CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 388/GT/2023

Coram:

Shri Jishnu Barua, Chairperson
Shri Ramesh Babu V, Member
Shri Harish Dudani, Member

Date of Order: 18th March, 2025

In the matter of:

Petition for determination of tariff towards the installation of various Emission Control Systems (ECS) at Feroze Gandhi Unchahar Thermal Power Station, Stage-IV (500 MW) in compliance with the Revised Emission Standards.

And

In the matter of:

NTPC Limited,
NTPC Bhawan, Core-7, Scope Complex,
7, Institutional Area, Lodhi Road,
New Delhi-110 003 **.....Petitioner**

Vs

1. Uttar Pradesh Power Corporation Limited,
   Shakti Bhawan, 14, Ashok Marg, Lucknow-226 001

2. Rajasthan Urja Vikas Nigam Limited (RUVNL)
   (on behalf of DISCOMs of Rajasthan),
   Vidyut Bhawan, Janpath, Jaipur 302 005

3. Haryana Power Purchase Centre (HPPC)
   Shakti Bhawan, Sector – VI,
   Panchkula, Haryana – 134 109

4. Power Development Department (J&K)
   Govt. of J&K, Secretariat, Srinagar

5. Electricity Department (Chandigarh)
   Union Territory of Chandigarh
   Addl. Office Building, Sector-9 D, Chandigarh

6. Uttarakhand Power Corporation Limited,
   Urja Bhawan, Kanwali Road, Dehradun – 248 001
   Uttarakhand. **……Respondents**

Parties present:

Shri Adarsh Tripathi, Advocate, NTPC
Shri Ajitesh Gargh, Advocate, NTPC
Shri Abinash Das, NTPC

ORDER

The Petitioner, NTPC Limited, has filed this Petition for the determination of tariff towards the installation of various Emission Control Systems (ECS) at the Feroze Gandhi Unchahar Thermal Power Station, Stage-IV (500 MW) (in short, "the generating station") in compliance with the Revised Emission Standards and has sought the following relief(s):

(i) Allow Petitioner to bill provisional supplementary tariff based on implementation of ECS system in the instant station till the Supplementary tariff is finally determined and approved by the Hon'ble Commission.

(ii) Allow the recovery of the cost of reagent consumption through Supplementary Energy Charges from the date of commissioning & put to use of the ECS Schemes till 31.03.2024.

(iii) Determine & Approve Supplementary Tariff of FGUTPS-IV for the tariff period from the date of operationalization of the ECS schemes till 31.03.2024.

(iv) Grant liberty to approach Hon'ble Commission for undertaking implementation of remaining ECS and the impact on unit efficiency, water consumption, Plant availability factor etc as applicable pertaining to entire Emission Control System.

(v) Direct the beneficiaries of the instant station to not consider the Supplementary energy charge for Merit order Dispatch.

(vi) Pass any other order as it may deem fit in the circumstances mentioned above.

Background

2. On 7.12.2015, the Ministry of Environment, Forest and Climate Change, Government of India (MoEF&CC) notified the Environment (Protection) Amendment Rules, 2015 (in short, the 'MoEFCC Notification'), which mandatorily required all thermal power generating plants, including the generating station of the Petitioner, to comply with the revised norms as mentioned below:

Date of Installation	PM	SO_2	NO_x	Mercury (Hg)
Before 31-12 2003	100 mg/Nm^3	600 mg/Nm^3 for <500MW 200 mg/Nm^3 for >=500MW	600 mg/Nm^3	0.03 mg/Nm^3 for >=500MW
After 01-01-2004 & Upto 31-12-2016	50 mg/Nm^3	600 mg/Nm^3 for <500MW 200 mg/Nm^3 for >=500MW	300 mg/Nm^3	0.03 mg/Nm^3
On or after 01-01-2017	30 mg/Nm^3	100 mg/Nm^3	100 mg/Nm^3	0.03 mg/Nm^3

3. In compliance with the Revised Emission Standards under the MOEF&CC Notification, the Petitioner was required to install various ECS in the generating station. Accordingly, in Petition No. 98/MP/2017 filed by the Petitioner, in-principle approval was sought on the issues related to the installation of ECS at the generating stations of the Petitioner and the Commission vide order dated 20.7.2018 disposed of the same as under:

> *"46. ……. In all these situations, additional capital expenditure on "change in law or compliance with any existing law" is allowed. Therefore, additional capital expenditure on implementation of the ECS in terms of Notification dated 7.12.2015 shall be admissible after due prudence check, under Regulation 14 of the 2014 Tariff Regulations."*

4. Thereafter, on 7.3.2019, the Commission notified the Central Electricity Regulatory Commission (Terms & Conditions of Tariff) Regulations, 2019 ("the 2019 Tariff Regulations"). Subsequently, on 25.8.2020, the 2019 Tariff Regulations were amended (First Amendment) to specify the regulatory framework for the determination of the supplementary tariff for ECS, which was effective from 3.2.2021 (the date of publication in the gazette). Pursuant to this, the Petitioner filed Petition No. 553/MP/2020, seeking approval of the additional capitalization to be incurred towards the installation of ECS at the generating station, to comply with the Revised Emission Standards vide ECS proposal dated 4.9.2020, subsequent to the first amendment to the 2019 Tariff Regulations. The Commission, vide its order dated 17.11.2021, approved the hard cost

of Rs.59.00 lakh per MW towards the installation of FGD and provided in-principle approval for the installation of the Combustion Modification (CM) system implemented in the generating station. Also, the Commission, while approving the installation of the CM system, did not approve the capital cost of the CM system but granted liberty to the Petitioner to claim the same after installation. As regards the Petitioner's claim for IDC, IEDC, FERV, taxes, and duties & other costs, the Commission, in the said order dated 17.11.2021, observed as under:

> *"99. Besides the hard cost towards installation of WFGD, DSI based FGD system and De-NOx systems, the Petitioner has also claimed IDC, IEDC, FERV, taxes and duties and other costs. As the instant petitions are for "in-principle" approval of ACE towards installation of ECS to comply with the MoEFCC Notification, the Petitioner's claim for the same is not considered in this order and these claims would be considered on case to case basis on the petitions to be filed by the Petitioner for determination of tariff after implementation of ECS as provided under Regulation 29(4) of the 2019 Tariff Regulations."*

5. Also, with regard to the prayer of the Petitioner for additional APC, additional water consumption, additional O&M expenses, cost of reagents, Gross Station Heat Rate (GSHR), and for allowing deemed availability on account of shutdown for the installation of ECS, the Commission in the said order directed as under:

