

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Petition No. 281/GT/2014**

**Coram:**

**Shri A.S. Bakshi, Member  
Dr. M. K. Iyer, Member**

**Date of Hearing: 11.7.2016**

**Date of Order : 29.7.2016**

**In the matter of**

Approval of tariff of Talcher Super Thermal Power Station Stage-I (2x500 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. West Bengal State Electricity Distribution Company Limited  
Vidyut Bhawan, Block-DJ,  
Sector-II, Salt Lake City  
Kolkata – 700 091

2. Bihar State Power Holding Company Limited  
(erstwhile Bihar State Electricity Board)  
Vidyut Bhawan, Bailey Road  
Patna – 800 001

3. Jharkhand Urja Vikas Nigam Ltd.  
Engineering Bhawan  
Heavy Engineering Corporation  
Dhurwa, Ranchi-834 004.

4. GRIDCO Limited  
Janpath,  
Bhubaneswar – 751007

5. Damodar Valley Corporation  
DVC Towers, VIP Road  
Kolkata-700054

6. Power Department  
Govt. of Sikkim, Kazi Road,



Gangtok, Sikkim-737101  
7. Assam Power Distribution Company Ltd  
Bijulee Bhawan, Paltan Bazar  
Guwahati – 781001

8. Tamil Nadu Generation and Distribution Company Limited  
NPKRP Maaligail,  
144, Anna Salai, Chennai – 600002

...Respondents

**Parties present:**

For Petitioner: Shri Sameer Aggarwal, NTPC  
Shri Rajeev Chaudhary, NTPC  
Shri Ajay Dua, NTPC  
Shri Shailendra Singh, NTPC

For Respondents: Shri R. B. Sharma, Advocate, GRIDCO & BSP(H)CL  
Shri Madhusudan Sahoo, GRIDCO

**ORDER**

This petition has been filed by the petitioner, NTPC for approval of tariff of Talcher Super Thermal Power Station, Stage-I (2 x 500 MW) (hereinafter referred to as “the generating station”) for the period 20014-19 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 with a capacity of 1000 MW comprises of two units of 500 MW each and the said units were declared under commercial operation on 1.1.1997 and 1.7.1997 respectively.

3. The Commission by order dated 15.6.2012 in Petition No. 228/2009 had approved the tariff of the generating station for the period 2009-14 considering the opening capital cost of ₹251595.54 lakh as on 1.4.2009 (after removal of un-discharged liabilities of ₹1469.52 lakh as on 1.4.2009). Aggrieved by the said order dated 15.6.2012, the petitioner filed Review Petition No. 23/2012 and the same was allowed by order dated 15.4.2013. Thereafter, in Petition No. 243/GT/2013 filed by the petitioner for truing-up of tariff in terms of the proviso to clause 6(1) of the 2009 Tariff



Regulations, the Commission vide order dated 21.12.2015 revised the annual fixed charges of the generating station based on the actual additional capital expenditure incurred for the years 2009-10, 2010-11 and 2011-12 and projected additional capital expenditure for the years 2012-13 and 2013-14, based on the latest estimates and status of works. Subsequently, the Commission vide order dated 20.7.2016 in Petition No. 207/GT/2014 had revised the tariff of the generating station for the period 2009-14 after truing-up of tariff in terms of Regulation 6 (1) of the 2009 Tariff Regulations, considering the capital cost of ₹257916.15 lakh as on 31.3.2014 and after deduction of un-discharged liabilities of ₹1469.52 lakh as on 1.4.2009. Accordingly, the annual fixed charges approved by the said order dated 20.7.2016 is as under:

	(₹ in lakh)				
	2009-10	2010-11	2011-12	2012-13	2013-14
Depreciation	6202.04	6253.49	6302.73	6461.33	6749.88
Interest on Loan	543.82	134.48	0.00	0.00	0.00
Return on Equity	29526.24	29230.43	28948.82	29058.66	29884.69
Interest on Working Capital	4472.83	4500.85	4545.83	4592.05	4666.89
O&M Expenses	13000.00	13740.00	14530.00	15360.00	16240.00
Secondary fuel oil cost	1524.49	1524.49	1528.67	1524.49	1524.49
Compensation Allowance	150.00	150.00	150.00	250.00	350.00
<b>Total</b>	<b>55419.42</b>	<b>55533.74</b>	<b>56006.04</b>	<b>57246.54</b>	<b>59415.95</b>

4. The petitioner in this petition filed vide affidavit dated on 13.8.2014 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	262144.25	264805.25	276565.25	286863.25	316966.25
Add: Additional capital expenditure	2661.00	11760.00	10298.00	30103.00	4100.00
<b>Closing Capital Cost</b>	<b>264805.25</b>	<b>276565.25</b>	<b>286863.25</b>	<b>316966.25</b>	<b>321066.25</b>
<b>Average Capital Cost</b>	<b>263474.75</b>	<b>270685.25</b>	<b>281714.25</b>	<b>301914.75</b>	<b>319016.25</b>

### Annual Fixed Charges

	(₹ in lakh)				
	2014-15	2015-16	2016-17	2017-18	2018-19
Depreciation	7385.30	8313.69	9970.80	13392.51	16972.78
Interest on Loan	0.00	0.00	0.00	296.09	256.36
Return on Equity	26332.07	26772.89	27447.15	28682.12	29727.63



Interest on Working Capital	6335.47	6449.82	6566.21	6759.99	6950.24
O&M Expenses	18000.34	19137.36	20342.45	21626.11	22988.90
Compensation Allowance	500.00	500.00	500.00	750.00	1000.00
<b>Total</b>	<b>58553.18</b>	<b>61173.76</b>	<b>64826.61</b>	<b>71506.82</b>	<b>77895.91</b>

5. In compliance with the directions of the Commission, the petitioner has filed additional information and has served copies of the same on the respondents. The respondents, GRIDCO and TANGEDCO have filed their replies in the matter and the petitioner has filed its rejoinder to the said replies. 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 1.4.2009

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 tured 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 annual fixed charges claimed in the petition are based on opening capital cost of ₹262144.25 lakh as on 1.4.2014, as against the closing capital cost of ₹257916.15 lakh as on 31.3.2014 as admitted by the Commission vide order dated 20.7.2016 in Petition No. 207/GT/2014. Further, the petitioner vide affidavit dated 13.8.2014 has furnished the value of capital cost and liabilities as on 1.4.2014 as per books of accounts in Form-9E. The details of liabilities and capital cost have been reconciled with the information available with the records of the Commission as under:

	<i>(₹ in lakh)</i>	
	<b>As per Form-9E</b>	<b>As per records of Commission</b>
Capital cost as on 1.4.2014 as per books	269232.81	269232.81
Liabilities included in the above	681.09	681.09



8. It is evident from the above that there is no variation in the capital cost and liabilities position as on 1.4.2014 as per the books and details available with the Commission. Further, out of the total liabilities amounting to ₹681.09 lakh, the liabilities corresponding to the approved works is ₹637.33 lakh which corresponds to the approved capital cost of ₹257916.15 lakh (on cash basis) as on 31.3.2014. Accordingly, the opening capital cost considered as on 1.4.2014, after removal of un-discharged liabilities works out to ₹257916.15 lakh (on cash basis).

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

9. 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 obsolesce 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.”

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

(₹ in lakh)

Sl. No.	Head of Work /Equipment	Regulations	2014-15	2015-16	2016-17	2017-18	2018-19	Total
<b>I</b>	<b>Ash dyke raising &amp; Strengthening works.</b>							
(i)	Ash dyke works of Lagoon 1 (Including Raising & strengthening).	14(3)(iv) & 54 & 55	850.00	5100.00	4100.00	0.00	0.00	10050.00
(ii)	Ash dyke works of Lagoon 2 (Including Raising & strengthening).	14(3)(iv) & 54 & 55	1057.00	1245.00	1050.00	3905.00	4100.00	11357.00
(iv)	Land for new ash dyke	14(3)(iv)	0.00	0.00	0.00	2458.00		2458.00
(iii)	4th pump in ash slurry series	14(3)(iv)	315.00	315.00	0.00	0.00	0.00	630.00
	<b>Sub Total- I</b>		<b>2222.00</b>	<b>6660.00</b>	<b>5150.00</b>	<b>6363.00</b>	<b>4100.00</b>	<b>24495.00</b>
<b>II</b>	<b>Works under Change of Law.</b>							



