

CENTRAL ELECTRICITY REGULATORY COMMISSION

NEW DELHI

Petition Nos. 597/MP/2020

Coram:

**Shri P. K. Pujari, Chairperson
Shri I. S. Jha, Member
Shri A. K. Goyal, Member
Shri P.K Singh, Member**

Date of Order: 28.09.2021

Petition under Section 79 of the Electricity Act, 2003 read with Regulation 29 of the Central Electricity Regulatory Commission (Terms and Condition of Tariff) Regulations, 2019 for approval of additional expenditure on installation of various Emission Control Systems at NSPCL Bhilai Expansion Plant (2x250 MW) in compliance of Ministry of Environment and Forests and Climate Change, Government of India notification dated 7.12.2015.

And in the matter of:

NTPC SAIL Power Company Limited,
4th Floor, NBCC Tower,
15 Bhikaji Cama Place,
New Delhi-110066.

.... Petitioner

Vs

1. DNH Power Distribution Corporation Limited,
First Floor, Vidhyut Bhavan,
Opp Secretariat, Silvassa-396230.
2. Electricity Department,
Administration of Daman & Diu, Daman-396210.
3. Chattisgarh State Power Distribution Co. Limited (CSPDCL),
P.O. Sundar Nagar,
Danganiya, Raipur-492013.
4. Steel Authority of India Limited (SAIL),
Ispat Bhavan, Lodhi Road, New Delhi -110003.



ORDER

The Petitioner, NTPC SAIL Power Company Limited, has filed the instant petition under Section 79 of the Electricity Act, 2003 (hereinafter referred to as “the 2003 Act”) read with Regulation 29 of the Central Electricity Regulatory Commission (Terms and Condition of Tariff) Regulations, 2019 (hereinafter referred to as “the 2019 Tariff Regulations”) for approval of Additional Capital Expenditure (ACE) on account of installation of various Emission Control Systems (ECS) at NSPCL Bhilai Expansion Plant (hereinafter referred to as “NSPCL Plant”) (2x250 MW) in compliance with the Environment (Protection) Amendment Rules, 2015 dated 7.12.2015 (hereinafter referred to as "the MoEFCC Notification") notified by Ministry of Environment and Forests and Climate Change (“MoEFCC”), Government of India. The MoEFCC Notification mandates all thermal power plants (TPPs) to comply with the revised emission control norms (ECNs) as specified in the MoEFCC Notification.

2. The Petitioner has made the following prayers in the instant petition:

“It is respectfully prayed that the Hon’ble Commission may be pleased to:

- i) Grant approval for under taking implementation of the scheme mentioned above in order to meet Revised Emission Standards.*
- ii) Grant liberty to approach Hon’ble Commission for approval of implementation of Revised Emission Schemes on account of mercury, specific water consumption, Particulate Matter, if required.*
- iii) Allow additional APC, additional water consumption, additional O&M Expenses, Cost of Reagents etc as per Regulation-76 i.e. “Power to relax” of the Tariff Regulations 2019.*
- iv) Allow deemed availability of the station/unit on account of shutdown for the implementation of ECS as per Regulation-76 i.e. “Power to relax” of the Tariff Regulations 2019.*
- v) Allow the petitioner to file hard copies of the petition along with affidavit duly notarized, once normalcy is resumed.*
- vi) Pass such orders as deemed fit and necessary in the facts and circumstances of the present case.”*



3. The first 250 MW unit of NSPCL Plant at Bhilai in the State of Chhattisgarh was commissioned on 22.4.2009 and the second unit was commissioned on 21.10.2009. The petition was admitted on 27.2.2020 and order was reserved on 13.8.2021. DNHPDCL, Respondent No. 1, has filed its reply to the petition vide affidavit dated 26.5.2021. The Petitioner has filed its rejoinder vide affidavit dated 16.7.2021. Chhattisgarh State Power Distribution Company Ltd. (CSPDCL), Respondent No.3, has filed its reply to the petition vide affidavit dated 10.5.2021. The Petitioner has filed rejoinder to the reply of CSPDCL vide affidavit dated 24.5.2021. The Petitioner has filed reply to the queries raised in the RoP (record of proceedings) dated 31.3.2021 and 29.4.2021 vide affidavits dated 9.4.2021, 12.6.2021 and 12.8.2021 respectively.

Background

4. Background of the instant petition are as follows:

(a) In exercise of the powers conferred under Section 6 and Section 25 of the Environment (Protection) Act, 1986, MoEFCC vide Notification No. S.O. 3305(E) dated 7.12.2015 has amended the Environment (Protection) Rules, 1986, revising and introducing the standards for emission of environmental pollutants to be followed by all existing and new TPPs. As per the MoEFCC Notification, it is mandatory for all TPPs to comply with the revised ECNs within a period of two years from the date of MoEFCC Notification dated 7.12.2015. The deadline for compliance with the revised ECNs has been subsequently modified to 2022. The amended norms prescribed by MoEFCC are as follows:



“

Sr. No.	Industry	Parameter	Standards
1	2	3	4
“5A.	Thermal Power Plant (Water consumption limit)	Water consumption	<p><i>I. All plants with Once Through Cooling (OTC) shall install Cooling Tower (CT) and achieve specific water consumption upto maximum of 3.5m³/MWh within a period of two years from the date of publication of this notification.</i></p> <p><i>II. All existing CT-based plants reduce specific water consumption upto maximum of 3.5m³/MWh within a period of two years from the date of publication of this notification.</i></p> <p><i>III. New plants to be installed after 1st January, 2017 shall have to meet specific water consumption upto maximum of 2.5 m³/MWh and achieve zero waste water discharged”;</i></p>
“25.	Thermal Power Plant	TPPs (units) installed before 31st December, 2003*	
		Particulate Matter	100 mg/Nm ³
		Sulphur Dioxide (SO ₂)	600 mg/Nm ³ (Units Smaller than 500 MW capacity units) 200 mg/Nm ³ (for units having capacity of 500MW and above)
		Oxides of Nitrogen (NO _x)	600 mg/Nm ³
		Mercury (Hg)	0.03 mg/Nm ³ (for units having capacity of 500 MW and above)
		TPPs (units) installed after [1st January, 2004,][#] up to 31st December, 2016*	
		Particulate Matter	50 mg/Nm ³
		Sulphur Dioxide (SO ₂)	600 mg/Nm ³ (Units Smaller than 500 MW capacity units) 200 mg/Nm ³ (for units having capacity of 500 MW and above)
		Oxides of Nitrogen (NO _x)	300 mg/Nm ³
		Mercury (Hg)	0.03 mg/Nm ³
		TPPs (units) to be installed from 1st January, 2017**	
		Particulate Matter	30 mg/Nm ³
		Sulphur Dioxide (SO ₂)	100 mg/Nm ³
Oxides of Nitrogen (NO _x)	100 mg/Nm ³		
Mercury (Hg)	0.03 mg/Nm ³		

*TPPs (units) shall meet the limits within two years from date of publication of this notification.



***Includes all the TPPs (units) which have been accorded environmental clearance and are under construction**.*

#Amdended vide Gazette Notification No. 590 dated 7.3.2016

(b) As per the MoEFCC Notification, water consumption norms for TPPs with Once Through Cooling (OTC), existing CT-based TPPs and new TPPs commissioned after 1.1.2017 were specified. Further, ECNs for particulate matter, sulphur dioxide (SO₂), oxides of nitrogen (NO_x) and mercury for TPPs commissioned before 31.12.2003, TPPs commissioned after 1.1.2004 upto 31.12.2016 and TPPs commissioned after 1.1.2017 were also specified. Subsequently, MoEFCC relaxed the norms of NO_x for TPPs installed during the period 1.1.2004 to 31.12.2016 from 300 mg/Nm³ that was stipulated through the MoEFCC Notification of 7.12.2015 to 450 mg/Nm³ vide Notification G.S.R. 662(E) dated 19.10.2020.

(c) For implementation of ECNs notified by MoEFCC, the Central Electricity Authority (CEA) was entrusted with planning and coordination. CEA along with Regional Power Committees formulated a phasing plan up to 2024 which was subsequently revised to 2022 as per revised action plan of Ministry of Power. Further, Hon'ble Supreme Court issued direction to complete the installation of ECS in highly polluted and densely populated areas by December 2021 and other stations latest by December 2022.

(d) The Ministry of Power issued directions to the Commission in exercise of power under Section 107 of the 2003 Act, vide letter dated 30.5.2018 to consider the additional cost implication due to the installation of ECS as a pass through in tariff.

(e) As compliance of the MoEFCC Notification requires capital expenditure, NTPC filed Petition No. 98/MP/2017 for in-principle approval of the capital cost required for installation of ECS and other facilities in Singrauli STPS and Sipat STPSS-I. The Commission vide order dated 20.7.2018 in Petition No. 98/MP/2017 held that ACE for implementation of ECS as per the MoEFCC Notification is admissible under "change in law". The Commission



further observed that it would require TPPs to identify suitable technology depending upon location of plant and existing level of emission and accordingly directed CEA to prepare guidelines regarding suitable technology, operational parameters, norms and other technical inputs. The relevant portions of the order dated 20.7.2018 is as follows:

“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 the Notification dated 7.12.2015 shall be admissible after due prudence check, under Regulation 14 of the 2014 Tariff Regulations.

47. The compliance of the revised norms specified under the MOEFCC Notification by these generating stations would require identification of suitable technology depending upon location of plant and existing level of emission from such plant. Moreover, the scope of work would also differ from plant to plant, depending upon the type of technology to be adopted.....”

“48. Therefore, a mechanism needs to be devised for addressing the issues like identification of suitable technology for each plant for implementation of ECS, its impact on operational parameters and on tariff, and the recovery of additional capital and operational cost. The Commission in this regard directs the CEA to prepare guidelines specifying;

- (a) Suitable technology with model specification for each plant, with regard to implementation of new norms;*
- (b) Operational parameters of the thermal power plants such as auxiliary consumption, O&M expenses, Station Heat Rate etc., consequent to the implementation of ECS.*
- (c) Norms of consumption of water, limestone, ammonia etc., required for operation of the plants after implementation of ECS.*
- (d) Any other detailed technical inputs.”*

(f) On the basis of directions of the Commission in order dated 20.7.2018 in Petition No. 98/MP/2017, CEA has vide its letter dated 21.2.2019 recommended various technologies for implementation of the MoEFCC Notification.

(g) Taking into consideration the norms specified by MoEFCC and the guidelines issued by CEA, the Petitioner had identified the technology suitable for it and has filed the instant petition for approval of the capital cost for implementation of ECS as ACE as per Regulation 29 of the 2019 Tariff Regulations.



