

**CENTRAL ELECTRICITY REGULATORY COMMISSION  
NEW DELHI**

**Petition No. 72/MP/2016**

**Coram:**

**Shri Gireesh B. Pradhan, Chairperson**

**Shri A. K. Singhal, Member**

**Shri A.S. Bakshi, Member**

**Dr. M.K. Iyer, Member**

**Date of Order: 20<sup>th</sup> of March, 2017**

**In the matter of**

Petition seeking in-principle approval of the "Abstract Schemes" of Capital Expenditure in compliance with Environment (Protection) Amendment Rules, 2015 issued by the Ministry of Environment, Forest and Climate Change dated 7.12.2015.

**And**

**In the matter of**

Maithon Power Limited  
34, Sant Tukaram Road, Camac Bunder,  
Mumbai - 400 009

..... **Petitioner**

**Versus**

1. Damodar Valley Corporation,  
DVC Headquarters, DVC Towers, VIP  
Road, Kolkata – 700054.

2. Tata Power Delhi Distribution Limited,  
NDPL House, Hudson Lane,  
Kingsway Camp, New Delhi – 110 009.

3. West Bengal State Electricity Distribution Company Limited  
Vidyut Bhavan, Bidhannagar,  
Sector II, Salt Lake, Kolkata - 700 091.

4. Kerala State Electricity Board Limited  
Vydyuthui Bhavnam, Pattom  
Thiruvananthapuram-695004

5. Tata Power Trading Company Limited  
Corporate Centre, 'A' Block,

34, Sant Tukaram Road, Camac Bunder,  
Mumbai 400 006.

.....Respondents

**Parties Present:**

Shri Aveek Chaterjee, MPL  
Shri Ramkrishna Gadre, MPL  
Shri Pradip Roy, MPL  
Shri Abhay Kumar, MPL

**ORDER**

The petitioner, Maithon Power Limited (“MPL”), a Joint Venture company of the Tata Power Company Ltd and Damodar Valley Corporation has filed the present petition under Regulation 13 (3) (ii) read with Regulation 3 (9) and 12 (2) of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2014 (2104 Tariff Regulations) seeking in-principle approval of the ‘Abstract Schemes’ of capital expenditure in compliance with the Environment (Protection) Amendment Rules, 2015 issued by the Ministry of Environment, Forest and Climate Change ( MoEFCC) on 7.12.2015.

2. The Petitioner, Maithon Power Limited (“MPL”), a Joint Venture company of the Tata Power Company Ltd and Damodar Valley Corporation has set up a 1050 MW (2x250 MW) Maithon Right Bank Thermal Power Project (generating station) in District Dhanbad in the State of Jharkhand. Unit 1 and Unit-II of the generating station were commissioned on 1.9.2011 and 24.7.2012 respectively. The petitioner has entered into long-term PPAs/PSAs with DVC for sale of 300 MW of power, WBSEDCL for sale of 300MW of

power through TPTCL, TPDDL for sale of 300MW of power through TPTCL and KSEBL for sale of 150MW of power.

3. The Government of India, Ministry of Environment, Forest and Climate Change (MoEFCC) vide its Notification No.S.O.3305(E) dated 7.12.2015 notified the Environment (Protection) Amendment Rules, 2015 (Amendment Rules, 2015) amending/introducing the standards for emission of environmental pollutants to be followed by the 'Thermal Power Plants'. By the said Amendment Rules, all existing Thermal Power Plants are required to meet the modified/new norms within a period of two (2) years from the date of the Notification. By the said amendment, MoEFCC has,-

- (a) Revised emission parameters of Particulate Matter ("**PM**").
- (b) Introduced new parameters qua Sulphur Dioxide (SO<sub>2</sub>), Oxides of Nitrogen (NO<sub>x</sub>) and Mercury (Hg).
- (c) Directed all Thermal Power Plants with Once Through Cooling ("**OTC**") to install Cooling Tower ("**CT**"); and
- (d) Introduced/prescribed a limit to the amount of Cooling Water to be used per Unit.

