

GOVERNMENT OF INDIA  
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

**LOK SABHA**  
**UN-STARRED QUESTION NO.2284**  
TO BE ANSWERED ON 23.09.2020

**Emission Standard**

2284. SHRI DUSHYANT SINGH:

Will the Minister of ENVIRONMENT, FOREST AND CLIMATE CHANGE be pleased to state:

- (a) whether the Ministry has given in-principle approval for relaxation of Nitrogen Oxide emission standard limit from 300mg/Nm<sup>3</sup> to 450mg/Nm<sup>3</sup> in May 2019;
- (b) if so, the reasons therefor along with the steps taken by Government to tackle “Climate Change”;
- (c) the details of communications between Ministry of Power (MoP), Central Electricity Authority (CEA) and Central Pollution Control Board (CPCB) related to increasing NOx emission standards;
- (d) if so, the details of the officials involved in this decision from MoP, CEA and CPCB;
- (e) the monitoring report on emissions of four thermal power plants sent to the Ministry in May 2019; and
- (f) the details of thermal power plants violating the 300mg/Nm<sup>3</sup> standard as per the monitoring report at full-load and part-load?

**ANSWER**

**MINISTER OF STATE IN THE MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE**  
**(SHRI BABUL SUPRIYO)**

(a) & (b) The Ministry of Environment, Forest and Climate Change has in-principle approved for relaxation of NOx emission standard limit from 300mg/Nm<sup>3</sup> to 450 mg/Nm<sup>3</sup> in May 2019 for the Thermal Power Plants installed between 1 January 2004 to 31 December 2016, based on the recommendations of meeting held by committee having members from the Ministry of Environment, Forest and Climate (MoEFCC), Ministry of Power (MoP), Central Electricity Authority (CEA), Central Pollution Control Board (CPCB) and National Thermal Power Corporation Limited (NTPC) on 17 May 2019. The recommendation was based on following considerations.

- (i) The report submitted by CPCB and CEA on the joint monitoring carried out in 7 units of 4 Thermal Power Plants;
- (ii) Difficulties to achieve by combustion modification to achieve norms of 300 mg/Nm<sup>3</sup>;
- (iii) Assurance given to power generating companies by BHEL would be able to achieve NOx emission level of 450 mg/Nm<sup>3</sup> by combustion modification;
- (iv) Operational issues with the Selected Non-Catalytic Reduction (SNCR) as it requires Urea/Ammonia for control of NOx and its suitability to all type of boiler, temperature band;

- (v) Globally available SCR system for NO<sub>x</sub> control are not proven for Indian Coal having high ash contained and retrofitting is not possible in operating/under construction plants;
- (vi) NO<sub>x</sub> emission level varies based on the operational conditions of the unit for example unit load, composition of the coal, mill combination (i.e. top mill, bottom mill, middle mill operation), excess air etc.

(c) & (d) The details of communications held between the MoP, CEA and CPCB is annexed (Annexure I).Some of the officials involved in the process, includes the Chief Engineer and AGM, Thermal Performance Evaluation & Climate Change Division, CEA; Secretary, Joint Secretary (Thermal), Under Secretary and Section Officer, MoP; Secretary, Joint Secretary (Control of Pollution), Ministry of Environment, Forest and Climate Change; Additional Directors, CPCB.

(e)& (f) A copy of the joint monitoring report (at full and half load), as carried out by the CPCB and CEA on emissions of four thermal power plants, as submitted by the CPCB to the Ministry is also annexed (Annexure II).

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 केन्द्रीय विद्युत प्राधिकरण/Central Electricity Authority/  
 राष्ट्रीय निष्पादन मूल्यांकन एवं जलवायु परिवर्तन प्रभाग  
 Thermal Performance Evaluation & Climate Change Division

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**Sub.: New environmental norms for Thermal Power Plants- Monitoring of Phasing Plan reg.**

This is with reference to Ministry of Power letter No. 10/1/2018 St. Th. dated 1.8.2018 on the above cited subject and in continuation of our earlier letter No. CE/Th/TPE&CC/ENV/60/2018/169 & 172-173/174-175 dated 8.8.2018 & 14.8.2018.

MoEF&CC vide notification dated 7.12.2015 issued new environmental norms for Thermal Power Plants (TPPs) which also include norms for NOx emissions. The norms prescribed by MoEF&CC for Oxides of Nitrogen (NOx) are as below:

TPPs (units) installed before 31.12.2003	TPPs (units) installed after 31.12.2003 and up to 31.12.2016	TPPs (units) to be installed from 1.1.2017
600 mg/Nm <sup>3</sup>	300 mg/Nm <sup>3</sup>	100 mg/Nm <sup>3</sup>

The norm of 600 mg/Nm<sup>3</sup> can be met by TPPs by combustion optimization/combustion modification. The norm of 300 mg/Nm<sup>3</sup> and 100 mg/Nm<sup>3</sup> is difficult to achieve by combustion modification alone and will require retrofit of post combustion De-NOx system. The technology of such De-NOx system to achieve norm of 300 mg/Nm<sup>3</sup> may be Selective Non - Catalytic Reduction (SNCR). There are operational issues with the SNCR systems, as it requires urea/ammonia for control of NOx and its suitability for all types of boilers. In SNCR system, NOx control can be achieved only in a particular temperature band. If the temperature band is not maintained then ammonia/urea may slip along with

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(2)

stack emissions and may create another environmental hazard. Pilot studies are being carried out for testing the efficacy of this system in the country.

