest of working capital	313.27	322.56	372.07	531.39	689.84
Annual Transmission Charges					
Depreciation	1105.00	1127.48	2351.34	7114.72	12385.66
Interest on Loan	0.00	0.00	217.06	892.29	1060.61
Return on Equity	6751.08	6759.89	7068.87	8120.46	9102.88
Interest on Working Capital	313.27	322.56	372.07	531.39	689.84
O & M Expenses	2397.54	2552.79	2719.86	2899.56	3092.12
Total	10566.88	10762.72	12729.20	19558.41	26331.11

(₹ in lakh)

Asset-II					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Depreciation					
Opening Gross Block	58639.46	59390.63	60749.86	61453.35	61736.75
Additional Capitalisation	751.17	1359.23	703.49	283.40	0.00
Closing Gross Block	59390.63	60749.86	61453.35	61736.75	61736.75
Average Gross Block	59015.05	60070.25	61101.61	61595.05	61736.75
Rate of Depreciation (%)	5.24	5.24	5.24	5.24	5.24
Depreciable Value	52823.01	53772.69	54700.92	55145.02	55272.55
Balance Useful life of the asset	7.00	6.00	5.00	4.00	3.00
Elapsed Life	23.00	24.00	25.00	26.00	27.00
Remaining Depreciable Value	7856.44	7809.30	7549.97	6536.81	5030.14
Depreciation	1122.35	1301.55	1509.99	1634.20	1676.71
Cumulative depreciation (incl. of AAD)	46088.92	47264.94	48660.94	50242.41	51919.12
Interest on Loan					
Gross Normative Loan	30513.18	31039.00	31990.46	32482.90	32681.28
Cumulative Repayment upto Previous Year	30513.18	31039.00	31990.46	32482.90	32681.28
Net Loan-Opening	0.00	0.00	0.00	0.00	0.00
Additions	525.82	951.46	492.44	198.38	0.00
Repayment during the year	525.82	951.46	492.44	198.38	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 (%)	8.7029	8.7025	8.7021	8.7016	8.7009
Interest	0.00	0.00	0.00	0.00	0.00
Return on Equity					
Opening Equity	28126.28	28351.63	28759.40	28970.45	29055.47
Additions	225.35	407.77	211.05	85.02	0.00
Closing Equity	28351.63	28759.40	28970.45	29055.47	29055.47
Average Equity	28238.96	28555.52	28864.93	29012.96	29055.47
Return on Equity (Base Rate) (%)	15.500	15.500	15.500	15.500	15.500



Asset-II					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
MAT rate for the respective year (%)	20.961	20.961	20.961	20.961	20.961
Rate of Return on Equity (%)	19.610	19.610	19.610	19.610	19.610
Return on Equity	5537.79	5599.87	5660.54	5689.57	5697.91
Interest on Working Capital					
O & M expenses	209.48	216.50	223.71	231.10	238.78
Maintenance Spares	377.22	389.86	402.83	416.15	429.97
Receivables	1577.86	1633.82	1694.91	1736.66	1761.53
Total	2164.56	2240.18	2321.46	2383.91	2430.29
Rate of Interest (%)	13.50	13.50	13.50	13.50	13.50
Interest on working capital	292.22	302.42	313.40	321.83	328.09
Annual Transmission Charges					
Depreciation	1122.35	1301.55	1509.99	1634.20	1676.71
Interest on Loan	0.00	0.00	0.00	0.00	0.00
Return on Equity	5537.79	5599.87	5660.54	5689.57	5697.91
Interest on Working Capital	292.22	302.42	313.40	321.83	328.09
O & M Expenses	2514.80	2599.08	2685.56	2774.33	2866.50
Total	9467.15	9802.92	10169.49	10419.94	10569.21

Deferred Tax Liability

67. The petitioner has sought recovery of deferred tax liability before 1.4.2009 from the beneficiaries or long term consumers/ DICs as and when materialized. The deferred tax liability shall be dealt as per Regulations 49 of the 2014 Tariff Regulations, as amended. Accordingly, the petitioner is entitled to recover the deferred tax liability upto 31.3.2009 whenever the same gets materialized directly from the beneficiaries or long term transmission customers /DICs.