(h) The Commission amended the 2019 Tariff Regulations vide Central Electricity Regulatory Commission (Terms and Conditions of Tariff) (First Amendment) Regulations, 2020 (hereinafter referred to as the “2020 Amendment Regulations”), wherein separate tariff stream for ECS including determination of capital cost, financial parameters and operational parameters were specified.

(i) Further, CEA on 7.2.2020 issued an Advisory on FGD Technology selection for different unit sizes. As per the Advisory, TPPs are required to select the appropriate FGD technology based on parameters like SO₂ removal efficiency, units’ size, balance plant life and the geographical location of TPPs.

(j) MoEFCC has extended the time limit for installation of ECS, vide Notification dated 1.4.2021, to comply with the revised ECNs through the Environment (Protection) Amendment Rules, 2021. The said Notification dated 1.4.2021 also provides for constitution of task force and environment compensation for operating TPPs beyond the specified timelines. The relevant portion of the Notification dated 1.4.2021 is as follows:

“(i) A task force shall be constituted by Central Pollution Control Board (CPCB) comprising of representative from Ministry of Environment and Forest and Climate Change, Ministry of Power, Central Electricity Authority (CEA) and CPCB to categorise thermal power plants in three categories as specified in the Table-I on the basis of their location to comply with the emission norms within the time limit as specified in column (4) of the Table-I, namely: -

Table-I

Sl. No.	Category	Location/area	Timelines for compliance	
			Non retiring units	Retiring units
(1)	(2)	(3)	(4)	(5)
1	Category A	Within 10 km radius of National Capital Region or cities having million plus population ¹ .	Up to 31 st December 2022	Up to 31 st December 2022
2	Category B	Within 10 km radius of Critically Polluted Areas ² or Non-attainment cities ²	Up to 31 st December 2023	Up to 31 st December 2025
3	Category C	Other than those included in category A and B	Up to 31 st December 2024	Up to 31 st December 2025

¹ As per 2011 census of India.

² As defined by CPCB.

(ii) the thermal power plant declared to retire before the date as specified in column (5) of Table-I shall not be required to meet the specified norms in case such plants



submit an undertaking to CPCB and CEA for exemption on ground of retirement of such plant:

Provided that such plants shall be levied environment compensation at the rate of rupees **0.20** per unit electricity generated in case their operation is continued beyond the date as specified in the Undertaking;

(iii) there shall be levied environment compensation on the non-retiring thermal power plant, after the date as specified in column (4) of Table-I, as per the rates specified in the Table-II, namely:-

Table-II

Non-Compliant operation beyond the Timeline	Environmental Compensation (Rs. per unit electricity generated)		
	Category A	Category B	Category C
0-180 days	0.10	0.07	0.05
181-365 days	0.15	0.10	0.075
366 days and beyond	0.20	0.15	0.10. ”

5. The Petitioner has filed the instant petition under the 2019 Tariff Regulations for in-principle approval of the capital cost for implementation of ECS as ACE. The Petitioner initially in the petition sought approval of additional APC (Auxiliary Power Consumption), Gross Station Heat Rate (GSHR), additional water consumption, additional O&M Expenses, cost of reagents and availability of the station/ unit on account of shutdown for implementation of ECS under Regulation 76, i.e. “Power to Relax” of the 2019 Tariff Regulations as there were no specific provisions under the 2019 Tariff Regulations. During the pendency of the proceedings, the 2020 Amendment Regulations were notified by the Commission which deal with some of the prayers made by the Petitioner. Accordingly, some of the prayers made by the Petitioner are dealt as per the provisions of the 2020 Amendment Regulations in this order.

6. The Petitioner has submitted that due to COVID-19 pandemic and the subsequent lockdown across the country and restriction on movement of the



persons, the Petitioner was unable to file hard copy of the petition, reply and rejoinders and requested to allow the Petitioner to file the affidavits after return of normalcy. It is observed that the Petitioner has filed the hard copy of the petition, reply to the RoP queries and rejoinders to the replies of the Respondents and they are supported by affidavit and the Respondents have also filed hard copy of the reply on affidavit. Accordingly, the submissions made by the parties are considered in this order.

Submissions of the Petitioner

7. The gist of the submissions made by the Petitioner in the instant petition in support of its claim is as follows:

(a) To comply with the revised ECNs specified in the MoEFCC Notification dated 7.12.2015, the Petitioner is required to install various ECS in NSPCL Plant. The MoEFCC Notification mandates reduction in water consumption, particulate matter, SO₂, NO_x and mercury emission.

(b) Regulation 29 of the 2019 Tariff Regulations provides for allowing ACE on account of installation of ECS to meet the revised ECNs. The instant petition is filed for approval of ACE to be incurred to comply with revised ECNs.

(c) The Petitioner has considered the operating parameters recommended by CEA in its letter dated 21.2.2019. Normative parameters are considered for working out indicative tariff based on the capital cost.

(d) To comply with the revised ECNs, it is proposed to implement (a) Wet Lime based Flue Gas Desulphurisation (WFGD) for SO₂ and (b) Combustion Modification for NO_x control. The norms specified for water consumption, particulate matter and Mercury emission are already being met by NSPCL Plant and, therefore, there is no proposal to install any ECS for the same. The Petitioner seeks liberty to approach to the Commission as and when the



work(s) pertaining to the same are required to be taken up in future.

(e) CEA has recommended four types of technology for reduction of SO₂ emissions, namely WFGD, Lime Spray Drier/Semi-dry FGD, Dry Sorbent Injection based FGD and Furnace Injection in CFBC Boilers. WFGD technology is the most appropriate technology for reduction of SO₂ emissions and it meets the norms specified in the MoEFCC Notification and also adheres to the CEA's recommendations dated 7.2.2020.

(f) WFGD technology is a wet scrubbing process and it uses limestone or lime as a reagent. It is widely used FGD system for SO₂ reduction from coal-fired utility boilers. It removes SO₂ by scrubbing the flue gas with limestone slurry. Flue gas is treated in an absorber by passing the flue gas stream through a limestone or lime slurry spray where the gas flows upwards through the absorber counter current to the spray liquor flowing downward through the absorber. The shut-down period required for installation of the WFGD system is approximately 45 days and it is envisaged that it would reduce the SO₂ emission to less than 600 mg/Nm³ i.e. within the specified limit and would thereby comply with revised ECNs of the MoEFCC Notification.

(g) In order to comply with the revised ECN pertaining to SO₂, the Petitioner proceeded to implement WFGD system immediately after the notification taking into consideration that the installation time and pre-award activities such as identification of suitable proven technology based on the geographical location of the station, identification of vendors, engineering, tendering, location survey, etc. consume substantial time. Further, to meet the deadline, the Petitioner awarded consultancy contract to NTPC for preparation of specification and proceeded to issue NIT for WFGD technology.

(h) CEA has further specified the norms based on De-NO_x combustion system as well as SCR/SNCR technology. There are two kinds of technologies for NO₂ control (a) primary control technologies wherein the amount of NO_x produced in the combustion/ furnace zone is reduced by modifying fuel burners



and (b) secondary control technologies reduces NO_2 present in the flue gas by injection of reagent (ammonia $[\text{NH}_3]$ or urea) in flue gas path where it reacts with NO_x to reduce it to N_2 and water.

(i) In De- NO_x Combustion Modification (CM) System, the normal burners installed in the unit boilers are to be replaced by Low- NO_x Burners (LNB). A LNB limits NO_x formation by regulating the temperature profiles of the fuel combustion by controlling the aerodynamic distribution and mixing of the fuel and air, thereby yielding reduced oxygen in the primary flame zone, which limits the flame temperature, which in turn limits thermal NO_x formation. Due to the change in temperature profile of the furnace and heat transfer pattern, LNB retrofits lead to higher economizer inlet temperatures and increase in un-burnt carbon. This increases heat loss of boiler. Accordingly, the unit heat rate is anticipated to increase by around 0.8% on account of De- NO_x LNB retrofit.

(j) De- NO_x Selective Non-Catalytic Reduction (SNCR) process involves injecting nitrogen-containing chemicals into the upper furnace or convective pass of a boiler within a specific temperature window without the use of a catalyst. There are different chemicals that can be used that selectively react with NO_2 in the presence of oxygen to form molecular nitrogen and water. Two such most common chemicals are ammonia and urea. SNCR system to be installed is proposed to be based on urea. This system requires low capital cost, having moderate NO_2 removal and it involves non-toxic chemical and it requires typically low energy injection. Further, due to formation of water particles during NO_2 reduction, it increases the wet loss of boilers leading to deterioration of Unit Heat Rate by about 0.5%. Shut-down period required for installation of Combustion Modification System and SNCR is approximately 45 to 60 days and 15 days respectively. SNCR demonstration pilot tests are being conducted at NTPC stations and implementation of SNCR shall be taken up based on the reports of SNCR pilot tests.

(k) De- NO_x Selective Catalytic Reduction (SCR) process involves injecting nitrogen-containing chemicals into the upper furnace or convective pass of a



boiler within a specific temperature window with the use of a catalyst. SCR process chemically reduces NO₂ molecule into molecular nitrogen and water vapor. A nitrogen-based reagent such as ammonia or urea is injected into the furnace and SCR proposed to be installed is based on ammonia. The hot flue gas and reagent diffuse through the catalyst which is composed of active metals or ceramics with a highly porous structure. The reagent reacts selectively with NO₂ within in the presence of the catalyst and oxygen. The use of a catalyst results in two primary advantages of SCR - higher NO₂ control efficiency and reactions within a broader temperature range. This system requires high capital cost, having high NO_x removal and involves toxic chemical. Due to formation of water particles during NO_x reduction, it increases the wet loss of boilers leading to deterioration of Unit Heat Rate by about 0.1%.

(l) In the NSPCL Plant, Low NO_x Burners (Primary Control) is being installed to bring down the present NO₂ level within the prescribed norm of 300 mg/Nm³. The Petitioner is planning to install SCR/SNCR System at later stage after this technology is proven in Indian conditions and seeks liberty to approach the Commission in case of installation of SCR/SNCR system at later date.

