

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Petition No. 339/GT/2014**

**Coram:**

**Shri. Gireesh B. Pradhan, Chairperson  
Shri A.K.Singhal, Member  
Shri A.S. Bakshi, Member  
Dr. M. K. Iyer, Member**

**Date of Order : 10.3.2017**

**In the matter of**

Approval of tariff of Vindhyachal Super Thermal Power Station Stage IV (1000 MW) for the period from 1.4.2014 to 31.3.2019

**And in the matter of**

NTPC Ltd  
NTPC Bhawan,  
Core-7, SCOPE Complex,  
7, Institutional Area, Lodhi Road,  
New Delhi-110003)

**.....Petitioner**

**Vs**

1. Madhya Pradesh Power Management Company Ltd.  
Shakti Bhawan, Vidyut nagar  
Jabalpur - 482 008
2. Maharashtra State Electricity Distribution Co. Ltd.  
Prakashgad, Bandra (East),  
Mumbai - 400 051
3. Gujarat Urja Vikas Nigam Ltd.(GUVNL)  
Vidyut Bhawan, Race Course  
Vadodara - 390 007
4. Govt. Of Goa  
Electricity Department ,Vidyut Bhawan,  
Panaji, Goa - 403 001
5. Electricity Department  
Administration of Daman & Diu  
Daman - 396 210
6. Electricity Department  
Administration of Dadra & Nagar Haveli  
Silvassa



7. Chhattisgarh State power Distribution Co. Ltd  
Dangania, Raipur-492013

**Parties present:**

For Petitioner: Shri Ajay Dua, NTPC  
Shri Sameer Aggarwal, NTPC  
Shri Nishant Gupta, NTPC  
Shri Rajeev Choudhary, NTPC  
Shri Bhupinder Kumar, NTPC  
Shri T. Vinodh Kumar, NTPC  
Ms. Suchitra Maggon, NTPC  
Shri Parimal Piyush, NTPC  
Shri Manish Jain , NTPC  
Shri Sachin Jain, NTPC  
Shri Rohit Ladha. NTPC

For Respondents: Shri Arvind Banerjee, CSPDCL

**ORDER**

This petition has been filed by the petitioner, NTPC for approval of tariff for Vindhyachal Super Thermal Power Station Stage-IV (1000 MW) (hereinafter referred to as “the generating station”) for the period 2014-19 in accordance with the provisions of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2014 (hereinafter referred to as “the 2014 Tariff Regulations”).

2. The generating station has a capacity of 1000 MW (2x500MW). The dates of commercial operation (COD) of the units of the generating station are as under:

Unit	COD
Unit-I	1.3.2013
Unit-II	27.3.2014

3. The Commission vide order dated 2.9.2015 in Petition No. 70/GT/2013 & 297/GT/2014 had revised the tariff of the generating station for the period 2009-14 based on the actual capital cost and the actual additional capital expenditure incurred for the period from the actual date of commercial operation of Unit-I (1.3.2013) and Unit-II (27.3.2014) till 31.3.2014 in terms of provision



of Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2009 considering the capital cost of ₹476707.81 lakh as on 31.3.2014 on cash basis. The annual fixed charges approved by the said order dated 2.9.2015 was as under:

(₹ in lakh)

	2012-13 (1.3.2013 to 31.3.2013)	2013-14	
		1.4.2013 to 26.3.2014	27.3.2014 to 31.3.2014
Depreciation	11557.88	12452.55	24220.50
Interest on Loan	13190.74	14035.91	27246.48
Return on Equity	15796.65	17736.40	33523.49
Interest on Working Capital	2815.56	2923.50	7128.89
O&M Expenses	6528.00	6902.00	13804.00
Secondary fuel oil cost	1765.78	1765.78	3848.77
<b>Total</b>	<b>51654.61</b>	<b>55816.14</b>	<b>109772.13</b>

4. The petitioner vide affidavit dated on 19.8.2014 has sought the approval of tariff in accordance with the provisions of the 2014 Tariff Regulations. Accordingly, the capital cost and the annual fixed charges claimed by the petitioner for the period 2014-19 in this petition are as under:

#### Capital Cost

(₹ in lakh)

	2014-15	2015-16	2016-17	2017-18	2018-19
Opening Capital Cost	476080.36	533018.61	565440.58	576240.58	583040.58
Add: Additional capital expenditure	56938.25	32421.97	10800.00	6800.00	6872.31
<b>Closing Capital Cost</b>	<b>533018.61</b>	<b>565440.58</b>	<b>576240.58</b>	<b>583040.58</b>	<b>589912.89</b>
Average Capital Cost	<b>504549.48</b>	<b>549229.60</b>	<b>570840.58</b>	<b>579640.58</b>	<b>586476.74</b>

#### Annual Fixed Charges

(₹ in lakh)

	2014-15	2015-16	2016-17	2017-18	2018-19
Depreciation	25678.31	27952.24	29052.10	29499.97	29847.88
Interest on Loan	26595.44	26484.79	25342.97	24009.37	21963.47
Return on Equity	30845.87	33577.41	34898.60	35436.60	35854.53
Interest on Working Capital	7144.09	7335.13	7424.09	7491.65	7542.41
O&M Expenses	17058.18	18135.37	19276.84	20492.83	21783.66
Compensation Allowance	0.00	0.00	0.00	0.00	0.00
Special Allowance	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>107321.89</b>	<b>113484.94</b>	<b>115994.60</b>	<b>116930.42</b>	<b>116991.95</b>



5. In compliance with the directions of the Commission, the petitioner has filed additional information and has served copies on the respondents. The respondents MSEDCL and MPPMCL have filed the reply in the matter. The petitioner has filed its rejoinder to the same. We now proceed to examine the claim of the petitioner based on the submissions of the parties and the documents available on record, as discussed in the subsequent paragraphs.

#### **Capital Cost as on 1.4.2014**

6. Clause 3 of Regulation 9 of the 2014 Tariff Regulations provides as under:

*“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.”*

7. The petitioner vide affidavit dated 19.8.2014 has claimed the annual fixed charges based on opening capital cost of ₹476080.36 lakh as on 1.4.2014 based on the anticipated capital expenditure and closing capital cost of petition No. 70/GT/2013 & 297/GT/2014, as against ₹476707.81 lakh as on 31.3.2014 as admitted by the Commission vide order dated 2.9.2015 in Petition No. 297/GT/2014 based on the actual capital expenditure. Accordingly, the opening capital cost of ₹476707.81 lakh (on cash basis) has been considered as on 1.4.2014.

#### **Actual/ Projected Additional Capital Expenditure during 2014-19**

8. Regulation 14 (3) of the 2014 Tariff Regulations, provides as under:

*“14.(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 of 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 un-discharged 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-materialization 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.”