(i)	Seepage water recycling system	14(3)(ii)	0.00	1500.00	774.00	0.00	0.00	2274.00
(ii)	Mine void filling through lean slurry system	14(3)(ii)	0.00	0.00	0.00	21340.00	0.00	21340.00
(iii)	Up-gradation of ESP of Stage-I	14(3)(ii)	0.00	3600.00	3600.00	2400.00	0.00	9600.00
(iv)	Separate Ash evacuation system of stage-I boiler and economiser Hoppers	14 (3)(ii)	140.00	0.00	0.00	0.00	0.00	140.00
(v)	Modification/ addition/ replacement of fire detection & protection system in Stage- I.	14 (3) (ii) & (iii)	299.00	0.00	774.00	0.00	0.00	1073.00
	<b>Sub Total- II</b>		<b>439.00</b>	<b>5100.00</b>	<b>5148.00</b>	<b>23740.00</b>	<b>0.00</b>	<b>34427.00</b>
	<b>Total Additional Capitalisation claimed</b>		<b>2661.00</b>	<b>11760.00</b>	<b>10298.00</b>	<b>30103.00</b>	<b>4100.00</b>	<b>58922.00</b>

11. The projected additional capital expenditure claimed by the petitioner is discussed in the succeeding paragraphs.

#### **Ash dyke raising & strengthening works**

12. The petitioner has claimed projected additional capital expenditure of ₹1907.00 lakh in 2014-15, ₹6345.00 lakh in 2015-16, ₹5150.00 lakh in 2016-17, ₹3905.00 lakh in 2017-18 and ₹4100.00 lakh in 2018-19 towards works of Ash dyke raising consisting of two Lagoons i.e. Lagoon-1 and Lagoon-2 (including raising & strengthening). In justification of the same, the petitioner has submitted that these works are under approved scheme in the original scope of works relating to ash pond/ash handling system. It has submitted that total 7 raisings were envisaged initially for catering to the need of ash disposal for life of Stage-I i.e. 2021-22 at the time of investment approval as per the prevailing norms of 62.80% PLF at that time. The petitioner has also submitted that over the period the operating norms have been revised from 62.80% to 85% and the operating level (PLF) of the generating station has also increased significantly with the integration of ER grid with other Regional grids. Accordingly, the petitioner has submitted that this has led to increase in the annual production of ash, specifically in Stage-I to 26.5 lakh cum., as against an expected disposal of 14.4 lakh cum. estimated during the initial design stage. It has further submitted that 5 raisings have already been completed in both Lagoon 1 & 2 of Stage-I ash dyke up to 2009-14. It has submitted that in order to fulfil the need of ash disposal, 6<sup>th</sup> and 7<sup>th</sup> raisings are planned now in



2014-16 much earlier than envisaged. The petitioner has stated that at this rate even with these newly created raisings, full capacity of Stage-I dyke is likely to exhaust by the year 2016-17 instead of its full envisaged service life till 2020-21. The petitioner has submitted that incidents of ash dyke breach / crack have occurred in the past wherein SPCB had issued closure notice because of problems in ash dyke, subsequent to which the petitioner took a number of measures most of which are going to be completed & capitalised during 2014-19. The petitioner has also submitted that it took expert advice from NIT Rourkela for resolving ash dyke problem of the generating station and the expert undertook study of the dyke for stability, seepage analysis, liquification, slope protection of the ash fill and suggested buttressing/strengthening of ash dyke by evacuating ash from existing filled up lagoon and using it as fill material for buttressing at least for a width of 7m. It has further stated that the works claimed include raising and associated strengthening work in both Lagoon 1 & 2 as suggested by the expert committee and this would create additional space of 100 lakh cum in the existing dyke. Accordingly, the petitioner has prayed that the Commission may approve the additional capital expenditure claimed in the petition.

13. The respondent, GRIDCO has submitted that the work contemplated by the petitioner in raising Ash dyke for ash disposal, ash pond work is not actually a deferred work but is a continuous process during the entire operational life time of the generating station and hence it is an O&M expense for which an increased norm in the 2014 Tariff Regulations, have been incorporated. The respondent has further submitted that necessary documents in support of the claim may be produced by the petitioner otherwise the expenditure may be treated as of continuous nature and the same be met from the O&M expenses provided for this generating station. The respondent TNAGEDCO has submitted that that the claim towards ash dyke raising works will unduly enrich the generator at the cost of the respondents. It has also submitted that the petitioner has included compensation allowance and has also claimed expenditure on ash dyke raising separately. The respondent has further submitted that the generating station is in service from 1997 and will be completing its useful life during the year 2021-22 and therefore the claim of the petitioner for the





expenditure in respect of 6<sup>th</sup> and 7<sup>th</sup> raisings (which is planned for the period 2021-22) during the period 2014-19, is liable to be rejected.

14. We have examined the matter. It is observed from the submissions of the petitioner that expenditure projected towards ash dyke raising is for planned works related to ash pond/ ash handling system which is of continuous nature during the operational life of generating station and the works claimed are as per the approved scheme under original scope of work. The petitioner has submitted newspapers extracts from 2011 depicting the coverage of the issues pertaining to ash disposal. As the expenditure is covered under original scope of works and based on environmental considerations the said expenditure is allowed under Regulation 14(3)(iv) of the 2014 Tariff Regulations for the period 2014-19.

15. As regards, expenditure projected for strengthening and buttressing works of ash dyke, the petitioner has enclosed the expert study report on distress of R2 raising of Lagoon 1, Stage-1. The study pertains to Lagoon-1 and the expert recommended strengthening and buttressing works against the same on an urgent basis. Since, these strengthening works were not envisaged originally but are required for the reasons stated above, these have been claimed under Regulation 14(3)(ii) along with Regulation 54 "Power to Relax" and Regulation 55 "Power to Difficulty" of the 2014 Tariff Regulations. It is observed that the petitioner had claimed an expenditure of ₹877.00 lakh towards ash dyke strengthening works in Lagoon-1 during 2012-14 and the same had been allowed vide order dated 20.7.2014 in Petition No. 207/GT/2014. The dyke strengthening works in Lagoon-1 are allowed as the expenditure is based on environmental considerations and on the recommendations of the expert study group, under Regulation 14(3)(iv) of the 2014 Tariff Regulations for the period 2014-19. However, since the study referred to by the petitioner doesn't specify any recommendations for the Lagoon-2, we are of the view that the expenditure towards strengthening works is not justified in Lagoon-2. Accordingly, we allow the estimated expenditure only towards Ash dyke raising works for Lagoon-2 to the tune of ₹3352.00 lakh (₹1057.00 lakh in 2014-15, ₹1245.00 lakh in 2015-16, and ₹1050.00 lakh in 2016-17). The expenditure towards dyke



strengthening works in Lagoon-2 would be considered at the time of truing up subject to submission of documentary evidence to justify the works. Further, the petitioner is directed to submit at the time of truing up of tariff, the detail break-up of the activities along with the cost incurred for each work under the Raising of Ash Dyke works, the estimated expenditure envisaged for Ash Handling system/ Ash Dyke Raising in the original scope of work, the actual expenditure incurred as on COD of the generating station and from COD to 2018-19.

### **Land for new ash dyke**

16. The petitioner has claimed projected additional capital expenditure of ₹2458.00 lakh in 2017-18 towards land for new ash dyke under Regulation 14(3)(iv) of the 2014 Tariff Regulations. The petitioner has submitted that due to change in operational norms in the initial design, there is substantial increase in ash generation that cannot be disposed with the existing ash ponds for Stage-I. It is further submitted that in the existing ash dyke, already 5 raisings have been completed and 2 more raisings are planned during 2014-16 in both lagoon-1 & 2 as envisaged in the original scope of works and the annual ash production in Stage-1 is 26.5 lakh cum against estimated disposal of 14.4 lakh cum during initial design stage. It has further submitted that at this rate, Stage-I dyke capacity is likely to be exhausted by 2016-17, despite 6<sup>th</sup> and 7<sup>th</sup> raising instead of its full envisaged service life till 2020-21. The petitioner has stated that in view of the reasons explained above, additional land is required for Stage-I ash disposal for completing its useful life. The petitioner has submitted that it has applied for additional land for ash dyke disposal and the State administration has given the approval for acquisition of 535 acres of land for ash dyke of the generating station. The respondent GRIDCO has submitted that the justification furnished by the petitioner is merely academic in nature and has no practical aspects. It has submitted that coal is supplied to this power station from its linked mine and the petitioner was aware of the ground situation. It has further submitted that this generating station has been operating at a very high PLF since its inception and thus the justification furnished by the petitioner is only an excuse and liable to be rejected.