4. The submissions of the petitioner are as under:

(a) As per the Amendment Rules, 2015, the thermal generating stations are required to comply with the revised environmental norms within 2 years of the date of publication of the above notification dated 7.12.2017. The revised norms as applicable for Maithon Project are summarized as under:

Sr.No.	Parameter	Standards	Design/Actual Values
1.	<b>Water Consumption</b>	All plants with Once Through Cooling (OTC) shall install Cooling Tower (CT) and achieve specific water consumption upto maximum of 3.5 m <sup>3</sup> /MWh.	Closed cooling System. Actual specific water consumption is within specified limit.

2.	<b>Particulate Matter</b> for TPPs (units) installed after 1 <sup>st</sup> January 2003 upto 31 <sup>st</sup> December, 2016	50 mg/Nm <sup>3</sup>	Design - 50 mg/Nm <sup>3</sup> Actual - Within specified limit.
3.	<b>Sulphur Dioxide (SO<sub>2</sub>)</b> for TPPs (units) installed after 1 <sup>st</sup> January 2003 upto 31 <sup>st</sup> December, 2016	200 mg/Nm <sup>3</sup> (units having capacity of 500 MW and above)	Actual observed - 647 to 1012 mg/Nm <sup>3</sup> at 6% O <sub>2</sub> with Sulphur in Coal around 0.44% (Air-Dry basis).
4.	<b>Oxides of Nitrogen (NO<sub>x</sub>)</b> for TPPs (units) installed after 1 <sup>st</sup>	300 mg/Nm <sup>3</sup>	Design - 880 mg/Nm <sup>3</sup> Actual observed - 612 to 819 mg/Nm <sup>3</sup> at 6% O <sub>2</sub> .
5.	<b>Mercury (Hg)</b> for TPPs (units) installed after 1 <sup>st</sup>	0.03 mg/Nm <sup>3</sup>	Within limit.

(b) The petitioner operates its generating station within the new limits prescribed by MoEFCC for Water Consumption, Particulate Matter and Mercury (Hg). However, it shall have to carry out modifications in the Project in order to comply with the norms prescribed for Sulphur Dioxide (“SO<sub>2</sub>”) and Oxides of Nitrogen (“NO<sub>x</sub>”). In order to achieve the norms prescribed for SO<sub>2</sub> and NO<sub>x</sub> as applicable for the Maithon Project, an initial estimate has been developed that indicates a substantial investment requirement besides having impact on O&M expenses and some of the operational parameters having impact on available energy and the resultant costs of generation from generating station.

(c) Pursuant to Amendment Rules, 2015, the petitioner is required to estimate appropriate Additional Capital Expenditure Schemes (“Abstract Schemes”) and obtain an in-principle approval from the Commission before committing any capital expenditure and undertaking any modification in the

Plant and Machinery of the Project. The petitioner, therefore, has proposed to take up and commission the two Abstract Schemes, namely (i) installation of Flue Gas De-Sulphurization (“FGD”) Plant ,and (ii) Installation of Selective Catalytic Reduction alongwith associated Electrical System Modification and Civil Foundations. The Abstract Schemes are estimated to be commissioned in the tariff period of financial year 2014-19.

(d) The following norms are applicable for the generating station:

<b>Installation of TPP</b>	<b>Sulphur Dioxide</b>	<b>Oxides of Nitrogen</b>
TPPs (Units) installed between 1.1.2003 and 31.12.2016	200 mg/Nm <sup>3</sup> for >500MW	300 mg/Nm <sup>3</sup>

(e) The Amendment Rules, 2015 can be categorized specifically under Regulation 3 (9) of the 2014 Tariff Regulations. Such event of ‘Change in Law’ has a substantial impact on the following:

(i) The capital cost of the Maithon Project, on account of installation of additional plant, machinery and equipment for complying with the norms prescribed under the MoEFCC Notification have been triggered .

(ii) The O&M Expenses of the Maithon Project, including any other additional cost on account of purchase of raw material, consumables for the operation of additional plant, machinery and equipment purchased for complying the norms prescribed under the MoEFCC Notification, routine Maintenance, preventive Maintenance and breakdown Maintenance of these additional plant, machinery and equipment and performance impact due to modification of the Project at all.