(m) With installation of revised ECS, there would be requirement of additional manpower for operation and maintenance of these systems, spares pertaining to these systems etc. on sustained basis. Accordingly, the Petitioner would incur additional O&M Expenses on account of implementation of ECS. In case of thermal generating stations, the norms of O&M Expenses in the 2019 Tariff Regulations have been fixed (in Rs.lakh/MW) based on actual O&M Expenses of different stations in the last five years. As FGD and other ECS were not installed at various stations, the expenditure on account of them was not considered while framing the norms. Further, the actual O&M Expenses data on account of the FGD system and other ECS system is not available. Therefore, it is suggested that reference for O&M Expenses for ECS system to be installed may be taken from the enclosed Financial Appraisal Report for



Installation of FGD system for NSPCL prepared by Deloitte. Additional O&M Expenses equivalent to 10% of capital cost of ECS installed per annum may be granted and the same has been considered to compute indicative tariff.

(n) Units may have to be taken under shutdown for about 45-60 days for implementation of the ECS and stabilization of the same may take some more time. During the period of shut down of unit, there would be loss of availability of the station and would lead to under-recovery of Annual Fixed Charges (AFC) on account of implementation of ECS. Accordingly, the shutdown period of unit for implementation of ECS may be treated as deemed availability under Regulation 76 of the 2019 Tariff Regulations.

(o) The Commission may allow additional GSHR (gross station heat rate) over and above the normative GSHR for the station due to implementation of ECS.

(p) There is likely increase in associated costs such as increased water charges, cost of chemicals/ reagents (limestone, urea etc.) on account of implementation of ECS.

(q) A separate supplementary tariff petition will be filed in terms of Regulations 29(4) of the 2019 Tariff Regulations based on actual and projected expenditure, normative operating parameters/ norms as specified in the 2019 Tariff Regulations and subsequent notification for reagent consumption, etc.

8. The Commission had directed the Petitioner, vide RoP dated 31.3.2021, to submit certain information. The Petitioner vide affidavit dated 9.4.2021 has submitted the information. The gist of the submissions made by the Petitioner is as follows:

(a) Petition No. 98/MP/2017 was filed by NTPC for in-principle approval of the capital cost required for installation of ECS. In order dated 20.7.2018 in Petition No. 98/MP/2017, the Commission held that the MoEFCC Notification constitutes "change in law" and that ACE incurred towards implementation of



ECS for meeting the revised emission standards shall be admissible under “change in law” after prudence check by the Commission. The Commission further directed CEA to prepare guidelines to meet the revised emission norms stipulated under the MoEFCC Notification. There was no direction to the CEA to recommend technology for each/ specific plant of the Petitioner. Prior to the 2019 Tariff Regulations or the order dated 20.7.2018 in Petition No. 98/MP/2017, there was no express or implied direction to NTPC that for its various individual projects, it has to seek approval for the technology selected. The Commission only observed that on basis of the guidelines/ recommendation and operational parameters determined by CEA, the Commission will approve expenditure after prudence check as per Regulation 14(3) of the 2014 Tariff Regulations.

(b) CEA, in its recommendations *vide* letter dated 20.2.2019 on ‘*Operation Norms for Thermal Generating Stations for the Tariff Period 2019-2024*’ has provided the operational norms for four technologies to comply with revised SO₂ emission norms reduction: WFGD, Lime Spray Drier/ Semi-dry Semi FGD, Dry Sorbent Injection based FGD and Furnace Injection in CFBC Boilers. The Petitioner adopted WFGD technology in order to comply with the MoEFCC Notification.

(c) On 7.2.2020, CEA issued ‘*Advice on FGD Technology selection for different units size*’. The said Advisory issued by CEA provides advise/ suggestions to TPPs for selection of appropriate FGD technology based upon various parameters of the respective plant. WFGD technology has many positives when compared to others for unit size 250 MW and, hence, is most suitable for NSPCL Plant of 2x250 MW.

(d) WFGD technology has been adopted by the Petitioner in line with the CEA recommendations and it would meet the evaluation criteria of CEA Advisory dated 7.2.2020 and would also meet the SO₂ emission norms stipulated by MoEFCC in the MoEFCC Notification dated 7.12.2015.



(e) The Petitioner followed Policy as per its Delegation of Power in the Competitive Bidding process followed for the award of WFGD system.

(f) The bidding was conducted by NTPC for NSPCL Plant along with generating stations of NTPC. NTPC has acted as the consultant for carrying out the competitive bidding. The Board of the Petitioner Company in its 172nd Meeting dated 20.12.2018 approved its consultancy contract for providing pre-award and post award engineering consultancy work for installation of WFGD system to NTPC. The Commission in order dated 28.4.2021 in Petition No. 335/MP/2020 (NTPC Ltd vs MPPMCL and Ors.) found the bidding process to be transparent.

(g) The Board of Directors of the Petitioner, in the 179th meeting dated 5.8.2019, accorded the Investment Approval (IA) to undertake implementation of WFGD system.

(h) The CEA's recommendation for selection of FGD technology is advisory in nature and is not mandatory. The said Advisory has been issued post the award of contract for installation of WFGD system. However, the technology adopted by the Petitioner is in line with the CEA's recommendations/ guidelines dated 7.2.2020.

(i) In the MoEFCC Notification dated 7.12.2015, ECNs with respect to NO_x is $300\text{mg}/\text{Nm}^3$. Accordingly, the Petitioner has sought approval of additional expenditure on account of Combustion Modification System as primary control and SCR/SNCR as secondary control. However, the above emission norm of $300\text{mg}/\text{Nm}^3$ was revised by MoEFCC *vide* its Notification dated 19.10.2020 to $450\text{ mg}/\text{Nm}^3$ for the unit(s) executed from 1.1.2004 to 31.12.2016. Accordingly, the Petitioner is now only proposing installation of Combustion Modification as primary system of De- NO_x to bring the level of NO_x emission below $450\text{ mg}/\text{Nm}^3$.



(j) Invitation for Bids (“IFB”) for installation of FGD system at NSPCL Plant was issued by NTPC on 31.8.2018. The bids were invited by NTPC by issuing IFB in public domain on 31.0.2018 through DCB (domestic competitive bidding).

(k) Pursuant to the MoEFCC notification dated 7.12.2015 for revised emission standards pertaining to SO₂, NO_x and other parameters, the Petitioner went through various steps like selection of technology on the basis of efficiency, capital and operating costs, location of plant, reliability, availability of suppliers, supply chain & disposal etc. Subsequently, the Petitioner went through the pre-award activities like detailed engineering, NIT approval and publication of NIT/ IFB etc. Further, the bids were called for the same under DCB on two-stage bidding basis, i.e. Techno-commercial Bid and Price Bid. The bidders were evaluated and those found qualified in the first stage (Techno-commercial bid) of bid submission were qualified for Price bids through e-tendering portal. Subsequently, based on the price quoted the L1 bidder was considered for award of contract.

(l) BHEL emerged as the successful bidder (L1) and was awarded the contract for installation of WFGD system at NSPCL Plant. Accordingly, on 26.8.2019, Notice of Award (NoA) was issued to BHEL for WFGD system installation.

(m) Both NTPC (parent company of the Petitioner through which bid was invited) and the Petitioner are Central Public Sector Utilities guided by the directions/ guidelines issued by the Central Government.

(n) Subsequent to the award of contract for installation of FGD system on 26.8.2019, BHEL has started the works for installation of WFGD system.

(o) CEA vide its letter dated 24.2.2021 has itself acknowledged that the earlier cost estimation is approximately three years old and the cost of FGD installation has increased due to various reasons. CEA has also sought latest tendering cost for different size and technology from TPPs in India.



(p) The cost provided by CEA was only indicative in nature and does not represent the actual procurement cost. Further, the Commission has itself acknowledged that, in recent times, bids for installation of WFGD have been floated by other generating stations as well and these may lead to change in prices of WFGD in the international and domestic market.

9. The issues raised by the Respondents, CSPDCL and DNHPDCL, and clarifications given by the Petitioner are dealt in the respective paragraphs of this order.

Maintainability

10. CSPDCL and DNHPDCL have submitted that the contract for implementation of FGD system was awarded on 26.8.2019. In accordance with the Regulation 29 of the 2019 Tariff Regulations, the Petitioner is required to share the proposal for implementation of FGD system with the beneficiaries and thereafter file the petition for approval of the proposal. However, the Petitioner has not shared the proposal with the beneficiaries. The Petitioner is aware that the installation of FGD system would result in a huge cost impact. Therefore, it was incumbent on the Petitioner to first share its proposal with the beneficiaries before filing the petition. The Petitioner has not followed the procedure laid down under Regulation 29(2) of the 2019 Tariff Regulations and, hence, the instant petition is not maintainable.

11. In response, the Petitioner has submitted that the factum of the legal mandate under the MoEFCC Notification to install FGD system is beyond doubt and consequently, the Petitioner was required to take all requisite steps to install the same in compliance with law. The Petitioner had undertaken steps for installation of ECS on 31.8.2018 when the tender was issued. Steps were taken in order to meet



the stringent timelines laid down by the MoEFCC Notification for installing and commissioning ECS by December 2021 which has now been extended to December 2022 by the Hon'ble Supreme Court. Further, the steps were taken prior to the notification of the 2019 Tariff Regulations. Therefore, it cannot be said that the Petitioner has not complied with the requirement of sharing the proposal for installation of ECS with the beneficiaries in terms of Regulation 29 of the 2019 Tariff Regulations, when the same was not notified on the relevant date. The Petitioner has submitted that the issue has already been decided by the Commission in its order dated 28.4.2021 in Petition No. 335/MP/2020 & Ors, wherein the Commission held similar petitions as maintainable.

12. We have considered the contention of CSDPCL and DNHPDCL and the clarifications given by the Petitioner. The instant petition is for in-principle approval of ACE towards installation of ECS in compliance of the MoEFCC Notification. The Respondents have contended that the Petitioner has not complied with the provisions of Regulation 29 of the 2019 Tariff Regulations and, therefore, the instant petition is not maintainable. The Commission has prescribed the procedure for claiming ACE on account of implementation of the revised ECNs in Regulation 29 of the 2019 Tariff Regulations, which provides as follows:

“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."

13. As per the procedure prescribed under Regulation 29(1) of the 2019 Tariff Regulations, a generating company intending to incur ACE towards installation of revised ECS shall share its proposal with the Respondents/ beneficiaries and file a petition for undertaking ACE. The proposal should contain the details of the proposed technology as specified by CEA and other relevant information under Regulation 29(2) of the 2019 Tariff Regulations. On an application by the generating station, the Commission may approve ACE towards the implementation of ECS after prudence check as per Regulation 29(3) of the 2019 Tariff Regulations. As per Regulation 29(4) of the 2019 Tariff Regulations, the generating station after implementation of the revised ECS shall file a petition for determination of tariff.