To meet the norm of 100 mg/Nm<sup>3</sup> will require installation of new/ retrofit of post combustion De-NOx system. This norm can be achieved only by the use of Selective Catalytic Reduction (SCR) technology in a TPP. The globally available SCR system for NOx control are not proven for Indian coal having high ash contents. Moreover, there are complex layout issues for installation of SCR system in the existing units. There are also operational issues with the SCR systems, as it requires ammonia for control of NOx, which may slip along with stack emissions and may create another environmental hazard. Pilot studies are being carried for testing the efficacy of the SCR system in the country.

As an intermediate measure, the solution lies in Combustion Modification, which is the cost effective primary method for reduction of NOx. In the combustion modification, mainly the following modifications are required based on the type of boiler installed at the TPPs:

- a) For Wall fired boiler- Low NOx Burner, Air staging and flue gas recirculation.
- b) For Tangential/ corner fired Boiler- Modification in complete combustion system which includes coal nozzle, air Nozzle, wind box design, air staging and installation of additional Over Fire Air (OFA), Secondary Over Fire Air (SOFA) etc.

Further, the NOx emission levels varies based on the operating condition of the unit for example the composition of the coal, mill combination in operation ( i.e. top mill, Bottom mill, middle mill operation), unit load, excess air and burner tilt (0-30 deg) etc. All these factors decides the flame temperature and the NOx emissions may vary depending upon the above factors. Accordingly, after carrying out combustion modification, the norm of 600 mg/Nm<sup>3</sup> can be met easily.

As per the MoEF&CC notification, NOx norm of 300mg/Nm<sup>3</sup> / 100 mg/Nm<sup>3</sup> has to be met at all the times and all the operating conditions. Here it is important to mention the industry response to meet the NOx level of 300mg/Nm<sup>3</sup> by a way of Combustion

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Optimization. NTPC has issued NIT for its TPPs located in and around NCR for reduction of NOx by Combustion Modification method. During this bidding process, the bidders are not agreeing to guarantee to meet the norm of 300mg/Nm<sup>3</sup> after completion of Combustion Modification.

Earlier CEA vide its letter dated 08.08.2018 has recommended the relaxation of NOx limit of 300mg/Nm<sup>3</sup> and 100mg/Nm<sup>3</sup> to 600mg/Nm<sup>3</sup> considering the issues discussed above. However, as per the discussions held with BHEL, BHEL has assured that the power generating companies would be able to achieve NOx emission levels of 450 mg/Nm<sup>3</sup> after completion of Combustion Modification process in the units. However, this is subject to space availability in the boilers to install the requisite equipment's for combustion modification and stable operating conditions above technical minimum load of the unit.

This issues with the approval of Chairperson, CEA.

*Narender Singh*  
(Narender Singh)  
Chief Engineer

Joint Secretary (Thermal), Ministry of Power  
No. CEA/Th/TPE&CC/ENV/50/2018/179, 180

Date: 16.8.2018

Copy: CE (TPRM), CEA





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Thermal Performance Evaluation & Climate Change Division

**Subject: Environmental norms for NOx emissions from Thermal Power Plants - reg.**

This has reference to CPCB report sent by MoEF&CC vide F. No. Q-15Q17/40/2007-CPW dated 15.5.2019 regarding NOx emission monitoring results carried out jointly by CPCB & CEA. The joint monitoring was carried out at the units which were installed between 1.1.2004 & 31.12.2018 and having primary control measures (low NOx burners & over fire air dampers) by design to control the NOx emissions. These units are required to meet the NOx emission norm of 300 mg/Nm<sup>3</sup>.

The report has been examined at CEA and it is found that the NOx emissions vary widely at different load conditions of a unit. Towards full load conditions the units are seen meeting the norm of 300 mg/Nm<sup>3</sup> whereas at the part load the NOx emissions in the units are on higher side (above 450 mg/Nm<sup>3</sup>) and well above the prescribed norm of 300 mg/Nm<sup>3</sup>. This trend has been confirmed at Nabha Power Ltd., Rajpura where NOx testing/ monitoring could be conducted both at half load and at full load of the unit.

In view of the above, the matter may be taken up with MoEF&CC for changing the NOx norm of 300 mg/Nm<sup>3</sup> to at least 450 mg/Nm<sup>3</sup> which could be met by the units by primary control measures by carrying out combustion modification.

  
(B S Rajput)  
AGM

A K Deyeshwar, Section Officer, Ministry of Power

No. CE/Th/TPE&CC/ENV/50/2019/ 156

Date: 23.5.2019







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Thermal Performance Evaluation & Climate Change Division

**Subject: Environmental norms for NOx emissions from Thermal Power Plants - reg.**

This has reference to your email dated 6.6.2019 on new environmental norms for NOx emissions from TPPs. In this regard in continuation to our letter No. CEA/Th/TPE&CC/ENV/50/2019/156 dated 23.5.2019, it is to mention that CEA vide email dated 17.5.2019 (copy enclosed) had sent its comments to MoEF&CC & CPCB with a copy to MoP on CPCB report on joint sampling/ monitoring by CEA & CPCB of NOx emissions from TPPs which have primary control measures of NOx control by design.