> *"102. The Petitioner has further prayed for additional APC, additional water consumption, additional O&M Expenses, cost of reagents, Gross Station Heat Rate (GSHR) and allow deemed availability on account of shutdown for installation of ECS under Regulation 76, i.e. Power to Relax of the 2019 Tariff Regulations. Some of the Respondents have raised their concerns on the said prayers of the Petitioner. The Petitioner in the case of TTPS has also prayed to not consider the supplementary variable charge for Merit order Dispatch. As the instant petition is for "in-principle" approval of ACE towards installation of ECS, we do not deem fit to go into these prayers at this stage and we would consider them in petitions to be filed by the Petitioner under Regulation 29(4) of the 2019 Tariff Regulations after installation of ECS. However, we would like to point out that after filing of the instant petitions by the Petitioner and during the present proceedings, the Commission has introduced a separate tariff stream for ECS by amending the 2019 Tariff Regulations vide the 2020 Amendment Regulations. Accordingly, the Petitioner's prayer for additional APC, additional water consumption and additional O&M Expenses will be considered as per Regulation 49(E)(f), Regulation 35(1)(6) and Regulation 35(1)(7) of the amended 2019 Tariff Regulations respectively. The Petitioner's prayer for allowing cost of reagents, GSHR and deemed availability on account of shutdown will be dealt on a case to case basis on a petition under Regulation 29(4) of the 2019 Tariff Regulations."*

Present Petition

6. In the above background, the Petitioner filed the present Petition under the provisions of the 2019 Tariff Regulations read with the First Amendment to the said Regulations. Thereafter, the Petitioner, vide affidavit 3.9.2024, revised its claim for the capital cost and annual fixed charges as under:

Capital Cost (revised)

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	2023-24
Capital cost as on ODe	31851.18*	
Add: Un-amortized Finance Charges	149.98	
Add: Notional IDC	84.97	
Add: Loan ERV Charged to P&L	(-) 1937.01	
Opening capital cost	30149.12	30482.89
Add: Addition during the year / period	149.63	1048.23
Add: Discharges of liabilities during the year / period	184.14	2960.98
Closing capital cost	30482.89	34492.09
Average capital cost	30316.00	32487.49

**** Net of undischarged liabilities of Rs.4072.37 lakh***

Annual Fixed Charges (revised)

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	2023-24
Depreciation	1573.19	1685.88
Interest on Loan	666.69	708.74
Return on Equity	1157.13	1240.01
Interest on Working Capital	121.14	143.26
O&M Expenses	484.59	-
Total	**4002.74**	**3777.89**
Landed Cost of Reagent (Rs./MT)	**2,296.26**	**2,296.26**
Supplementary ECR ex-bus (Rs./kWh)	**0.076**	**0.076**

Hearing dated 29.4.2024

7. During the hearing of the Petition hearing on 29.4.2024, the Commission directed the Petitioner to file certain additional information and also the parties to complete their pleadings. In response, the Petitioner has filed the additional information vide affidavit dated 29.5.2024, after serving a copy to the Respondents. Except for UPPCL (who had filed its reply affidavit dated 4.1.2024), none of the other Respondents have filed their reply/objections to the tariff proposal of the Petitioner.

Hearing dated 11.7.2024

8. Pursuant to the hearing on 11.7.2024, the Commission directed the Petitioner to file certain additional information, and in response, the Petitioner vide affidavit dated 3.9.2024, has filed the information, after serving a copy on the Respondents.

Hearing dated 30.9.2024

9. Pursuant to the hearing on 30.9.2024, the Commission, after directing the Petitioner to file certain additional information and the parties to complete their pleadings, reserved its order in the Petition. In response, the Petitioner vide affidavit dated 29.10.2024 has filed the additional information. None of the Respondents have filed their reply in the matter.

10. Based on the submissions and the documents on record, we proceed to examine the prayer(s) of the Petitioner, as stated in the subsequent paragraphs.

11. The Date of Commercial Operation (COD) of the unit of the generating station and the date of operation (ODe) of the FGD are as under:

COD of generating station	Date of Operation of FGD
30.9.2017	11.10.2022

12. As regards the CM system, the Petitioner clarified that the same is expected to be capitalized in the 2nd quarter of 2024-25.

Time Overrun

13. The scheduled date of commissioning, as per the investment approval and the actual date of commissioning of the FGD, are as under:

Unit	Scheduled ODe	Actual ODe	Delay (in months)
Unit-I	15.7.2021	11.10.2022	15

Reasons for Time overrun

14. The Petitioner, vide affidavit dated 3.9.2024, has broadly submitted the reasons for time overrun as under:

(i) The investment approval for the FGD package was granted in the 465th meeting of the board of directors held on 13.10.2018, and the package was awarded to M/s GE Power India Limited vide LOA dated 16.10.2018 with a work schedule of 33 months. The package was awarded, and the site was mobilised in July 2018. There was no delay in starting the civil construction works; meanwhile, the completion of construction works faced delay due to several factors.

(ii) The schedule outlined in the contract was not realistic, as it was based on estimates rather than benchmarks, given that FGD (Flue Gas Desulfurization) technology was new to India at the time and lacked established references. The project has experienced a time overrun of approximately 15 months beyond the contractual schedule.

(iii) Further, the delay caused was due to various factors beyond the Petitioner's control, which has led to the deferral of the project beyond the scheduled date, as listed below:

- Slow progress of civil works due to the short supply of construction materials.
- Work stoppages during both waves of COVID-19 and the subsequent impact on project construction and timelines.

(iv) The civil construction of the project faced delays due to a combination of factors, including a severe shortage of construction materials, particularly sand, exacerbated by environmental regulations, seasonal restrictions on sand mining, and the ban on mechanized mining in Uttar Pradesh. The Covid-19 pandemic further compounded these challenges, leading to disrupted supply chains. These issues collectively caused delays in the civil works of the FGD system despite all the efforts made by the Petitioner.

(v) The civil construction activities of the FGD system were started as per the schedule, i.e., from January 2019. However, the progress could not reach full capacity due to the limited availability of sand and other Moorum. The shortage was due to the imposition of a ban on the mining of sand by various State Governments, including the State of UP, in terms of the directions of the National Green Tribunal (NGT) vide order dated 29.2.2016. Further, in September 2015, the NGT directed the Environment Ministry not to grant environmental clearance for sand mining in the rivers of North India during the rainy season. As Uttar Pradesh experiences a lengthy monsoon season, stretching from mid-June to the beginning of October, as outlined in sustainable sand management guidelines 2016 vide letter dated 18.1.2016 of the Indian Meteorological Department, Nagpur, made sand mining effectively prohibited

for nearly four months of the year. The impracticality to store vast quantities of sand for such an extended period, along with the logistical challenge and a sudden and sharp reduction in sand supply during the rainy season, created difficulties each year on sand for construction. As a result, there was a delay of approximately 9 months (June to October 2019, 2020, and 2021) due to the annual halting of sand mining operations during the rainy season.

(vi) In 2017, the NGT imposed a ban on mechanized sand mining in Uttar Pradesh to address the severe environmental degradation caused by large-scale extraction methods. This decision drastically curtailed sand mining operations, reducing both the volume and efficiency of sand production. Moreover, At the time of project execution, the State of Uttar Pradesh did not have any policy governing the production and use of manufactured sand (M-sand). Hence project construction faced an additional challenge.

(vii) Further, the MOEF&CC introduced new Regulations on Enforcement & Monitoring Guidelines for sand mining, which forced many of the suppliers to scale back, thereby significantly reducing the available sand supply. Further, the Covid-19 pandemic struck in March 2020, which was followed by total lockdown and severe restrictions, bringing the already scaled-back mining operations to a near standstill. This prolonged disruption further exacerbated the sand shortage and hindered the project's progress. Consequently, the supply shortage, compounded by stricter enforcement and Covid-19 (January 2020 to October 2020), contributed to a delay of approximately 10 months.