14. The Respondents have contended that the Petitioner is required under Regulation 29(1) of the 2019 Tariff Regulations to share the proposal before the implementation of the revised ECNs with the beneficiaries and thereafter file a petition for undertaking such ACE. However, the Petitioner has not shared the proposal along with the details, as specified in Regulations 29(1) of the 2019 Tariff Regulations. In response, the Petitioner has submitted that as the installation of ECS



is mandatory and was to be implemented within a strict timeframe, which was being monitored by the Hon'ble Supreme Court. The Petitioner had initiated the pre-award activities and floated NIT during the 2014-19 tariff period. The Commission has already dealt with the contentions of the Respondents in order dated 28.4.2021 in Petition No. 335/MP/2020 and batch matters. The relevant portion of the order dated 28.4.2021 is as follows:

“18. It is observed that the Commission in order dated 20.7.2018 in Petition No. 98/MP/2017 has already held that ACE due to “change in law or compliance with any existing law” is allowable and, therefore, ACE due to installation of ECS in compliance with the MoEFCC Notification, which is a “change in law” event shall be admissible after due prudence check under Regulation 14 of the 2014 Tariff Regulations. Taking into consideration the observations of the Commission in order dated 20.7.2018, the stringent timelines specified in the MoEFCC Notification and the fact that the compliance of the revised ECNs is being monitored by the Hon'ble Supreme Court, the Petitioner had initiated and taken substantial action for installation of ECS for meeting the revised ECNs in the right earnest during the 2014-19 tariff period. This can be seen from the following table:

Petition No.	Generating station/unit Capacity (MW)	BoD Meeting Number and date of approval of the proposal for FGD	Date of issue of IFB	BOD Meeting Number and date of approval of award of FGD	BOD Meeting No. and date of Investment Approval for FGD	Date of issue of NoA
509/MP/2020	VSTPS-III (2X500)	444 th 22.3.2017	31.7.2017	463 rd 8.9.2018	463 rd 8.9.2018	18.9.2018
516/MP/2020	VSTPS-IV (2X500)	444 th 22.3.2017	31.7.2017	463 rd 8.9.2018	463 rd 8.9.2018	18.9.2018
526/MP/2020	MSTPS-I (2X500)	444 th 22.3.2017	31.7.2017	259 th 8.9.2018	463 rd 8.9.2018	18.9.2018
512/MP/2020	MSTPS-II (2X660)	444 th 22.3.2017	30.6.2017	462 nd 28.7.2018	462 nd 28.7.2018	31.7.2018
335/MP/2020	VSTPS-I (6X210)	444 th 22.3.2017	28.9.2018	473 rd 1.7.2019	475 th 10.8.2019	22.8.2019
519/MP/2020	VSTPS-II (2X500)	444 th 22.3.2017	28.9.2018	473 rd 1.7.2019	475 th 10.8.2019	22.8.2019
338/MP/2020	KSTPS-I&II (3X200 + 3X500)	444 th 22.3.2017	28.9.2018	473 rd 1.7.2019	475 th 10.8.2019.	22.8.2019
521/MP/2020	KSTPS-III (500)	444 th 22.3.2017	28.9.2018	473 rd 1.7.2019	475 th 10.8.2019	22.8.2020
339/MP/2020	SSTPS-II (2X500)	444 th 22.3.2017	24.4.2020	The bidding for FGD is under process.		

19. The requirement of sharing the proposal for installation of ECS for meeting the revised ECNs with the beneficiaries was introduced in the 2019 Tariff Regulations,



which were notified in March 2019 and is effective since 1.4.2019 i.e. much after the Petitioner had initiated action for installation of ECS for meeting the revised ECNs in compliance with the MoEFCC Notification. Therefore, the Petitioner could not have shared the proposal for installation of the ECS with the beneficiaries in the year 2017 or 2018, as the provision of sharing such proposal was mandated only in the 2019 Tariff Regulations.

20. However, the Petitioner has shared the proposal for installation of the ECS with the beneficiaries on the directions of the Commission. Further, on the request of the beneficiaries during the hearing on 12.3.2021, the Petitioner was directed to provide the relevant information to the beneficiaries. Moreover, a copy of the petition is automatically served on the beneficiaries immediately after the petition is uploaded in the e-filing portal of the Commission. Therefore, we are unable to agree with the beneficiaries that the instant petitions should be rejected and the Petitioner should be asked to file fresh petitions as per the procedure laid down in Regulation 29(1) of the 2019 Tariff Regulations. Accepting contentions of the Respondents would serve no material purpose and only delay the installation of the ECS and the Petitioner would not be able to comply with the timelines specified in the MoEFCC Notification and directions of the Hon'ble Supreme Court. Therefore, we reject the contentions of the beneficiaries on maintainability and are considering the instant nine petitions for "in-principle approval" under Regulation 11 of the 2019 Tariff Regulations."

15. Moreover, in the instant case, IFB (invitation for bids) was issued on 31.8.2018 i.e. during the 2014-19 tariff period and prior to the notification of the 2019 Tariff Regulations. NoA (notice of award) was issued on 26.8.2019 i.e., during the 2019-24 tariff period. It is observed that the Petitioner had initiated the process for implementation of ECS in compliance of the MoEFCC notification in the 2014-19 tariff period. As there was no provision in the 2014 Tariff Regulations for sharing the proposal for installation of ECS and approval of the consequent ACE, the Petitioner did not share the proposal for installation of ECS with the Respondents. The requirement of sharing the proposal for implementation of the ECS with the Respondents was introduced in the 2019 Tariff Regulations, which were notified in March 2019 and is effective since 1.4.2019. We are of the view that the Petitioner was not required to share the proposal for installation of ECS with the Respondents before issuing IFB as the mandate for sharing such proposal was introduced in the 2019 Tariff Regulations.



16. It is also observed that the Petitioner has shared the proposal with the Respondents on filing of the instant petition and on the directions of the Commission. Moreover, a copy of the petition is automatically served on the beneficiaries immediately after the petition is uploaded in the e-filing portal of the Commission. Though the Petitioner should have shared the details of the proposal with the beneficiaries as envisaged in Regulation 29(1) of the 2019 Tariff Regulations before filing the petition for in-principle approval of ACE due to implementation of ECS, we are unable to agree with the Respondents that the petition is not maintainable as it would not serve any purpose and only delay the implementation of ECS. Further, the Petitioner would not be able to comply with the timelines specified in the MoEFCC Notification and directions of the Hon'ble Supreme Court. Therefore, we set aside the contentions of the Respondents and consider the prayers of the Petitioner in the instant petitions.

Prayers of the Petitioner

17. We now take up the prayers of the Petitioner in the instant petition. The Petitioner has prayed to (a) approve undertaking implementation of ECS in order to meet revised ECNs; (b) grant liberty to approach the Commission for approval of implementation of ECS on account of mercury, water consumption and particulate matter in future, if required; (c) allow additional APC; (d) allow additional GSHR; (e) allow additional water consumption; (f) allow additional O&M Expenses; (g) allow cost of reagents; and (h) allow deemed availability on account of shutdown.



Approval for undertaking implementation of ECS and incurring Additional Capital Expenditure (ACE)

18. The Petitioner has sought in-principle approval for undertaking implementation of ECS in order to meet revised ECNs and the consequent ACE. The Petitioner has proposed WFGD system for control of SO₂ and Combustion Modification to control NO_x emissions in NSPCL Plant.

19. The Petitioner, based on the capital cost of ECS discovered through competitive bidding and on the basis of certain assumptions regarding operating parameters, had arrived at the indicative supplementary tariff submitted in the petition. However, the Commission has introduced the operating parameters through the 2020 Amendment Regulations for additional APC, water consumption and O&M Expenses on account of installation of ECS. The operating parameters and indicative tariff claimed by the Petitioner in the instant petition is given in the following paragraphs.

20. The Petitioner has made the following claims:

(a) The following capital cost and operating parameters for computing the indicative supplementary tariff was initially considered:

Sl. No.	Particulars	FGD	De-NO _x Combustion System	Remarks
1	Capital Cost	Rs. 472.89 crore	Rs. 14.00 crore (without IDC etc.)	
2	Normative Specific Limestone/Reagent Consumption (Kg/kwh)	0.0152 (Limestone)	Nil	
3	Additional APC	1.0%	Nil	
4	Additional O&M	10% of capital cost		
5	Shutdown Period (days)	45 days	45-60 days	



6	Increase in GSHR		19.32 kCal/kWh	0.8% increase: due to De-NO _x combustion.
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(b) The indicative supplementary tariff impact (without considering the impact on GSHR) due to installation of schemes in order to meet revised ECNs is fixed charges: 43.78 paise/kWh; variable charges: 3.38 paise/kWh (1st year) and fixed charges: 41.66 paise/kWh (levelised); variable charges: 3.38 paise/kWh (levelised). Further, it is anticipated that there would be increase in Energy Charge Rate and per unit Fixed Charge (@85% Scheduled Generation) of the station by about 8 paise/kWh due to increased APC and Station Heat Rate.

(c) WFGD technology adopted by the Petitioner meets the criteria indicated in CEA advisory dated 7.2.2020 and it would also meet SO₂ emission norms specified by MoEFCC Notification.

(d) As regards NO_x technology, the Petitioner has considered the Combustion Modification System to bring the level of NO_x emission below 450 mg/Nm³.

(e) The primary De-NO_x system of CM for NSPCL Plant has been awarded to L&T MHPS Boilers Pvt. Ltd. through competitive Bidding Route.

(f) The cost estimate for implementation of WFGD system in both the units of NSPCL Plant was initially stated to be approximately ₹472.89 crore and later it has been raised to ₹494.59 crore. The capital cost of De-NO_x system is Rs.14 crore (without IDC).

21. On the basis of the submissions made by the Petitioner, the following three issues arise for our consideration as part of prudence check (a) approvals and the bidding process; (b) suitability and effectiveness of ECS; and (c) capital cost of the identified ECS. We deal with them in the following paragraphs.



Approvals and the bidding process

22. The revised ECNs notified by MoEFCC on 7.12.2015 specify norms for water consumption, particulate matter, SO₂, NO_x and mercury. The Petitioner has submitted that NSPCL Plant meets the revised ECNs with respect to particulate matters, water consumption and mercury. Therefore, the Petitioner's Board of Directors (BOD) considered the revised ECNs in its 165th meeting held on 21.3.2018 and gave approval for the proposal for installation of FGD system and for carrying out pre-award and post-award engineering consultancy work. Thereafter, the Petitioner went through various stages of selection of technology on the basis of efficiency, capital and operating costs, location of plant, reliability, availability of suppliers, supply chain and disposal, etc. The Petitioner went through the pre-award activities like detailed engineering, NIT approval and publication of IFB, etc. The bids were called under DCB on two-stage bidding basis, i.e. techno-commercial bid and price bid. The bidders were evaluated and those found qualified in the first stage (techno-commercial bid) were asked to submit price bids through e-tendering portal. Based on the price bids, the L1 bidder was considered for award of contract. IFB for installation of FGD in the instant generating station was issued by NTPC on 31.8.2018. The Petitioner's Board of Directors in the 179th Meeting dated 5.8.2019 approved the proposal to award the contracts for the FGD package. Accordingly, the Petitioner issued NOA to the lowest bidder i.e. on 26.8.2019, BHEL for FGD system installation at NSPCL Plant.