9. The break-up of the projected additional capital expenditure claimed during 2014-19 is detailed as under:

Head of work/Equipment	Projected Additional Expenditure claimed					Regulation
	2014-15	2015-16	2016-17	2017-18	2018-19	
Land	-	-	-	-	-	14(1)(ii)
Steam Generator Island	2,475.17	338.20	-	-	-	14(1)(ii)
Turbine Generator Island	1,173.77	-	-	-	-	14(1)(ii)
CW system	-	-	-	-	-	14(1)(ii)
WTP & ETP	1,925.50	213.94	-	-	-	14(1)(ii)
CPU System	27.84	-	-	-	-	14(1)(ii)
Ash Handling System	125.00	2,423.50	-	-	-	14(1)(ii)
Coal Handling Plant	35,000.00	2,500.00	-	-	-	14(1)(ii)
MGR Rolling Stock	-	-	-	-	-	14(1)(ii)
MGR	25.00	6,550.00	4,500.00	-	-	14(1)(ii)
Air Condition & Ventilation System	36.56	2.25	-	-	-	14(1)(ii)
Fire fighting System	800.00	1,000.00	-	-	-	14(1)(ii)
HP/LP Piping (Incl in 2.3.6)	-	-	-	-	-	14(1)(ii)
Cooling Tower	-	-	-	-	-	14(1)(ii)
Ash Water Recirculation	811.65	937.35	-	-	-	14(1)(ii)
Workshop & Lab eqpt.	-	-	-	-	-	14(1)(ii)
Misc. Tools & Plant	-	-	-	-	-	14(1)(ii)
Switch Yard Package	18.93	-	-	-	-	14(1)(ii)
Transformers Package	178.63	-	-	-	-	14(1)(ii)
Switch gear Package	242.70	-	-	-	-	14(1)(ii)
Cables , Cable facilities & grounding	185.01	-	-	-	-	14(1)(ii)
Lighting	-	-	-	-	-	14(1)(ii)
Computer facilities	-	-	-	-	-	14(1)(ii)
Reactor	-	-	-	-	-	14(1)(ii)
BT Procurement	-	-	-	-	-	14(1)(ii)
C & I Package	-	-	-	-	-	14(1)(ii)
Main plant/Chimney/CW System/offsite civil works	8,906.81	1,873.53	300.00	-	-	14(1)(ii)
Township & Colony	2,830.69	520.20	-	-	-	14(1)(ii)
Temp. construction & enabling works	-	-	-	-	-	14(1)(ii)
Central Repair Facility	-	-	-	-	-	14(1)(ii)
Raw water reservoir	-	-	-	-	-	14(1)(ii)
Ash dyke - First 9 yrs	175.00	10,063.00	-	800.00	872.31	14(1)(ii)
ESP VSTPS-I	0.00	4000	6000	6000	6000	14(3)(ii)
ESP VSTPS-II	2000	2000	0.00	0.00	0.00	14(3)(ii)
<b>Total (Excluding ESP of Stage-I &amp; Stage-II)</b>	<b>54,938.25</b>	<b>26,421.97</b>	<b>4,800.00</b>	<b>800.00</b>	<b>872.31</b>	
<b>Total (With ESP of Stage-I &amp; Stage-II)</b>	<b>56,938.25</b>	<b>32,421.97</b>	<b>10,800.00</b>	<b>6,800.00</b>	<b>6,872.31</b>	



10. The petitioner has claimed the additional capital expenditure towards the works approved under original scope and for the expenditure towards Electro Static Precipitator (ESP). The projected additional capital expenditure claimed by the petitioner is discussed in the succeeding paragraphs.

#### **Works Under Original Scope of work- Regulation 14(1)(ii)**

11. The petitioner has claimed ₹54938.25 lakh in 2014-15, ₹26421.97 lakh in 2015-16, ₹4800.00 lakh in 2016-17, ₹800.00 lakh in 2017-18 and ₹872.31 lakh in 2018-19 for the works under original scope in various heads and works deferred for execution under Regulation 14(1)(ii) of 2014 Tariff Regulations.

12. The respondent, MPPMCL has submitted that the petitioner's claim for additional capital expenditure after the cut-off date i.e., 31.3.2017 under the Regulation 14(1)(ii) is not admissible. The respondent has pointed out that any expenditure after the cut-off date has to be claimed under Regulation 14(3) of Tariff Regulation 2014. The respondent has further submitted that the additional capital expenditure claimed by the petitioner are liable to be rejected without any justification for the same. In response, the petitioner has submitted that the additional capital expenditure claimed for the period 2014-19 pertain to original scope of work and have been executed as per investment approval accorded by Board of Directors.

13. We have examined the submissions of the parties. It is observed that the additional capital expenditure claimed by the petitioner are within the original scope of work as per investment approval and has already been approved vide order dated 2.9.2015 in Petition No. 70/GT/2013 & 297/GT/2014. Accordingly, the additional capital expenditure of ₹54938.25 lakh in 2014-15, ₹26421.97 lakh in 2015-16, ₹4800.00 lakh in 2016-17 is allowed under Regulation 14(1)(ii) of 2014 Tariff Regulations. However, as the projected capital expenditure of ₹800.00 lakh in 2017-18 and ₹872.31 lakh in 2018-19 is for works under original scope and works deferred for execution beyond



the cut-off date, the same is allowed under Regulation 14(3)(v) and petitioner is directed to claim the same under appropriate regulation at the time of truing-up.

### **ESP - Change of Law 14(3)(ii)**

14. The petitioner has claimed additional capital expenditure of ₹2000.00 lakh in 2014-15, ₹6000.00 lakh in 2015-16, ₹6000.00 lakh in 2016-17, ₹6000.00 lakh in 2017-18 and ₹6000.00 lakh in 2018-19 towards the ESP retrofitting for Stage-I & II under Regulation 14(3)(ii) of 2014 Tariff Regulations.

15. The respondent, MPPMCL submitted that the huge expenditure claimed by the petitioner for retrofitting of ESP in Stage-I and II in capital cost of Stage-IV is not justifiable and is liable to be rejected. In response, the petitioner has submitted that the ESP retrofit for Stage-I & II has been undertaken as per the directions/guidelines of Ministry of Environment and Forest (MOEF) vide notification dated 5.2.2009 and the capital expenditure claimed in Stage-IV is in-line with the expenditure approved vide order dated 12.9.2012 in Petition No. 227/2009.

16. We have examined the submissions of the parties. It is observed that in order dated 12.9.2012 in Petition No. 227/2009 the petitioner had claimed the expenditure of ESP for Stage-I and II as the reduction of emission levels had been made mandatory by the MP Pollution Control Board, as per the directions/guidelines of Ministry of Environment and Forest (MOEF) vide notification dated 5.2.2009. It is further observed that the Commission had decided to consider the expenditure for modification of ESPs of Stage-I against Stage-IV and the petitioner had agreed to the same. The relevant paras of the order are extracted as under:-

### **“ESP Modification of Stage-I units**

*28. The petitioner has claimed expenditure of ₹1400.00 lakh during 2011-12, ₹4000.00 lakh during 2012-13 and ₹4000.00 lakh during 2013-14. The petitioner has submitted that the present emission level at Stages I & II is 250-300 mg/Nm<sup>3</sup> as against the design value of 345mg/Nm<sup>3</sup>. It has also submitted that in terms of the conditional clearance granted by the Ministry of Environment & Forests, Government of India vide its letter dated 5.2.2009 for Stage IV of the generating station, the emission from ESP is required to be reduced to 75 mg/Nm<sup>3</sup> before commissioning of Stage IV of*





the generating station. Based on this, the R&M of ESPs have become necessary and the expenditure may be allowed, the petitioner has stated. The petitioner in its affidavits dated 21.3.2011 and 25.4.2011 has reiterated that the revised scope of work includes the retrofitting of ESPs (6 units) with additional collection area of 30000M<sup>2</sup> and 58000 M<sup>2</sup> in Stage I & II units respectively to reduce the emission level to 75 Mg/Nm<sup>3</sup>. **It has also been submitted that the reduction of emission levels have been made mandatory by the MP Pollution Control Board and hence the proposed phased funding for execution of work upto 31.3.2014 may be approved.**

29. On a specific query by the Commission during the hearing on 28.6.2011, as to whether the expenditure for modification of ESPs of Stage-I could be considered against Stage-IV of the generating station, since the expenditure for modification of ESPs of Stage-I was necessitated due to conditional clearance by the Ministry of Environment & Forests, Government of India aforesaid, the representative of the petitioner replied in the affirmative and has not objected to the same. Accordingly, the total expenditure of ₹9400.00 lakh during 2011-14 claimed by petitioner has not been considered for Stage-I of the generating station."