Further, as already mentioned in the letter dated 23.5.2019, CEA has examined the CPCB report and it is found that the NOx emissions vary widely at different load conditions of a unit. Towards full load conditions the units are seen meeting the norm of 300 mg/Nm<sup>3</sup> whereas at the part load the NOx emissions in the units are on higher side (above 450 mg/Nm<sup>3</sup>) and well above the prescribed norm of 300 mg/Nm<sup>3</sup>. This trend has been confirmed at Nabha Power Ltd., Rajpura where NOx testing/ monitoring could be conducted both at half load and at full load of the unit.

In view of the above, it is again requested to take up the matter suitably with MoEF&CC for changing the NOx norm of 300 mg/Nm<sup>3</sup> to at least 450 mg/Nm<sup>3</sup> which could be met by the units by primary control measures by carrying out combustion modification.

*Bret*  
6/6/19  
(B S Rajput)

AGM

A K Deveshwar, Under Secretary to Govt, Ministry of Power

No. CEA/Th/TPE&CC/ENV/50/2019/162

Date: 6.6.2019

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## Central Electricity Authority

### TPE&CC Division

17.5.2019

#### Comments on Joint sampling and monitoring report on NO<sub>x</sub> by CPCB:

##### General Comments:

1. CPCB has mentioned average load for the units under test. However, instantaneous load is relevant at the time of sampling.
2. At all the stations CEMS data is not calibrated to 6% O<sub>2</sub>.
3. Use of multiplication factor in CEMS for conversion from ppm to mg/Nm<sup>3</sup>. Stations are using different factors for conversion.
4. Analyser readings taken during sampling at the stations (except Kawai TPS) may also be incorporated in the report.
5. Station wise comments are as below:

S.No.	Station	CPCB Report	Comments
1	Kawai TPS (Adani Power) 2 x 660 MW	Mentions avg. load of 660 MW & 635 MW for the unit nos. 1 & 2 respectively.	The instantaneous load of the units during sampling was 484 (73%) MW & 451 (68%) MW only. This was also discussed in a meeting held at ASG office.
		For U#2 date of monitoring is mentioned as 13.2.2019	Samples of both the units were taken on 16.2.2019.
		During 1000 to 1800 Hrs U#1 CEMS data 278-658 U#2 CEMS data 217-388	During 1000 to 1715 Hrs U#1 CEMS data 330-559 U#2 CEMS data 353-494 (Provided by station)
			Instantaneous CEMS values corrected to 6% O <sub>2</sub> are 448 & 490 mg/Nm <sup>3</sup> . CPCB results are 509 & 584
2	Mauda TPS (NTPC) 2 x 660 MW	Mentions avg. load (two and half hour) of 460.6 MW & 441 MW for the unit nos. 3 & 4 respectively.	The instantaneous load of the units during sampling was 387 MW (59%) & 414 MW (63%) only.
		For U#4 date of monitoring is mentioned as 28.2.2019	Samples of both the units were taken on 27.2.2019.
		CEMS data is mentioned in range for a period of 1100 to 1330 and 1200 to 1430 Hrs.	Samples were taken at 1245 Hrs for U#4 and at 1345 Hrs for U#3.
		Does not mention analyser readings.	The analyser readings corrected to 6% O <sub>2</sub> are 551 and 482 mg/Nm <sup>3</sup> for U#3 & U#4

# Central Electricity Authority

## TPE&CC Division

17.5.2019

### Comments on Joint sampling and monitoring report on NOx by CPCB:

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		For U#4 date of monitoring is mentioned as 28.2.2019	Samples of both the units were taken on 27.2.2019.
		CEMS data is mentioned in range for a period of 1100 to 1330 and 1200 to 1430 Hrs.	Samples were taken at 1245 Hrs for U#4 and at 1345 Hrs for U#3.
		Does not mention analyser readings.	The analyser readings corrected to 6% O <sub>2</sub> are 551 and 482 mg/Nm <sup>3</sup> for U#3 & U#4

			respectively. CEMS readings were 411 & 466 mg/Nm <sup>3</sup> after applying 6% O <sub>2</sub> correction.
		Timing of the samples	Error in quoting the sample and its timings. Needs to be interchanged for the Units.
3	CLP, Jhajjar 2 x 660 MW	Report mentions testing on 18.3.19 and 19.3.19 for both Units.	Joint sampling was done for U#1 only on 19.3.2019.
		Mentions average load of 401-405 MW for U#1 on 19.3.2019.	The instantaneous load of the unit during sampling was 580 MW which is 88% of full load.
		Out of four samples readings of two samples is 71.1 & 93.7 mg/Nm <sup>3</sup>	There seems to be error in these samples as these results are very low and needs to be discarded.
			CPCB readings (197, 259), CEMS (269) & CPCB analyser (259) all are below 300 at full load. Readings in mg/Nm <sup>3</sup> .
4	Nabha Power Ltd. 2 x 700 MW	Out of four samples reading of one sample is 92.8 mg/Nm <sup>3</sup>	There seems to be error in this sample as the results are very low and needs to be discarded.
		Avg. CEMS NO <sub>x</sub> concentration at half load from 0800 to 0900 hrs. 203-207	Half load achieved at 0840 Hrs and testing continued till 0905 Hrs. The avg CEMS NO <sub>x</sub> for 0840 to 0915 Hrs corrected to 6% O <sub>2</sub> works out to 584
		Avg. CEMS NO <sub>x</sub> concentration at full load from 1100 to 1200 hrs. 203-207	Full load achieved at 1150 Hrs and testing continued till 1210 Hrs. The avg CEMS NO <sub>x</sub> for this period corrected to 6% O <sub>2</sub> works out to 287. Corresponding CPCB analyser readings were 624 and 304 mg/Nm <sup>3</sup> at half load and full load respectively.