23. It is observed that the whole process from identification of the suitable technology to award of NoA to the selected L1 bidder was with the approval of its



Board. The Petitioner has also certified that bidding and award has been carried out in a fair and transparent manner as per Delegation of Power (DoP) of the Petitioner and it is in line with the Government of India guidelines. The Petitioner has also submitted that WFGD technology is the most appropriate technology to meet the ECNs (related to SO₂) specified in the MoEFCC Notification and it is in line with the CEA's recommendations dated 21.2.2019. NoA was issued on 26.8.2019 and work is under progress. It is observed that BHEL has started the works for installation of WFGD system and the civil works are in progress at the instant station. As regards Combustion Modification System for controlling NO_x emissions, the work has been awarded to L&T MHPS Boilers Pvt. Ltd. through competitive bidding route. Having gone through the documents submitted by the Petitioner, we are of the view that the process from the stage of identification of FGD package to issue of NoA was with the approval of the Petitioner's Board of Directors and as per the procedure laid down under its DoP and the bidding was carried out in a fair and transparent manner.

Suitability and effectiveness of the ECS

24. The Petitioner has proposed WFGD system to comply with the revised SO₂ emission norms. The Petitioner has submitted that it has been used successfully around the world, is capable of high SO₂ removal efficiency (around 98%), operates with very low Ca/S molar ratio, is best suited for high PLF stations and there are many technology providers leading to advantage on competitive bidding process. The Petitioner has further submitted that as per the CEA's Advisory dated 7.2.2020, TPPs should select the appropriate FGD technology based on parameters like SO₂



removal efficiency, units' size, balance plant life and the geographical location of TPPs.

25. The Petitioner has proposed installation of only Combustion Modification as primary system of De-NO_x to bring the level of NO_x emission below 450 mg/Nm³.

26. The Petitioner has further submitted that selection of technology is in conformity with recommendations dated 21.2.2019 and Advisory dated 7.2.2020 issued by CEA. On the basis of the directions of the Commission in order dated 20.7.2018 in Petition No.98/MP/2017, CEA vide letter dated 20.2.2019 on 'Operation Norms for Thermal Generating Stations for the Tariff Period 2019-2024' has recommended four technologies to comply with revised SO₂ emission norms, which are as follows: (a) Wet limestone based FGD; (b) Lime Spray Drier/ Semi-dry Semi FGD; (c) Dry Sorbent Injection based FGD; and (d) Furnace Injection in CFBC Boilers.

27. The Petitioner has submitted that WFGD system is better than the other three FGD systems for the following reasons:

(a) In case of Dry Sorbent Injection/ Dry type FGD, SO₂ removal efficiency is low (typically 30%- 50%) which can be increased to 70%, but with very high consumption of reagent. The reagent utilization is low when compared to WFGD system leading to high operational expenses.

(b) There are very few providers of Ammonia based FGD technology when compared to WFGD system leading to less competition in competitive bidding process. The storage and handling of aqueous ammonia is potentially risky/ hazardous when compared to handling of limestone. Though Ammonia based FGD technologies have approximately 10% less CAPEX and APC when compared to WFGD systems and by-product of Ammonia based FGD



technologies, i.e. Ammonium Sulphate is easily saleable, handling of Ammonia, which is volatile is a matter of concern. Further, availability of ammonia is also matter of concern.

(c) Sea Water FGD system is suitable only for coastal power stations as sea water is required for de-sulphurisation process. The instant generating station is not located near the coast and, hence, this technology was not considered.

(d) Dry Sorbent Injection (DSI)/ Dry type FGD technologies based on dry sorbent injection is preferable for unit size of 60 MW-250 MW since the reagent cost in this technology is relatively higher than WFGD systems and Ammonia based FGD. It is more suitable for units running on low PLF and units with balance operating life of 7-9 years.

28. The Petitioner has proposed WFGD systems to comply with the revised SO₂ emission norms in case of the subject generating station. The Petitioner has submitted that WFGD technologies based on limestone slurry as reagent is most versatile and suitable for any unit size and has a large footprint. The Petitioner has further submitted that CEA on 7.2.2020 issued Advice on FGD Technology selection for units of different size. As per the CEA Advisory, there is only one technology i.e. WFGD for the unit size of 250 MW. This technology has many positives as compared to others for unit size 250 MW and, hence, is most suitable for NSPCL Plant. He submitted that the said advisory has been issued post the award of contract for installation of WFGD. Nevertheless, the technology adopted is in compliance with the CEA's recommendations/ guidelines dated 7.2.2020 and letter dated 20.2.2019.



29. CSPDCL and DNHPDCL have submitted that the Petitioner has stated that after installation of WFGD system, SO₂ emission level will be reduced below 600 mg/Nm³. However, the Petitioner has not indicated the present level of SO₂ from which emission level will be reduced, so as to ascertain the efficacy of the equipment. The Petitioner has also not submitted the present levels of NO_x. The Hon'ble Supreme Court in the matter of Bharat Heavy Electricals Ltd. in judgment dated 8.7.2020 in the IA No. 12493/2020 has relaxed the permissible limit prescribed by MoEFCC for emission of NO_x in respect of power stations commissioned during the period December 2003 and December 2016 up to 450 mg/Nm³. As such, if the present level of emission of NO_x in the Petitioner's power plant is of the range of 450 mg/Nm³, then there is no need of installation of De-NO_x system and hence should not be allowed. In response, the Petitioner has submitted that the FGD system installation is statutory mandate and the same is required to be put in place so as to make the emission level within the prescribed limit. The efficacy of the proposed system lies in achieving the prescribed level of emission (i.e. less than 600 mg/Nm³) and the contemplated system as recommended by CEA is proven to achieve the same. The current SO₂ profile of the generating station is beyond the prescribed norm of 600 mg/Nm³ and its value ranges between 900 mg/Nm³ to 1200 mg/Nm³. As regards NO_x, the Petitioner has submitted that MoEFCC vide Notification dated 19.10.2020 has revised NO_x emissions norms from 300 mg/Nm³ to 450 mg/Nm³. Accordingly, the Petitioner is proposing for only the Combustion Modification system as the primary system of De-NO_x to bring NO_x emission levels below 450 mg/Nm³. The said notification dated 19.10.2020 came to be notified after filing of the petition. Accordingly, the Petitioner has approached the Commission for consideration of



installation of SCR/SNCR if required in future. The Petitioner has further submitted that the present NO_x profile of the generating station is in excess of 450 mg/Nm³ and its value generally remains in the range 550 mg/Nm³ to 600 mg/Nm³. Therefore, it is necessary to ensure installation of Combustion Modification system to bring the emission profile within the norm of 450 mg/Nm³ prescribed by MoEFCC. The Petitioner has further submitted that SO₂ and NO_x emission levels during the last one year as submitted to the Pollution Control Board and it is given in Annexure to this order along with the norms prescribed by MoEFCC.

30. We have considered the submissions made by Petitioner, CSPDCL and DNHPDCL. The Respondents have contended that the Petitioner has not submitted the present emission levels of SO₂ and NO_x and, therefore, it is not possible to verify the requirement of installation of ECS. The Respondents have further submitted that as the emission level for NO_x has been revised by MoEFCC, there is no requirement for installation of de-NO_x system. In response, the Petitioner, on affidavit dated 12.8.2021, has submitted the month-wise emission levels of SO₂ and NO_x during the last one year which was submitted to the Pollution Control Board. It is observed that the emissions levels of SO₂ and NO_x in both the units of NSPCL since July 2020 is higher than the norms prescribed in the MoEFCC Notification. Accordingly, there is a requirement to install ECS to control SO₂ and NO_x emission levels.

31. As regards the selection of the suitable technology of FGD for the instant generating station, it is observed that the suitability and selection of the technology depends on various parameters like the age, size and location of the plant/ generating station, cost and availability of the technology, cost and availability of the



reagents, usage of the by-products, etc. CEA has recommended four types of technologies for control of SO₂ emissions and the Petitioner has selected WFGD technology for both the units of the instant generating station. The Petitioner has mentioned the advantages of WFGD technology over other FGD technologies. Further, large number of WFGD technology providers offers an opportunity for obtaining competitive prices. Further, the efficiency level of WFGD system in reducing SO₂ emissions is around 98% which is better than the other three technologies suggested by CEA. WFGD system proposed by the Petitioner is also in compliance of the CEA's recommendations.

32. The Petitioner has also proposed Combustion Modification for reduction of NO_x emission levels.

33. We are of the view that the Petitioner has done due diligence in identifying WFGD systems and Combustion Modification as the most suitable technology for reduction of SO₂ and NO_x emissions respectively in compliance of MoEFCC Notification. Accordingly, we approve installation of WFGD and Combustion Modification technologies for both the units of NSPCL.

Capital Cost of the identified ECS

34. The Petitioner has claimed the following capital cost towards implementation of WFGD System to control the SO₂ emissions in the subject generating station:



(₹ in lakh)							
Generating station/unit Capacity (MW)	CEA indicative hard cost (₹ lakh per MW)	Hard cost claimed (₹ lakh per MW)	Total IDC claimed (₹ lakh)	Total IEDC claimed (₹ lakh)	Total taxes and duties claimed (₹ lakh)	Total other costs claimed (₹ lakh)	Total costs claimed (₹ lakh)
NSPCL Bhilai Expansion Plant (2x 250)	45.00	72.45	3882.00	2170.00	6621.00	561.00	49459.00

35. CSPDCL has submitted that the estimated cost for implementation of WFGD system at the instant generating station is on a higher side when compared to the estimated cost for implementation of WFGD system in NTPC VSTPS Stage-III (2X500 MW) or other stations of NTPC. The per MW cost of WFGD system to be installed by NSPCL is 1.82 times more than WFGD system to be installed by NTPC at VSTPS Stage-III and as such this requires prudence check by the Commission and such huge cost may be disallowed.