17. In view of the above, we are inclined to allow the additional capital expenditure ₹2000.00 lakh in 2014-15, ₹6000.00 lakh in 2015-16, ₹6000.00 lakh in 2016-17, ₹6000.00 lakh in 2017-18 and ₹6000.00 lakh in 2018-19 towards the ESP retrofitting for Stage-I & II under Regulation 14(3)(ii) of the 2014 Tariff Regulations. The petitioner is however directed to submit the details of works capitalized in respect of Stage-I and II respectively at the time of truing-up in terms of Regulation 8 of 2014 Tariff Regulations.

18. Based on the above discussions, the projected additional capital expenditure allowed during the period 2014-19 is summarized as under:

Head of work/Equipment	Projected Additional Expenditure Allowed					Regulation
	2014-15	2015-16	2016-17	2017-18	2018-19	
Land	-	-	-	-	-	14(1)(ii)
Steam Generator Island	2,475.17	338.20	-	-	-	14(1)(ii)
Turbine Generator Island	1,173.77	-	-	-	-	14(1)(ii)
CW system	-	-	-	-	-	14(1)(ii)
WTP & ETP	1,925.50	213.94	-	-	-	14(1)(ii)
CPU System	27.84	-	-	-	-	14(1)(ii)
Ash Handling System	125.00	2,423.50	-	-	-	14(1)(ii)
Coal Handling Plant	35,000.00	2,500.00	-	-	-	14(1)(ii)
MGR Rolling Stock	-	-	-	-	-	14(1)(ii)
MGR	25.00	6,550.00	4,500.00	-	-	14(1)(ii)
Air Condition & Ventilation System	36.56	2.25	-	-	-	14(1)(ii)
Fire fighting System	800.00	1,000.00	-	-	-	14(1)(ii)
HP/LP Piping (Incl in 2.3.6)	-	-	-	-	-	14(1)(ii)
Cooling Tower	-	-	-	-	-	14(1)(ii)
Ash Water Recirculation	811.65	937.35	-	-	-	14(1)(ii)
Workshop & Lab eqpt.	-	-	-	-	-	14(1)(ii)



Head of work/Equipment	Projected Additional Expenditure Allowed					Regulation
	2014-15	2015-16	2016-17	2017-18	2018-19	
Misc. Tools & Plant	-	-	-	-	-	14(1)(ii)
Switch Yard Package	18.93	-	-	-	-	14(1)(ii)
Transformers Package	178.63	-	-	-	-	14(1)(ii)
Switch gear Package	242.70	-	-	-	-	14(1)(ii)
Cables , Cable facilities & grounding	185.01	-	-	-	-	14(1)(ii)
Lighting	-	-	-	-	-	14(1)(ii)
Computer facilities	-	-	-	-	-	14(1)(ii)
Reactor	-	-	-	-	-	14(1)(ii)
BT Procurement	-	-	-	-	-	14(1)(ii)
C & I Package	-	-	-	-	-	14(1)(ii)
Main plant/Chimney/CW System/offsite civil works	8,906.81	1,873.53	300.00	-	-	14(1)(ii)
Township & Colony	2,830.69	520.20	-	-	-	14(1)(ii)
Temp. construction & enabling works	-	-	-	-	-	14(1)(ii)
Central Repair Facility	-	-	-	-	-	14(1)(ii)
Raw water reservoir	-	-	-	-	-	14(1)(ii)
Ash dyke - First 9 yrs	175.00	10,063.00	-	800.00	872.31	14(1)(ii)
ESP VSTPS-I	0.00	4000	6000	6000	6000	14(3)(ii)
ESP VSTPS-II	2000	2000	0.00	0.00	0.00	14(3)(ii)
<b>Total (Excluding ESP of Stage-I &amp; Stage-II)</b>	54938.25	26421.97	4800.00	800.00	872.31	
<b>Total (With ESP of Stage-I &amp; Stage-II)</b>	56938.25	32421.97	10800.00	6,800.00	6872.31	

19. Accordingly, the capital cost for the period 2014-19 in respect of the generating station is worked out and allowed as under:

	(₹ in lakh)				
	2014-15	2015-16	2016-17	2017-18	2018-19
<b>Opening Capital Cost</b>	476707.81	533646.06	566068.03	576868.03	583668.03
<b>Add: Additional capital expenditure</b>	56938.25	32421.97	10800.00	6800.00	6872.31
<b>Closing Capital Cost</b>	533646.06	566068.03	576868.03	583668.03	590540.34

### Debt-Equity Ratio

20. Regulation 19 of the 2014 Tariff Regulations provides as under:

*(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:*

*Provided that:*



*(i) where equity actually deployed is less than 30% of the capital cost, actual equity shall be considered for determination of tariff:*

*(ii) the equity invested in foreign currency shall be designated in Indian rupees on the date of each investment:*

*(iii) any grant obtained for the execution of the project shall not be considered as a part of capital structure for the purpose of debt-equity ratio.*

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

*(2) The generating Company or the transmission licensee shall submit the resolution of the Board of the company or approval from Cabinet Committee on Economic Affairs (CCEA) regarding infusion of fund from internal resources in support of the utilisation made or proposed to be made to meet the capital expenditure of the generating station or the transmission system including communication system, as the case may be.*

*(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.*

*(4) In case of generating station and the transmission system including communication system declared under commercial operation prior to 1.4.2014, but where debt:equity ratio has not been determined by the Commission for determination of tariff for the period ending 31.3.2014, the Commission shall approve the debt:equity ratio based on actual information provided by the generating company or the transmission licensee as the case may be.*

*(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.*

21. Accordingly, the gross normative loan and equity amounting to ₹333695.47 lakh and ₹143012.34 lakh, respectively as on 31.3.2014 as considered in order dated 2.9.2015, has been considered as gross normative loan and equity as on 1.4.2014. The normative debt equity ratio of



70:30 has been considered in the case of additional capital expenditure. This is subject to truing-up in terms of the 2014 Tariff Regulations.

## **Return on Equity**

22. Regulation 24 of the 2014 Tariff Regulations provides 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 and run of the river hydro generating station, and at the base rate of 16.50% for the storage type hydro generating stations including pumped storage hydro generating stations and run of river generating station with pondage:*

*Provided that:*

*i) in case of projects commissioned on or after 1st April, 2014, an additional return of 0.50 % shall be allowed, if such projects are completed within the timeline specified in Appendix-I:*

*ii). the additional return of 0.5% shall not be admissible if the project is not completed within the timeline specified above for reasons whatsoever:*

*iii). additional RoE of 0.50% may be allowed if any element of the transmission project is completed within the specified timeline and it is certified by the Regional Power Committee/National Power Committee that commissioning of the particular element will benefit the system operation in the regional/national grid:*

*iv). the rate of return of a new project shall be reduced by 1% for such period as may be decided by the Commission, if the generating station or transmission system is found to be declared under commercial operation without commissioning of any of the Restricted Governor Mode Operation (RGMO)/ Free Governor Mode Operation (FGMO), data telemetry, communication system up to load dispatch centre or protection system:*

*v) as and when any of the above requirements are found lacking in a generating station based on the report submitted by the respective RLDC, RoE shall be reduced by 1% for the period for which the deficiency continues:*

*vi) additional RoE shall not be admissible for transmission line having length of less than 50 kilometers.*

23. Regulation 25 of the 2014 Tariff Regulations provides as under:



**“Tax on Return on Equity**

(1) *The base rate of return on equity as allowed by the Commission under Regulation 24 shall be grossed up with the effective tax rate of the respective financial year. For this purpose, the effective tax rate shall be considered on the basis of actual tax paid in the respect of the financial year in line with the provisions of the relevant Finance Acts by the concerned generating company or the transmission licensee, as the case may be. The actual tax income on other income stream (i.e., income of non-generation or non-transmission business, as the case may be) shall not be considered for the calculation of “effective tax rate”.*