(iii) In addition to the above, there is a possibility of an impact on some of the operational parameters such as the Station Heat Rate as well as the Auxiliary Power Consumption, etc. which would be better ascertained subsequent to the detailed engineering study and finalization of the specifications and other design and operational details of the proposed Abstract Schemes.

(f) With the given deadline for implementation of such Amendment Rules, 2015 by the MoEFCC, investment towards Abstract Schemes is unavoidable for the petitioner. The petitioner is required to implement sophisticated technology to bridge the gap between the existing parameters and the desired parameters. The initial estimates for capital expenditure pertaining to the above parameters puts the investment requirements to be about **Rs. 2065 crore** including Interest During Construction (“IDC”). Therefore, the in-principle approval of the Commission is required for securing financing from the financial institutions for the required Abstract Schemes and achieve financial closure in order to make the execution possible within the stipulated timeline.

(g) With regard to introduction of norms for Emission of Sulphur Dioxide and Proposed Abstract Scheme, the petitioner has submitted that there was no applicable standard limiting emission of Sulphur Dioxide in flue gases, which was required to be considered/maintained by the petitioner before the enactment of the amendment Rules and the Plant and Machinery erected by the petitioner was well equipped with systems to control such parameters under prudent utility practices. However, MoEFCC vide its Notification dated 7.12.2015, has introduced norms for emission of SO<sub>2</sub> in flue gases and limited the same to 200 mg/Nm<sup>3</sup> for generating

units having capacity of 500 MW and above and commissioned between 1.1.2003 to 31.12.2016. The introduction of new parameters for emission of SO<sub>2</sub> amounts to 'Change in Law' in terms of the 2014 Tariff Regulations.

(h) The Boilers of the Maithon generating units are designed to fire domestic coal having about 0.2% Sulphur. However, the coal received by the petitioner at the site is of sub-optimal quality with a Sulphur content of about 0.44%. The present emission level is in the range of 647 to 1012 mg/Nm<sup>3</sup> at 6% O<sub>2</sub> and currently there is no equipment available in the project for SO<sub>2</sub> emission abatement. However, the Norm set by MoEFCC (i.e., 200 mg/Nm<sup>3</sup>) is much more stringent than that presently maintained by the petitioner; especially by firing domestic coal with Sulphur content of about 0.44%, the petitioner will not be able to comply with the stringent Norm of 200 mg/Nm<sup>3</sup> as laid down by the MoEFCC unless specialized arrangement is made to control the Sulphur emission in the atmosphere. In this regard, the impact of MoEFCC Notification on emission of Sulphur Dioxide is as under:

<b>Pollutant</b>	<b>Maximum Operating value - As reported mg/Nm<sup>3</sup></b>	<b>Maximum Corrected Value with 6% O<sub>2</sub> mg/Nm<sup>3</sup></b>	<b>Allowable Limits as per MoEFCC Notification mg/Nm<sup>3</sup></b>
Sulphur Dioxide	890 at 7.2% O <sub>2</sub>	1012	200

(i) The FGD technology is a proven technology for Sulphur reduction. Considering the huge variation of Sulphur content of the coal received at Maithon Project with respect to the design Coal, Wet FGD System has been proposed for Maithon Project. The FGD Plant is expected to reduce the present emission level of 1191 mg/Nm<sup>3</sup> (calculated value considered for design of FGD based on 0.44% Sulphur in Coal) of SO<sub>2</sub> to ≤200 mg/Nm<sup>3</sup> considering about 83.2% efficiency. Further, the FGD

Plant would need about 110 m<sup>3</sup>/hr of fresh water for Flue Gas Desulphurization process and it will have about 20 m<sup>3</sup>/hr per FGD Plant as waste water reject. The waste water reject would be treated in the Reverse Osmosis (“**RO**”) Plant for meeting Zero Liquid Discharge (“**ZLD**”) condition which is already under construction at the generating station. No additional water treatment facility is required. The Petitioner has proposed such RO Plant for meeting ZLD condition through the Tariff Petition No. 152/GT/2015 dated 01.06.2015 for the approval of the Commission which is under consideration of the Commission. Apart from the installation of specific plant and Machinery, the proposed FGD plant installation would also require modification of the existing electrical system and additional civil constructions. The FGD plant shall be connected to Unit Auxiliary Transformers (UAT).