6. Out of nine readings of joint sampling only five are found to be meeting the NO<sub>x</sub> norm of 300 mg/Nm<sup>3</sup>. Further, there is a co-relation between the NO<sub>x</sub> values and Unit load. Towards full load the units are meeting the norm and whereas at part load the NO<sub>x</sub> emissions in the units are on higher side and well above the prescribed norm of 300 mg/Nm<sup>3</sup>.

अजय भल्ला  
सचिव  
भारत सरकार  
AJAY BHALLA  
Secretary  
Government of India



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D.O No. 10/1/2018-St. Th

August 16, 2018

Dear Sir,

Please refer to the MoEF&CC's Notification dated 07.12.2015 regarding new environment norms for coal based Thermal Power Plants. The norms for NOx emission, are as follows:

TPPs (units) installed before 31.12.2003	TPPs (units) installed after 31.12.2003 and up to 31.12.2016	TPPs (units) to be installed from 1.1.2017
600 mg/Nm <sup>3</sup>	300 mg/Nm <sup>3</sup>	100 mg/Nm <sup>3</sup>

2. This issue has been examined in the Ministry and extensive deliberations have been held with stakeholders including NTPC.
3. In this regard, CEA vide letter dated 16.08.2018 (copy enclosed) has clarified that as per the discussions held with BHEL, BHEL has assured that the power generating companies would be able to achieve NOx emission levels of 450 mg/Nm<sup>3</sup> after completion of Combustion Modification process in the units. However, this is subject to space availability in the boilers to install the requisite equipment's for combustion modification and stable operating conditions above technical minimum load of the unit.
4. Detailed justification are as under:
  - i. The NOx emission levels varies based on the operating condition of the unit for example the type of the coal, mill combination in operation ( i.e. top mill, Bottom mill, middle mill operation), unit load, excess air and burner tilt (0-30 deg) etc. All these factors decide the flame temperature. Accordingly, after carrying out combustion modification, NOx emissions may vary and can safely be assumed to be within the range of 600mg/Nm<sup>3</sup>. However, as per the MoEF&CC notification NOx norm of 300mg/Nm<sup>3</sup> has to be met at all the times and all the operating conditions. Therefore, CEA had earlier advised that norm of 600 mg/Nm<sup>3</sup> can be met by combustion optimization/combustion modification. The norm of 300 mg/Nm<sup>3</sup> is difficult to achieve by combustion modification alone.
  - ii. To meet the norm of NOx of 100 mg/Nm<sup>3</sup> the thermal plants require installation of new/ retrofit of post combustion De-NOx system. This norm can be achieved only by the use of Selective Catalytic Reduction (SCR) technology in a TPP. The globally available SCR system for NOx control are not proven for Indian

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coal having high ash contents. Moreover, there are complex layout issues for installation of SCR system in the existing units. There are also operational issues with the SCR systems, as it requires ammonia for control of NO<sub>x</sub>, which may slip along with stack emissions and may create another environmental hazard. Pilot studies are being carried out for testing the efficacy of the SCR system in the country.

- iii. The matter was also discussed in the office of Learned ASG on 30.07.2018, in compliance of the Hon'ble Supreme Court directions in WP(C) No. 13029 of 1985. In the meeting, it was also discussed that some data has been received from power plants in MoEF&CC regarding the achievement of NO<sub>x</sub> emissions below 300 mg/Nm<sup>3</sup>. In this regard, CEA informed that there could be some error in data collection/measurements/ reporting, as these levels are not technically achievable without SCR/SCNR systems.
- iv. As an intermediate measure, the solution lies in Combustion Modification, which is the cost effective primary method for reduction of NO<sub>x</sub>. In the combustion modification, mainly the following modifications are required based on the type of boiler installed at the TPPs:
  1. **For Wall fired boiler-** Low NO<sub>x</sub> Burner, Air staging and flue gas recirculation.
  2. **For Tangential/ corner fired Boiler-** Modification in complete combustion system which includes coal nozzle, air Nozzle, wind box design, air staging and installation of additional Over Fire Air (OFA), Secondary Over Fire Air (SOFA) etc.
- v. Here it is important to mention the industry response to meet the NO<sub>x</sub> level of 300mg/Nm<sup>3</sup> by a way of Combustion Optimization. NTPC has issued NIT for its TPPs located in and around NCR for reduction of NO<sub>x</sub> by Combustion Modification method. During this bidding process the bidders are not agreeing to guarantee to meet the norm of 300mg/Nm<sup>3</sup> after completion of Combustion Modification.
- vi. Regarding completion of works related to combustion modification during annual maintenance shutdown of the unit for reduction of NO<sub>x</sub> emissions. In this regard it is submitted that the shut down time required for Combustion Modification i.e. Low NO<sub>x</sub> burner/ system and installation of OFA/SOFA dampers will be 60 days (minimum). Generally annual maintenance shutdown activities of a unit are over in a timeframe of about 10-15 days. Major overhaul/maintenance of a unit is generally carried out once in two years' time and the shut down time required for this major overhaul is around 35-45 days. Combustion Modification work can be planned during major overhaul of a unit but it will require additional shutdown time of about 15-25 days. Major overhaul is a planned activity carried out by Regional Power Committees (RPCs) in co-ordination with the generators, transmission licensees and distribution licensees keeping in view the Load Generation balance of the country. The

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coal having high ash contents. Moreover, there are complex layout issues for installation of SCR system in the existing units. There are also operational issues with the SCR systems, as it requires ammonia for control of NO<sub>x</sub>, which may slip along with stack emissions and may create another environmental hazard. Pilot studies are being carried out for testing the efficacy of the SCR system in the country.