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

$$\text{Rate of pre-tax return on equity} = \text{Base rate} / (1-t)$$

*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.*

24. The petitioner has claimed return on equity considering base rate of 15.5% and effective tax rate of 23.9394%.. This issue being not confined to a single petition and being generic in nature as the issue is applicable to all NTPC petitions uniformly need deliberation. On this issue against specific query through ROP, the petitioner vide its affidavit dated 8.1.2016 in Petition no. 280/GT/2014 (Farakka STPS, Stage-III) has filed Auditor's Certificate regarding deposit of advance tax on generation business for the year 2014-15 as well as Income Tax return for the financial year 2014-15 (Assessment Year 2015-16). We have examined the documents submitted and observed that the regulation prescribe computation of effective tax rate on the basis of tax paid, still we deem it proper to allow grossing up on MAT rate considering the fact that the matter is getting decided in the year 2016-17. Accordingly, the effective tax rate (MAT) of 20.961% has been considered for the year 2014-15 and 21.342% for the year 2015-16 onwards up to the year 2018-19 for the purpose of grossing up of base rate of 15.5%. Accordingly, the rate of Return on Equity works out to 19.610% for the year 2014-15 and 19.705% for the year 2015-16 onwards. This is however, subject to true-up. Accordingly, return on equity has been worked out as under:



(₹ in lakh)					
Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
Notional Equity-Opening	143012.34	160093.81	169820.41	173060.41	175100.41
Addition of Equity due to additional capital expenditure	17081.47	9726.59	3240.00	2040.00	2061.69
Normative Equity-Closing	160093.81	169820.41	173060.41	175100.41	177162.10
Average Normative Equity	151553.08	164957.11	171440.41	174080.41	176131.25
Return on Equity (Base Rate)	15.500	15.500	15.500	15.500	15.500
Tax Rate for the year	20.961	21.342	21.342	21.342	21.342
Rate of Return on Equity (Pre Tax)	19.610	19.705	19.705	19.705	19.705
<b>Return on Equity(Pre Tax) annualised</b>	<b>29720.24</b>	<b>32505.56</b>	<b>33783.12</b>	<b>34303.35</b>	<b>34707.47</b>

### Interest on Loan

25. Regulation 26 of the 2014 Tariff Regulations provides as under:

**“26. Interest on loan capital:** (1) *The loans arrived at in the manner indicated in regulation 19 shall be considered as gross normative loan for calculation of interest on loan.*

(2) *The normative loan outstanding as on 1.4.2014 shall be worked out by deducting the cumulative repayment as admitted by the Commission up to 31.3.2014 from the gross normative loan.*

(3) *The repayment for each of the year of the tariff period 2014-19 shall be deemed to be equal to the depreciation allowed for the corresponding year/period. In case of de-capitalization of assets, the repayment shall be adjusted by taking into account cumulative repayment on a pro rata basis and the adjustment should not exceed cumulative depreciation recovered upto the date of de-capitalization of such asset.*

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

(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.*

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

*(8) The changes to the terms and conditions of the loans shall be reflected from the date of such refinancing.*

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

*Provided that the beneficiaries or the long term transmission customers /DICs shall not withhold any payment on account of the interest claimed by the generating company or the transmission licensee during the pendency of any dispute arising out of re-financing of loan.”*

26. Interest on loan has been worked out as under:

(a) The gross normative loan of ₹333695.47 lakh as on 1.4.2014 has been considered.

(b) Cumulative repayment of loan of ₹13595.39 lakh as on 31.3.2014 as considered in order dated 2.9.2015 in Petition No. 70/GT/2013 & 297/GT/2014 has been considered as on 1.4.2014.

(c) Accordingly, the net normative opening loan as on 1.4.2014 works out to ₹320100.08 lakh

(d) Addition to normative loan on account of the admitted additional capital expenditure has been considered on year to year basis.

(e) Depreciation allowed for the period has been considered as repayment of normative loan during the respective year for the period 2014-19.

(f) In line with the provisions of the regulation, the weighted average rate of interest has been calculated applying the actual loan portfolio existing as on 1.4.2014 along with subsequent additions during the period 2014-19, if any, for the generating station. In case of loans carrying floating rate of



interest the rate of interest as provided by the petitioner has been considered for the purpose of tariff. The calculations for weighted average rate of interest on loan have been enclosed as Annexure-I to this order.

(g) It is observed that the opening gross loan considered by the petitioner to work out the weighted average rate of interest on loan is different from approved gross loan as considered by the petitioner as on 31.3.2014 in previous order. We have considered the weighted average rate of interest on loan as submitted by the petitioner. However, the petitioner is directed to reconcile the same at the time of true up based on actual loan portfolio.

27. The necessary calculation for interest on loan is as under:

	(₹ in lakh)				
	2014-15	2015-16	2016-17	2017-18	2018-19
Gross opening loan	333695.47	373552.24	396247.63	403807.63	408567.63
Cumulative repayment of loan upto previous year	13595.39	39303.84	67286.07	96368.08	125897.92
Net Loan Opening	320100.08	334248.40	328961.56	307439.55	282669.71
Addition due to additional capital expenditure	39856.77	22695.38	7560.00	4760.00	4810.62
Repayment of loan during the year	25708.45	27982.23	29082.01	29529.84	29877.73
Less: Repayment adjustment on account of de-capitalization	0.00	0.00	0.00	0.00	0.00
Add: Repayment adjustment on account of discharges corresponding to un-discharged liabilities deducted as on 1.4.2009	0.00	0.00	0.00	0.00	0.00
Net Repayment	25708.45	27982.23	29082.01	29529.84	29877.73
Net Loan Closing	334248.40	328961.56	307439.55	282669.71	257602.59
Average Loan	327174.24	331604.98	318200.55	295054.63	270136.15
Weighted Average Rate of Interest of loan(%)	8.1384	7.9954	7.9726	8.1454	8.1385
<b>Interest on Loan</b>	<b>26626.75</b>	<b>26513.14</b>	<b>25368.86</b>	<b>24033.38</b>	<b>21985.03</b>

## Depreciation

28. Regulation 27 of the 2014 Tariff Regulations provides as under:

**“27. Depreciation:** (1) Depreciation shall be computed from the date of commercial operation of a generating station or unit thereof or a transmission system including





communication system or element thereof. In case of the tariff of all the units of a generating station or all elements of a transmission system including communication system for which a single tariff needs to be determined, the depreciation shall be computed from the effective date of commercial operation of the generating station or the transmission system taking into consideration the depreciation of individual units or elements thereof.

Provided that effective date of commercial operation shall be worked out by considering the actual date of commercial operation and installed capacity of all the units of the generating station or capital cost of all elements of the transmission system, for which single tariff needs to be determined.

(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.

(3) The salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the capital cost of the asset:

Provided that in case of hydro generating station, the salvage value shall be as provided in the agreement signed by the developers with the State Government for development of the Plant:

Provided further that the capital cost of the assets of the hydro generating station for the purpose of computation of depreciated value shall correspond to the percentage of sale of electricity under long term power purchase agreement at regulated tariff:

Provided also that any depreciation disallowed on account of lower availability of the generating station or generating unit or transmission system as the case may be, shall not be allowed to be recovered at a later stage during the useful life and the extended life.

(4) Land other than the land held under lease and the land for reservoir in case of hydro generating station shall not be a depreciable asset and its cost shall be excluded from the capital cost while computing depreciable value of the asset.

(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.



(7) The generating company or the transmission licensee, as the case may be, shall submit the details of proposed capital expenditure during the fag end of the project (five years before the useful life) along with justification and proposed life extension. The Commission based on prudence check of such submissions shall approve the depreciation on capital expenditure during the fag end of the project.

(8) In case of de-capitalization of assets in respect of generating station or unit thereof or transmission system or element thereof, the cumulative depreciation shall be adjusted by taking into account the depreciation recovered in tariff by the de-capitalized asset during its useful services.”