Filing Fee and the Publication Expenses

68. The petitioner has sought reimbursement of fee paid by it for filing the petition and publication expenses. The petitioner shall be entitled for reimbursement of the filing fees and publication expenses in connection with the present petition, directly from the beneficiaries on pro-rata basis in accordance with Regulation 52 (1) of the 2014 Tariff Regulations.



Licence Fee & RLDC Fees and Charges

69. The petitioner shall be entitled for reimbursement of licence fee in accordance with Regulation 52 (2) (b) of the 2014 Tariff Regulations for 2014-19 tariff period. The petitioner shall also be entitled for recovery of RLDC fee & charges in accordance with Regulations 52 (2) (a) of the 2014 Tariff Regulations for 2014-19 tariff period.

Service Tax

70. The petitioner has prayed for reimbursement of service tax if it is subjected to such tax in future. We are of the view that the petitioner's prayer is premature.

Foreign Exchange Rate Variation

71. The petitioner has sought recovery of FERV on foreign loans deployed under clause 50 of 2014 Tariff Regulations. The petitioner is entitled to recover the FERV directly from the beneficiaries or the long term transmission customers / DICs, as the case may be, in accordance with Regulation 51(1) of the 2014 Tariff Regulations

Sharing of Transmission Charges

72. The billing, collection and disbursement of the transmission charges approved shall be governed by the provisions of Central Electricity Regulatory Commission (Sharing of Inter-State Transmission Charges and Losses) Regulations, 2010, as amended from time to time as provided in Regulation 43 of the 2014 Tariff Regulations.

73. This order disposes of Petition No. 133/TT/2015.

sd/-

(Dr. M.K. Iyer)
Member

sd/-

(A.S. Bakshi)
Member



DETAILS OF LOAN BASED ON ACTUAL LOAN PORTFOLIO (2009-14)**Asset-I**

(₹ in lakh)

Particulars	Rate of interest (%)					Loan deployed as on 1.4.2009	Additions during the tariff period	Total
	2009-10	2010-11	2011-12	2012-13	2013-14			
IBRD I-DOCO-44.31	8.4056	8.7450	8.9548	8.9738	8.6800	414.21	0.00	414.21
BOND-I (ISSUE-III)-DOCO-	9.00	9.00	9.00	9.00	9.00	131.40	0.00	131.40
NTPC BONDS-DOCO-	5.00	5.00	5.00	5.00	5.00	82.20	0.00	82.20
ING BANK-DOCO-	5.00	5.00	5.00	5.00	5.00	692.18	0.00	692.18
SUMITOMO-DOCO-	5.00	5.00	5.00	5.00	5.00	3997.21	0.00	3997.21
IBJ III (Replacement of Exim Bank)-DOCO-4238	5.00	5.00	5.00	5.00	5.00	3269.26	0.00	3269.26
LIC-II (17.10.2003) Replacement of GOI Loan FOR RIHAND - DOCO-	6.30	6.30	6.30	6.30	6.30	8858.08	0.00	8858.08
Total						17444.54	0.00	17444.54

WEIGHTED AVERAGE RATE OF INTEREST ON LOAN DURING 2009-14 TARIFF PERIOD

(₹ in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Gross Opening Loan	17444.54	17444.54	17444.54	17444.54	17444.54
Cumulative Repayments of Loans up to Previous Year	16808.84	17298.32	17336.36	17377.27	17421.28
Net Loans Opening	635.70	146.22	108.18	67.27	23.26
Add: Drawl(s) during the Year	0.00	0.00	0.00	0.00	0.00
Less: Repayments during the year	489.48	38.04	40.91	44.01	23.26
Net Closing Loan	146.22	108.18	67.27	23.26	0.00
Average Net Loan	390.96	127.20	87.73	45.27	11.63
Rate of Interest on Loan (%)*	7.1827%	8.7450%	8.9548%	8.9738%	8.6800%
Interest on Loan	28.08	11.12	7.86	4.06	1.01

*Petitioner, in the tariff computation submitted with the petition, has considered rate of interest on loan up to two decimal points.