(viii) The year 2020 witnessed an unprecedented health and humanitarian crisis arising because of the novel Covid viral epidemic not only in India but around the Globe. The various restrictions imposed in relation to it have resulted in an adverse impact on the performance of industrial activities. The multiple events/activities/orders issued by the GOI, State governments, including the Government of UP and various other authorities pertaining to the Covid-19 pandemic from 24.3.2020 to 22.3.2022 have impacted FGD project progress/ performance with lockdowns, travel restrictions, and labour shortages impacting all industrial activities.

(ix) The pandemic’s impact extended beyond mere lockdowns; during the first wave of the Covid-19 pandemic, the project execution was kept on hold from 22.3.2020 to 14.5.2020. Despite the unforeseen delays, the site manpower was only able to reach pre-Covid strength by November 2020. Therefore, the delay of around 09 months (Mar-20 to Nov-20) due to the Covid-19 first wave.

(x) The second wave of Covid-19 in March 2021 had a devastating impact on public health. Government restriction was imposed again from 1.4.2021, which gradually tightened in subsequent months till 30.6.2021. Further, during the second wave of Covid-19, there was a huge demand for oxygen by hospitals,

which cut down the industrial supply. Since, Industrial oxygen is a critical input for erection activities such as metal cutting and welding, a shortage of the same resulted in the stoppage of erection activities. Therefore, the delay of around 5 months (March 2021 to July 2021) due to the Covid-19 second wave at the site was beyond the control of the Petitioner.

(xi) The initial MOEFCC notification led to a surge in FGD system orders, exceeding the available technical expertise and skilled manpower. Limited vendor availability for FGD system equipment further complicated the supply chain situation. Further, executing FGD projects in existing power plants (brownfield projects) is inherently complex. CEA, the technical wing of the Ministry of Power already acknowledged these challenges in the execution of FGD projects in India in its published reports. In addition, a study commissioned by MOP to assess the compliance of thermal power plant emission norms was conducted by IIT Delhi, and based on the report, MOEFCC revised the timelines for the implementation of FGD systems.

Submissions of the Respondent UPPCL

15. The Respondent UPPCL has objected to the tariff proposal made by the Petitioner mainly with regard to the details to be provided by the Petitioner on issues like capital cost, additional capitalisation, O&M expenses, ROE, etc.

Cost Overrun

16. The Petitioner has submitted that there is no cost overrun due to the delay in the implementation of the FGD package. The details furnished with regard to the approved and actual capital cost in Form-B for FGD are as under:

(Rs. in lakh)

	As per the I.A.	**Actual cost@**	**Cost Overrun**
FGD			
Plant & Machinery, and Civil Works	35695.00	# 35031.18	(-)663.82
IDC, FC, IEDC, FERV & Hedging cost	5029.00	2100.11	(-)2928.89
Total ECS System (FGD)	**39839.00**	**# 37131.30**	**(-)2707.70**

 # including un-discharged liabilities of Rs.937.13 lakh; @ as on 31.3.2024.

Analysis and Decision

17. It is noticed from the submissions of the Petitioner that the delay in the commissioning of the FGD system is on account of a combination of various factors (as stated above). However, there is no cost overrun in the installation of the FGD system. It is also noticed that the Petitioner has not furnished the relevant tariff filing forms

pertaining to the cost and time overrun in Form-F and Form-G, respectively. The Petitioner submitted that the major reasons for the delay were on account of short supply of construction materials, halting sand mining, a ban on mechanised sand mining, Covid-19, and challenges due to the teething of technology. According to us, in order to examine the issues related to FGD system installation and to confirm whether these reasons for delay were beyond the control of the Petitioner, complete details of time overrun with regard to the ODe of the FGD system are required to be furnished with all relevant supporting documents for scrutiny and consideration. As such, the time overrun is not being examined in this order. The Petitioner is, therefore, directed to furnish the said details, at the time of the truing-up of the tariff. Be that as it may, we note that this generating station has been designated as Category-C and has to meet the MOEF&CC compliance for its SOx emissions by December 2026. Thus, considering the fact that the installation of ECS at existing generating stations, is to comply with the new stringent environmental norms is necessary and is required to make power available to the beneficiaries on a sustained basis, meeting all statutory requirements and at the same time to avoid cash flow problems, we are inclined to allow the provisional supplementary tariff towards implementation of CM system and FGD system in respect of the generating station, based on the capital cost as approved in the Investment Approval. This is subject to adjustment, after truing up of tariff in terms of the 2019 Tariff Regulations. We direct accordingly. The Petitioner is also directed to furnish the details of the liquidated damages recovered from the contractors for the delay in completing the work and also submit the time and cost overrun in the prescribed formats (Form-F and Form-G) under the 2019 Tariff Regulations. However, for the purpose of tariff, the Ode, i.e.,11.10.2022, as claimed by the Petitioner, is considered for the purpose of tariff.

Capital cost as on ODe of ECS system

18. The Petitioner has claimed the following capital cost (as per Form-1(I)) as on the ODe of the ECS system:

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
Capital cost as on ODe	31851.18	-
Add: Un-amortized Finance Charges	149.98	-
Add: Notional IDC	84.97	-
Add: Loan ERV Charged to P&L	(-) 1937.01	-
Opening capital cost	30149.12	30482.89
Add: Addition during the year / period	149.63	1048.23
Add: Discharges of liabilities during the year / period	184.14	2960.98
Closing capital cost	**30482.89**	**34492.09**
Average capital cost	30316.00	32487.49

19. For the present, the capital cost (including all its components viz IDC, IEDC, FC & FERV, etc.) as claimed as on the respective ODe of the ECS system is allowed. The Petitioner is, however, directed to furnish the (i) Auditor-certified statement showing reconciliation of capital cost claimed with the books of accounts, as on ODe of ECS as well as the additional capital expenditure claimed thereafter; (ii) Detailed clarification regarding the expenditure towards contingencies, as on the ODe of ECS system, included in I.A. approved cost; (iii) Detailed workings with links in respect of IDC, FC and FERV calculations, as on the ODe of ECS system; (iv) Auditor certified statement that the un-amortised financing charges claimed as on ODe is pertaining to installation of ECS. The Petitioner is also directed to submit the complete details of the scheme of the ECS system along with the major components capitalized as per Form-9A of the 2019 Tariff Regulations along with the details of the old items de-capitalized as per Form-9B(i) of the 2019 Tariff Regulations.