29. The cumulative depreciation amounting to ₹13595.39 lakh as on 31.3.2014 as considered in order dated 2.9.2015 has been considered for the purpose of tariff. Further, the value of freehold land included in the average capital cost has been adjusted while calculating depreciable value for the purpose of tariff. Accordingly, the balance depreciable value (before providing depreciation) for the year 2014-15 works out to ₹427081.96 lakh.

30. Accordingly, depreciation has been computed as follows:

	(₹ in lakh)				
	2014-15	2015-16	2016-17	2017-18	2018-19
Opening Capital Cost	476707.81	533646.06	566068.03	576868.03	583668.03
Add: Additional Capital Expenditure	56938.25	32421.97	10800.00	6800.00	6872.31
Closing Capital Cost	533646.06	566068.03	576868.03	583668.03	590540.34
Average Capital Cost	505176.93	549857.05	571468.03	580268.03	587104.19
Rate of depreciation	5.09%	5.09%	5.09%	5.09%	5.09%
Depreciable value (excluding land) @ 90%	440677.35	480889.46	500339.34	508259.34	514411.88
Balance depreciable Value	427081.96	441585.61	433053.27	411891.27	388513.96
Depreciation (annualized)	<b>25708.45</b>	<b>27982.23</b>	<b>29082.01</b>	<b>29529.84</b>	<b>29877.73</b>
Cumulative depreciation (at the beginning of the period)	13595.39	39303.84	67286.07	96368.08	125897.92
Less: Cumulative Depreciation adjustment on account of un-discharged liabilities	0.00	0.00	0.00	0.00	0.00
Less: Cumulative Depreciation reduction due to de-capitalization	0.00	0.00	0.00	0.00	0.00
Cumulative depreciation (at the end of the period)	39303.84	67286.07	96368.08	125897.92	155775.65



## O&M Expenses

31. Regulation 29 (1) (c) of the 2014 Tariff Regulations provides the year-wise O&M expense norms for the generating station of the petitioner as under:

*(₹ in lakh)*

2014-15	2015-16	2016-17	2017-18	2018-19
16.00	17.01	18.08	19.22	20.43

32. The petitioner has claimed the year-wise O&M expenses in terms of the above said norms as under:

*(₹ in lakh)*

	2014-15	2015-16	2016-17	2017-18	2018-19
O & M Expenses	16000.00	17010.00	18080.00	19220.00	20430.00

33. The proviso to the said regulation provides as under:

<b>500 MW and above</b>	Additional 3 <sup>rd</sup> & 4 <sup>th</sup> units	0.90
	Additional 5 <sup>th</sup> & above units	0.85

34. The proviso to Regulation 29 (1) (a) of 2014 Tariff Regulations, provides for multiplication factors for arriving at norms of O&M norms for additional units in respective unit sizes for the units whose COD occurs on or after 1.4.2014.

35. The generating station, VSTPS-IV is the expansion project and hence, the admissible O&M norms have been multiplied by a factor of 0.85 and are allowed as under:

*(₹ in lakh)*

2014-15	2015-16	2016-17	2017-18	2018-19
13.60	14.46	15.37	16.34	17.37

36. Accordingly, the year-wise O&M expenses in terms of the above said norms are allowed as under:



	(₹ in lakh)				
	2014-15	2015-16	2016-17	2017-18	2018-19
O & M Expenses	13600.00	14458.50	15368.00	16337.00	17365.50

## Water Charges

37. Regulation 29(2) of the 2014 Tariff Regulations provide as under:

*“29.(2) The Water Charges and capital spares for thermal generating stations shall be allowed separately:*

*Provided that water charges shall be allowed based on water consumption depending upon type of plant, type of cooling water system etc., subject to prudence check. The details regarding the same shall be furnished along with the petition:*

*Provided that the generating station shall submit the details of year wise actual capital spares consumed at the time of truing up with appropriate justification for incurring the same and substantiating that the same is not funded through compensatory allowance or special allowance or claimed as a part of additional capitalisation or consumption of stores and spares and renovation and modernization”*

38. In terms of the above regulation, water charges are to be allowed based on water consumption depending upon type of plant, type of cooling water system etc., subject to prudence check of the details furnished by the petitioner.

39. The petitioner has claimed water charges based on the expected water consumption of the generating station and the type of cooling water system has also been furnished. The water charges claimed by the petitioner are as follows:

	(₹ in lakh)				
	2014-15	2015-16	2016-17	2017-18	2018-19
	1058.18	1125.37	1196.84	1272.83	1353.66

40. The respondents MSEDCL has raised the issue of regarding the water charged claimed by the petitioner without providing any justification. The petitioner vide affidavit dated 16.8.2016 has submitted details of actual water consumption in VTPS Stage-IV and the applicable water charges. The details in respect of water charges such as type of cooling water system, water consumption, rate of water charges as applicable for 2013-14 have been furnished by the petitioner as under:



Description	Remarks
Type of Plant	Coal
Type of cooling water system	Closed Circuit Cooling
Total water charges in 2013-14	₹1058.18 lakh*
<i>*water charges paid as per allocated water quantity</i>	

41. In compliance with the above, the petitioner vide affidavit dated 16.8.2016 has submitted details of actual water consumption in VTPS Stage-IV from 2012-16 and the applicable water charges. The petitioner has submitted the given details are based on audited accounts of 2012-16. The details of the year-wise water consumption and water charges are detailed below:-

(₹ in lakh)

Year	Actual annual water consumption (M3)	Actual Annual water Consumption (Cusec)	Rate of Water Charges (Rs/M3)
2011-12	-	-	4.5 ( April- Dec`11), 5 (Jan- March`12)
2012-13	1342941	-	5 (April-Dec`12), 5.5 (Jan-March`13)
2013-14	415100	-	5.5
2014-15	8966852	10.00	5.5
2015-16	19491570	21.80	5.5

42. As per the submission made by the petitioner based on actual water consumption and the water charges paid per/M3 the actual water charges for year 2014-15 has been considered and worked out as ₹493.18 lakh.

43. The petitioner has claimed the water charges during the year 2014-15 and the same has been escalated the same @ 6.35% as per the escalation rate in O&M norms specified by the Commission for the tariff period 2014-19. This escalation rate of 6.35% considered by the petitioner is not in line with the water supply agreement signed with Department of water resources, Govt of MP which does not specify any escalation rate. Accordingly, water charges have been allowed without the annual escalation during 2014-19. Based on which water charges allowed as given here under:-



*(₹ in lakh)*

Year	Water charges allowed
2014-15	493.18
2015-16	493.18
2016-17	493.18
2017-18	493.18
2018-19	493.18

44. The petitioner is directed to furnish the details such as the contracted quantity, allocation of water, the actual water consumed during 2014-19, the basis of calculation of quantity of CW and computation of water charges at the time of truing-up of tariff in terms of the 2014 Tariff Regulations. In addition, the petitioner shall also confirm / clarify as to whether the water charges have been paid on the basis of contracted quantity or on the basis of allocation.

45. Accordingly, the total O&M expenses including water charges as claimed by the petitioner and allowed for the purpose of tariff is as under:

*(₹ in lakh)*

	2014-15	2015-16	2016-17	2017-18	2018-19
O&M Expenses as claimed	16,000.00	17,010.00	18,080.00	19,220.00	20,430.00
O&M Expenses as allowed	13600.00	14458.50	15368.00	16337.00	17365.50
Water charges as claimed	1,058.18	1,125.37	1,196.84	1,272.83	1,353.66
Water charges as allowed	493.18	493.18	493.18	493.18	493.18
Total O&M Expenses as claimed (including Water charges)	<b>17058.18</b>	<b>18,135.37</b>	<b>19,276.84</b>	<b>20,492.83</b>	<b>21,783.66</b>
<b>Total O&amp;M Expenses as allowed(including Water charges)</b>	<b>14093.18</b>	<b>14951.68</b>	<b>15861.18</b>	<b>16830.18</b>	<b>17858.68</b>

### Capital spares

46. The petitioner has not claimed capital spares on projection basis during the period 2014-19. Accordingly, the same has not been considered in this order. The claim of the petitioner, if any, at the time of truing-up, shall be considered on merits, after prudence check.