Asset-II

(₹ in lakh)

Particulars	Rate of interest (%)					Loan deployed as on 1.4.2009	Additions during the tariff period	Total
	2009-10	2010-11	2011-12	2012-13	2013-14			
IBRD I-DOCO-44.31	8.4056	8.7450	8.9548	8.9738	8.6800	335.07	0.00	335.07
BOND-I (ISSUE -I)-DOCO Funding	16.7500	16.7500	16.7500	16.7500	16.7500	106.30	0.00	106.30
NTPC BONDS-DOCO-	5.0000	5.0000	5.0000	5.0000	5.0000	66.50	0.00	66.50
IBJ-II (TRANCHE D)-DOCO-	0.0000	0.0000	0.0000	0.0000	0.0000	798.87	0.00	798.87
COMMERZE BANK-DOCO-	5.0000	5.0000	5.0000	5.0000	5.0000	427.63	0.00	427.63
ING BANK-DOCO-	5.0000	5.0000	5.0000	5.0000	5.0000	559.92	0.00	559.92
SUMITOMO-DOCO-	5.0000	5.0000	5.0000	5.0000	5.0000	3233.44	0.00	3233.44
IBJ III (Replacement of Exim Bank)-DOCO-4238	3.0900	3.0900	3.0900	3.0900	3.0900	2644.59	0.00	2644.59
BOND XXX-ADCAP FOR 2009-2010 Loan 8-	8.8000	8.8000	8.8000	8.8000	8.8000	0.00	256.52	256.52
BOND XXXIII-ADDCAP FOR 2010-2011 Loan 9-	0.0000	8.6400	8.6400	8.6400	8.6400	0.00	150.43	150.43
BOND XXXIII-ADDCAP FOR 2012-2013 Modified Loan 12-	0.0000	0.0000	0.0000	8.6400	8.6400	0.00	183.50	183.50
BOND XXXIII-ADDCAP FOR 2013-2014 Loan 11-	0.0000	0.0000	0.0000	0.0000	8.6400	0.00	28.01	28.01
LIC-II (17.10.2003) Replacement of GOI Loan FOR	6.3000	6.3000	6.3000	6.3000	6.3000	7165.51	0.00	7165.51



Particulars	Rate of interest (%)					Loan deployed as on 1.4.2009	Additions during the tariff period	Total
	2009-10	2010-11	2011-12	2012-13	2013-14			
RIHAND-DOCO-								
Total						15337.83	618.46	15956.29

WEIGHTED AVERAGE RATE OF INTEREST ON LOAN DURING 2009-14 TARIFF PERIOD

(₹ in lakh)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14
Gross Opening Loan	15337.83	15594.35	15744.78	15744.78	15928.28
Cumulative Repayments of Loans up to Previous Year	14823.67	15219.60	15250.36	15283.44	15319.03
Net Loans Opening	514.16	374.75	494.42	461.34	609.25
Add: Drawl(s) during the Year	256.52	150.43	0.00	183.50	28.01
Less: Repayments during the year	395.93	30.76	33.08	35.59	40.18
Net Closing Loan	374.75	494.42	461.34	609.25	597.08
Average Net Loan	444.46	434.59	477.88	535.30	603.17
Rate of Interest on Loan (%)*	7.6493%	8.7593%	8.7726%	8.7395%	8.7058%
Interest on Loan	34.00	38.07	41.92	46.78	52.51

*Petitioner, in the tariff computation submitted with the petition, has considered rate of interest on loan up to two decimal points.