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- iv. As an intermediate measure, the solution lies in Combustion Modification, which is the cost effective primary method for reduction of NO<sub>x</sub>. In the combustion modification, mainly the following modifications are required based on the type of boiler installed at the TPPs:
  1. For Wall fired boiler- Low NO<sub>x</sub> Burner, Air staging and flue gas recirculation.
  2. For Tangential/ corner fired Boiler- Modification in complete combustion system which includes coal nozzle, air Nozzle, wind box design, air staging and installation of additional Over Fire Air (OFA), Secondary Over Fire Air (SOFA) etc.
- v. Here it is important to mention the industry response to meet the NO<sub>x</sub> level of 300mg/Nm<sup>3</sup> by a way of Combustion Optimization. NTPC has issued NIT for its TPPs located in and around NCR for reduction of NO<sub>x</sub> by Combustion Modification method. During this bidding process the bidders are not agreeing to guarantee to meet the norm of 300mg/Nm<sup>3</sup> after completion of Combustion Modification.
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same has to be planned by the RPCs, as it will entail additional shutdown time of at least 15 days along with major overhaul. As many units cannot be given shutdown simultaneously, implementation of combustion modification in all the units has to be done in a phased manner and it is expected to be completed by December 2022.

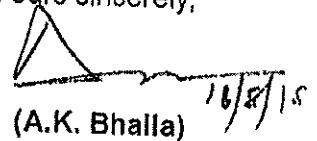
5. In view of the above and especially since there is no proven technology to achieve these 300/100 mg/Nm<sup>3</sup> norms, I would like to request you to look into the matter and to consider the request for changing the norm of 300 mg/Nm<sup>3</sup> and 100 mg/Nm<sup>3</sup> for TPPs (units) installed after 31.12.2003 to 450 mg/Nm<sup>3</sup> which is practically achievable with the Combustion Modification in the plant.

With regards,

Enclosed: as stated

Shri C.K Mishra,  
Secretary,  
Ministry of Environment, Forest & Climate Change,  
Indira Paryavaran Bhawan,  
Jor Bagh Road,  
New Delhi

Yours sincerely,

  
(A.K. Bhalla) 16/8/15



CHAIRMAN OFFICE  
C. P. C. B.  
No. 94004  
Date 21/12

(233)

No. 15017/40/2007CPW  
GOVERNMENT OF INDIA

MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE  
(CP DIVISION)

\*\*\*\*\*

94004/mj  
21/12

Indira Paryavaran Bhawan  
Level-II, Agni Wing, Jorbagh Road  
New Delhi-110003

MR  
IPCT-II  
21/12/18  
4/12/18  
LALU

Dated: 18<sup>th</sup> December, 2018

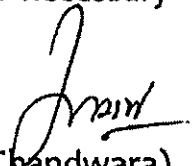
4/12/18  
SD-SECP

OFFICE MEMORANDUM

**Subject:** Record of Discussions of the meeting regarding environmental norms for NOx: coal based Thermal Power Plants held on 30/10/2018 at Indira Paryavaran Bhawan, MoEF&CC, New Delhi.

Please find herewith a copy of minutes of the meeting held on 30/10/2018 under the Chairmanship of Secretary, Ministry of Environment, Forest and Climate Change on the mentioned subject, for your perusal and necessary action.

Encl: as above

  
(MR Chandwara)  
Section Officer

1. ✓ The Chairman, Central Pollution Control Board, Parivesh Bhawan, East Arjun Nagar, Delhi-110032
2. Shri S.P. Siwal, Member, Central Electricity Authority (CEA), Sewa Bhawan, R. K. Puram, Sector-1, New Delhi – 110066
3. The Joint Secretary (Thermal Power), Ministry of Power, Shram Shakti Bhavan, Rafi Marg, New Delhi – 1100012
4. Chairman & Managing Director, NTPC Limited, NTPC Bhawan, Scope Complex, 7, Institutional Area, Lodhi Road, New Delhi-110003

Copy to:

PPS to Secretary, (EF&CC)  
PPS to AS (AKM)  
PPS to ASV)

931004/DS  
20/12/18

(390)

**Record of discussion of the Meeting regarding environmental norms for NOx: coal based Thermal Power Plants on 30<sup>th</sup> October, 2018 at Indra Paryavaran Bhawan, MoEF&CC, New Delhi.**

A Meeting was held under the Chairmanship of Shri C.K Mishra, MoEF&CC regarding environmental norms of NOx for coal based Thermal Power Plants, on 30<sup>th</sup> October, 2018 at Indra Paryavaran Bhawan, MoEF&CC, New Delhi. The list of participants is Annexed A.

2. At the outset, the Chairman welcomed the Officers of Ministry of Power (MoP), CEA, CPCB and NTPC. He requested MoP to indicate their stand regarding compliance to meeting environmental norms for NOx by coal based Thermal Power Plants.