Additional Capital Expenditure

20. Regulation 29 of the 2019 Tariff Regulations provides for the additional capitalization related to compliance with the ECS as under:

> *"29. Additional Capitalization on account of Revised Emission Standards: (1) A generating company requiring to incur additional capital expenditure in the existing generating station for compliance of the revised emissions standards shall share its proposal with the beneficiaries and file a petition for undertaking such additional capitalization.*
>
> *(2) The proposal under clause (1) above shall contain details of proposed technology as specified by the Central Electricity Authority, scope of the work, phasing of expenditure, schedule of completion, estimated completion cost including foreign exchange component, if any, detailed computation of indicative impact on tariff to the beneficiaries, and any other information considered to be relevant by the generating company.*
>
> *(3) Where the generating company makes an application for approval of additional capital expenditure on account of implementation of revised emission standards, the Commission may grant approval after due consideration of the reasonableness of the cost estimates, financing plan, schedule of completion, interest during construction, use of efficient technology, cost-benefit analysis, and such other factors as may be considered relevant by the Commission.*
>
> *(4) After completion of the implementation of revised emission standards, the generating company shall file a petition for determination of tariff. Any expenditure incurred or projected to be incurred and admitted by the Commission after prudence check based on reasonableness of the cost and impact on operational parameters shall form the basis of determination of tariff.*
>
> (5) *Un-discharged liability, if any, on account of emission control system shall be allowed as additional capital expenditure during the year it is discharged, subject to prudence check."*

21. The Petitioner has claimed the following additional capital expenditure (ACE) under Regulation 24(1)(b) and Regulation 29(5) of the 2019 Tariff Regulations:

(Rs. In lakh)

Sl. No.	**Head of Work /Equipment**	**ACE claimed (actual)**	
		2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
1	Wet FGD	149.63	840.45
2	Initial Spare	0.00	207.78
Total Add Cap		149.63	1048.23
3	Discharges of liabilities	184.14	2,960.98
Total Add. Cap. claimed incl. discharges of liabilities		**333.77**	**4009.20**

22. We now examine the additional capital expenditure claims of the Petitioner as under:

Wet FGD System

23. The Petitioner has claimed the additional capital expenditure of Rs.990.08 lakh (Rs.149.63 lakh in 2022-23 and Rs.840.45 lakh in 2023-24) under Regulation 24(1)(b) of the 2019 Tariff Regulations for the FGD system installed in the generating station. In justification for the same, the Petitioner has submitted that the work/asset claimed forms part of the FGD system, which is within the original scope of work and up to the cut-off date. The matter has been examined. It is noticed that the Petitioner has claimed the additional capital expenditure under Regulation 24(1)(b) of the 2019 Tariff Regulations. However, the provisions of Regulation 29 are only applicable for the purpose of additional capital expenditure for the ECS system. Since the claim of the Petitioner is for assets that are under the original scope and are within the limit of approved cost (I.A. cost), the claim of the Petitioner is allowed under Regulation 29(4) of the 2019 Tariff Regulations. The Petitioner is at liberty to claim the additional capital expenditure along with the break-up at the time of the truing-up of tariff.

Initial Spares

24. The Petitioner has claimed the additional capital expenditure of Rs.207.78 lakh in 2023-24 under Regulation 24(1)(b) of the 2019 Tariff Regulations towards initial spares. In justification for the same, the Petitioner has submitted that the work/asset claimed to form part of the FGD system is within the original scope of work and up to the cut-off date. With regard to initial spares for ECS, Regulation 23 of the 2019 Tariff Regulations provides as given below:

> "**23. *Initial Spares:*** *Initial spares shall be capitalised as a percentage of the Plant and Machinery cost, subject to following ceiling norms:*
>
> *(a) Coal-based/lignite-fired thermal generating stations - 4.0%*
>
> *xxxxxxxxxxxx*
>
> i. *Plant and Machinery cost shall be considered as the original project cost excluding IDC, IEDC, Land Cost and Cost of Civil Works. The generating company and the transmission licensee for the purpose of estimating Plant and Machinery Cost, shall submit the break-up of head wise IDC and IEDC in its tariff application;*

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iii. where the emission control system is installed, the norms of initial spares specified in this Regulation for coal or lignite based thermal generating station as the case may be, shall apply."

25. The Petitioner, in Form-B of the tariff forms, submitted an amount of Rs.30955.61 lakh for Plant and Machinery cost capitalized as on 31.3.2024 (including un-discharged liabilities of Rs.933.71 lakh). As per the above regulation, the limit for initial spares works out to Rs.1190.60 lakh. It is pertinent to mention that the Petitioner has not furnished the details of initial spares capitalized till the Ode but has claimed the capitalization of Rs.207.78 lakh of initial spares during 2023-24, which is within the ceiling limit. Though the Petitioner has claimed the additional capital expenditure under Regulation 24(1)(b) of the 2019 Tariff Regulations, the provisions of Regulation 29 are only applicable for the said purpose. Since the claim of the Petitioner is for the assets that are under the original scope and are within the limit of the approved cost (I.A. cost), the claim of the Petitioner is allowed under Regulation 29(4) of the 2019 Tariff Regulations. The Petitioner is directed to submit the details of the Plant & Machinery cost, in terms of Regulation 23 of the 2019 Tariff Regulations, along with details of the initial spares capitalised as on the ODe of FGD system and beyond, including details of the liabilities corresponding to it, at the time of truing-up of tariff.

Discharge of Liabilities

26. The Petitioner has claimed a total discharge of liabilities of Rs.3145.12 lakh under Regulation 24(1)(a) and Regulation 29(5) of the 2019 Tariff Regulations, with the period-wise breakup as under:

(Rs. in lakh)

ACE claimed (actual)	
2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
184.14	2960.98

27. The discharge of liabilities claimed as above is allowed.

28. Based on the above, the total additional capital expenditure allowed for the purpose of the supplementary tariff is as under:

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	2023-24
Additional capital expenditure allowed	149.63	1048.23
Add: Discharges of liabilities allowed	184.14	2960.98
Net additional capital expenditure allowed	**333.77**	**4009.20**

Capital Cost for the purpose of Supplementary Tariff

29. Accordingly, the capital cost allowed for the purpose of the supplementary tariff is as under:

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	2023-24
Opening Capital Cost	30149.12	30482.89
Additional Capital Expenditure allowed	333.77	4009.20
Closing Capital Cost	**30482.89**	**34492.09**
Average Capital Cost	30316.00	32487.49

Debt-Equity Ratio

30. Regulation 18 of the 2019 Tariff Regulations provides as under:

> *"18. Debt-Equity Ratio: (1) For a new project, the debt-equity ratio of 70:30 as on date of commercial operation shall be considered. 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, as the case may be, shall submit the resolution of the Board of the company or approval of the competent authority in other cases regarding infusion of funds from internal resources in support of the utilization 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 1.4.2019, debt: equity ratio allowed by the Commission for determination of tariff for the period ending 31.3.2019 shall be considered:*

Provided that in case of generating station or a transmission system including communication system which has completed its useful life as on or after 1.4.2019, if the equity actually deployed as on 1.4.2019 is more than 30% of the capital cost, equity in excess of 30% shall not be taken into account for tariff computation;
Provided further that in case of projects owned by Damodar Valley Corporation, the debt: equity ratio shall be governed as per sub-clause (ii) of clause (2) of Regulation 72 of these regulations.
(4) In case of the generating station and the transmission system including communication system declared under commercial operation prior to 1.4.2019, but where debt: equity ratio has not been determined by the Commission for determination of tariff for the period ending 31.3.2019, the Commission shall approve the debt: equity ratio in accordance with clause (1) of this Regulation.
(5) Any expenditure incurred or projected to be incurred on or after 1.4.2019 as may be admitted by the Commission as additional capital expenditure for determination of tariff, and renovation and modernization expenditure for life extension shall be serviced in the manner specified in clause (1) of this Regulation.
(6) Any expenditure incurred for the emission control system during the tariff period as may be admitted by the Commission as additional capital expenditure for determination of supplementary tariff, shall be serviced in the manner specified in clause (1) of this Regulation."