17. We have considered the submissions. It is observed that additional land is required for Stage-I ash disposal and in support the petitioner has enclosed copies of approval of the Department of Energy, Government of Odisha, in respect of 87.24 acres of private land, 110.57 acres of govt. land and 309.11 acres of forest land for the purpose of new ash dyke for the generation station. It is observed from these documents that the administrative approval has been accorded for 110.57 acres of govt. land and 309.11 acres of forest land vide letter dated 22.5.2013, while for the 87.24 acres of private land, the approval is only for the purpose of publishing notification u/s 4(1) of the Land Acquisition Act (LA). In view of the requirement of ash disposal, the expenditure on land for new ash dyke is allowed under Regulations 14(3)(iv) of the 2014 Tariff Regulations. However, the petitioner is directed to submit at the time of truing up of tariff the details of expenditure incurred towards the overall land acquired for new ash dyke.

#### **Installation of 4<sup>th</sup> Slurry Pump**

18. As against the expenditure of ₹800.00 lakh allowed vide Commission's order dated 15.6.2012 in Petition No.228/2009, the petitioner has claimed projected additional capital expenditure of ₹630.00 lakh (₹315.00 lakh in 2014-15 and ₹315.00 lakh in 2015-16) in respect of the Installation of 4<sup>th</sup> slurry pump during 2014-16. The petitioner did not claim any expenditure in Petition No. 207/GT/2014 on this count. The petitioner has submitted that the work is required to handle the increased pumping head of ash slurry pumps consequent to raising of ash dykes and is as per approved scheme in the original scope of works relating to ash pond or ash handling system. The petitioner has further submitted that the work included additional pump in existing series with space creation for new pump in existing ash slurry pump house and suitable relocation of pipeline. It has submitted that the petitioner had initiated the actions for implementation of the scheme in 2010-11 but the design finalization took time since this additional pump & associated equipment and piping had to be accommodated in an existing power house with other running vital equipment and space constraint. The petitioner has also submitted that after considering various alternative options, specifications and Qualifying Requirement (QR) for the work were finalised, post which the bid was



opened on 28.3.2012, but there was poor response from vendors that led to time extension on many occasions at the request of vendors. It is submitted that only one party qualified finally to which the purchase order was placed on 1.5.2013, contract was awarded and the work has already started.

19. We have considered the submissions of the parties. The Commission in order dated 15.6.2012 had allowed the projected capitalisation of ₹800.00 lakh for this item/asset and decided that *“the work relating to ash dyke raising and associated work of ash handling system form part of the original approved scope of works and are normally taken up in stages as and when required during the life of the generating station. Since the expenditure is specifically covered under Regulation 9(2)(iii) of the 2009 Tariff Regulations, we allow the expenditure claimed for 2009-14 for capitalization, under this head.”* Thereafter, in respect of the claim of the petitioner for this asset in Petition No. 207/GT/2014, the Commission by order dated 20.7.2014 decided as under:

*“36....Accordingly, the petitioner has prayed that the said expenditure may be allowed upon capitalization during the period 2014-19. In view of the submissions of the petitioner, we grant liberty to the petitioner to claim the capitalization of this expenditure during the period 2014-19 and the same would be considered in terms of the 2014 Tariff Regulations.”*

20. Since the expenditure of ₹630.00 lakh projected to be incurred by the petitioner during 2014-16 is within the projected expenditure allowed vide order dated 15.6.2012, we are inclined to allow the additional capital expenditure estimated by the petitioner on this item, in terms of Regulation 14(3)(iv) of the 2014 Tariff Regulations. Accordingly, the additional capital expenditure of ₹630.00 lakh (315.00 lakh+315.00 lakh) has been allowed for the purpose of tariff.

### **Works under change in law**

#### **Seepage water recycling system**

21. The petitioner has claimed projected additional capital expenditure of ₹1500.00 lakh in 2015-16 and ₹774.00 lakh in 2016-17, for construction of seepage water re-circulation pump house under Regulation 14(3)(ii) of the 2014 Tariff Regulations. In justification of the same, the petitioner has submitted that the Orissa Pollution Control Board (OPCB) in the consent order dated 13.1.2012 has observed the issue of overflow of ash dyke seepage water of the generating station going into the



adjoining Tikira River. It has also submitted that OPCB in the Consent order dated 13.1.2012 has directed the petitioner to completely recycle seepage and overflow effluent of ash pond and accordingly, the petitioner finalised a scheme for construction of seepage water re-circulation pump house (into dyke) at different locations of ash dyke with necessary power arrangement & provision of area lighting system for having zero discharge. The petitioner has stated that the scheme will enable pumping back the seepage water from ash dyke lagoons to overflow lagoon.

22. The respondent, GRIDCO has submitted that there is no mention of this additional work in the consent order dated 13.1.2012 issued by the OPCB and this requirement is only to maintain the conditions stipulated by proper upkeep of assets by the petitioner. It has also submitted that the selective documentation furnished in the petition does not reflect the real issue, if any, on the subject.

23. We have examined the matter. The petitioner has submitted a copy of the consent order dated 13.1.2012 from OPCB wherein the petitioner has been directed to completely recycle seepage and overflow effluent of ash pond. It is further observed from the consent order dated 19.8.2014, that the aforesaid works are required for compliance with the statutory guidelines. The conditions to be complied as stated in the consent order are as under:

*“Additional conditions to be complied as per this office Letter No. 10597, dtd. 01.07.2014 and to be covered under Bank guarantee of Rs 13.60 Cr.*

*(1) Laying cast basalt pipeline replacing MS slurry pipeline for stage-II units to prevent frequent rupture of the ash slurry pipe line by December 2015.*

*(2) Project for collection, treatment and reuse of seepage water in ash pond area (both stage I&II shall be completed by 30.06.2016.*

*(3) Up-gradation of ESPs of Unit -1 and Unit -2 of Stage-I through retrofitting shall be completed by 30.06.2015 and by 30.06.2016 respectively.*

*(4) Bank guarantee worth Rs.13.40 crores shall be submitted to the Board by 31<sup>st</sup> August, 2014 as asked vide Board's letter no.10597 dtd. 01/07/2014.”*

24. As seen above, the consent order dated 19.8.2014 of OPCB envisaged the need to complete the project for collection, treatment and reuse of seepage water in ash pond area (for both stage-I & II of the generating station) by 30.6.2016. It is not clear from the submissions of the petitioner



whether the work has been completed within the time line specified in the consent order. However, considering the fact that the expenditure is required for compliance with the statutory guidelines of the OPCB based on the environmental considerations, the projected additional capital expenditure is allowed under Regulation 14(3)(ii) of the 2014 Tariff Regulations. The petitioner is directed to submit the reasons for delay in completion of the said activities, if any, at the time of revision of tariff based on true-up exercise in terms of Regulation 8 of the 2014 Tariff Regulations.

### **Mine void filling through lean slurry system**

25. The petitioner has claimed projected additional capital expenditure of ₹21340.00 lakh in 2017-18, for implementing the scheme for transportation of fly ash to mine void at Jagannath quarry under Regulation 14(3)(ii) of the 2014 Tariff Regulations. In justification of the same, the petitioner has submitted that the OPCB in their consent order dated 13.1.2012 at Clause No. 15 of special system conditions for water pollution control directed the petitioner to expedite all works towards ash disposal in mine voids of Jagannath quarry. It has submitted that during the high level meeting held on 8.7.2011 with Govt. of Odisha, Ministry of Environment Odisha and OSPCCB on the issue of closure notice served to the generating station for ash dyke problem, deliberations were held on mine filling with ash and accordingly the station has prepared a comprehensive scheme for implementing the scheme for transportation of fly ash to mine void at Jagannath quarry and the same has been approved by the management of petitioner's company.

26. The respondent, GRIDCO has submitted that the State Pollution Control Board had only asked to expedite the study and survey required for transportation of fly ash. It has also submitted that the issue pertains to ash utilization and the petitioner must find out the ways and means for ash utilization either by selling the by-product or by some other commercial efforts like brick manufacturing and use these efforts in the reduction of energy charges.