### Operational Norms

47. The operational norms in respect of the generating station claimed by the petitioner are as under:



Target Availability (%)	83.00
Heat Rate (kcal/kWh)	2418.98
Auxiliary Energy Consumption (%)	5.75
Specific Oil Consumption (ml/ kWh)	0.50

48. The operational norms claimed by the petitioner are in accordance with Regulation 36 of the 2014 Tariff Regulations and discussed as under:

### **Normative Annual Plant Availability Factor (NAPAF)**

49. Regulation 36 (A) (a) of the 2014 Tariff Regulations provides as under:

*(a) All Thermal generating stations, except those covered under clauses (b) (c) (d) & (e)- 85%.*

*Provided that in view of the shortage of coal and uncertainty of assured coal supply on sustained basis experienced by the generating stations, the NAPAF for recovery of fixed charges shall be 83% till the same is reviewed.*

*The above provision shall be reviewed based on actual feedback after 3 years from 01.04.2014.*

50. The petitioner has considered the target availability norm of 83% during 2014-19. The petitioner vide affidavit dated 5.1.2015 has submitted that as per Regulation 36(A)(a) of Tariff Regulation 2014, in view of shortage of coal and uncertainty of assured coal supply on sustained basis the fixed charges are recovered at availability of 83%. In view of the above submissions, the Commission due to shortage of domestic coal supply has relaxed target availability norm to 83% for first 3 years from 1.4.2014 and the same shall be reviewed after 3 years. Hence, in view of the above provision the target availability of 83% is allowed for the period 2014-15 to 2016-17 and 85% for the period 2017-18 & 2018-19 in terms of the Regulation 36(A) (a) of the 2014 Tariff Regulations.

### **Heat Rate (kCal/kWh)**

51. Regulation 36(C)(c)(i) of the 2014 Tariff Regulations, provides for maximum design unit heat rate (kcal/kwh) for Calculation of Heat Rate of New Thermal generating station achieving on or after



1.4.2009 till 31.03.2014. The petitioner has claimed the plant characteristics for VSTPS-IV as under:-

Guaranteed Turbine Heat Rate (kcal/Kwh)	1944.44
Guaranteed Boiler Efficiency (%)	84%

52. The respondent, MPPMCL has submitted that the petitioner has claimed the heat rate of 2418.98 kcal/kwh for 2014-19 period which is not justified.

53. We have considered the submissions of the parties. On prudence check, it is observed that the petitioner had claimed the turbine heat rate of 1932 kcal/kwh and boiler efficiency of 84% during the period 2009-14 in petition no. 70/GT/2013 & 297/GT/2014 . It is to be noticed that the petitioner has to maintain the minimum boiler efficiency of 85% and the maximum turbine heat rate of 1935 kcal/kwh as per 2009 Tariff Regulations, however the petitioner has changed the Turbine Heat Rate and Boiler Efficiency in the next tariff period. Accordingly, in terms of Regulation 36(C)(c)(i) of the 2014 Tariff Regulations, the design heat rate has been calculated based on the Turbine heat rate of 1932 kcal/kwh and boiler efficiency of 85%. The Heat rate of the station is calculated as below:

Guaranteed Design Gross Turbine Cycle Heat Rate	1932
Guaranteed Boiler Efficiency	85%
Multiplying Factor	1.045
<b>Gross Station Heat Rate</b>	<b>2375.22</b>

### **Auxiliary Energy Consumption**

54. The petitioner has claimed Auxiliary Energy Consumption at 5.75% during 2014-19 period. Regulation 36(E)(a) of Tariff Regulations, 2014 provides Auxiliary Energy Consumption of 5.25% for coal based generating stations of 500 MW sets with Natural Draft cooling tower or without cooling tower with steam driven BFP. It further provides that for thermal generating stations with induced draft cooling towers, the norms shall be further increased by 0.5%. Accordingly, the Auxiliary Energy





Consumption to be considered is 5.75% as per the norms and the same is allowed for the purpose of tariff computations.

### **Specific Oil Consumption**

55. Regulation 36(D)(a) of the 2014 Tariff Regulations, provides secondary fuel oil consumption of 0.50 ml/kWh for coal-based generating station. Hence, the secondary fuel oil consumption considered by the petitioner is as per norms and is allowed.

### **Interest on Working Capital**

56. Sub-section (1) of clause (1) of Regulation 28 of the 2014 Tariff Regulations provides as under:

*“28. Interest on Working Capital:*

*(1) The working capital shall cover*

*(a) Coal-based/lignite-fired thermal generating stations*

*(i) Cost of coal or lignite and limestone towards stock, if applicable, for 15 days for pit-head generating stations and 30 days for non-pit-head generating stations for generation corresponding to the normative annual plant availability factor or the maximum coal/lignite stock storage capacity whichever is lower;*

*(ii) Cost of coal or lignite and limestone for 30 days for generation corresponding to the normative annual plant availability factor;*

*(iii) Cost of secondary fuel oil for two months for generation corresponding to the normative annual plant availability factor, and in case of use of more than one secondary fuel oil, cost of fuel oil stock for the main secondary fuel oil;*

*(iv) Maintenance spares @ 20% of operation and maintenance expenses specified in regulation 29;*

*(v) Receivables equivalent to two months of capacity charges and energy charges for sale of electricity calculated on the normative annual plant availability factor; and*

*(vi) Operation and maintenance expenses for one month.*

### **Fuel Components and Energy Charges in working capital**

57. The petitioner has claimed cost for fuel components in working capital based on “as fired” GCV of coal procured and burnt for the preceding three months of January, 2014, February, 2014



and March, 2014 and secondary fuel oil for the preceding three months of January, 2014, February, 2014 and March, 2014, as under:

(₹ in lakh)						
Sl. No.	Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
1A	Cost of Coal for Stock for 15 days	4223.18	4234.75	4223.18	4223.18	4223.18
1B	Cost of Coal for Generation for 30 days	8446.35	8469.49	8446.35	8446.35	8446.35
2	Cost of Main Secondary Fuel Oil for 2 months	318.39	319.26	318.39	318.39	318.39

58. The petitioner vide affidavit dated 19.8.2014 and 29.10.2014 has submitted the details of GCV of coal as billed for period from Jan'14 to Mar'14.

59. The issue of "as received" GCV for computation of energy charges was challenged by NTPC and other generating companies through writ petition in the Hon'ble High Court of Delhi. The writ petition was heard on 7.9.2015 and Hon'ble High Court of Delhi had directed that the Commission shall decide the place from where the sample of coal should be taken for measurement of GCV of coal on as received basis within 1 month on the request of petitioners.