31. The Petitioner has claimed tariff considering the debt-equity ratio of 70:30 as on the ODe of ECS, as well as for the purpose of additional capital expenditure, and the same has been considered.

Return on Equity

32. Regulation 30 of the 2019 Tariff Regulations provides as under:

"30. Return on Equity:
(1) Return on equity shall be computed in rupee terms on the equity base determined in accordance with Regulation 18 of these regulations.
(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 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 return on equity in respect of additional capitalization after cut-off date beyond the original scope, excluding additional capitalization on account of emission control system, shall be computed at the weighted average rate of interest on actual loan portfolio of the generating station or the transmission system or in the absence of actual loan portfolio of the generating station or the transmission system, the weighted average rate of interest of the generating company or the transmission licensee, as the case may be, as a whole shall be considered, subject to ceiling of 14%.
Provided further that:
(i) In case of a new project the rate of return on equity shall be reduced by 1.00% 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) or Free Governor Mode Operation (FGMO) data telemetry communication system up to load dispatch centre or protection system based on the report submitted by the respective RLDC;
(ii) in case of existing generating station as and when any of the requirements under

(i) above of this Regulation are found lacking based on the report submitted by the concerned RLDC rate of return on equity shall be reduced by 1.00% for the period for which the deficiency continues;

(iii) in case of a thermal generating station with effect from 1.4.2020:

(a) rate of return on equity shall be reduced by 0.25% in case of failure to achieve the ramp rate of 1% per minute;

(b) an additional rate of return on equity of 0.25% shall be allowed for every incremental ramp rate of 1% per minute achieved over and above the ramp rate of 1% per minute subject to ceiling of additional rate of return on equity of 1.00%:

Provided that the detailed guidelines in this regard shall be issued by National Load Dispatch Centre by 30.6.2019.

(3) The return on equity in respect of additional capitalization on account of emission control system shall be computed at the base rate of one year marginal cost of lending rate (MCLR) of the State Bank of India as on 1st April of the year in which the date of operation (ODe) occurs plus 350 basis point, subject to ceiling of 14%."

33. Regulation 31 of the 2019 Tariff Regulations provides as under:

"31. Tax on Return on Equity:

(1) The base rate of return on equity as allowed by the Commission under Regulation 30 of these regulations 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 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 paid on income from other businesses including deferred tax liability (i.e. income from business other than business of generation or transmission as the case may be) shall be excluded 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.

Illustration-

(i) In case of the generating company or the transmission licensee paying Minimum Alternate

Tax (MAT) @ 21.55% including surcharge and cess:

Rate of return on equity = 15.50/(1-0.2155) = 19.758%

(ii) In case of a generating company or the transmission licensee paying normal corporate tax including surcharge and cess:

(a) Estimated Gross Income from generation or transmission business for FY 2019-20 is Rs

1000 crore;

(b) Estimated Advance Tax for the year on above is Rs 240 crore;

(c) Effective Tax Rate for the year 2019-20 = Rs 240 Crore/Rs 1000 Crore = 24%;

(d) Rate of return on equity = 15.50/ (1-0.24) = 20.395%.

(2) The generating company or the transmission licensee as the case may be shall true up the grossed-up rate of return on equity at the end of every financial year based on actual tax paid together with any additional tax demand including interest thereon duly adjusted for any refund of tax including interest received from the income tax authorities pertaining to the tariff period 2019-24 on actual gross income of any financial year.

However, penalty if any arising on account of delay in deposit or short deposit of tax amount shall not be claimed by the generating company or the transmission licensee as the case may be. Any under-recovery or over-recovery of grossed up rate on return on equity after truing up shall be recovered or refunded to beneficiaries or the long-term transmission customers as the case may be on year to year basis."

34. The Petitioner has claimed tariff, considering the rate of Return on Equity (ROE) of 12.723% with the base rate of ROE of 10.50% (1-year SBI MCLR of 7.00% as on 1.4.2022 plus 350 bps) and the effective tax rate of 17.472% is the MAT rate applicable for the period 2022-24. The same is in order and is allowed for the purpose of tariff. Accordingly, ROE has been worked out as under:

(Rs. in lakh)

		2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
A	Normative Equity-Opening	9044.74	9144.87
B	Addition of Equity due to additional capital expenditure	100.13	1202.76
C	Normative Equity-Closing (A+B)	9144.87	10347.63
D	Average Normative Equity [(A+C)/2]	9094.80	9746.25
E	Return on Equity (Base Rate)	10.500%	10.500%
F	Effective Tax Rate for the year	17.472%	17.472%
G	Rate of Return on Equity (Pre-Tax) [E/(1-F)]	12.723%	12.723%
H	**Return on Equity (Pre-Tax) (DxG) (*annualized)***	**1157.13**	**1240.01**
I	**Return on Equity (*pro-rata*)**	**545.28**	**1240.01**

Interest on Loan

35. Regulation 32 of the 2019 Tariff Regulations provides as under:

"32. Interest on loan capital: (1) The loans arrived at in the manner indicated in Regulation 18 of these regulations shall be considered as gross normative loan for calculation of interest on loan.
(2) The normative loan outstanding as on 1.4.2019 shall be worked out by deducting the cumulative repayment as admitted by the Commission up to 31.3.2019 from the gross normative loan.
(3) The repayment for each of the year of the tariff period 2019-24 shall be deemed to be equal to the depreciation allowed for the corresponding year/period. In case of decapitalization 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.
(5a) The rate of interest on loan for installation of emission control system shall be the weighted average rate of interest of actual loan portfolio of the emission control system or in the absence of actual loan portfolio, the weighted average rate of interest of the generating company 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 changes to the terms and conditions of the loan shall be reflected from the date of such re-financing."

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

(a) Gross normative loan equivalent to 70% of the capital cost allowed as on ODe of ECS has been considered.

(b) Addition to normative loan on account of additional capital expenditure approved above has been considered.

(c) Depreciation allowed has been considered as repayment of normative loan during the respective year of the period 2019-24.

(d) The weighted average rate of interest as claimed by the Petitioner has been considered for the purpose of tariff, subject to truing up.