27. We have examined the matter. The petitioner has submitted a copy of the consent order dated 13.1.2012 from SPCB, Odisha where the petitioner has been directed to expedite all the study and



survey required for transportation of fly ash to the mine void at the Jagannath quarry so that physical work can be started by December 2012. It is further observed in the Special Conditions Clause F1 (5) in the consent order dated 19.8.2014, that the petitioner is required to expedite the project for disposal of ash in the allotted mine void of Jagannath OCP of Mahanadi Coalfields Limited (MCL). In response to the directions of the Commission vide Record of the Proceedings of the hearing dated 20.5.2016, the petitioner has affidavit dated 5.7.2016, has submitted detailed justification for the aforesaid claim. The relevant portion of the affidavit is extracted as under:

*“Due to geographical disadvantage of location, the utilization of ash in nearby industry has been very low, there are no cement plants in the vicinity and there is not much demand of fly ash bricks in the state and there are not many infrastructure projects coming up in the State where the fly ash can be utilized. Therefore, there is no other option than to use for mine void filling. The issue has been discussed at various levels with State Pollution Control Board and Environment Ministry of Odisha, and it was suggested that TSTPS should look for a long term solution by utilizing the high quantity of ash generated through mine voids filling. The issue was taken-up with Mahanadi Coalfield Limited (MCL) and they have allocated Jagannath OCP for mine filling by ash generated from the TSTPC, letters of allocation enclosed as Annexure -5.*

*In this regard SPCB in their consent dtd 13.01.2012 at point 15&17 of special conditions for water pollution control ( page 63 of petition) has directed to expedite works towards ash disposal in mine voids of Jagannath quarry in order to comply with the provisions of fly ash utilization notification of MoEF dtd 03.11.2009. Also SPCB in their consent dtd 19.08.2014 has as special conditions of consent (point No.5) reiterated that unit shall expedite the project for disposal of ash in the allotted mines voids of Jagannath OCP of MCL (enclosed as Annexure- 6).”*

28. The petitioner has submitted that it has prepared a detailed scheme for implementing mine void filling through lean slurry based on study by M/s Desein Ltd., and has projected the capitalisation of the amount in 2017-18. The petitioner has further submitted that no ash filling in mines can be done in Talcher Angul area without prior approval of Ministry of Environment & Forest (MoEF). From the copy of the application enclosed by the petitioner, it is observed that the petitioner had proposed to the MoEF, GOI for amendment in the Environment Clearance for the Stage-1 of the generating station for disposal of ash into the voids of Jagannath Mine (Quarry No. 8 on 16.2.2015 and the said proposal is presently under consideration of Expert Appraisal Committee (EAC) under MoEF, GOI and the MoEF, GOI is in the process of taking a policy decision regarding mine void filling of ash. It is submitted by the petitioner that the work involves laying of pipelines corridor of around 20 km along with a Booster pump house in between which will be a forest land for which land diversion is required. In support of this, the petitioner has submitted a copy of the letter dated



8.4.2016 of the Chief Conservator of forests, Bhubhaneswar, Odisha addressed to the Divisional forest Officer, Deogarh Forest Division, depicting the need for identification of degraded forest land for compensatory afforestation in the context of diversion of land for mine void filling by the generating station. It is further observed that the work shall be undertaken only after clearance from MoEF, GOI. Considering the fact that these works which are required in compliance with the statutory guidelines have not yet been approved by the MOEF, GOI, we are of the considered view that the expenditure projected by the petitioner cannot be considered at this stage. We direct accordingly. However, we grant liberty to the petitioner to approach the Commission after approval of the works, by the competent authority and the same will be considered at the time of revision of tariff based on truing up exercise in terms of Regulation 8 of the 2014 Tariff Regulations.

#### **Separate Ash evacuation system of Stage-I boiler and Economiser Hoppers**

29. The petitioner has claimed projected additional capital expenditure of ₹140.00 lakh in 2014-15 towards Separation of Ash evacuation system of Stage-I boiler and Economiser hoppers under Regulation 14(3)(ii) of the 2014 Tariff Regulations. In justification of the same, the petitioner has referred to the action plan prepared by the petitioner in accordance with the directions of OPCB to bring down emission levels to prescribed standard of 100 mg/Nm<sup>3</sup> and to take steps to achieve emission standard of 50 mg/Nm<sup>3</sup>. It has submitted that based on the conditions prescribed by the OPCB, the action plan was made for both short term and long term for meeting the conditions prescribed. It has submitted that as part of the short term works, the up-gradation of ESP controller of Stage-I was undertaken during 2012-14 and the work of separation of hoppers of Boiler economiser and air pre-heater for reducing the emission level from boilers of Stage-I, laid down as one of the special conditions of OPCB in the consent order dated 13.1.2012 has been started and completed in 2014-15.

30. The respondent, GRIDCO has submitted that the work related to 'Separate Ash evacuation system of Stage-I boiler and economiser Hopper' amounting ₹140.00 lakh to bring down the SPM level to below 50 mg/Nm<sup>3</sup> is undergoing since the last tariff period but no progress (physical and





financial) has been filed in the petition. In response, the petitioner has reiterated that the short term works including the work of up-gradation of ESP controller of Stage-I (completed during 2012-14) and separation of hoppers of the boiler economizer and air pre-heater have been completed during 2014-15.

31. The matter has been examined. The Commission in its order dated 21.12.2015 in Petition No. 243/GT/2013 had allowed the projected additional capital expenditure of ₹546.00 lakh for this item/asset for the period 2012-14 and had observed as under:

*“24. We have examined the matter. It is noticed that that the short term work of up-gradation of ESP controller of Stage-I was undertaken by the petitioner during 2012-14 in order to comply with the CEPI action plan notified by SPCB Odisha in 2012 which mandates the bringing down the level of emissions 100/50 mg/Nm<sup>3</sup> for all units and to take steps to achieve emission standard of 50 mg/Nm<sup>3</sup> as per CEPI action plan. Based on the above submissions and since the expenditure incurred is on account of compliance with the statutory guidelines of the Pollution Control Board, we allow the additional capital expenditure for ₹546.00 lakh on this count under Regulation 9(2)(ii) of the 2009 Tariff Regulations. However, the capitalization of the expenditure towards long term plan for ESP, Stage-I up gradation and retrofitting which are expected to be capitalized in stages during the period 2015-18 as submitted by the petitioner vide affidavit dated 22.7.2014 shall be considered in terms of the provisions of the 2014 Tariff Regulations.”*

As regards the claim of the petitioner in Petition No. 207/GT/2014, the Commission in its order dated 20.7.2016 had observed as under:

*“It is noticed that the petitioner in its rejoinder dated 15.6.2016 has submitted that the works towards “modification of Boiler Ash evacuation system” have been completed and has been capitalised in 2014-15. However, the petitioner has claimed an expenditure of ₹0.91 lakh in 2013-14 due to some delay in the capitalisation of the said work projected earlier. However, from the Petition No. 281/GT/2014 filed by the petitioner on 13.8.2014 for determination of tariff for the period 2014-19 in respect of this generating station, it is observed that the petitioner has claimed the balance expenditure of ₹140.00 lakh in 2014-15 towards “modification of Boiler Ash evacuation system” as short term work of up-gradation of ESP controller of Stage-I. Since the actual expenditure of ₹0.91 lakh incurred by the petitioner in 2013-14 is part capitalisation in respect of the said work for compliance with the statutory guidelines of the State Pollution Control Board and is less than the projected expenditure allowed vide order dated 21.12.2015, we are inclined to allow the actual capital expenditure incurred by the petitioner on this item, in terms of Regulation 9(2)(ii) of the 2009 Tariff Regulations. We order accordingly. The petitioner has considered the de-capitalisation of ₹179.48 lakh towards ESP intelligent control system in 2012-13 and has also submitted the details of the depreciation recovered towards this asset. Accordingly, the actual additional capital expenditure of ₹385.56 lakh (384.65 + 0.91) along with the de-capitalisation of (-) ₹179.48 lakh has been allowed for the purpose of tariff.*

*20. The submission of the petitioner as regards the completion and capitalisation of the balance work towards modification in Boiler ash evacuation system in 2014-15 shall however be considered in terms of the provisions of the 2014 Tariff Regulations.”*



Since the actual additional capital expenditure of ₹140.00 lakh incurred by the petitioner in 2014-15 is in respect of the balance work towards short term up-gradation work for ESP in compliance of the statutory guidelines of the OPCB, we allow the actual capital expenditure incurred by the petitioner in terms of Regulation 14(3)(ii) of the 2014 Tariff Regulations.