36. In response, the Petitioner has submitted that comparing the cost of installing ECS in NSPCL Plant with other NTPC stations is misplaced. The size of a unit is a determinative factor for comparison. A station of 2x250 MW cannot be compared to station of 2x500 MW (NTPC VSTPS Stage-III). The cost of a generating station with a configuration of 2X250 MW cannot be stated to be in the same position as a 2X500 MW or a 6X210 MW or a generating station having multiple Stages such as Korba-I&II (3x200 MW + 3x500 MW) as well as Korba-III (500 MW) which were clubbed together for the bidding purpose leading to a lower per MW cost on account of economies of scale. The Petitioner has submitted that the Commission considered the aspect of unit size, combining of units and economies of scale in order dated 28.4.2021 in Petition No. 335/MP/2020 & Ors. The Petitioner has submitted that in



the instant case, there was no option for clubbing or taking advantage of the economies of scale leading to a higher per MW cost. Further, the cost of common limestone handling system, milling system including limestone slurry preparation system, gypsum dewatering system, gypsum handling system and makeup water system do not vary with respect to unit size and number of units. This leads to higher per MW cost in the case of smaller size units and having lesser number of units in the project. The Petitioner has further submitted that the capacity of the material handling unit used for handling the crushed slurried limestone installed in ECS remains the same for large size as well as smaller size plants. This is despite the fact that the capacity required for smaller size units is lesser than that of larger size plants. Since separate units/ parts are not available for smaller units (200/250 MW), FGD system has to be constructed/ assembled as per the (larger) systems available in the market, consequently, leading to high per MW FGD system installation cost. The Petitioner has submitted that for reasons beyond the control of the Petitioner, per MW cost of installation of ECS in NSPCL Plant is higher in comparison to other generating stations of NTPC.

37. DNHPDCL has submitted that the estimated cost for implementation of WFGD system in NSPCL of 2X250 MW is approximately ₹472.89 crore which works out to almost ₹94.57 lakh/MW. The expenditure proposed is high when compared to other TPPs including NTPC. In the case of Bongaigaon TPP, which is a similar 250 MW unit, NTPC had claimed ₹108 crore in Petition No. 45/GT/2016 which works out to ₹43 lakh/MW. Similarly, in respect of Singrauli and Sipat STPS of NTPC with a capacity of 2000 MW and 1980 MW respectively, the cost of installation of FGD



system estimated by NTPC ranges from ₹40 lakh to ₹50 lakh/MW. The general norms prescribed by CEA for installation of WFGD system for a 250 MW unit is ₹45 lakh/MW. The present estimate given by the Petitioner is, however, more than two times the expenditure proposed for other TPPs. Therefore, it requires strict prudence check and analysis by the Commission.

38. In response, the Petitioner has submitted that DNHPDCL has derived the cost of ₹94.57 lakh per MW on the basis of the ₹472.89 crore proposed by the Petitioner (inclusive of taxes, GST etc.), whereas CEA recommended cost is only the hard cost of ₹45 lakh per MW. The hard cost of the ECS works out to ₹72.45 lakh per MW. The Petitioner has submitted that in the case of a unit of a power plant of a smaller size, the estimated cost has gone above the CEA indicated cost and the same has been acknowledged by CEA in its letter dated 24.2.2021 whereby CEA has observed that the costs derived are not commensurate with the prevailing rates and has sought for responses in so far as the cost incurred in installation of FGD system in smaller sized plants. By placing reliance on order dated 28.4.2021 in Petition No. 335/MP/2020 & Ors, the Petitioner reiterated that the size of a unit is a determinative factor for comparison. As regard the contention of the Respondent that the cost of installation of FGD at the Bongaigaon Thermal Project works out to ₹43 lakh/MW, the Petitioner has submitted that the order dated 22.5.2017 passed by the Commission in Petition No. 45/GT/2016 relating to the approval of tariff (on estimate basis for the 2014-19 tariff period) was on the basis of the SO₂ norm prescribed in 2012 i.e. prior to the MoEFCC notification of 2015. Therefore, the implication of the stringent norms prescribed in the MoEFCC Notification of 2015 has not been considered by the Commission in its order dated 22.5.2017. The Petitioner has



further submitted that NTPC has subsequently filed the petition for the 2019-24 tariff period wherein the actual costs incurred in respect of FGD system installation have been in excess of ₹43 lakh/MW.

39. The Petitioner has submitted that in case of NTPC and its other JVs, per MW cost is higher than the CEA indicative cost where the unit size is small and number of units is less. In the case of Bhartiya Rail Bijlee Company Limited (BRBCL) of 4X250 MW, per MW cost is ₹63 lakh. Moreover, the cost of common systems is shared by 4 units whereas in the case of NSPCL Plant, it is shared by only two units, leading to a higher cost per MW of ₹72.45 lakh/MW. The Petitioner has further submitted that the cost of installation of ECS at the Muzaffarpur Thermal Power Station, Stage-II (2 X 195 MW) has been estimated to be ₹85 lakh/ MW. Therefore, the size and configuration of a generating station has a direct bearing on the per MW cost. CEA has also acknowledged that '*the increase in the number of units will reduce the CAPEX because of common facilities*'.

40. During the hearing on 29.4.2021, the Commission directed the Petitioner to furnish the reasons/ justifications for deviation in the capital cost from the CEA benchmark cost along with the due diligence conducted by the Petitioner. In compliance of the directions of the Commission, the Petitioner has made the following submissions vide affidavit dated 12.6.2021:

- (a) On 18.12.2018, the Board of the Petitioner company has approved the proposal for installation of FGD system through competitive bidding process in accordance with norms prescribed by the Central Vigilance Commission and other government instructions. Competitive bidding was chosen as it has been



found to be the best suited approach to encourage competition, efficiency, economical use of the resources, good performance and optimum investments.

(b) The Board of the Petitioner Company in its 172nd meeting dated 20.12.2018 had approved consultancy contract for providing pre-award and post-award engineering consultancy work for installation of FGD system to NTPC. The scope of consultancy work broadly covers all the aspects including competitive biddings. The bidding was conducted by NTPC and the bidding process conducted by NTPC has been found to be transparent by the Commission in order dated 28.4.2021 in Petition No. 335/MP/2020 (NTPC Ltd vs MPPMCL and Ors.).

(c) The Petitioner had also conducted due diligence through an independent agency to ascertain feasibility, optimum financial options and other connected aspects. Accordingly, Deloitte in July 2019 has submitted its Report titled "*Financial Appraisal for installation of FGD at Bhilai PP-III Project*". The market parameters were duly examined by the said independent expert and it was, *inter alia*, observed that total base cost was estimated to be ₹362.90 crore. A copy of the said Report has also been filed along with the petition.

(d) In case of units of a power plant of smaller size, the estimated cost is above the CEA recommended cost. Therefore, CEA has called upon NTPC and other generators to share the data so as to enable it to revise the indicative cost. CEA has sought, vide letter dated 24.2.2021, for responses regarding cost incurred in installation of FGD in smaller sized plants.

(e) The competitive bidding is the best judge to fetch the "most cost effective price" for installation of FGD. Thus, any indicative cost, which relates to period prior to material time is not always a safe guide to fix the benchmark especially when the vendors are not much inclined to undertake the installation of FGD system at smaller plants. Such installations are often found to be a heavy investment and proportionate financial burden incurred for the same in smaller plants is onerous in comparison to large size plants.



(f) In order to achieve the most optimum price, FGD system for NSPCL Plant was also put to bid along with other NTPC plants in Lot 2 of NTPC projects. The tender was allotted to Lowest Bidder (L-1), that too after series of negotiations. BHEL emerged as a successful bidder, a Government company, with proven record of efficiency and commercial accountability.

(g) Out of seven projects for which bids were invited in Lot 2, out of six qualified bidders, only 3 bidders have applied for undertaking the installation work at NSPCL Plant because of its small size. In case of larger plants, the number of bidders was in the range of 6. It shows that “installation of FGD” at smaller plant in terms of commercial benefits to vendor is not promising because of (i) size of the unit (ii) number of units (iii) layout constraint (iv) required SO₂ removal efficiency (v) chimney layout (vi) type of corrosion protection lining in chimney, absorber and other sections of FGD and (vii) progressive increase in demand of FGD equipment.

(h) The causes for variation in the cost of ECS installation at NSPCL Plant *vis-à-vis* the CEA indicative cost are as follows:

(i) The primary factor while determining the per MW cost is the configuration of the unit as well as the size of the generating station. The bigger the plant or higher the MW capacity, the lower the per MW cost. In the case of NSPCL Plant, size of the units are small (250 MW each) and number of units are less (only 2 in number).

(ii) The cost of a generating station with a configuration of 2X250 MW cannot be stated to be in the same position as a 2X500 MW or even a 6X210 MW or a generating station having multiple stages such as Korba-I & II (3x200 MW+3x500 MW) as well as Korba-III (500 MW) which were clubbed together for the competitive bidding purpose leading to a lower per MW cost, on account of economies of scale. The Commission has already considered this aspect in order dated 28.4.2021 in Petition No. 335/MP/2020, which is as follows:

“48. In the case of VSTPS-I, which has 6 units of 210 MW, the Petitioner has submitted that they are clubbed together to take advantage of the



economies of scale and common supply of reagent..... In the case of Korba Stage-I, which has 3 units of 200 MW each, the Petitioner has submitted that the FGD system for Korba-I&II (3x200 MW+3x500 MW) as well as Korba-III (500 MW) were clubbed together for International Competitive Bidding to reap the benefit of economy of scale. The Petitioner has further submitted that the hard cost proposed for Korba-III is the cost pro-rated on MW basis, thereby normalizing the impact of lower size units of 200 MW.

(iii) In the case of NSPCL Plant, there was no option for clubbing or taking advantage of the economies of scale, leading to a higher per MW cost.

(iv) The cost of common Limestone Handling System, Milling System including Limestone Slurry Preparation system, Gypsum Dewatering System, Gypsum Handling System and Makeup Water System does not vary with respect to the unit size. On account of the contribution of common system components in case of smaller size and lesser number of units per MW cost increases significantly. It is a crucial aspect of costing which leads to higher cost in case of smaller size units and having lesser number of units in project as in the case of NSPCL Plant. Even un-itemized item cost per MW will be higher for smaller equipment as equipment size and cost do not vary linearly.

(v) FGD system is installed/ designed for a generating unit keeping into consideration the flue gas flow as one of the parameters. The rate of flue gas flow in case of 2x250 MW units is comparable to 500 MW unit. In such case, the common systems shall be of equivalent capacity. However, the interconnecting ducts, pipings, cablings required for two number units are much larger quantity/ length in comparison to one unit of 500 MW. FGD system size depends upon the flue gas flow. Flue gas flow per MW is higher for smaller units and sub-critical units, which is the case for smaller units.