37. Necessary calculations for interest on loan are as under:

(Rs. in lakh)

		2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
A	Gross opening loan	21104.38	21338.02
B	Cumulative repayment of loan up to the previous year/period	0.00	514.29
C	Net Loan Opening (A-B)	21104.38	20823.73
D	Addition due to additional capital expenditure	233.64	2806.44
E	Repayment of loan during the year	514.29	1169.55
F	Net Loan Closing (C+D-E)	20823.73	22460.62
G	Average Loan [(C+F)/2]	20964.06	21642.17
H	WAROI	3.197%	3.350%
I	**Interest on Loan (GxH) (*annualised)***	**670.32**	**724.99**
J	**Interest on Loan (*pro-rata)***	**315.88**	**724.99**

Depreciation

38. Regulation 33 of the 2019 Tariff Regulations provides as under:

"33. Depreciation: (1) Depreciation shall be computed from the date of commercial operation of a generating station or unit thereof or a transmission system or element thereof including communication system. 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:

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 a 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 the salvage value for IT equipment and software shall be considered as NIL and 100% value of the assets shall be considered depreciable;

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

Provided also 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 unit or transmission system as the case may be, shall not be allowed to be recovered at a later stage during the useful life or 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-I 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 1.4.2019 shall be worked out by deducting the cumulative depreciation as admitted by the Commission upto 31.3.2019 from the gross depreciable value of the assets.

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

(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.

9) Where the emission control system is implemented within the original scope of the generating station and the date of commercial operation of the generating station or unit thereof and the date of operation of the emission control system are the same, depreciation of the generating station or unit thereof including the emission control system shall be computed in accordance with Clauses (1) to (8) of this Regulation.

(10) Depreciation of the emission control system of an existing or a new generating station or unit thereof where the date of operation of the emission control system is subsequent to the date of commercial operation of the generating station or unit thereof, shall be computed annually from the date of operation of such emission control system based on straight line method, with salvage value of 10%, over a period of — a) twenty five years, in case the generating station or unit thereof is in operation for fifteen years or less as on the date of operation of the emission control system; or b) balance useful life of the generating station or unit thereof plus fifteen years, in case the generating station or unit thereof is in operation for more than fifteen years as on the date of operation of the emission control system; or c) ten years or a period mutually agreed by the generating company and the beneficiaries, whichever is higher, in case the generating station or unit thereof has completed its useful life."

39. The Petitioner has claimed a tariff considering the Weighted Average Rate of Depreciation (WAROD) of 5.19% for the period 2022-24. The COD of the generating station is 30.9.2017, which is within 15 years from the ODe of the ECS. Accordingly, depreciation has been calculated considering WAROD of 3.60% (calculated using the Straight-Line Method (SLM) with a salvage value of 10% over a life of 25 years). Accordingly, depreciation has been computed as under:

(Rs. in lakh)

		2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
A	Average capital cost	30316.00	32487.49
B	Depreciable Value (A x 90%)	27284.40	29238.74
C	WAROD	3.60%	3.60%
D	Remaining depreciable value at the beginning of the year (B-'G' of previous year / period)	27284.40	28724.45
E	**Depreciation during the year *(pro-rata)***	514.29	1169.55
F	**Depreciation during the year (AxD) *(annualised)***	**1091.38**	**1169.55**
G	Cumulative depreciation at the end of the year (E+'G' of previous year / period)	514.29	1683.84

O&M Expenses

40. Regulation 35(7) of the 2019 Tariff Regulations provides for O&M expenses for ECS system as under:

"The operation and maintenance expenses on account of emission control system in coal or lignite based thermal generating station shall be 2% of the admitted capital expenditure (excluding IDC and IEDC) as on its date of operation, which shall be escalated annually @3.5% during the tariff period ending on 31st March 2024:

Provided that income generated from sale of gypsum or other by-products shall be reduced from the operation and maintenance expenses."

41. Based on the above, the Petitioner has revised the claim of O&M expenses vide affidavit dated 3.9.2024, considering the revenue realised from the sale of gypsum as below:

(Rs. in lakh)

S.No.		2022-23 (11.10.2022 to 31.3.2023)	2023-24
1	O&M expenses under Reg. 35(1)(7)		
1a	Normative O&M expenses- ECS	676.47	700.15
2	O&M expenses		
3	Total O&M Expenses	676.47	700.15
4	Revenue Realised from Sale of Gypsum	191.88	787.77
5	**Net O&M Expenses**	**484.59**	**0.00**

42. The O&M expenses claimed are in line with Regulation 35(1)(7) of the 2019 Tariff Regulations and hence allowed. As per the proviso to Regulation 35(1)(7) of the 2019 Tariff Regulations, the income generated from the sale of gypsum and other by-products shall be reduced from the O&M expenses. The Petitioner, vide affidavit dated 3.9.2024, has submitted the following details regarding the consumption of limestone, gypsum production, and revenue from the sale of gypsum from the generating station:

Year	Limestone Consumption (MT)	Expenditure in procurement of Limestone (Rs. Lakh)	Gypsum Sold (MT)	Revenue Realized from sale of Gypsum (Rs. Lakh)	Methodology for disposal of Gypsum
FY 2022-23	9622	212.74	8727	191.88	Competitive Bidding
FY 2023-24	15314	385.66	32403	787.77	

43. The revenue earned from gypsum in 2022-23 was Rs. 191.88 lakh (from October 2022 to March 2023), while in 2023-24, the revenue earned was Rs.787.77 lakh (for the period of April 2023 to March 2024). This has been considered. Further, the O&M expenses have been calculated after adjusting the revenue from the sale of gypsum (on a pro-rata basis during 2023-24) as submitted by the Petitioner. Accordingly, the following O&M expenses are allowed for the FGD system:

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	2023-24
Capital cost as on ODe of FGD excluding IDC and IEDC (a)	28215.89	30387.37
Normative O&M expenses as per Regulation 35(7) of the 2019 Tariff Regulations i.e., 2% of above (b)	564.32	771.99
Revenue from the sale of gypsum (c)	191.88	787.77
Annualized O&M expenses allowed (d)=(b)-(c)	**372.44**	**0.00**
O&M expenses allowed *(pro-rata during 2022-23)*	**175.50**	**0.00**

44. The O&M expenses allowed, as above, are subject to truing-up based on the finalization of capital cost as of the ODe of the FGD system. The Petitioner is directed to furnish the audited details of revenue earned through the sale of gypsum prior to Ode (to be adjusted in capital cost claimed as on Ode) and after ODe (to be adjusted in the O&M expense) at the time of truing up of tariff. The O&M expenses allowed for the FGD system, as above, shall be used for the calculation of IWC.

Operational Norms

45. The operational norms with respect to ECS (FGD), i.e., normative annual plant availability factor, gross station heat rate, specific limestone consumption, and auxiliary power consumption, are discussed below:

Normative Annual Plant Availability Factor (NAPAF)

46. The Petitioner has claimed NAPAF of 85% and the same is allowed to the generating station.

Gross Station Heat Rate (kCal/kWh)

47. The Petitioner has claimed the Gross Station Heat Rate (GSHR) of 2358.84 kCal/kWh. The Commission, vide its order dated 15.4.2022 in Petition 3/GT/2021, had allowed the GSHR of 2358.84 kCal/kWh for the generating station, and the same is considered.