### **Up-gradation of ESP of Stage-I**

32. The petitioner has claimed total projected additional capital expenditure of ₹9600.00 lakh (₹3600.00 lakh in 2016-17, ₹3600.00 lakh in 2017-18 and ₹2400.00 lakh in 2018-19) towards the Up-gradation of ESP of Stage-I to achieve SPM level prescribed by the OPCB under Regulation 14 (3)(ii) of the 2014 Tariff Regulations. In justification, the petitioner has submitted that the Talcher Angul area has been classified under clusters of industries which are critically polluted and in order to address this problem, the Central Pollution Control Board (CPCB) has developed Comprehensive Environmental Pollution Index (CEPI) for evaluating pollution level of industrial clusters, Angul-Talcher being one of them. It has submitted that the CEPI action plan prepared by CPCB mandates to bring down the SPM level to below 50 mg/Nm<sup>3</sup> by all Thermal Power Plants in Talcher Angul area, in view of which the CPCB directed all stakeholders to take necessary steps for implementing the CEPI action plan. The petitioner has further submitted that the OPCB has issued directions to the generating station to implement an action plan for the same vide letter dated 13.1.2012 based on which an action plan was prepared by the petitioner for both short term and long term for meeting the conditions prescribed by SPCB. The petitioner has stated that in short term, the work of up-gradation of ESP controller of Stage-I was undertaken during 2012-14 and also separation of hoppers of the boiler economizer and air pre-heater is to be completed in 2014-15. The petitioner has submitted that in order to meet these stringent emission norms of below design level with the present coal quality, the petitioner has chalked out long term plan for ESP of Stage-I up gradation and retrofitting which involves

- Replacement of existing ESP internals with modified ESP internals.
- Use of 15m long collecting electrode in place of existing 13.5 m.
- Spacing of electrodes to be changed to 400 mm from 300 mm



- New High voltage Rectifier (HVR) of 95 KV for ESP transformer to be used in place of existing 70 KV to supply higher power for particulate charging and collection.
- Use of existing dummy field (8<sup>th</sup> field) by filling it with new design ESP internals.
- Retrofitting of 2 new fields (9<sup>th</sup> & 10<sup>th</sup>), a total addition of 16 new fields for both units. (The original ESP design has 7 fields with one dummy field in place per pass and there are 4 passes per unit for ESP of Stage-1).
- Modification of existing ESP outlet duct and duct supporting structure.

The petitioner has submitted that these long term works will be carried out during overhauling / shutdown to maximise unit availability, with each phase put to use after completion of work.

33. The respondent, GRIDCO has submitted that the claim of additional amount of ₹9600.00 lakh proposed for up gradation of ESP of Stage-I cannot be examined due to lack of documentation from the petitioner's end. In response, the petitioner has submitted along with the relevant documents that the long term plan for up-gradation and retrofitting of ESP of Stage-I was required to meet the stringent emission norms of below design level with the present coal quality.

34. The matter has been examined. It is noticed that that the long term works of up-gradation of ESP of Stage-I is proposed to be undertaken by the petitioner during 2015-18 in order to comply with the CEPI action plan notified by OPCB in 2012 which mandates the bringing down of level of emissions to 100/50 mg/Nm<sup>3</sup> for all units and to take steps to achieve emission standard of 50 mg/Nm<sup>3</sup> as per CEPI action plan. Further, the consent order dated 19.8.2014 envisage the need to expedite the up-gradation and retrofitting works related to ESP. Considering the fact that the expenditure is to be incurred on account of compliance with the statutory guidelines of the OPCB, we allow the projected additional capital expenditure of ₹9600.00 lakh under Regulation 14(3)(ii) of the 2014 Tariff Regulations. The petitioner is however directed to submit the details of the actual expenditure along with the de-capitalisation at the time of revision of tariff based on truing up exercise in terms of Regulation 8 of the 2014 Tariff Regulations.

#### **Modification/ addition/ replacement of fire detection & protection system in Stage- I**

35. The petitioner has claimed projected additional capital expenditure of ₹299.00 lakh in 2014-15 and ₹774.00 lakh in 2016-17 for modification/ addition/ replacement of Fire detection & Protection



system in Stage-I under Regulation 14(3)(ii) & 14(3)(iii) of the 2014 Tariff Regulations. In justification of the same, the petitioner has submitted that as per the Environment (Protection) Act 1986, the Central Government has prescribed the Ozone Depleting Substances (Regulation and Control) Rules, 2000, which discourage the engagement in any activity that uses ozone depleting substances and the generating companies are allowed to continue with the existing fire fighting system for a period of 10 years (up to 1.1.2010) after which the production and servicing of the same was stopped (vide Schedule IV). Accordingly, it has been proposed by the petitioner to replace Halon gas fire protection system with alternate inert gas in line with Central Electricity Authority (Technical Standards for construction of Electrical Plants and Electric Lines) Regulation, 2010. The petitioner has also prayed to allow the capitalisation of inert gas fire extinguishing system under Regulation 14(3)(ii). In addition, the petitioner has submitted that assessment of availability, reliability and design adequacy of Fire detection and Protection system of all coal based thermal stations of the petitioner company was carried out in line with Regulation 12(5) of Central Electricity Authority (Technical Standards for construction of Electrical Plants and Electric Lines) Regulations, 2010 and based on these guidelines, the petitioner has identified the following jobs for compliance with the said regulation with respect to fire detection and protection system at the generating station:

- i) Inert gas fire protection for Stage-I Unit control room (UCR) and Central Equipment Room (CER)
- (ii) Medium Velocity Water (MVW) spray system for main plant cable galleries in AB & BC bays ESP/VFD control room, LDO tanks (2 Nos.) & Stage-1 stacker reclaimers (2 Nos.)
- iii) Internal Hydrant system for high rise conveyors 5 A/B, 6 A/B, 7 A/B
- iv) Booster pumping system for providing internal hydrants in Stage-I boilers from 55 mtr. to 90 mtr.
- v) Wet detection system (QB detector) for all conveyors
- vi) Fire detection & Alarm system (Addressable system)
- vii) Linear heat sensing cable (LHSC) for all cable galleries & Stage-I Stacker reclaimers
- viii) Automatic foam protection for LDO tanks (2 Nos.)
- ix) Fire alarm control and annunciation panels



The petitioner has submitted that the augmentation of fire protection system of Stacker Reclaimer area and conveyers is essentially required to prevent any catastrophic damage in case fire breaks out in CHP as existence of coal in CHP area makes it vulnerable to fire hazard and mobile fire protection equipments may not be able to control the spread of fire. The petitioner has therefore prayed that the Commission may allow the capitalisation on account of Augmentation of fire protection system under Regulations 14(3)(ii) and 14(3)(iii) of the 2014 Tariff Regulations.

36. The respondent, GRIDCO has submitted that no document has been filed by the petitioner in support of its claim and it is also not clear as to how the Halon fire protection system, if it contains Ozone depleting substance, is being continued by its manufacturers. It has submitted that the documents filed by the petitioner including the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric lines) Regulations, 2010 do not support the claim for augmentation of the Halon fire protection system with inert gas fire extinguishing system and thus the claim is liable to be rejected. In response, the petitioner has submitted that the generating companies were allowed to continue with the existing fire fighting systems for a period of 10 years after which production and servicing of the same was stopped. It has further submitted that Halon is listed at S.N 6-7 in Group-II in the list of ozone depleting substance at Schedule-I of the Ozone Depleting Substances (Regulation) Rules, 2000.

37. In response to the directions of the Commission, the petitioner vide affidavit dated 5.7.2016 has submitted as under:

*"It is submitted that the petitioner has claimed Rs 10.73 Cr towards fire fighting systems in the instant petition. Out of this, Rs 2.99 Cr has been projected towards replacement of Halon fire fighting system in Stage-1 UCR and Central Equipment Room (CER) in 2014-15. The work has been completed in 2014-15. The actual claim will be submitted at the time of mid-term true-up.*

*The balance amount of Rs 7.74 Cr projected in 2016-17 is towards augmentation of fire fighting system in CHP, Cable galleries, Conveyers etc as detailed at page 33 of instant petition which was not existing earlier. Reliability and design adequacy audit of fire detection and protection system was carried out by NTPC for all of its thermal stations in line with Regulation 12(5) of CEA (Technical standards for construction of Electrical plants and electrical lines) Regulations, 2010. Based on these guidelines, major jobs were identified in audit to comply the said Regulations with respect to fire detection and protection system. Hon'ble Commission may please allow the same*



*under Regulation 14(3)(ii) compliance of existing law and Regulation 14(3)(iii) Higher Security and safety of the plant under Tariff Regulations, 2014.*

*The work of replacement of Halon based fire fighting system with inert gas system was allowed by Hon'ble Commission in Rihand STPS Stage-1 for Rs 1.94 Cr (including liability of Rs 24.46 Lakh) with corresponding decap of Rs 55.23 lakh in 2011-12, vide order dtd 15.05.2014 in Petition No. 176/GT/2013. There is a difference of Rs 1.05 Cr in capital expenditure claimed here as scope of work involves larger area of work in TSTPS Stage-I in comparison to Rihand Stage-I. Secondly, there was escalation of price based on award value as the Rihand Stage-I order was placed in 2010 and TSTPS-1 order was placed in 2013. The decap amount against the above replacement will be submitted at the time of true-up.”*

38. We have considered the submissions of the parties. On perusal of Schedule IV of the said Rules (Regulation on consumption of ozone depleting substances on end use basis) it is noticed that the phase out time and for switching over to non ozone depleting substance technology in respect of fire extinguishers and fire extinguishing systems is 10 years. The petitioner has claimed the expenditure on this count for the year 2014-15. In the circumstances, since the expenditure incurred is on account of replacement due to statutory compliance with the provisions of the Rules as aforesaid, we are of the view that the expenditure falls within the scope of Regulation 14(3)(ii) of the 2014 Tariff Regulations.