3. The official from the NTPC made a detailed presentation and informed the status of the Pilot Plants that are being established at eight locations across the country. These pilot plants are yet to be completed. In the presentation NTPC indicated the technical difficulties by the TPP to achieve the prescribed NOx standard. Hence, MoP requested to consider revising the norms of 300 mg/Nm<sup>3</sup> and 100 mg/Nm<sup>3</sup> for TPPs (units) installed after 31.12.2003 to 450 mg/Nm<sup>3</sup> which is practically achievable with the combustion Modification in the plant. Copy of this request annexed at Annexure B.

4. After detailed discussions, it was decided that the Ministry of Power will make an assessment report and formulate a strategy that shall be submitted to MoEF&CC / CPCB for consideration. Based on the report a decision will be taken with regard to the NOx standards.

5. The meeting ended with vote of thanks to the Chair.

\*\*\*\*\*

**Annexure**

**Meeting for Environmental norms for NOx: coal based Thermal Power Plants (TTPs) under the Chairmanship of Shri C.K. Mishra, Secretary, EF&CC on 30/10/2018.**

<b>Sl. No.</b>	<b>Name</b>	<b>Designation &amp; Address</b>
1.	Shri C.K. Mishra,	Secretary, MoEF&CC
2.	Dr. A.K. Mehta	Additional Secretary, MoEF&CC
3.	Dr. S.P. Singh Parihar	Chairman, CPCB
4.	Shri P.D. Siwal	Member, CEA
5.	Smt. Archana Agarwal	Joint Secretary, MoP
6.	Shri Narendra Singh	Chief Engineer, CEA
7.	Shri B.S. Rajput	CEA
8.	Shri Pawan Ku. Kalarwal	Director, MoP
9.	Dr. Nazimuddin	Scientist 'E', CPCB
10.	Shri S.K. Paliwal	Scientist 'D', CPCB
11.	Shri Gurdeep Singh	CMD, NTPC
12.	Shri P.K. Mahapatra	NTPC
13.	Shri M. Anand	GM, NTPC
14.	Shri Mohit Bhargava	GM, NTPC
15.	Shri Udayan Kumar	AGM, NTPC
16.	Shri Pankaj Kr Gupta	AGM, NTPC
17.	Dr. H. Kharkwal	Scientist 'D', MoEF&CC

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**Minutes of the Meeting regarding Environmental Norms of NO<sub>x</sub> for Coal based Thermal Power Plants on 17<sup>th</sup> May, 2019 at Indira Paryavaran Bhawan, MoEF&CC, New Delhi.**

A Meeting was held under the Chairmanship of Shri Ritesh Kumar Singh, Joint Secretary, MoEF&CC regarding Environmental Norms of NO<sub>x</sub> for Coal based Thermal Power Plants on 17<sup>th</sup> May, 2019 at Indira Paryavaran Bhawan, MoEF&CC, New Delhi. The list of participants is Annexed A.

2. At the outset, the Chairman welcomed the Officers of Ministry of Power (MoP), CEA, CPCB and NTPC. The Chairman intimated that the CPCB joint monitoring report has been received and requested to CPCB, MoP / NTPC to brief about report and implementation of Environmental Norms for NO<sub>x</sub> by Coal based Thermal Power Plants as per notification dated 07/12/2015.
3. The Officers from the MoP / NTPC made a detailed brief and intimated that an Affidavit was filed by CEA on 20/8/2018 with respect to NO<sub>x</sub>, enclosing MoP Letter dated 16/08/18 requesting for changing norm of 300 mg/Nm<sup>3</sup> and 100 mg/Nm<sup>3</sup> for TPP (units) installed after 31/12/2003 to 450 mg/Nm<sup>3</sup> which is practically achievable with the Combustion Modification. In this regards a Meeting was held under the Chairmanship of Secretary, MoEF&CC on 30/10/18 and decided that MoP will make assessment report and formulate a strategy on NO<sub>x</sub>. Further, during the briefing to ASG in the matter M.C Mehta Vs UOI & Ors which is pending before Hon'ble Supreme Court of India for implementation of TPP Environmental Standard it was decided that to assess NO<sub>x</sub> emissions joint sampling with CEA & CPCB may be carried out at TPPs having Combustion Modification by design and CPCB shall submit Report to MoEF&CC.
4. The Officer of CPCB intimated that the joint monitoring was carried out in 7 units of 4 Thermal Power Plants by joint team of CPCB and CEA during the period of 13/02/2019 to 02/04/2019. Out of 07 monitored units only 05 units were found complying with the NO<sub>x</sub> emission standards of 300 mg/Nm<sup>3</sup> at full load only, however some units are not complying during the partial load operation to the Plants established between 01/01/2004 and 31/12/2016 even after combustion modification. The copy of report is at Annexure 'B'.
5. The Committee discussed: i) the report submitted by CPCB and CEA the joint monitoring was carried out in 7 units of 4 Thermal Power Plant ii) difficult to achieve by combustion modification along to achieve norms of 300 mg/Nm<sup>3</sup> iii) assurance given to Power generating companies by BHEL would be able to achieve NO<sub>x</sub> emission level of 450 mg/Nm<sup>3</sup> by combustion modification iv) operational issues with the Selected Non-Catalytic Reduction (SNCR) as it require Urea/Ammonia for control of NO<sub>x</sub> and its suitability all type of boiler, temperature band v) globally available SCR system for NO<sub>x</sub> control are not proven for Indian Coal having high ash contained and retrofitting is not possible in operating/under construction plants vi) No<sub>x</sub> emission level varies based on the operational conditions of the unit for example unit load, composition of the coal, mill combination ( i.e top mill, bottom mill, middle mill operation), excess air etc.
6. After detailed discussion, it was agreed in principle to revise the NO<sub>x</sub> norms from 300 mg/Nm<sup>3</sup> to 450 mg/Nm<sup>3</sup> for Thermal Power Plants installed between 01/01/2004 to 31/12/2016 and same will be presented for a final decision to Secretary MoEF&CC and Secretary MoP.
7. The meeting ended with vote of thanks to the Chair.