(j) With regard to introduction of norms for Emission of Oxides of Nitrogen and Proposed Abstract Scheme, the petitioner has submitted that there was no applicable standard limiting emission of NO<sub>x</sub> in flue gases, which was required to be considered/maintained by the petitioner before the enactment of the amendment Rules. However, MoEFCC vide its amendment Rules introduced the norm for the generating units commissioned between the years 1.1.2003 to 31.12.2016 and prescribed a stringent limit of 300 mg/Nm<sup>3</sup>. The norm of 300 mg/Nm<sup>3</sup> is much more stringent than that could be achieved without installing additional specialized facilities. The introduction of new parameters for emission of Nitrogen Oxide amounts to ‘Change in Law’ in terms of the 2014 Tariff Regulations. The design guarantee of Nitrogen Oxide is 880 mg/Nm<sup>3</sup> and actual observed Nitrogen Oxide emission level is in the range of 538 mg/Nm<sup>3</sup> at 7.8% O<sub>2</sub> to 753 mg/Nm<sup>3</sup> at 7.2% O<sub>2</sub>, which is about 612 to 819 mg/Nm<sup>3</sup> at 6% O<sub>2</sub>. Both the design and actual values exceed the above allowable limit and there is no NO<sub>x</sub> control equipment at Maithon



Project. Therefore, Nitrogen Oxide abatement measures are required to meet the norms laid down by the MoEFCC.

(k) The available methodology for reduction of NO<sub>x</sub> emission is the post-combustion controls which is expected to reduce the level of NO<sub>x</sub> emissions by converting the NO<sub>x</sub> formed during combustion into Nitrogen. Such technique introduces an agent into the flue gas stream to selectively react with the NO<sub>x</sub>. The reaction may be completed either with or without the use of a catalyst. In case of use of catalyst in the process, the technique is known as Selective Catalytic Reduction System ("SCR System") wherein Aqueous Ammonia is widely used as a reagent; and if the technique does not use any catalyst, it is known as the Selective Non-Catalytic Reduction System ("SNCR System"). However, the SCR System is more effective than the SNCR System. Therefore, the SCR System is proposed for the Units of Maithon generating station in order to comply with the Norms of the amendment Rules. The SCR system shall also be connected to UAT and the electrical loads shall be supplied from the existing unit electrical Auxiliary Power supply system.

(l) The estimated cost of such proposed Abstract Schemes pertaining to FGD Plant and the SCR System (including Electrical System modification and Civil Foundations) required to reduce the SO<sub>2</sub> and NO<sub>x</sub> has been estimated at about Rs. 1949 crore (excluding IDC). Although the proposed timeline for commissioning of the Abstract Schemes is 30.11.2017 and efforts would be made to get the retrofits operational by the above target date. However, the actual completion of work would depend on a number of factors which are not exactly under the control/influence of the petitioner. Such factors include grant of in-principle approval

to the Abstract Scheme, availability of financial commitments from the Financial Institutions for such modifications followed by financial closure, ability of the potential contractors/suppliers to deliver and commission the facilities within the stipulated dates, availability of allowable shutdown of the generating units by the long-time Beneficiaries/RLDC's for such field activities considering similar requirements by a large number of generating stations in the same timeframe etc. Such possibility of delays may not allow the retrofit work to get completed within the stipulated timeline and force the petitioner to approach the MoEFCC for grant of extension of time and this Commission with more accurate estimates of IDC, etc.

(n) The capital expenditure requirement has been envisaged based on the present market rates and is, therefore, only a quick estimate of the capital expenditure requirement for the Abstract Schemes. Such estimates may differ from the actual investment made later towards such Abstract Schemes subject to more definite technical requirements and price variation. The IDC considered in the above computation has been estimated as per the proposed timeline for commissioning the necessary modifications at the generating station by 30.11.2017. Such IDC is indicative and the estimates of IDC may also undergo a subsequent revision with the completion of the abstract schemes.