Specific limestone consumption

48. Regulation 49 clause (F) of the 2019 Tariff Regulations provides as under: -

*"**(F) Norms for consumption of reagent:***

(1) The normative consumption of specific reagents for various technologies for the reduction of emission of sulphur dioxide shall be as under:

(a) For Wet Limestone based Flue Gas De-sulphurisation (FGD) system:
The specific limestone consumption (g/kWh) shall be worked out by following formula:
[K x SHR x S/CVPF] x [85/ LP]
Where, S = Sulphur content in percentage,
LP = Limestone Purity in percentage,
SHR= Gross station heat rate, in kCal per kWh
CVPF = (a) Weighted Average Gross calorific value of coal as received, in kCal per kg for coal based thermal generating stations less 85 kCal/kg on account of variation during storage at generating station;
(b) Weighted Average Gross calorific value of lignite as received, in kCal per kg, as applicable for lignite based thermal generating stations:

Provided that value of K shall be equivalent to (35.2 x Design SO2 Removal Efficiency/96%) for units to comply with SO2 emission norm of 100/200 mg/Nm3 or (26.8 x Design SO2 Removal Efficiency/73%) for units to comply with SO2 emission norm of 600 mg/Nm3 ;

Provided further that the limestone purity shall not be less than 85%."

49. The Petitioner has claimed the following Specific Reagent Consumption (SRC) based on the average values of CVPF, Sulphur Content (S), and Limestone Purity (LP). The following consumption of specific reagents has been claimed using the above methodology:

Unit	2022-23 (11.10.2022 to 31.3.2023)	2023-24
kg/kWh	10.491	10.491

50. The Petitioner has claimed the SRC above, based on the following assumptions:

SN	Particulars	Unit	2022-23 (11.10.2022 to 31.3.2023)	2023-24
1	Auxiliary consumption	%	6.25	6.25
2	Additional Auxiliary Power Consumption (ECS)	%	1.00	1.00
3	Design SO2 Removal Efficiency	%	95.06%	95.06%
4	SHR		2358.84	2358.84
5	CVPF		3922.69	3922.69
6	**Specific Reagent Consumption (kg/kwh)**	kg/kwh	10.491	10.491
4	**Landed Cost of Reagent (Rs/MT)**	Rs/MT	2,296	2,296
7	**Supplementary Energy Charge (Rs/kwh)**	Rs/kwh	0.0756	0.0756
8	Installed Capacity	MW	500	500
9	No of Days in the year	Days	365	366
10	ESO in 1 Day	MU	9.46	9.46
11	Cost of Reagent consumed in a day	Rs Lakh	2.46	2.46

		ECR supp.	dECR+ [(SRC x LPR / 10)/(100-(AUXn + AUXen))]	0.0756	Rs/KWh
		dECR	ECRen-ECRn	0.050	Rs/KWh
		SRC	[K x SHR x S/CVPF] x [85/ LP]	10.49 34.86	g/KWh
		K	(35.2 x Design SO2 Removal Efficiency/96%)		
		CVPF		3923	Kcal/Kg
		ECRn		4.609	Rs/Kwh
		ECRen		4.658	Rs/Kwh
		S		0.53	%

Form-O(i) Parameters			
CVPF	3,973.00	3,936.27	3,858.79
CVPF (Average)	3922.69		
LP(Average)	90.00		
Sulphur Content (Average)	0.53		
ECRn (Average)	4.61		
ECREn (Average)	4.66		
Data			
CVPF (kCal/Kg)	3,973.00	3,936.27	3,858.79
CVSF (kCal/Litre)	9,145.00	9,200.00	9,200.00
LPPF (Rs/MT)	6,929.90	6,718.89	7,205.88
LPSF (Rs/KL)	108,262.74	108,262.74	108,262.74
AUX-Norm (%)	6.25	6.25	6.25
GHR-Norm (kCal/kWh)	2358.84	2358.84	2358.84
SFC-Norm (Litre/kWh)	0.0005	0.0005	0.0005
ECR (INR)	4.534	4.439	4.853
AUX for DESOX(Norm) (%)	1.00	1.00	1.00
NEW AUX-NORM (%)	7.25	7.25	7.25
NEW GHR-NORM (kCal/kWh)	2358.84	2358.84	2358.84
NEW-SFC-NORM (Litre/kWh)	0.0005	0.0005	0.0005
NEW ECR (INR)	4.583	4.49	4.91
Delta ECR ((New ECR-OLD ECR) = ΔECR)	0.0490	0.0480	0.0520

51. Considering the fact that there are no specific norms for SRC, but it is derived using the formula, the Commission, in this order, has considered the assumptions submitted by the Petitioner for the quantities used in the formula and allowed the above-claimed SRC. However, the Petitioner is directed to furnish the month-wise details of the CVPF, Sulphur Content (S), and Limestone Purity (LP) as per Form Oi of the 2019 Tariff Regulations at the time of truing-up of the tariff.

Auxiliary Energy Consumption (AUXen)

52. With regard to AUXen, sub-clause (f) of clause (E) of Regulation 49 of the 2019 Tariff Regulations provides for 1% of AUXen for Wet limestone-based FGD system. This has been allowed.

Interest on Working Capital

53. Regulation 34(a) (aa) of the 2019 Tariff Regulations provides for Interest on Working Capital for the ECS as under:

"(aa) For emission control system of coal or lignite based thermal generating stations:

(i) Cost of limestone or reagent towards stock for 20 days corresponding to the normative annual plant availability factor;

(ii) Advance payment for 30 days towards cost of reagent for generation corresponding to the normative annual plant availability factor;

(iii) Receivables equivalent to 45 days of supplementary capacity charge and supplementary energy charge for sale of electricity calculated on the normative annual plant availability factor;

(iv) Operation and maintenance expenses in respect of emission control system for one month;

(v) Maintenance spares @20% of operation and maintenance expenses in respect of emission control system."

54. The Petitioner has claimed the following Interest on Working Capital:

(Rs. in lakh)

Sl. No.			**2022-23 (11.10.2022 to 31.3.2023)**	**2023-24**
	No of days		365	366
1	Cost of Limestone/Reagent Stock	20 days	49.15	49.15
1a	Cost of Limestone/Reagent Advance Payment	30 days	73.72	73.72
2	**Receivables**	**45 days**	**839.17**	**872.60**
3	O & M Expenses	1 mon.	56.37	58.35
4	Maintenance Spares	@20%	135.29	140.03
5	Total Working Capital		1153.70	1193.84
6	Rate of Interest	%	10.50	12.00
7	**Interest on Working Capital**		**121.14**	**143.26**

Landed Cost of Reagent

55. As regards the landed cost of limestone, Regulation 41(1) of the 2019 Tariff Regulations provides as under:

41(1) Where specific reagents such as Limestone, Sodium Bi-Carbonate, Urea or Anhydrous Ammonia are used during operation of emission control system for meeting revised emission standards, the landed cost of such reagents shall be determined based on normative consumption and purchase price of the reagent through competitive bidding, applicable statutory charges and transportation cost.