39. As regards the claim for projected additional capital expenditure towards Augmentation of fire fighting system in CHP, Cable galleries, Conveyers etc. based on the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric lines) Regulations, 2010. It is not clear from the submissions of the petitioner as to what steps have been taken by the petitioner for compliance with the regulations of CEA since 2010 in respect of this generating station towards augmentation of fire fighting system etc. In the absence of any justification for the need for capitalisation of these works/assets at this stage, the claim of the petitioner for projected additional capital expenditure is not justifiable. Accordingly, we are not inclined to consider the claim of the petitioner for ₹774.00 lakh in the year 2016-17 towards augmentation of a fire fighting system. Hence, the said claim is disallowed. Even otherwise, the generating station is eligible for compensation allowance and the expenditure on this count shall be met from the compensation allowance granted to the generating station.



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

(₹ in lakh)

Sl. No.	Head of Work / Equipment	Regulations under which claimed	2014-15	2015-16	2016-17	2017-18	2018-19	Total
<b>I</b>	<b>Ash dyke raising &amp; Strengthening works.</b>							
(i)	Ash dyke works of Lagoon 1 (including Raising & strengthening).	14(3) (iv) & Reg. 54 & 55.	850.00	5100.00	4100.00	0.00	0.00	10050.00
(ii)	Ash dyke works of Lagoon 2 (Including Raising)	14(3)(iv)	1057.00	1245.00	1050.00	0.00	0.00	3352.00
(iv)	Land for new ash dyke	14(3)(iv)	0.00	0.00	0.00	2458.00		2458.00
(iii)	4th pump in ash slurry series	14(3)(iv)	315.00	315.00	0.00	0.00	0.00	630.00
	<b>Sub Total</b>		<b>2222.00</b>	<b>6660.00</b>	<b>5150.00</b>	<b>2458.00</b>	<b>0.00</b>	<b>16490.00</b>
<b>II</b>	<b>Works under Change of Law.</b>							
(i)	Seepage water recycling system	14 (3)(ii)	0.00	1500.00	774.00	0.00	0.00	2274.00
(ii)	Mine void filling through lean slurry system	14 (3)(ii)	0.00	0.00	0.00	0.00	0.00	0.00
(iii)	Upgradation of ESP of Stage-I	14 (3)(ii)	0.00	3600.00	3600.00	2400.00	0.00	9600.00
(iv)	Separate Ash evacuation system of stage-I boiler and economiser Hoppers	14 (3)(ii)	140.00	0.00	0.00	0.00	0.00	140.00
(v)	Modification/ addition/ replacement of fire detection & protection system in Stage- I.	14 (3) (ii)	299.00	0.00	0.00	0.00	0.00	299.00
	<b>Sub Total</b>		<b>439.00</b>	<b>5100.00</b>	<b>4374.00</b>	<b>2400.00</b>	<b>0.00</b>	<b>12313.00</b>
	Total Asset capitalisation		2661.00	11760.00	9524.00	4858.00	0.00	28803.00
<b>2</b>	De-capitalisation		0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total Additional Capitalisation Allowed</b>		<b>2661.00</b>	<b>11760.00</b>	<b>9524.00</b>	<b>4858.00</b>	<b>0.00</b>	<b>28803.00</b>

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

(₹ in lakh)

	2014-15	2015-16	2016-17	2017-18	2018-19
Opening Capital Cost	257916.15	260577.15	272337.15	281861.15	286719.15
Add: Additional capital expenditure	2661.00	11760.00	9524.00	4858.00	0.00
Closing Capital Cost	260577.15	272337.15	281861.15	286719.15	286719.15



## Debt-Equity Ratio

42. 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.*





43. Accordingly, the gross normative loan and equity amounting to ₹130368.68 lakh and ₹127547.46 lakh, respectively as on 31.3.2014 as considered in order dated 20.7.2016, has been considered as gross normative loan and equity as on 1.4.2014. Hence, 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**

44. 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.*



45. 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:*

*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.*

46. The petitioner has claimed return on equity considering base rate of 15.5% and effective tax rate of 23.939%. However, the petitioner in its submissions dated 5.7.2016 has submitted the effective tax rate of 22.584% based on the actual profit and tax paid for the year 2014-15. During the hearing of NTPC petitions, beneficiaries had raised an issue on the computation of effective tax rate. 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)

	2014-15	2015-16	2016-17	2017-18	2018-19
Notional Equity- Opening	127547.46	128345.76	131873.76	134730.96	136188.36
Addition of Equity due to additional capital expenditure	798.30	3528.00	2857.20	1457.40	0.00
Normative Equity-Closing	128345.76	131873.76	134730.96	136188.36	136188.36
Average Normative Equity	127946.61	130109.76	133302.36	135459.66	136188.36
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)	19.611	19.706	19.706	19.706	19.706
<b>Return on Equity(Pre Tax) annualised</b>	<b>25091.10</b>	<b>25638.91</b>	<b>26268.03</b>	<b>26693.14</b>	<b>26836.73</b>

## Interest on Loan

47. 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.”*

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

- (a) The gross normative loan of ₹130368.68 lakh as on 1.4.2014 has been considered.
- (b) Cumulative repayment of loan of ₹130368.68 lakh as on 31.3.2014 as considered in order dated 20.7.2016 in Petition No.207/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 “nil”.
- (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.

49. 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	130368.68	132231.38	140463.38	147130.18	150530.78
Cumulative repayment of loan upto previous year	130368.68	132231.38	140189.01	147130.18	150530.78
Net Loan Opening	0.00	0.00	274.38	0.00	0.00
Addition due to additional capital expenditure	1862.70	8232.00	6666.80	3400.60	0.00
Repayment of loan during the year	1862.70	7957.62	6941.18	3400.60	0.00
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	1862.70	7957.62	6941.18	3400.60	0.00
Net Loan Closing	0.00	274.38	0.00	0.00	0.00
Average Loan	0.00	137.19	137.19	0.00	0.00
Weighted Average Rate of Interest of loan	8.980	8.803	8.455	7.711	6.676
<b>Interest on Loan</b>	<b>0.00</b>	<b>12.08</b>	<b>11.60</b>	<b>0.00</b>	<b>0.00</b>

## Depreciation

50. 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 license, 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.”

51. The cumulative depreciation amounting to ₹174610.01 lakh as on 31.3.2014 as considered in order dated 20.7.2016 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 ₹56163.58 lakh. Since the used life of the generating station as on 1.4.2014 exceed 12 years from the effective station COD, the depreciation for the period 2014-19 shall be calculated using spreading of the remaining depreciable value over the balance useful life for respective years. Accordingly, depreciation has been computed as follows:

(₹ in lakh)

	2014-15	2015-16	2016-17	2017-18	2018-19
Opening Capital Cost	257916.15	260577.15	272337.15	281861.15	286719.15
Add: Additional Capital Expenditure	2661.00	11760.00	9524.00	4858.00	0.00
Closing Capital Cost	260577.15	272337.15	281861.15	286719.15	286719.15
Average Capital Cost	259246.65	266457.15	277099.15	284290.15	286719.15
Balance useful life	7.99	6.99	5.99	4.99	3.99
Depreciable value (excluding land)@ 90%	230773.60	237263.05	246840.85	252206.65	253286.65
Balance depreciable Value	56163.58	55623.80	57243.97	53053.18	43501.28
Depreciation (annualized)	<b>7029.23</b>	<b>7957.62</b>	<b>9556.59</b>	<b>10631.90</b>	<b>10902.58</b>
Cumulative depreciation at the end	174610.02	181639.25	189596.88	199153.46	209785.36
Cumulative depreciation (at the end of the period)	181639.25	189596.88	199153.46	209785.36	220687.94

### Compensation Allowance

52. Regulation 17(1) of the 2014 Tariff Regulations provides as under:

**“17. Compensation Allowance:** (1) In case of coal-based or lignite-fired thermal generating station or a unit thereof, a separate compensation allowance shall be admissible to meet expenses on new assets of capital nature which are not admissible under Regulation 14 of these regulations, and in such an event, revision of the capital cost shall not be allowed on account of compensation allowance but the compensation allowance shall be allowed to be recovered separately.



