

BEFORE THE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI
Original Application No. 256 of 2020 (SZ)

REPORT OF THE JOINT COMMITTEE
IN COMPLIANCE OF THE HON'BLE NGT ORDER DATED 15.12.2020

Date : 11-11-2021

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REPORT OF THE JOINT COMMITTEE IN COMPLIANCE OF THE HON'BLE NGT ORDER DATED 15.12.2020 IN THE MATTER OF ORIGINAL APPLICATION NO. 256 OF 2020 (SZ)

1. BACKGROUND

1.1 Hon'ble NGT Order dated 15-12-2020

The Hon'ble NGT, Southern Bench in the matter of Tribunal on its own motion-suo motu based on the news item in News Desk Magazine dated 11.11.2020, Air Pollution and Industries, "These Six Industries in North Chennai are polluting the air for more than half the year" Vs Union of India & Ors, OA No. 256 of 2020 (SZ) vide order dated 15-12-2020 has constituted a Joint Committee to inspect the unit in question and submit a factual and action taken report, if there is any violation is found. The directions of NGT are reproduced below:

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| <p><i>"8. In order to ascertain the real state of affairs and also the genuineness of the allegations in the news paper report and also to take the remedial measures if such things are happening, we feel it appropriate to appoint a joint committee comprising of 1) a Senior Officer from Ministry of Environment, Forests and Climate Change (MoEF & CC), Regional Office, Chennai, (2) a Senior Scientist from Central Pollution Control Board (CPCB), Regional Office, Chennai (3), a Senior Officer from the Tamil Nadu State Pollution Control Board as designated by its Chairman, (4) a Professor from Anna University of Environmental Engineering, Guindy, Chennai who is dealing with the Environmental related issues to inspect the area in question and submit a factual as well as action taken report, if there is any violation found".</i></p> |
| <p><i>"9. The Ministry of Environment, Forests and Climate change, (MoEF &CC), Regional Office, Chennai will be the nodal agency for co-ordination and for providing all necessary logistics for this purpose".</i></p> |
| <p><i>"10. The committee is directed to inspect the units in that area and ascertain as to whether the units are complying with the pollution norms and also complying with the conditions imposed while granting permission to establish such industries in that area by the Ministry of Environment, Forest and Climate Change (MoEF&CC), and State Environmental Impact Assessment Authority (SEIAA) as the case may be and the Tamil Nadu State Pollution Control Board (TNPCB) and if there is any violation, what is the action taken by the regulators, so as to make the erring industries to comply with the norms".</i></p> |
| <p><i>"11. They are also directed to assess the environmental compensation against the erring units as has been directed by the Principal Bench in several cases of this nature applying the guide line provided by the Central Pollution Control Board (CPCB)".</i></p> |
| <p><i>"12. They are also directed to conduct the Ambient Air Quality (AAQ) test, so as to ascertain the quality of air in that area and from the nature of pollutants available in the air trace out the sources of pollution and the persons responsible for the same and take</i></p> |

appropriate legal action against those persons in accordance with law and submit a factual as well as action taken report”.

“13. The committee is also directed to ascertain as to whether the necessary pollution control mechanism are in operation efficiently in these existing units in that industrial area and if there is any improvement required, for the purpose of abating the air pollution that is likely to be caused on account of their activities, then suggest and recommend the nature of improvement to be done by each industry considering the nature of pollutants being released by them in the air to avoid such things in future”.

“14. The committee is also directed to ascertain the environment carrying capacity of the area as to whether any more such industries can be accommodated in that area, considering the nature of pollution load created on account of existing units”.

2. JOINT COMMITTEE

The MoEF&CC, Integrated Regional Office (IRO), Chennai, as the nodal agency, requested all concerned authorities for the nomination of the officials for the Joint Committee and site inspection. As per the nominations received, the Joint Committee consists of the following members:

- 1 Shri M. Malayandi
Joint Chief Environmental Engineer (Monitoring)
Tamilnadu Pollution Control Board, Chennai-600 032
- 2 Professor Dr. S. Kanmani
Director Centre for Environmental Studies
Anna University, Chennai
- 3 Shri. R. Rajkumar
Scientist ‘D’
Regional Directorate, CPCB, Chennai.
- 4 Dr. R. Sridhar
Scientist ‘D’
Integrated Regional Office (IRO), MoEFCC, Chennai