56. The Petitioner, in Form 16A, has claimed the following landed cost of reagent:

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
Cost of Limestone/Reagent Stock (20 days per annum) corresponding to the normative annual plant availability factor	49.15	49.15
Advance Payment for limestone (30 days per annum) for generation corresponding to the normative annual plant availability factor	73.72	73.72

57. It is noticed from the Petitioner's claim in Form-16 that the cost of the Limestone claimed has not been audited in terms of Regulation 41(1) of the 2019 Tariff Regulations. The Petitioner has also not submitted the calculation of the landed cost of the Reagents, based on the normative consumption and the purchase price of the Reagent through competitive bidding, the applicable statutory charges, and the transportation cost. Moreover, the transportation cost of Limestone has not been specified. The Petitioner has only furnished the total amount charged for the Limestone supply, including the transportation charges. However, the Petitioner's claim of the Petitioner as above has been considered provisionally. The Petitioner is directed to certify, at the time of truing-up of tariff, that the purchase price of Reagent is through a competitive bidding process with all supporting documents, including the basis of the transportation rates/ the details of the transport charges, etc., along with the reasons for variations, duly certified by the Auditor.

Supplementary Energy Charge Rate (SECR)

58. As regards SECR, Regulation 43 (1a) of the 2019 Tariff Regulations provides as under:

> *" (1a) The supplementary energy charge on account of emission control system shall cover the differential energy charges due to auxiliary energy consumption and cost of reagent consumption, and shall be payable by every beneficiary for the total energy scheduled to be supplied to such beneficiary during the calendar month on ex-power plant basis, at the supplementary energy charge rate of the month. Total supplementary energy charge payable to the generating company for a month shall be:*
>
> *Supplementary Energy Charges = (Supplementary energy charge rate in Rs./kWh) x {Scheduled energy (ex-bus) for the month in kWh}"*

59. Regulation 43(2)(a) (aa) of the 2019 Tariff Regulations provides as under:

> ***"(aa) Supplementary ECR for coal and lignite based thermal generating stations:***
>
> *Supplementary ECR = (∆ECR) + [(SRC x LPR / 10)/(100-(AUXn + AUXen))]*
> *Where,*
>
> *(∆ECR) = Difference between ECR with revised auxiliary energy consumption with emission control system equivalent to (AUXn + AUXen) and ECR with normative auxiliary energy consumption as specified in these regulations and revised;*

SRC = Specific reagent consumption on account of revised emission standards (in g/kWh);

LPR = Weighted average landed price of reagent for emission control system (in Rs./kg)".

60. The Petitioner has claimed SECR as follows:

*(**Rs. in lakh**)*

	Unit	**2022-23 (11.10.2022 to 31.3.2023)**	**2023-24**
Auxiliary consumption	%	6.25	6.25
Additional Auxiliary Power Consumption (ECS)	%	1.00	1.00
Design SO2 Removal Efficiency	%	95.06	95.06
SHR		2358.84	2358.84
CVPF		3922.69	3922.69
Specific Reagent Consumption	gm/kWh	10.491	10.491
Landed Cost of Reagent	Rs/MT	2,296	2,296
Supplementary Energy Charge	Rs/kwh	0.0756	0.0756

61. The claims of the Petitioner, in terms of Regulation 43(1)(a) and Regulation 43(2)(a) (aa) of the 2019 Tariff Regulations, have been considered. The Petitioner is directed to submit the relevant documents in support of the claim for Design SO_2 Removal Efficiency, month-wise details of CVPF, LPR, and Limestone purity, at the time of truing-up of tariff.

Working Capital for Receivables

62. The Petitioner has claimed Receivables equivalent to 45 days of supplementary capacity charge and supplementary energy charge for the sale of electricity, calculated on the normative annual plant availability factor, as under:

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
Receivables equivalent to 45 days of Supplementary Capacity Charges	517.15	550.58
Supplementary Energy Charge for sale of electricity calculated on the normative annual plant availability factor	322.02	322.02
Total	**839.17**	**872.60**

63. Considering the energy charges and capacity charges allowed, the receivables allowable are worked out as under:

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	2023-24
Receivables equivalent to 45 days of Supplementary Capacity Charge	418.33	397.85
Supplementary Energy Charge, equivalent to 45 days, for the sale of electricity calculated on the normative annual plant availability factor	323.55	323.55
Total	**741.88**	**721.40**

O&M Expenses (1 month) for computation of working capital

64. In terms of Regulation 34 (aa) (iv) of the 2019 Tariff Regulations, one month's O&M expenses allowed is as under:

(Rs. in lakh)

2022-23 (11.10.2022 to 31.3.2023)	2023-24
31.04	0.00

Maintenance Spares for computation of working capital

65. In terms of Regulation 34(aa)(v) of the 2019 Tariff Regulations, maintenance spares @ 20% of the O&M expenses allowed is as under:

(Rs. in lakh)

2022-23 (11.10.2022 to 31.3.2023)	2023-24
74.19	0.00

66. In line with Regulation 34(3) of the 2019 Tariff Regulations, the rate of interest on working capital is considered as 10.50% (i.e., 1-year SBI MCLR of 7.00% as on 1.4.2022 + 350 bps) for the year 2021-22 and 12.00% (i.e., 1-year SBI MCLR of 8.50% as on 1.4.2023 + 350 bps) for the year 2023-24. Accordingly, Interest on working capital, is computed and allowed as under:

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	2023-24
Working capital for Cost of Limestone/ Reagent Stock (20 days generation corresponding to NAPAF) (A)	49.15	49.15
Working capital for advances towards Cost of Limestone/ Reagent (30 days generation corresponding to NAPAF) (B)	73.72	73.72
Working capital for Maintenance Spares (20% of O&M expenses) (D)	74.49	0.00

Working capital for Receivables (45 days of sale of electricity at NAPAF) (E)	741.88	721.40
Working capital for O&M expenses (1 month of O&M expenses) (F)	31.04	0.00
Total Working Capital (G = A+B+C+D+E+F)	**970.27**	**844.27**
Rate of Interest (H)	10.50%	12.00%
Interest on Working Capital (I = G x H) *(annualised)*	**101.88**	**101.31**
Interest on Working Capital *(pro-rata for 2022-23)*	**48.01**	**101.31**

Supplementary tariff for the period 2019-24

67. Accordingly, the supplementary tariff approved towards the installation of ECS in the generating station for the period 2022-24 is summarised below:

(Rs. in lakh)

	2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
Depreciation	1091.38	1169.55
Interest on Loan	670.32	724.99
Return on Equity	1157.13	1240.01
Interest on Working Capital	101.88	101.31
O&M Expenses	372.44	0.00
Total	**3393.15**	**3235.87**

***Note:** (1) All figures are on an annualized basis. (2) All figures under each head have been rounded. The figure in total column in each year is also rounded. As such, the sum of individual items may not be equal to the arithmetic total of the column.*

68. The pro-rata tariff is to be calculated using the bases as under:

	2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
No. of days in the year	365	366
No. of days for which tariff is to be calculated	172	366

69. Accordingly, the pro-rata supplementary tariff for the period 2019-24 works out as under:

(Rs. in lakh)

2022-23 (11.10.2022 to 31.3.2023)	**2023-24**
1598.96	3235.87

70. The supplementary tariff approved as above, is subject to truing-up in terms of Regulation 13 of the 2019 Tariff Regulations.

71. Petition No. 388/GT/2023 is disposed of in terms of the above.

Sd/-	***Sd/-***	***Sd/-***
(Harish Dudani)	**(Ramesh Babu V.)**	**(Jishnu Barua)**
Member	**Member**	**Chairperson**