(o) The petitioner has worked out the provisional impact on generation tariff ("Incremental Tariff") of Maithon Project for the tariff period 2014-19 based on the capitalization phasing (including IDC). There would also be other cost implications on account of the proposed Abstract Schemes mainly pertaining to O&M expenses and Auxiliary Power Consumption etc. The O&M expenses for the proposed Abstract Schemes would increase on account of the running operation cost of the

consumables like Limestone Cost for the FGD Plant and Aqueous Ammonia Cost for the SCR System towards operation of the new facilities, costs towards disposal of byproducts and wastes of the FGD Plant such as Gypsum, etc. Accordingly, the cost of maintenance of spares and the service cost have been assumed at 20% (as per the provision of the 2014 Tariff Regulations) and 10% of the Base O&M Expenses respectively. The cost of capital spares and cost of disposal of byproducts and wastes of the FGD Plant in the proposed O & M expenses for Abstract Schemes has not been considered and the Water Charges at the present Rate has been assumed as **Rs 5.70/m<sup>3</sup>**.

(p) The additional Auxiliary Power Consumption for the proposed modification per unit would be about 12.40 MW as estimated in the PFR, i.e. about 2.36% of power output and the impact on the Energy Charges Rate component of generation tariff for the generating station has been computed considering an Auxiliary Power Consumption of 8.11% which is 2.36% higher than the Normative Auxiliary Power Consumption at 5.75% applicable for the Project.

(q) Due to the possible impact of the proposed changes under the Abstract Schemes and the resultant reduction in net capacity being available for export of power from the generating station, there may be a need for relinquishing some of the Long-term Access obtained from the CTU. There would be a need to carry out consequential correction in the quantum of LTA granted, with no cost implications to the Petitioner/Long-term Beneficiaries through an appropriate Regulatory provision.

(r) Regulation 54 of the 2014 Tariff Regulations provides the judicial discretion to the Commission to relax the norms based on the circumstances of the

case. Therefore, the petitioner may consider extending the Deemed Plant Availability benefits to the Units of generating station during such shutdown period required for installation and commissioning of the SCR system by exercising power conferred to it in order to protect the recovery of Annual Fixed Charges in its entirety.

(s) If such environmental norms were not being issued by MoEFCC, the petitioner would have recovered the entire annual fixed charges under the provisions of the 2014 Tariff Regulations for the particular year by making the generating units available for the estimated shutdown period of 4 months. This is an exceptional scenario wherein the petitioner is forced to undertake the proposed Abstract Schemes in order to comply with the mandates stipulated in the Amendment Rules, 2015 issued by the MoEFCC. Therefore, it would meet the ends of justice if the Commission allows the Deemed Plant Availability for the generating station by exercising the power given under Regulation 54 (Power to Relax) of the 2014 Tariff Regulations. The Hon'ble APTEL in its judgment dated 25.3.2011 in the matter of Ratnagiri Gas & Power Private Ltd. vs CERC in Appeal No. 130 of 2009 has held that the Commission has the discretionary power to relax the norms of the Regulations under 2014 Tariff Regulations based on the merit and circumstances of the case in order to avoid potential hardship to any person concerned.

(t) The Amendment Rules, 2015 have been issued by MoEFCC in exercise of the powers conferred on it under Sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986). Such amendment of Environment (Protection) Rules, 1986 under an Indian Act squarely falls under the definition of "Change in Law" as stipulated in

2014 Tariff Regulations. Further, such Change in Law is an uncontrollable factor as stipulated in Regulation 12 (2) of 2014 Tariff Regulations.