3. JOINT INSPECTION OF THE COMMITTEE

The Joint Committee conducted the site inspections in all six industries [North Chennai Thermal Power Station (NCTPS) Stage 1, NTECL Vallur Power Plant, Chennai Petroleum Corporation Limited (CPCL), Tamil Nadu Petroproducts Limited (TPL), Manali Petrochemicals Limited (MPL) and Madras Fertilizers Limited (MFL)] on 28-29 January 2021 and 2-3 February 2021. The Committee also conducted an initial meeting with the representatives of all six

industries on 19th Jan 2021 and discussed about Committee's plan of monitoring schedule and site inspection.

4. COMPLIANCE WITH THE POLLUTION NORMS AND ACTION TAKEN REPORT

It is submitted that TNPCB is conducting the stack monitoring and Ambient Air Quality survey within the unit premises to assess the emission level let out from the individual point source emission as well as to ascertain the Ambient Air Quality within the unit premises every year. The stack monitoring / Ambient Air Quality survey conducted by the TNPCB in the premises of the above said 6 industries (CPCL, TPL, MPL, MFL, NCTPS-Stage I and NTPC Ltd) reveals that the above units are complying with the emission norms in each point source and also satisfying the National Ambient Air Quality Standards prescribed by the CPCB Notification dated 18.11.2009.

Further it is submitted that the TNPCB is also monitoring the emission levels from the point sources of the industries round the clock through Online Continuous Emission Monitoring Sensors (OCEMS) provided and connected to Care Air Centre (CAC) of TNPCB by the industries.

It is submitted that as the industries M/s. CPCL, M/s.MFL, M/s.TPL (LAB Plant) and M/s.MFL have exceeded the stack emission levels prescribed by the TNPCB, during April 2019 to December 2020, as analysed the OCEMS data monitored through CAC of TNPCB, the TNPCB has assessed Environmental Compensation, for the above noted violation of emission norms, from those units.

Also, in due compliance with the direction of the Hon'ble National Green Tribunal (SZ), Chennai, the TNPCB has inspected the above said units and issued directions under section 33A of Water (Prevention &Control of Pollution) Act, 1974 as amended and under section 31A of Air (Prevention &Control of Pollution) Act, 1981 as amended to the respondent units for implementing the improvement measures.

The details of action taken by the respondent units for the directions issued by the TNPCB and remarks on the above by the TNPCB during the subsequent inspection are submitted in **Annexure-I**.

5. ENVIRONMENTAL COMPENSATION

It is respectfully submitted that the Environmental Compensation for the following industries, based on the Online Continuous Emission Monitoring System (OCEMS) data, monitored by TNPCB during April 2019 to December 2020, through Care Air Centre (CAC), TNPC Board Chennai, for the exceedance of stack emission levels prescribed by the Board, have been assessed by TNPCB and issued with show cause notice under Section 5 of Environment (Protection) Act, 1986 as amended as to why Environmental Compensation computed below as per the CPCB guidelines should not be imposed for the violation caused by the units as stated therein. The copies of the show cause notice issued by the TNPCB to the respondent units are attached as **Annexure-II**.

Sl.No	Name of the Industry	No of days of exceedance	Environmental Compensation assessed (in Rs)
1.	M/s. Chennai Petroleum Corporation Limited Refinery I, II and CPP	334	1,50,30,000/-
2.	M/s. Chennai Petroleum Corporation Limited Refinery III	418	1,88,10,000/-
3.	M/s. Chennai Petroleum Corporation Limited (Propylene Plant)	161	72,45,000/-
4.	M/s. Chennai Petroleum Corporation Limited (DHDS Plant)	121	54,45,000/-
5.	M/s. Chennai Petroleum Corporation Limited (Resid Upgradation Plant)	352	1,58,40,000/-
6.	M/s. North Chennai Thermal Power Station Stage I	273	1,22,85,000/-
7.	M/s. National Thermal Power Corporation Limited	124	55,80,000/-
8.	M/s Madras Fertilizers Limited, Manali	1	45,000/-
9.	M/s. Tamilnadu Petroproducts Limited (Lab Plant)	228	1,02,60,000/-

The above units are yet to remit the Environmental Compensation amount to the TNPCB.