(2) The Compensation Allowance shall be allowed in the following manner from the year following the year of completion of 10, 15, or 20 years of useful life:”

<b>Years of operation</b>	<b>Compensation Allowance ( lakh/MW/year)</b>
0-10	Nil
11-15	0.20
16-20	0.50
21-25	1.00

53. The petitioner has claimed compensation allowance (unit-wise) to meet expenses on new assets of capital nature including in the nature of minor assets as under:

(₹ in lakh)				
<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>
500.00	500.00	500.00	750.00	1000.00

54. In terms of above regulations, both the units of the generating station are under commercial operation for more than 10 years from their respective date of CODs and accordingly, the compensation allowance worked out and allowed as under:

<b>Description</b>	<b>Unit-I</b>	<b>Unit-II</b>
Capacity in MW	500	500
COD	1-Jan-97	1-Jul-97
Balance Useful life as on 1.4.2014	7.74	8.24
Actual useful life		
a) 10 years	1-1-2007	1-1-2007
b) 15 years	1-1-2012	1-1-2012
c) 20 years	1-1-2017	1-1-2017
d) 25 years	1-1-2022	1-1-2022
2014-15	250	250
2015-16	250	250
2016-17	250	250
2017-18	500	250
2018-19	500	500
<b>Total</b>	<b>1750</b>	<b>1500</b>

55. Accordingly, the compensation allowance of ₹1750.00 lakh for Unit-I and ₹1500.00 lakh Unit-II during the period 2014-19 is allowed.

### **O&M Expenses**

56. Regulation 29 (1) (c) of the 2014 Tariff Regulations provides the year-wise O&M expense norms claimed 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

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

(₹ in lakh)				
2014-15	2015-16	2016-17	2017-18	2018-19
16000.00	17010.00	18080.00	19220.00	20430.00

### Water Charges

58. 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”*

59. 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.

60. 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
2000.34	2127.36	2262.45	2406.11	2558.90

61. In order to examine the trend of the actual water consumption and rate of water charges, the petitioner was directed vide ROP of the hearing dated 20.5.2016 to furnish the details of the actual water consumption along with the rate of water charges for the last five years (i.e. 2009-10 to 2013-



14) along with relevant notification in support of the same. 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
Consumption of water	27.39 cusecs
Rate of water charges	₹5.60 / cum
Total water charges in 2013-14	₹2000.34 lakh*
<i>*water charges paid as per allocated water quantity</i>	

62. In compliance with the above, the petitioner vide affidavit dated 5.7.2016 has furnished the details of the year-wise actual water consumption and water charges for last 5 years as detailed below:

	2014-15	2015-16	2016-17	2017-18	2018-19
Allocated Water Quantity for station Stage-I & II (Cusec)	75.00	80.00	85.00	120.00	120.00
Actual Water drawl Station Stage I & II (Cusec)	79.63	70.65	75.47	80.32	82.19
Rate or Water Charges.	<p>From 1.4.2009 to 28.2.2010, payment on water drawl is made on actual water consumption for drinking water &amp; Industrial water.</p> <p>i) Industrial Water (@ Rs 250/- per One Lakh gallon) ii) Drinking Water (@ Rs 30/- per Ten Thousand cubic feet)</p> <p>From 1-Mar-2010 to 30-Sep-2010, payment on water drawl is @Rs 250/- per one lakh gallon) on allocated quantity.</p> <p>From 1-Oct-2010 onwards payment on water drawl is @Rs 5.60/m3 on allocated quantity.</p>				
Actual Water Charges paid for station (Rs Cr) Based on allocation of water	4.05	22.14	42.62	60.01	60.01
Actual Water Charges paid corresponding to stage-I (Total Water charges paid/3) (Rs Cr) (Proportionate allocation of water charges based on MW capacity)	1.35	7.38	14.21	20.00	20.00

63. The petitioner has further submitted that the payment of water charges is as per quantity of water drawn or allocated whichever is higher. It has submitted that where drawl of water is more than the allocated quantity, the penal rate is six times the rate on the quantity of excess drawl in



addition to the water charges on the allocated quantity. The petitioner has also enclosed the copy of water supply agreement signed with Department of water resources, Govt of Odisha dated 27.4.2013 and applicable for period April, 2013 to April, 2016. In justification of the quantity of water required for the generating station, the petitioner has submitted as under:

*“As per the above, the water requirement for 3000 MW (for TSTPS Stage-I & II) @ 5 cubic meter/hr/MW comes out to be 147 cusec (i.e. 131.4 MCM/year). Even being on conservative side with water flow @ 4 cubic meter/hr, the water requirement for both generating stations of TSTPS (2x500MW+4x500 MW) comes out to be 118 cusec (i.e. 105.12 MCM/year).*

*It is submitted that with better O&M practices, chemical dosing, Ash Water Recirculation System (A WRS) in place, the instant station has been able to reduce the raw water make-up and is maintaining its water requirement within the prescribed quantum as mentioned above.*

*It is further submitted that the agreement of water for a thermal generating station is carried out based on Water Balance Diagram based on various considerations like temperature and relative humidity affecting rate of evaporation of water from raw water pond, Cooling Towers etc, blow-down for design Cycle of Concentration (COC) for circulating water, drift loss of cooling tower, steam loss in the cycle, level of generation etc.*

*It is submitted that due to prohibitive high penal rate for consumption of water beyond allocation and for reasons as detailed above, the water allocation taken is higher than normal consumption. Therefore, Hon'ble Commission may be pleased to consider the above brought out factors behind the difference between allocated quantity and actual consumption of water and allow the expenditure pertaining to the allocated quantity of water for successful and efficient running of the station in long run.”*

64. It is noticed that the petitioner has claimed the same water charges during 2014-15 as in the year 2013-14. The total water charges claimed by the petitioner during the year 2014-15 is based on the water consumption and water charges paid during the year 2013-14 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 Odisha dated 27.4.2013, which specify the rate of ₹5.60 /m<sup>3</sup> on allocation of water up to 31.3.2016. Hence, the yearly escalation of water charges rate @6.35% is considered after 31.3.2016 as per the escalation rate in the O&M norms specified by the Commission under the 2014 Tariff Regulations. The water charge rate is considered @₹5.60/m<sup>3</sup> up to 31.3.2016. Accordingly, water charges have been allowed with the annual escalation of 6.5% to the water charges claimed during 2016-19. Based on this, water charges for the period 2014-19 are allowed as under:



(₹ in lakh)

Year	Water charges allowed
2014-15	2000.34
2015-16	2000.34
2016-17	2127.36
2017-18	2262.45
2018-19	2406.11

65. The water charges allowed as above is subject to truing -up at the end of the tariff period for which the petitioner is directed to place on record all relevant information. Based on the above, 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	16000.00	17010.00	18080.00	19220.00	20430.00
<b>O&amp;M Expenses as allowed</b>	<b>16000.00</b>	<b>17010.00</b>	<b>18080.00</b>	<b>19220.00</b>	<b>20430.00</b>
Water charges as claimed	2000.34	2127.36	2262.45	2406.11	2558.90
<b>Water charges as allowed</b>	<b>2000.34</b>	<b>2000.34</b>	<b>2127.36</b>	<b>2262.45</b>	<b>2406.11</b>
Total O&M Expenses as claimed (including Water charges)	18000.34	19137.36	20342.45	21626.11	22988.90
<b>Total O&amp;M Expenses as allowed(including Water charges)</b>	<b>18000.34</b>	<b>19010.34</b>	<b>20207.36</b>	<b>21482.45</b>	<b>22836.11</b>

### Capital spares

66. 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

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

Target Availability (%)	83.00
Heat Rate (kcal/kWh)	2375.00
Auxiliary Energy Consumption (%)	5.75
Specific Oil Consumption (ml/ kWh)	0.50

68. 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)

69. 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.*

70. The petitioner has considered the target availability norm of 83% during 2014-19. In respect of the coal availability situation during previous years, the petitioner has submitted as below:

*"It is submitted that TSTPS Station is having coal linkage from Mahanadi Coalfield Limited (MCL), subsidiary of Coal India Ltd. Details of Coal linkage and Coal made available by CIL during the period of 2014-15 & 2015-16 for TSTPS Stage-I (2x500 MW) and TSTPS Stage-II (4x500 MW) is as under:*

Name of Station	Annual Contracted Quantity (Lakh Metric Tonnes)	Coal supplied (Lakh Metric Tonnes)	
		2014-15	2015-16
TSTPS St-I & St-II (2x500MW+4x500MW)	173	154	157

*In addition to above, in order to meet the schedule requirement of beneficiaries, NTPC through its efforts arranged coal from other sources (including imported coal) of 30.06 LMT during 2014-15 and 18.2 LMT during 2015-16."*

71. In view of the above, the Commission due to shortage of domestic coal supply has relaxed the 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)

72. Regulation 36(C)(a) of the 2014 Tariff Regulations, provides Gross Station Heat Rate of 2375 kCal/kWh for existing coal based thermal generating stations of 500 MW sets whose CODs were



before 1.4.2009. The COD of the generating station was in 1997. Hence, the heat rate considered by the petitioner is as per norms and is allowed.