(vi) The capacity of the material handling unit used for handling the crushed slurried limestone installed in ECS remains the same though the capacity required for smaller size plants is lesser than that of large size



plants. However, owing to design constraints, the FGD system has to be constructed/ assembled as per the larger systems. Consequently, per MW FGD cost goes up for units of smaller size. Similar constraints also apply with respect to the gypsum maker (de-watering system), electrical systems having switchgear, switchboard and cable – which is also a part of the FGD system. The SO₂ analyser used in ECS for larger unit and smaller unit is also the same, irrespective of size.

(vii) The cost of installation of ECS at the Muzaffarpur Thermal Power Station, Stage-II (2 X 195 MW) has been estimated to be ₹85 lakh/MW. Similarly, the per MW cost in case of Unchahar-4 having a single unit of 500 MW is ₹61 lakh/MW cost. The hard cost of a single 500 MW Unit works out approximately ₹305 crore whereas that of a 2X250 MW Plant is to the tune of ₹362 crore. The difference in cost is on account of the piping, cabling, ducting etc. layout of the Plant, the distance at which the FGD is located, etc. The size and configuration of a generating station has a direct bearing on the per MW cost.

41. We have considered the submission of the Respondents and the clarification given by the Petitioner on the cost of installation of WFGD system in NSPCL Plant. The Petitioner has claimed hard cost of ₹72.45 lakh/MW towards installation of WFGD system in NSPCL Plant of 2X250 MW against the CEA recommended hard cost of ₹45.00 lakh for units of 250 MW size. The Respondents have contended that the hard cost of WFGD system claimed by the Petitioner is much higher than the CEA benchmark cost and, hence, it requires strict prudence check. The Respondents have also contended that the hard cost of WFGD system claimed by the Petitioner for NSPCL Plant of 2X250 MW is higher than similarly placed generating stations of NTPC and other generators. As the instant petition is for in-principle approval of hard cost of ECS, which excludes IDC, IEDC, FERV, taxes and



other cost, we are considering only the hard cost of FGD system and other components of cost of FGD system is not considered in this order. The same will be considered after implementation of WFGD system (and Combustion Modification system for NOx reduction) in NSPCL Plant in a petition to be filed by the Petitioner under Regulation 29(4) of the 2019 Tariff Regulations. As pointed out by the Respondents, the cost of WFGD system claimed by the Petitioner is prima facie much higher than the CEA indicative cost of ₹45.00 lakh/MW. In its justification for higher cost, the Petitioner has submitted that in NSPCL Plant, the unit size (250 MW) is small and the number of units (only two) is also less. It has also submitted that the cost of common facilities is high in case of smaller generating stations with fewer units like that of NSPCL Plant. Further due to reasons of design, the interconnecting ducts, pipings, cablings required for two units is higher when compared to one unit of 500 MW. In case of smaller generating stations with lesser units like that of NSPCL Plant, the cost of ECS is likely to be higher because of technical and economic reasons.

42. As regards the contention of the Respondents that the cost of ECS in case of Bongaigaon TPP and TPP of BRBCL is lower than the cost of ECS claimed by the Petitioner in the instant case, the Petitioner has clarified that in the case of Bongaigaon TTP, the Petitioner's claim of ₹43 lakh/MW in Petition No. 45/GT/2016 was for installation of FGD system to achieve less stringent SO₂ norms that were prescribed prior to the MoEFCC Notification of 7.12.2015. In the case of BRBCL, the Petitioner has submitted that per MW hard cost is ₹63 lakh which is lower than the Petitioner's claim of ₹72.45 lakh/MW but the same may be on account of the fact that



cost of common facilities is shared by four units of 250 MW each, whereas in the instant case, it is shared by two units of 250 MW each.

43. The Commission has already recognised in order dated 23.4.2020 in Petition No. 446/MP/2019 and order dated 6.5.2020 in Petition No.209/MP/2019 that the cost recommended by CEA is indicative in nature and that it is not possible to indicate the exact cost that can be discovered through a competitive bidding process. The hard cost of ₹72.45 lakh/MW claimed by the Petitioner towards installation of WFGD, which is more than the CEA recommended cost, is discovered through Domestic Competitive Bidding process and has been duly approved by the Board of Directors of the Petitioner. Moreover, the hard cost recommended by CEA is more than two to three years old and may have increased as has been acknowledged by CEA itself.

44. In view of the justifications provided by the Petitioner as regards cost of installation of WFGD system, we approve the hard cost of ₹72.45 lakh/MW claimed by the Petitioner towards installation of WFGD system to meet emission control norms for SO₂. Further, we also approve claimed cost of ₹14 crore (without IDC) towards the Combustion Modification System to meet emission control norms for NO_x.

Liberty to approach the Commission

45. The Petitioner has submitted that the MoEFCC Notification mandates revised ECNs for water consumption, mercury and particulate matter, besides SO₂ and NO_x. As NSPCL Plant meets the norms in respect of water consumption, mercury and



particulate matter as stipulated by the MoEFCC Notification, no claim has been made in respect of them. However, the Petitioner has sought liberty to approach the Commission if NSPCL Plant is unable to meet those norms and work(s) pertaining to the same are required to be undertaken in future.

46. We have considered the submissions of the Petitioner. It is observed that the MoEFCC Notification specifies revised ECNs for water consumption, particulate matter, SO₂ and NO_x and Mercury (Hg). NSPCL Plant already meets the norms specified by the MoEFCC Notification in case of water consumption, particulate matter and Mercury as on the date of filing of the petition. Accordingly, the Petitioner has proposed installation of ECS only for reduction of SO₂ and NO_x emissions. The Petitioner's prayer for approaching the Commission for installation of ECS for control of water consumption, Mercury emissions and particulate matter, if required, in future would be dealt as per the applicable laws and regulations.

Additional Auxiliary Power Consumption (APC)

47. The Petitioner has prayed for grant of additional APC over and above the normative APC due to implementation of ECS under Regulation 76 (Power to Relax) of the 2019 Tariff Regulations. The Petitioner has further submitted that additional APC for ECS has been claimed @1% as per the 2019 Tariff Regulations.

48. We have considered the prayer of the Petitioner. The claim for additional APC due to installation of FGD shall be dealt with as per provisions of the 2019 Tariff Regulations at the time of determination of supplementary tariff under Regulation of 29(4) of the 2019 Tariff Regulations after implementation of ECS.



Gross Station Heat Rate (GSHR)

49. The Petitioner has prayed for additional GSHR over and above the normative GSHR due to implementation of ECS under Regulation 76 i.e. “Power to relax” of the 2019 Tariff Regulations.

50. CSPDCL has submitted that the Petitioner has considered increase in GSHR to the extent of 19.32 kCal/kWh respectively towards De-NO_x system. There is no provision in the regulations for allowing increase in GSHR for determination of supplementary tariff. In response, the Petitioner has submitted that the approval of the increase in GSHR on account of De-NO_x is a necessary corollary to the approval granted by the Commission on the ground of “change in law”. In the larger public interest commensurate with legitimate expectation of the Petitioner, it is imperative that such approval be granted so as to put the Petitioner in same position of commercial standing where it stood prior to “change in law”. The Petitioner has further submitted that the idea behind prescribing a normative GSHR for a power plant was to incentivize operational efficiency of a power plant. The benefits arising out of efficient operation of plant are being shared with beneficiaries. The practice of conferment of incentive based on efficiency has induced a legitimate expectation of a substantive benefit to the generator. This benefit is likely to be taken away due to absence of factoring in the increase of GSHR on account of installation of De-NO_x system. Referring to the law laid down by Hon’ble Supreme Court in (2020) SCC Online SC 968 State of Jharkhand Vs. Brahmputra Metallics Ltd, Ranchi, the Petitioner has further submitted that it is within the means of the Commission to invoke such powers which would enable the generator to be in the same position where it stood prior to such change in law. The same is also in consonance with the



principle of equity and restitution. The Commission in its order dated 28.4.2021 in Petition No. 335/MP/2020 & Ors has observed that the normative GSHR will be considered on a case to case basis after implementation of ECS.

51. DNHPDCL has submitted that the Petitioner has considered increase in Gross Station Heat Rate to the extent of 19.32 kCal/kWh towards De-NO_x system without any basis. The Commission has not given any such dispensation under Regulations and allowing any additional operating norms over and above the normative norms for the stations is de hors the Regulations. In response, the Petitioner has submitted that the approval of the increase in GSHR on account of De-NO_x is a necessary corollary to the approval granted by the Commission on the ground of “change in law”. The Petitioner has further submitted that the Commission in order dated 28.4.2021 in Petition No. 335/MP/2020 & Ors held that the normative GSHR will be considered on a case to case basis after implementation of ECS.

52. We have considered the submissions of the Petitioner and the Respondents. The Petitioner has sought approval of additional GSHR over and above the normative GSHR due to implementation of ECS under Regulation 76 i.e. “Power to relax” of the 2019 Tariff Regulations. The Respondents have submitted that the 2019 Tariff Regulations do not provide for GSHR over and above the norms due to installation of ECS and it does not call for invocation of the Power to Relax under Regulation 76 of the 2019 Tariff Regulations. Since the 2019 Tariff Regulations do not provide for allowing additional GSHR on account of installation of ECS for NO_x, we are not inclined to consider the Petitioner’s prayer in this petition which is for in-principle approval for installation of ECS. The same will be considered on a case to



case basis in the petitions to be filed for determination of supplementary tariff under Regulation of 29(4) of the 2019 Tariff Regulations after implementation of ECS.

Additional Water Consumption

53. The Petitioner has submitted that the quantum of water consumption would increase after the installation of WFGD system. Accordingly, the Petitioner has claimed the cost of additional water consumption under Regulation 76 i.e. “Power to relax” of the 2019 Tariff Regulations.