\*\*\*\*\*

**Annexure - A**

**List of the Participants attended the meeting of Environmental Standard for NOx: Coal-based Thermal Power Plants under the Chairmanship of Shri Ritesh Kumar Singh, Joint Secretary, CP Division, MoEF&CC on 17<sup>th</sup> May, 2019.**

S. No.	Name	Designation
1.	Shri Ritesh Kumar Singh	Chairman, Joint Secretary, MoEF&CC
2.	Shri Vivek Kumar Dewangan	Joint Secretary, MoP
3.	Shri Pawan Kumar Kalarwal	Director, MoP
4.	Shri Rajeev Kumar	Director, CEA
5.	Shri S. K. Paliwal	Scientist 'D', CPCB
6.	Shri P.K.Mahapatra	Director (Technical), NTPC
7.	Shri Udayan Kumar	NTPC
8.	Shri Pankaj Kr Gupta	NTPC
9.	Shri A. K. Srivastava	NTPC
10.	Shri B. S. Rajput	NTPC
11.	Dr. H. Kharkwal	Convenor, Scientist 'E' MoEF&CC

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6-

केन्द्रीय प्रदूषण नियंत्रण बोर्ड / Annexure  
CENTRAL POLLUTION CONTROL BOARD  
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार  
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE GOVT. OF INDIA

B-33014/7/2019/IPC-II/TPP/ 301

May 02, 2019

To

Dr. H. Kharkwal, Scientist 'D'  
Ministry of Environment, Forests & Climate Change  
2nd Floor, Prithvi Wing,  
Indira Paryavaran Bhawan  
Jor Bagh Road, Aliganj,  
New Delhi - 110 003

Sub: NOx emission norms for Thermal Power Plants - reg.

Sir,

Please refer to your Letter No. Q-15017/40/2007-CPW dated 30.04.2019 seeking NOx emission monitoring results/ report of joint monitoring carried out by CPCB and CEA. The results of monitoring carried out by joint team is enclosed herewith for your information and necessary action.

Encl: as above

Yours faithfully,

[Nazimuddin]  
Divisional Head-IPC-II

### Summary of NOx Emission Monitoring Results

NOx emission monitoring has carried out in 7 units of 4 Thermal Power Plants by joint team of CPCB and CEA during the period of 13.02.2019 to 02.04.2019. The results of emission monitoring are enclosed at Annexure - I - IV. The brief analysis of NOx emission monitoring carried out by joint team is as follows:

1. Adani Power Rajasthan Limited, Kawai, Distt. Baran (Rajasthan):

Both units of Adani Power Rajasthan Limited, Kawai were running on approximately full load (Unit - 1: 660 MW, Unit - 2: 635 MW) and the NOx emission values from Units - 1 & 2 were found to be 509 mg/Nm<sup>3</sup> and 584 mg/Nm<sup>3</sup>. *Both units were found exceeding the prescribed NOx emission limit i.e. 300 mg/Nm<sup>3</sup>.*

2. NTPC Mouda Super TPS, Mouda, Dist-Nagpur, Maharashtra:

Units - 3 & 4 of NTPC Mouda Super TPS, Mouda were running on 88 - 92 % load (Unit - 3: 460.6 MW, Unit - 4: 441.0 MW) and the NOx emission values from Units - 1 & 2 were found to be 202.6 mg/Nm<sup>3</sup> and 178.95 mg/Nm<sup>3</sup>. *Both units were found complying with the prescribed NOx emission limit i.e. 300 mg/Nm<sup>3</sup>.*

3. Mahatma Gandhi TPS, CLP, Dist-Jhajjar, Haryana:

Unit - 1 of Mahatma Gandhi TPS, CLP was running on 60 - 68 % load (401 - 449 MW). 6 Nos. of samples were drawn from Unit - 1 and the NOx emission values were found to be 71 mg/Nm<sup>3</sup> to 286.7 mg/Nm<sup>3</sup>. Unit - 2 was running on 31% & 42% load and 02 Nos. of samples were drawn for Unit - 2 and NOx emission values were found to be 320.5 mg/Nm<sup>3</sup> and 227.8 mg/Nm<sup>3</sup>.

4. Nabha Power Limited, Rajpura, Punjab:

Total 04 Nos. of samples were drawn from Unit - 1 of Nabha Power Limited, Rajpura. 02 samples were drawn at 50% operating load of unit and 02 samples were drawn at full load operation. The NOx emission values at 50% operating load (522.7 mg/Nm<sup>3</sup> and 559.4 mg/Nm<sup>3</sup>) were found to exceeding the prescribed limit. However, at full load operation the NOx emission values were found 92.8 mg/Nm<sup>3</sup> and 282.3 mg/Nm<sup>3</sup> i.e. complying with NOx emission limit of 300 mg/Nm<sup>3</sup>.