60. As per the directions of the Hon'ble High Court, the Commission vide order dated 25.1.2016 in Petition No. 283/GT/2014 has decided as under:

*"58. In view of the above discussion, the issues referred by the Hon'ble High Court of Delhi are decided as under:*

*(a) There is no basis in the Indian Standards and other documents relied upon by NTPC etc. to support their claim that GCV of coal on as received basis should be measured by taking samples after the crusher set up inside the generating station, in terms of Regulation 30(6) of the 2014 Tariff regulations.*

*(b) The samples for the purpose of measurement of coal on as received basis should be collected from the loaded wagons at the generating stations either manually or through the Hydraulic Auger in accordance with provisions of IS 436(Part1/Section1)-1964 before the coal is unloaded. While collecting the samples, the safety of personnel and equipment as discussed in this order should be ensured. After collection of samples, the sample preparation and testing shall be carried out in the laboratory in accordance with the procedure prescribed in IS 436(Part1/Section1)-1964 which has been elaborated in the CPRI Report to PSERC."*

61. Further, the petitioner has claimed energy charge rate (ECR) of 150.694 Paise/kWh based on the weighted average price, GCV of coal (as fired basis) & oil procured and burnt for the



preceding three months. It is observed that the petitioner has not placed on record the GCV of coal on “as received” basis though the petitioner was statutorily required to furnish such information with effect from 1.4.2014. In compliance with the direction of the Hon’ble High Court of Delhi, the Commission in its order dated 25.1.2016 in Petition No. 283/GT/2014 has clarified that the measurement of GCV of coal on as received basis shall be taken from the loaded wagons at the unloading point either manually or through the Hydraulic Augur. The petitioner has not submitted the required data regarding measurement of GCV of coal in compliance with the directions contained in the said order dated 25.1.2016. The present petition cannot be kept pending till the petitioner submits the required information. Hence, the Commission has decided to compute fuel components and the energy charges in the working capital by provisionally taking the GCV of coal on as “billed basis” and allowing an adjustment for total moisture as per the formula given as under:

$$\frac{\text{GCV} \times (1 - \text{TM})}{(1 - \text{IM})}$$

Where: GCV=Gross Calorific value of coal  
 TM=Total moisture  
 IM= Inherent moisture

62. In view of the above, the cost for fuel components in working capital have been computed at 83% NAPAF for 2014-17 and 85% NAPAF for the year 2017-19 and based on “as billed” GCV of coal and price of coal procured and secondary fuel oil for the preceding three months from January 2014 to March 2014 and allowed as under:

	<i>(₹ in lakh)</i>				
	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>
Cost of Coal for stock– 15 days	2883.67	2883.67	2883.67	2953.16	2953.16
Cost of Coal for generation– 30 days	5767.34	5767.34	5767.34	5906.32	5906.32
Cost of secondary fuel oil – two months	318.39	319.26	318.39	326.06	326.06

63. Similarly, the energy charge rate (ECR) based on operational norms specified in 2014 Regulations and on “as billed” GCV of coal for preceding 3 months i.e. March to January 2014 is worked out as under:



	<b>Unit</b>	<b>2014-19</b>
Capacity	MW	1000
Gross Station Heat Rate	kCal/kWh	2375.22
Aux. Energy Consumption	%	5.75%
Weighted average GCV of oil (As fired)	kCal/lt.	9,617
Weighted average GCV of Coal (As Billed)	kCal/kg	4726.64
Adjustment on account of coal received at the generating station for equilibrated basis (Air dried) in the billed GCV Of Coal India		*
Weighted average price of oil	Rs./KL	52548.03
Weighted average price of Coal	Rs./MT	1924.39
Rate of energy charge ex-bus	₹/kWh	1.052

\* To be calculated by the petitioner based on the adjustment formula

\*\* To be revised as per the figures at Sr. No. 6

64. The GCV of coal as computed above shall be adjusted in the light of the GCV of coal on “as received basis” computed by the petitioner as per our directions in order dated 25.1.2016 in Petition No. 283/GT/2014.

### Maintenance spares

65. The petitioner has claimed maintenance spares in the working capital as under:

<i>(₹ in lakh)</i>				
<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>
3411.64	3627.07	3855.37	4098.57	4356.73

66. Regulation 28(1)(a)(iv) of the 2014 Tariff Regulations provide for maintenance spares @ 20% of the operation & maintenance expenses as specified in Regulation 29. As specified in Regulation 29 (2) of the 2014 Tariff Regulations and as allowed by the Commission in order dated 6.10.2015 in Petition No. 186/GT/2014 (Sugen Power Plant), the maintenance spares @ 20% of the operation & maintenance expenses including water charges, allowed are as under:

<i>(₹ in lakh)</i>				
<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>
2818.64	2990.34	3172.24	3366.04	3571.74

### Receivables

67. Receivables equivalent to two months of capacity charge and energy charges has been worked out and allowed as under:



	(₹ in lakh)				
	2014-15	2015-16	2016-17	2017-18	2018-19
Variable Charges (two months)	12015.12	12015.12	12015.12	12304.64	12304.64
Fixed Charges (two months)	16968.56	17964.90	18335.00	18455.53	18416.57
<b>Total</b>	<b>28983.68</b>	<b>30012.93</b>	<b>30350.12</b>	<b>30760.17</b>	<b>30721.21</b>

## O&M Expenses

68. O&M expenses for 1 month claimed by the petitioner for the purpose of working capital are as under:

(₹ in lakh)				
2014-15	2015-16	2016-17	2017-18	2018-19
1421.52	1511.28	1606.40	1707.74	1815.30

69. Based on the O&M expense norms specified by the Commission and in terms of the Commission's order dated 6.10.2015 in Petition No. 186/GT/2014, the O&M expenses for 1 month is allowed as under:

(₹ in lakh)				
2014-15	2015-16	2016-17	2017-18	2018-19
1174.43	1245.97	1321.76	1402.51	1488.22

## Rate of interest on working capital

70. Clause (3) of Regulation 28 of the 2014 Tariff Regulations provides as under:

*“Interest on working Capital: (3) Rate of interest on working capital shall be on normative basis and shall be considered as the bank rate as on 1.4.2014 or as on 1st April of the year during the tariff period 2014-15 to 2018-19 in which the generating station or a unit thereof or the transmission system including communication system or element thereof, as the case may be, is declared under commercial operation, whichever is later.”*

71. In terms of the above regulations, SBI PLR of 13.50% (Bank rate 10.00 + 350bps) has been considered for the purpose of calculating interest on working capital. Interest on working capital has been computed as under:

	(₹ in lakh)				
	2014-15	2015-16	2016-17	2017-18	2018-19
Cost of coal towards stock- 15 days	2883.67	2883.67	2883.67	2953.16	2953.16
Cost of coal towards generation- 30 days	5767.34	5783.14	5767.34	5906.32	5906.32
Cost of secondary fuel oil- 2 months	318.39	319.26	318.39	326.06	326.06
Maintenance Spares	2818.64	2990.34	3172.24	3366.04	3571.74
Receivables- 2 months	28983.68	30012.93	30350.12	30760.17	30721.21



O & M expenses- 1 Month	1174.43	1245.97	1321.76	1402.51	1488.22
Total Working Capital	<b>41946.15</b>	<b>43235.32</b>	<b>43813.52</b>	<b>44714.25</b>	<b>44966.70</b>
Rate of Interest	13.50	13.50	13.50	13.50	13.50
<b>Interest on Working Capital</b>	<b>5662.73</b>	<b>5836.77</b>	<b>5914.83</b>	<b>6036.42</b>	<b>6070.50</b>

72. Accordingly, annual fixed charges approved for the generating station for the period from 1.4.2014 to 31.3.2019 is summarized as under:

	(₹ in lakh)				
	2014-15	2015-16	2016-17	2017-18	2018-19
Depreciation	25708.45	27982.23	29082.01	29529.84	29877.73
Interest on Loan	26626.75	26513.14	25368.86	24033.38	21985.03
Return on Equity	29720.24	32505.56	33783.12	34303.35	34707.47
Interest on Working Capital	5662.73	5836.77	5914.83	6036.42	6070.50
O&M Expenses	14093.18	14951.68	15861.18	16830.18	17858.68
<b>Total</b>	<b>101811.35</b>	<b>107789.37</b>	<b>110009.99</b>	<b>110733.17</b>	<b>110499.42</b>

### Month to Month Energy Charges

73. Clause 6 sub-clause (a) of Regulation 30 of the 2014 Tariff Regulations provides for computation and payment of Capacity Charge and Energy Charge for thermal generating stations:

“6. Energy charge rate (ECR) in Rupees per kWh on ex-power plant basis shall be determined to three decimal place in accordance with the following formula:

(a) For coal based and lignite fired stations

$$ECR = \{(GHR - SFC \times CVSF) \times LPPF / CVPF + SFC \times LPSFi + LC \times LPL\} \times 100 / (100 - AUX)$$

Where,

AUX = Normative auxiliary energy consumption in percentage.