54. We have considered the submissions of the Petitioner. The Petitioner’s claim for additional water consumption due to installation of FGD shall be dealt as per the norms specified by MoEFCC Notification as provided under Regulation 35(1)(6) of the 2019 Tariff Regulations, which provides as follows:

“35 Operation and Maintenance Expenses:

(1) Thermal Generating Station: Normative Operation and Maintenance expenses of thermal generating stations shall be as follows:

(6) The Water Charges, Security Expenses and Capital Spares for thermal generating stations shall be allowed separately after prudence check:

Provided that water charges shall be allowed based on water consumption and considering the norms of specific water consumption notified by the Ministry of Environment, Forest and Climate Change” depending upon type of plant and type of cooling water system, subject to prudence check. The details regarding the same shall be furnished along with the petition;”

Additional O&M Expenses

55. The Petitioner has submitted that with the installation of various ECS to meet the revised ECNs, there would be requirement of additional manpower for operation and maintenance of these systems, spares pertaining to these systems etc. for operating these systems on sustained basis. Accordingly, the petitioner would incur



additional O&M Expenses. The Petitioner has further submitted that as per Regulation 35(1)(7) of the 2019 Tariff Regulations, additional O&M Expenses on account of implementation of ECS shall be notified separately. However, till the norms are notified, the Commission may decide the additional O&M Expenses on case to case basis. In case of thermal generating stations, the norms of O&M Expenditure have been fixed by the Commission (in lakh/MW) based on actual O&M expenditure of different stations in the last five years. As FGD and other ECS have not been installed at various stations, the expenditure on account of them has not been made part of these norms. Further, the actual O&M Expenses data on account of the FGD system and other ECS is not available. Therefore, the reference for O&M Expenses for ECS to be installed may be taken from Financial Appraisal Report for Installation of FGD system for NSPCL Bhilai PP-III project prepared by Deloitte. The Petitioner has prayed to allow additional O&M Expenses @10% of capital cost per annum and the same has been considered by the Petitioner to compute indicative.

56. CSPDCL and DNHPDCL have submitted that the claim of the Petitioner for additional O&M Expenses @ 10% of the capital cost of ECS is not maintainable. The Commission has already specified O&M Expenses @ 2% of the admitted capital expenditure (excluding IDC and IEDC) as on its date of operation. It has further submitted that the "Admitted Capital Expenditure" has to be only the Capital Expenditure towards ECS and not the capital expenditure of entire power plant. As such O&M Expenses @2% of the admitted capital expenditure towards ECS should be considered. In response, the Petitioner has submitted that the O&M Expenses admissible to the Petitioner will be in accordance with Regulations in force. The



contention of the Respondent that the “Admitted Capital Expenditure” has to be Capital Expenditure towards ECS equipment only and not the Capital Expenditure of entire Power plant” cannot be read into the 2019 Tariff Regulations. The Commission has already taken a view in the order dated 28.4.2021 that the O&M norms for ECS for thermal generating stations have been specified in Regulation 35(1)(7) of the 2020 Amendment Regulations and the claim shall be dealt accordingly in petitions to be filed for determination of supplementary tariff under Regulation of 29(4) of the 2019 Tariff Regulations after implementation of ECS.

57. We have considered the submissions of the Petitioner, CSPDCL and DNHPDCL. The O&M norms for ECS for TPPs have been specified in Regulation 35(1)(7) of the 2019 Tariff Regulations through the 2020 Amendment Regulations and the Petitioner’s claim shall be dealt accordingly in Petitions to be filed for determination of supplementary tariff under Regulation of 29(4) of the 2019 Tariff Regulations after implementation of ECS.

Cost of Reagents

58. The Petitioner has submitted that WFGD system is based on using limestone or lime as a reagent, which involves a wet scrubbing process. Accordingly, the Petitioner has also claimed cost of chemical reagents (limestone) on account of implementation of ECS in the instant station.

59. CSPDCL and DNHPDCL have submitted that the Petitioner has considered limestone consumption of 0.0152 kg/kWh i.e., an absolute figure and no calculation has been provided by the Petitioner. CSPDCL has requested to conduct a prudence



check of this value to ascertain that the same is in conformity with the formula specified by the Commission in the 2020 Amendment Regulations. In response, the Petitioner has placed reliance on the order dated 28.4.2021 in Petition No. 335/MP/2020 & Ors. wherein the Commission has held that the same would be considered after installation of ECS.

60. We have considered the submissions of Petitioner, CSDPCL and DNHPDCL. The Petitioner's claim for cost of reagent due to installation of FGD shall be dealt as provided in Regulation 49(F) of the 2020 Amendment Regulations which provides for norms for consumption of reagent in petition to be filed for determination of supplementary tariff under Regulation of 29(4) of the 2019 Tariff Regulations after installation of ECS.

Deemed availability of the station/unit on account of shutdown

61. The Petitioner has submitted that each generating unit has to be taken under shutdown for about 45-60 days for implementation of ECS in compliance of MoEFCC Notification and stabilization of the same would take some more time. The Petitioner has submitted that during the period of shutdown of unit, there would be loss of availability of the station and would lead to under recovery of Annual Fixed Charges on account of implementation of ECS. Accordingly, the Petitioner has prayed to consider the shutdown period of the unit for implementation of the ECS as "deemed availability".

62. CSDPCL has submitted that the "shut down" period has not been specified/ allowed by the Commission in the 2020 Amendment Regulations and as such the



Petitioner may be directed to carry out interconnection of ECS with the main plant during the annual overhaul of the plant. No additional shutdown period, over and above annual overhaul should be allowed. CSDPCL has further suggested that the Petitioner should approach Government of India and explore possibilities for utilizing NCEEF (National Clean Energy & Environment Fund) for installation of ECS in its generating station.

63. In response, the Petitioner has submitted that the claim of the shutdown period of 45 days for each unit for interconnection of WFGD system and 45-60 days for Combustion Modification, be treated as deemed availability is in consonance with the principle of restitution for the loss which may accrue on account of such shutdown. However, the Petitioner would attempt to align this period with the annual overhaul of the units, subject to feasibility. However, this shall not be treated as concession, acquiescence or waiver or plea of like nature. The Commission has already taken a view that the period of shut down will be decided on case to case to basis.

64. DNHPDCL has submitted that the prayer of the Petitioner for allowance of shut down period for installation and commissioning of ECS as “deemed availability” for payment of capacity charges has no legal basis since the Regulations do not provide for any such “deemed availability” and there shall be no such declaration of readiness by Petitioner during shutdown. Only two elements, O&M Expenses and Interest on Loan as part of the annual fixed charges, are entitled to be recovered by the Petitioner. The Petitioner should align shutdown period for ECS installation with the annual overhaul of the plant.



65. The Petitioner has submitted that in so far as the 2019 Tariff Regulations are concerned, the same are silent on this aspect and, therefore, there is no prescription in law to accede to the Respondent's view. The Petitioner has submitted that the period of shutdown is a natural probable requirement of installation and the commercial implication of the same is on account of the "change in law", as mandated by the MoEFCC Notification. The 2019 Tariff Regulations do not contemplate commercial loss for no fault of the Petitioner. The Commission has already taken a view that the period of shut down will be decided on a case to case to basis.

66. We have considered the submissions of the Petitioner and the Respondents. The Commission in order dated 22.6.2020 in Petition No. 168/MP/2019 has already held that Petitioner and the beneficiaries shall plan and synchronize the inter-connection of FGD system with the plant with the annual overhaul. The relevant portion of the order Commission's order dated 22.6.2020 reads as follows:

"...The Commission is of the view that beneficiaries and the petitioner shall plan the interconnection of FGD system with main plant by synchronizing it with annual overhaul..."

67. We are not inclined to go into this issue at this stage as we are of the view that the Petitioner's prayer for considering the shutdown period for implementation of ECS has to be dealt on a case to case basis.

68. We would also like to state that we have not considered the Petitioner's claim of total capital cost towards installation of FGD, which apart from hard cost includes IDC, IEDC, FERV, taxes and duties and other costs. These claims excluding hard cost would be considered on case to case basis on 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. Accordingly, the Petitioner is directed to file separate petitions for determination of tariff after implementation of ECS as provided in Regulation 29(4) of the 2019 Tariff Regulations.

69. Summary of our main findings and decisions are as follows:

(a) The process from the stage of identification of FGD package to NoA was with the approval of the Petitioner's Board of Directors and as per the procedure laid down under its DoP and the bidding has been carried out in a fair and transparent manner.

(b) The Petitioner has identified and proposed WFGD system for reduction in the SO₂ emissions and Combustion Modification system taking into consideration the effectiveness, availability and cost, size of the plant, operational expenses and availability of the reagents.

(c) The costs claimed by the Petitioner towards installation of WFGD system and Combustion Modification system have been discovered through a competitive bidding process. The hard costs claimed by the Petitioner for WFGD system is higher than the indicative cost recommended by CEA but the petitioner has provided justification and reasons for the same.

(d) "In-principle approval" is accorded to the claimed hard cost of ₹72.45 lakh/MW towards installation of WFGD system to meet emission control norms for SO₂ and claimed cost of ₹14 crore (without IDC) towards Combustion Modification System to meet emission control norms for NO_x.

70. Annexure given hereinafter shall form part of the order.



71. The instant order disposes of Petition No. 597/MP/2020 in terms of the above discussion and findings.

sd/-	sd/-	sd/-	sd/-
(P. K. Singh) Member	(Arun Goyal) Member	(I. S. Jha) Member	(P. K. Pujari) Chairperson



Annexure

SO₂ Data (mg/ Nm³)			
Month	Norm	Unit-I	Unit-II
July, 2020	600 mg/Nm ³	947.7	953.2
August, 2020	600 mg/Nm ³	912.3	901.6
September, 2020	600 mg/Nm ³	953.7	946.6
October, 2020	600 mg/Nm ³	962.4	977.3
November, 2020	600 mg/Nm ³	945.2	954.7
December, 2020	600 mg/Nm ³	985.4	961.7
January, 2021	600 mg/Nm ³	995.1	975
February, 2021	600 mg/Nm ³	1011.6	996.2
March, 2021	600 mg/Nm ³	1069.6	1052.5
April, 2021	600 mg/Nm ³	1075.4	1055.3
May, 2021	600 mg/Nm ³	1063.9	1072.5
June, 2021	600 mg/Nm ³	1063.9	1078.2

NO_x Data (mg/ Nm³)			
Month	Norm	Unit-I	Unit-II
July, 2020	450 mg/ Nm ³	548.2	537.7
August, 2020	450 mg/ Nm ³	504.2	534.2
September, 2020	450 mg/ Nm ³	557.2	540.2
October, 2020	450 mg/ Nm ³	567.3	605.1
November, 2020	450 mg/ Nm ³	558.3	576.1
December, 2020	450 mg/ Nm ³	565.5	546.3
January, 2021	450 mg/ Nm ³	586.9	579.2
February, 2021	450 mg/ Nm ³	540.7	571.6
March, 2021	450 mg/ Nm ³	572.0	551.4
April, 2021	450 mg/ Nm ³	553.5	561.7
May, 2021	450 mg/ Nm ³	555.6	543.3
June, 2021	450 mg/ Nm ³	541.2	533.0