Conclusion:

05 out of 07 monitored units have been found complying with the NOx emission standards of 300 mg/Nm<sup>3</sup> applicable to the Plants established between 01.01.2004 and 31.12.2016.





**Central Pollution Control Board  
Regional Directorate (Central),  
Bhopal**

**1. M/s Adani Power Rajasthan Limited, Kawai, Distt. Baran (Rajasthan)**

**Manual Monitoring Data:**

Sl. No.	Location	Date of Monitoring	Avg. Load (MW)	NOx Concentration (mg/Nm <sup>3</sup> )	Measured O <sub>2</sub> concentration (%)	NOx conc. after O <sub>2</sub> correction at 6% (mg/Nm <sup>3</sup> )
1	Unit-I	16.02.2019	660/660	483.64	6.74	509
2	Unit-II	13.02.2019	635/660	585.64	5.95	584

All values are in mg/Nm<sup>3</sup>

**Online Monitoring Data from CEMS:**

Sl. No.	Location	Date of Monitoring	Time Duration	NOx Concentration (mg/Nm <sup>3</sup> )
1	Unit-I	16.02.2019	10:00 - 18:00	278 - 658
2	Unit-II	13.02.2019	10:00 - 18:00	217 - 388



**Central Pollution Control Board  
Regional Directorate (West),  
Vadodara**

M/s NTPC Mouda Super TPS, Mouda, Dist-Nagpur, Maharashtra

Manual Monitoring Data:

Sl. No.	Location	Date of Monitoring	Avg. Load (MW)	NOx Concentration (mg/Nm <sup>3</sup> )	Measured O <sub>2</sub> concentration (%)	NOx conc. after O <sub>2</sub> correction at 6% (mg/Nm <sup>3</sup> )
1	Unit-III	28.02.2019 (11:00 - 13:30)	460.6/500	178.35	7.8	202.60
2	Unit-IV	27.02.2019 (12:00 - 14:30)	441.0/500	168.20	6.9	178.95

All values are in mg/Nm<sup>3</sup>

Online Monitoring Data from CEMS:

Sl. No.	Location	Date of Monitoring	Time Duration	NOx Concentration (mg/Nm <sup>3</sup> )
1	Unit-III	28.02.2019	11:00 - 13:30	292 - 365
2	Unit-IV	27.02.2019	12:00 - 14:30	363 - 498



**Central Pollution Control Board  
Head Office, Delhi**

M/s Mahatma Gandhi TPS, CLP, Dist-Jhajjar, Haryana

Manual Monitoring Data:

Sl. No.	Location	Date of Monitoring	Avg. Load (MW)	NOx Concentration (mg/Nm <sup>3</sup> )	Measured O <sub>2</sub> concentration (%)	NOx conc. after O <sub>2</sub> correction at 6% (mg/Nm <sup>3</sup> )
1	Unit-I	18.03.2019	404.5/660	229.1	7.7	258.6
2	Unit-I	18.03.2019	448.9/660	82.8	7.7	93.7
3	Unit-I	19.03.2019	401/660	63.0	7.7	71.1
4	Unit-I	19.03.2019	405/660	157.2	9.0	196.8
5	Unit-I	19.03.2019	401/660	145.3	9.11	183.6
6	Unit-I	19.03.2019	405/660	226.9	9.11	286.7
7	Unit-II	18.03.2019	280/660	141.9	11.62	227.8
8	Unit-II	18.03.2019	207/660	199.6	11.62	320.5

All values are in mg/Nm<sup>3</sup>

Online Monitoring Data from CEMS:

Sl. No.	Location	Date of Monitoring	Time Duration	NOx Concentration (mg/Nm <sup>3</sup> )
1	Unit-I	18.03.2019	14:00 - 18:00	188 - 226
2	Unit-I	19.03.2019	14:00 - 18:00	196 - 370
3	Unit-II	18.03.2019	14:00 - 18:00	172 - 294

11-



**Central Pollution Control Board  
Head Office, Delhi**

M/s Nabha Power Limited, Raipura, Punjab

Manual Monitoring Data:

Sl. No.	Location	Date of Monitoring	Avg. Load (MW)	NOx Concentration (mg/Nm <sup>3</sup> )	Measured O <sub>2</sub> concentration (%)	NOx conc. after O <sub>2</sub> correction at 6% (mg/Nm <sup>3</sup> )
1	Unit-I	02.04.2019 (08:35 AM)	350/700	461.03	8.62	559.4
2	Unit-I	02.04.2019 (08:35 AM)	350/700	430.8	8.62	522.7
3	Unit-I	02.04.2019 (11:45 AM)	700/700	99.7	4.90	92.8
4	Unit-I	02.04.2019 (11:45 AM)	700/700	303.1	4.90	282.3

All values are in mg/Nm<sup>3</sup>

Online Monitoring Data from CEMS:

Sl. No.	Location	Date of Monitoring	Time Duration	NOx Concentration (mg/Nm <sup>3</sup> )
1	Unit-I	02.04.2019	08:00 - 09:00	203 - 207
2	Unit-I	02.04.2019	11:00 - 12:00	197 - 205