6. Against the above background, the petitioner has filed the present petition with the following prayers:

“(a) Grant in-principle approval for the proposed Capital Cost (including IDC) of the Abstract Schemes pertaining to installation of Flue Gas De-Sulphurization Plant for reduction of SO<sub>2</sub> and Installation of Selective Catalytic Reduction System for reduction of NO<sub>x</sub> in order to comply with the provisions of the Amendment Rules considering the same under Change in Law as per the provisions of CERC Tariff Regulations 2014;

(b) Approve the indicative Incremental Tariff on account of commissioning of such Abstract Schemes and likely changes in the operational parameters of the Generating Units as a consequence of these schematic changes and allow the same to be recovered from the Beneficiaries;

(c) Approve the estimated increase in O&M Expenses and Auxiliary Power Consumption on account of commissioning of the proposed Abstract Schemes;

(d) Allow the Deemed Plant Availability during the period of shutdown of the Generating Units of Maithon Project in order to ensure the recovery of the Annual Fixed Charges in its entirety from the Beneficiaries by exercising its power under Regulation 54 of CERC Tariff Regulations 2014;

(e) Allow the Petitioner to seek requisite modifications in the granted LTA on account of reduction in the Net Capacity of Maithon Project due to increased Auxiliary Power Consumption;

(f) Allow the Petitioner to approach this Hon’ble Commission at its liberty to propose revised estimates of Capital Expenditure including IDC, Pre-Operative Expenses, IEDC and Design, Engineering & Project Management Cost; O&M Expenses required for installation and operation of the Abstract Schemes and impact on operational parameters and Generation Tariff of Maithon Project in order to obtain the final approval by the Hon’ble Commission;

(g) Condone any inadvertent omissions/errors/rounding-off differences/shortcomings and permit the Petitioner to add/alter this filing and make further submissions as may be required in future;

(h) Pass such other Order/s, as this Hon’ble Commission may deem fit and proper,”

7. The petition was heard on 30.6.2016 on the maintainability of the petition.

**Analysis and Decision:**

8. We have considered the submissions of the petitioner and perused the documents on record. We now consider as to whether the prayer of the petitioner for in-principle approval for the Abstract Scheme of capital expenditure is maintainable. The petitioner has submitted that the Amendment Rules, 2015 have been issued by MoEFCC in exercise of the powers conferred on it by Sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986). Such amendment of Environment (Protection) Rules, 1986 under an Indian Act squarely falls under the definition of "Change in Law" as stipulated in 2014 Tariff Regulations. Further, such Change in Law is an uncontrollable factor for the petitioner as stipulated in Regulation 12 (2) of the 2014 Tariff Regulations. The petitioner has contended that from the harmonious reading of the provisions of the Regulations, the present proposal of the petitioner on Abstract Schemes can be classified under Regulation 14 (3) (ii) read with Regulations 3 (9) and 12 (2) of 2014 Tariff Regulations.

9. The Ministry of Environment Forest and Climate Change (MoEFCC) vide notification dated 7.12.2015 notified the Environment (Protection) Amendment Rules, 2015 amending/introducing in schedule I of the Environment (Protection) Rules, 1986, the standards for emission of environmental pollutants to be followed by the thermal power plants. As per the said notification, all existing thermal power plants are required to meet the modified/new norms within a period of two years from the date of the notification. In order to comply with the revised environmental norms as prescribed by the MoEFCC, the petitioner proposes to take up two Abstract Schemes, namely (i)

Installation of Flue Gas De-Sulphurization, (ii) Installation of Selective Catalytic Reduction.

10. Since, the 2014 Tariff Regulations do not provide for the grant of in-principle approval for the capital expenditure, the prayer of the petitioner for in-principle approval of the Abstract scheme of capital expenditure by relaxing the provisions of the tariff regulations through invoking Regulation 54 of 2014 Tariff Regulations, is not maintainable. In our view, since, the implementation of new norms in the existing and under construction thermal generating stations would require modification of their existing system and installation of new systems such as Retro-fitting of additional fields in ESP/replacement of ESP, etc. to meet Suspended Particulate Matter norms, installation of FGD system to control SO<sub>x</sub> and Selective Catalytic Reduction (SCR) systems for DeNox, the petitioner is directed to approach the Central Electricity Authority to decide specific optimum technology, associated cost and major issues to be faced in installation of different system like SCR, etc. The petitioner is also directed to take up the matter with the Ministry of Environment and Forest for phasing of the implementation of the different environmental measures. Accordingly, the petitioner is granted liberty to file appropriate petition at an appropriate stage based on approval of CEA and direction of MoEF which shall be dealt with in accordance with law.

11. With the above, the petition is disposed of.

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

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

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

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