### **Auxiliary Energy Consumption**

73. The petitioner has claimed Auxiliary Energy Consumption at 5.75% during 2014-19 period. Further, the petitioner has submitted that the Auxiliary Energy Consumption has increased significantly due to deterioration in coal quality during the last two years and in view of increased Auxiliary Energy Consumption on account of usage of Tube Mills, the Commission is requested to allow the Auxiliary Energy Consumption norm of 7.25% under Regulation 54 & 55 of the Tariff Regulations, 2014.

74. Regulation 36(E)(a) of 2014 Tariff Regulations, provides for the 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**

75. 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**

76. Sub-section (a) 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**

77. The petitioner has claimed the 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.		2014-15	2015-16	2016-17	2017-18	2018-19
1A	Cost of Coal for Stock for 15 days	4510.75	4523.11	4510.75	4510.75	4510.75
1B	Cost of Coal for Generation for 30 days	9021.51	9046.23	9021.51	9021.51	9021.51
2	Cost of Main Secondary Fuel Oil for 2 months	289.25	290.04	289.25	289.25	289.25

78. The Commission vide ROP of the hearing dated 20.5.2016 had directed the petitioner to submit the GCV of coal on “as received” basis. In response, the petitioner vide affidavit dated 5.7.2016 has submitted that from Aug. 2014, onwards sampling for measurement of 'as received' GCV is being taken from secondary crusher.



79. 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.

80. 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.”*

81. Further, the petitioner has claimed energy charge rate (ECR) of 160.511 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 Auger. 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

82. Energy charges on the basis of billed GCV of coal have been worked out as under:

(₹ in lakh)				
2014-15	2015-16	2016-17	2017-18	2018-19
124.765	124.765	124.765	124.765	124.765

83. 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. The Energy Charge Rate (ECR) based on operational norms specified under the 2014 Tariff Regulations and on “as billed” GCV of coal for preceding 3 months i.e. January, 2014 to March,2014 to January 2014, is worked out as under.

S.N		Unit	2014-19
1	Capacity	MW	1000
2	Gross Station Heat Rate	kCal/kWh	2375.00
3	Aux. Energy Consumption	%	5.75
4	Weighted average GCV of oil (As fired)	kCal/lt.	9510
5	Weighted average GCV of Coal (As Billed)	kCal/kg	4042.33
6	Adjustment on account of coal received at the generating station for equilibrated basis (Air dried) in the billed GCV Of Coal India		*
7	Weighted average price of oil	Rs./KL	47739.24
8	Weighted average price of Coal	Rs./MT	1964.74
9	<b>Rate of energy charge ex-bus</b>	<b>Paise/kWh</b>	<b>124.765**</b>

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

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

84. 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 read with Commission’s order dated 25.1.2016 in Petition No. 283/GT/2014. 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.

85. In view of the above, the cost for fuel components in working capital have been computed at 83% NAPAF for the years 2014-15, 2015-16 and 2016-17 and at 85% NAPAF for the year 2017-18 & 2018-19 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:

	(₹ in lakh)				
	2014-15	2015-16	2016-17	2017-18	2018-19
Cost of Coal for stock– 15 days	3490.10	3499.66	3490.10	3574.20	3574.20
Cost of Coal for generation– 30 days	6980.19	6999.32	6980.19	7148.39	7148.39
Cost of secondary fuel oil – two months	289.25	290.04	289.25	296.22	296.22

### Maintenance spares

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

(₹ in lakh)				
2014-15	2015-16	2016-17	2017-18	2018-19
3600.07	3827.47	4068.49	4325.22	4597.78

87. 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. In terms of Regulation 29 (2) of the 2014 Tariff Regulations and in line with the Commission's 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:

(₹ in lakh)				
2014-15	2015-16	2016-17	2017-18	2018-19
3600.07	3802.07	4041.47	4296.49	4567.22

### Receivables

88. 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)	14249.64	14288.68	14249.64	14593.01	14593.01
Fixed Charges (two months)	9238.78	9672.90	10263.04	10756.49	11066.75
<b>Total</b>	<b>23488.42</b>	<b>23961.59</b>	<b>24512.68</b>	<b>25349.49</b>	<b>25659.76</b>



## O&M Expenses

89. 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
1500.03	1594.78	1695.20	1802.18	1915.74

90. 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
1500.03	1584.20	1683.95	1790.20	1903.01

## Rate of interest on working capital

91. 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.”*

92. 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	3490.10	3499.66	3490.10	3574.20	3574.20
Cost of coal towards generation- 30 days	6980.19	6999.32	6980.19	7148.39	7148.39
Cost of secondary fuel oil- 2 months	289.25	290.04	289.25	296.22	296.22
Maintenance Spares	3600.07	3802.07	4041.47	4296.49	4567.22
Receivables- 2 months	23488.42	23961.59	24512.68	25349.49	25659.76
O & M expenses- 1 Month	1500.03	1584.20	1683.95	1790.20	1903.01
<b>Total Working Capital</b>	<b>39348.06</b>	<b>40136.87</b>	<b>40997.65</b>	<b>42454.99</b>	<b>43148.80</b>
Rate of Interest	13.50	13.50	13.50	13.50	13.50
<b>Interest on Working Capital</b>	<b>5311.99</b>	<b>5418.48</b>	<b>5534.68</b>	<b>5731.42</b>	<b>5825.09</b>



93. Accordingly, the 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	7029.23	7957.62	9556.59	10631.90	10902.58
Interest on Loan	0.00	12.08	11.60	0.00	0.00
Return on Equity	25091.10	25638.91	26268.03	26693.14	26836.73
Interest on Working Capital	5311.99	5418.48	5534.68	5731.42	5825.09
O&M Expenses	18000.34	19010.34	20207.36	21482.45	22836.11
Compensation Allowance	500.00	500.00	500.00	750.00	1000.00
<b>Total</b>	<b>55932.66</b>	<b>58537.43</b>	<b>62078.26</b>	<b>65288.91</b>	<b>67400.51</b>

### Application Fee and Publication Expenses

94. 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.

95. 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.

96. Petition No. 281/GT/2014 is disposed of in terms of the above.

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

Sd/-  
(A. S. Bakshi)  
Member



**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
	2014-15	2015-16	2016-17	2017-18	2018-19			
Bond series XIII-A	9.5800	9.5800	9.5800	9.5800	9.5800	22242.00	0.00	22242.00
Bond series XIII-B	9.5800	9.5800	9.5800	9.5800	9.5800	18313.00	0.00	18313.00
SBI-VII-T1D7	10.2575	10.2575	10.2575	10.2575	10.2575	1000.00	0.00	1000.00
SBI-VII-T1D8	10.2575	10.2575	10.2575	10.2575	10.2575	1000.00	0.00	1000.00
SBI-VII-T1D12	10.2575	10.2575	10.2575	10.2575	10.2575	1000.00	0.00	1000.00
KFW ESP D1	3.1900	3.1900	3.1900	3.1900	3.1900	1007.71	0.00	1007.71
KFW ESP D2	3.1900	3.1900	3.1900	3.1900	3.1900	1125.68	0.00	1125.68
<b>Total</b>						<b>45688.39</b>	<b>0.00</b>	<b>45688.39</b>

**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 loan - Opening	45688.39	45688.39	45688.39	45688.39	45688.39
Cumulative repayments of Loans upto previous year	24333.00	28388.50	32819.00	37249.50	41946.67
Net loan - Opening	21355.39	17299.89	12869.39	8438.89	3741.72
Increase/ Decrease due to FERV	0.00	0.00	0.00	0.00	0.00
Increase/ Decrease due to ACE		0.00	0.00	0.00	0.00
Total	4055.50	4430.50	4430.50	4697.17	641.67
Less: Repayment (s) of Loans during the year	17299.89	12869.39	8438.89	3741.72	3100.04
Net loan - Closing	19327.64	15084.64	10654.14	6090.30	3420.88
Average Net Loan	8.9798%	8.8026%	8.4555%	7.7110%	6.6764%
Rate of Interest on Loan	1735.59	1327.84	900.86	469.62	228.39
Interest on loan	45688.39	45688.39	45688.39	45688.39	45688.39