CVPF = Gross calorific value of primary fuel as received, in kCal per kg, per litre or per standard cubic metre, as applicable.

CVSF = Calorific value of secondary fuel, in kCal per ml.

ECR = Energy charge rate, in Rupees per kWh sent out.

GHR = Gross station heat rate, in kCal per kWh.

LC = Normative limestone consumption in kg per kWh.

LPL = Weighted average landed price of limestone in Rupees per kg.

LPPF = Weighted average landed price of primary fuel, in Rupees per kg



74. The petitioner shall compute and claim the Energy Charges on month to month basis from the beneficiaries based on the formulae given under Regulation 30(6)(a) of the 2014 Tariff Regulations, 2014 read with Commission's order dated 25.1.2016 in Petition No. 283/GT/2014.

75. The petitioner has been directed by the Commission in its order dated 19.2.2016 in Petition No. 33/MP/2014, to introduce helpdesk to attend to the queries of the beneficiaries with regard to the Energy Charges. Accordingly, contentious issues if any, which arise regarding the Energy Charges, should be sorted out with the beneficiaries at the Senior Management level.

### **Application Fee and Publication Expenses**

76. The petitioner has sought the reimbursement of filing fee and also the expenses incurred towards publication of notices for application of tariff for the period 2014-19. The petitioner has deposited the filing fees for the period 2014-15 in terms of the provisions of the Central Electricity Regulatory Commission (Payment of Fees) Regulations, 2012. Accordingly, in terms of Regulation 52 of the 2014 Tariff Regulations and in line with the decision in Commission's order dated 5.1.2016 in Petition No. 232/GT/2014, we direct that the petitioner shall be entitled to recover pro rata, the filing fees and the expenses incurred on publication of notices for the period 2014-15 directly from the respondents on submission of documentary proof. The filing fees for the remaining years of the tariff period 2015-19 shall be recovered pro rata after deposit of the same and production of documentary proof.

77. The annual fixed charges approved for the period 2014-19 as above are subject to truing-up in terms of Regulation 8 of the 2014 Tariff Regulations.

78. Petition No. 339/GT/2014 is disposed of in terms of the above.

**Sd/-  
(Dr. M.K. Iyer)  
Member**

**Sd/-  
(A. S. Bakshi)  
Member**

**Sd/-  
(A. K. Singhal)  
Member**

**Sd/-  
(Gireesh B. Pradhan)  
Chairperson**



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

(₹ in lakh)

Particulars	Interest Rate	Loan deployed as on 1.4.2014	Additions during the tariff period	Total
	<b>2014-19</b>			
BTMU	1.7395%	33351.69	0.00	3351.69
EURO Bond III-5.625%	7.1775%	60019.47	0.00	60019.47
EURO Bond IV-4.75%	5.0215%	32320.82	0.00	32320.82
SBI New York	2.2482%	8262.35	0.00	8262.35
LIC V-D-1 repayment form 17.9.2012	11.0000%	20000.00	0.00	20000.00
LIC V-D-2 repayment form 17.9.2012	11.0000%	1963.75	0.00	1963.75
Canara Bank II Repayment from 30.12.2012	10.2000%	1000.00	0.00	1000.00
PFC-V Total Repayment form 15.7.2013	9.7193%	86800.00	0.00	86800.00
Syndicate Bank-II repayment form 30.9.2013	10.2500%	1000.00	0.00	1000.00
SBH-II repayment form 30.9.2013	10.2000%	1000.00	0.00	1000.00
SBI-V repayment form 30.9.2011	11.0000%	3000.00	0.00	3000.00
Bank of Maharashtra III repayment form 22.3.2013	10.5000%	10000.00	0.00	10000.00
United Bank of India III repayment form 23.9.2012	10.5000%	2000.00	0.00	2000.00
United Bank of India II repayment form 28.9.2011	10.5000%	3571.42	0.00	3571.42
Allahabad bank III repayment form 28.3.2014	10.2000%	3500.00	0.00	3500.00
SBI-VI repayment form 30.9.2012	11.0000%	13000.00	0.00	13000.00
HUDCO Ltd repayment from 31.5.2014	9.9300%	14500.00	0.00	14500.00
Indian Bank-II repayment from 29.12.2012	10.2000%	2000.00	0.00	2000.00
J&K bank –III-D5 date of repayment 18.12.2018 10 inst	10.2500%	5000.00	0.00	5000.00
Andhra Bank II repayment form 28.3.2019	10.2500%	5000.00	0.00	5000.00
United bank of India II repayment form 1.2.2017	10.2500%	2000.00	0.00	2000.00
Punjab and Sindh Bank repayment form 22.3.2013	10.2500%	6400.00	0.00	6400.00
SBI VII repayment form 30.9.2015	10.2500%	29500.00	0.00	29500.00
Indian Over seas Bank III repayment from 19.9.2015	10.2500%	20000.00	0.00	20000.00
Vijaya Bank V D-4 repayment form 29.9.2015	10.2000%	7000.00	0.00	7000.00
Bond XLII Series repayment from 25.1.2023	9.0300%	400.00	0.00	400.00
Bond XLVII Series repayment from	8.8700%	2500.00	0.00	2500.00





Particulars	Interest Rate	Loan deployed as on 1.4.2014	Additions during the tariff period	Total
4.10.2022				
Bond XLIX Series repayment from 4.4.2023	8.8300%	4300.00	0.00	4300.00
Bond L- IA repayment from 16.12.2023	8.4400%	1673.23	0.00	1673.23
Bond L- 2A repayment from 16.12.2028	8.5100%	856.95	0.00	856.95
Bond L- 3A repayment from 16.12.2023	8.6900%	1069.80	0.00	1069.80
Bond L- 1B repayment from 16.12.2023	8.6900%	715.33	0.00	715.33
Bond L- 2B repayment from 16.12.2028	8.7600%	313.34	0.00	313.34
Bond L- 3B repayment from 16.12.2023	8.9400%	1371.31	0.00	1371.31
Bond XXVI repayment from 4.6.2012	8.9400%	1963.75	0.00	1963.75
<b>Total</b>		<b>387353.21</b>	<b>0.00</b>	<b>387353.21</b>

**WEIGHTED AVERAGE RATE OF INTEREST ON LOAN DURING 2014-19 TARIFF PERIOD**

(₹ in lakh)

Particulars	2014-15	2015-16	2016-17	2017-18	2018-19
<b>Gross Loan</b>	387353.21	387353.21	387353.21	387353.21	387353.21
Cum Repayment	22481.07	41450.44	67607.31	110540.03	233780.47
Net Loan	364872.14	345902.77	319745.90	276813.18	233780.47
Increase/decrease due to FERV	0.00	0.00	0.00	0.00	0.00
Increase/decrease due to ACE/Drawal during the period	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>364872.14</b>	<b>345902.77</b>	<b>319745.90</b>	<b>276813.18</b>	<b>233780.47</b>
Repayment	18969.37	26156.87	42932.71	43032.71	26189.02
Net Loan Closing	345902.77	319745.90	276813.18	233780.47	207591.45
Avg net loan	355387.45	332824.33	298279.54	255296.83	220685.96
Wtd. Avg Rate of Interest (%)	<b>8.1384</b>	<b>7.9954</b>	<b>7.9726</b>	<b>8.1454</b>	<b>8.1385</b>
Interest	28922.75	26610.76	23780.50	20794.96	17960.49