DETAILS OF LOAN BASED ON ACTUAL LOAN PORTFOLIO (2014-19)**Asset-I**

(₹ in lakh)

Particulars	Rate of interest (%)	Loan deployed as on 1.4.2014	Additions during the tariff period	Total
	2014-19			
IBRD I-DOCO-44.31	8.6800	414.21	0.00	414.21
BOND-I (ISSUE-III)-DOCO-	9.0000	131.40	0.00	131.40
NTPC BONDS-DOCO-	5.0000	82.20	0.00	82.20
ING BANK-DOCO-	5.0000	692.18	0.00	692.18
SUMITOMO-DOCO-	5.0000	3997.21	0.00	3997.21
IBJ III (Replacement of Exim Bank)-DOCO-4238	5.0000	3269.26	0.00	3269.26
LIC-II (17.10.2003) Replacement of GOI Loan FOR RIHAND - DOCO-	6.3000	8858.08	0.00	8858.08
Total		17444.54	0.00	17444.54

WEIGHTED AVERAGE RATE OF INTEREST ON LOAN DURING 2009-14 TARIFF PERIOD

(₹ in lakh)

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Gross Opening Loan	17444.54	17444.54	17444.54	17444.54	17444.54
Cumulative Repayments of Loans up to Previous Year	17444.54	17444.54	17444.54	17444.54	17444.54
Net Loans Opening	0.00	0.00	0.00	0.00	0.00
Add: Drawl(s) during the Year	0.00	0.00	0.00	0.00	0.00
Less: Repayments during the year	0.00	0.00	0.00	0.00	0.00
Net Closing Loan	0.00	0.00	0.00	0.00	0.00
Average Net Loan	0.00	0.00	0.00	0.00	0.00
Rate of Interest on Loan (%)*	8.6800%	8.6800%	8.6800%	8.6800%	8.6800%
Interest on Loan	0.00	0.00	0.00	0.00	0.00

*Petitioner, in the tariff computation submitted with the petition, has considered rate of interest on loan up to two decimal points.



Asset-II

(₹ in lakh)

Particulars	Rate of interest (%)	Loan deployed as on 1.4.2014	Additions during the tariff period	Total
	2014-19			
IBRD I-DOCO-44.31	8.6800	335.07	0.00	335.07
BOND-I (ISSUE -I)-DOCO Funding	16.7500	106.30	0.00	106.30
NTPC BONDS-DOCO-	5.0000	66.50	0.00	66.50
IBJ-II (TRANCHE D)-DOCO-	0.0000	798.87	0.00	798.87
COMMERZE BANK-DOCO-	5.0000	427.63	0.00	427.63
ING BANK-DOCO-	5.0000	559.92	0.00	559.92
SUMITOMO-DOCO-	5.0000	3233.44	0.00	3233.44
IBJ III (Replacement of Exim Bank)-DOCO-4238	3.0900	2644.59	0.00	2644.59
BOND XXX-ADCAP FOR 2009-2010 Loan 8-	8.8000	256.52	0.00	256.52
BOND XXXIII-ADDCAP FOR 2010-2011 Loan 9-	8.6400	150.43	0.00	150.43
BOND XXXIII-ADDCAP FOR 2012-2013 Modified Loan 12-	8.6400	183.50	0.00	183.50
BOND XXXIII-ADDCAP FOR 2013-2014 Loan 11-	8.6400	28.01	0.00	28.01
LIC-II (17.10.2003) Replacement of GOI Loan FOR RIHAND-DOCO-	6.3000	7165.51	0.00	7165.51
Total		15956.29	0.00	15956.29

WEIGHTED AVERAGE RATE OF INTEREST ON LOAN DURING 2009-14 TARIFF PERIOD

(₹ in lakh)

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Gross Opening Loan	15956.29	15956.29	15956.29	15956.29	15956.29
Cumulative Repayments of Loans up to Previous Year	15359.21	15410.75	15462.29	15513.83	15565.37
Net Loans Opening	597.08	545.54	494.00	442.46	390.92
Add: Drawl(s) during the Year	0.00	0.00	0.00	0.00	0.00
Less: Repayments during the year	51.54	51.54	51.54	51.54	51.54
Net Closing Loan	545.54	494.00	442.46	390.92	339.38
Average Net Loan	571.31	519.77	468.23	416.69	365.15
Rate of Interest on Loan (%)*	8.7029%	8.7025%	8.7021%	8.7016%	8.7009%
Interest on Loan	49.72	45.23	40.75	36.26	31.77

*Petitioner, in the tariff computation submitted with the petition, has considered rate of interest on loan up to two decimal points.