6. POLLUTION CONTROL MECHANISM IN SIX INDUSTRIAL UNITS AND SUGGESTIONS FOR IMPROVEMENT

In order to ascertain as to whether the necessary pollution control mechanisms are in operation efficiently, the Joint Committee has conducted site inspection in all six industries and also conducted study on air pollution monitoring including source dispersion modelling for all six industries. The detailed monitoring reports are attached with the report and summary of the reports are given below:

6.1. The summary of the monitoring reports for all six industries:

6.1.1. North Chennai Thermal Power Station (NCTPS) Stage 1 (Annexure-III)

Ambient Air Quality: In Ambient Air Quality monitoring four sampling locations were identified to assess the GLC of point source emission of Gaseous and Particulate matter. The sampling locations are 33/11 KAV Substation, ECHS Control Room LCSS-, Feed Oil Pump House and Switch Yard. The values of SO₂, NO₂ and PM are within the standards.

Overall Conclusion on Source Dispersion Modelling: The source dispersion modelling output results showed the pollutants contribution from NCTPS Stage-1 to nearby villages are minimum and the environmental and health impacts are well below within the limit of National Ambient Air Quality standards and OSHA/ACGIH occupational exposure limit values. The NCTPS Stage-1 plant is surrounded by residential areas like 1.Ennore fish Market, 2.Attipattu pudu Nagar, 3.NTECL Township, 4.Athipet and 5.L&T Vinayaga Temple. From NCTPS Stage-1 to Ennore fish Market aerial distance is 3.24km, to Attipattupudu Nagar is 2.9km, to NTECL Township is 4.02km, to Athipet is 4.02km and to L&T Vinayaga Temple is 4.3km.

Particulate matter emissions: The cumulative particulate matter emissions from NCTPS Stage-1 through stacks is 2906mg/m³. The average ground level concentration achieves at a average distance of 2.22km and the concentration at that point is 114.85 µg/m³ which includes all the stacks at NCTPS Stage-1. It clearly indicates that the PM₁₀ contribution to the nearby communities is exceeding the ambient air quality standards and carrying capacity in this area is exceeding.

SO₂, and NO₂: The combined source mass emission load of SO₂, and NO₂ with the maximum ground level concentrations are not exceeding the NAAQ Standards and there is enough carrying capacity pertaining to this industry source emission load.

6.1.2. NTECL Vallur Power Plant, Chennai (Annexure-IV)

Ambient Air Quality monitoring: In Ambient Air Quality monitoring, eight sampling locations were identified to assess the GLC of point source emission of Gaseous and Particulate matter. The sampling locations are Kathivakkam (SE), NTPC Town Ship – STP Pant (NW),

Kondakarai Plant- Main Gate, NTECL Plant - Main Gate (N), Athipattu TNEB Camp, Ennore Cargo Container Terminal Pvt Ltd, NTECL STP PLANT- (CSSP-MCP) and Near Switch Yard. As per the observation, the values of SO₂, NO₂, PM₁₀, and PM_{2.5} are within the NAAQ Standards.

Results from AERMOD simulation indicated that PM, SO₂, NO₂ and CO emissions from the NTECL had no significant impact on nearby communities and Manali Industrial complex.

Overall combined source mass emission load: The overall combined source mass emission load of PM, SO₂, NO₂ and CO with the maximum ground level concentrations are not exceeding the NAAQ Standards and there is enough carrying capacity pertaining to this industry source emission load.

6.1.3. Chennai Petroleum Corporation Limited (CPCL) (Annexure-V)

Ambient Air Quality monitoring: In Ambient Air Quality monitoring, ten locations were identified as source of emission of Gaseous and Particulate matter. The sampling locations are, R & D, SRU, CPP, Temple, SS-5, ETP- 2, TTP, Polytanic, Isomer (Cabin) & Refinery 2 Maintenance Field Room. As per the observation, the values of SO₂, NO₂, PM₁₀, PM_{2.5}, Lead, Benzene and Nickel are within the NAAQ Standards.

Predicted concentrations were not exceeded the National ambient air quality standard for PM₁₀ and CO. Results from AERMOD simulation indicated that PM and CO emissions from the CPCL had no significant impact on nearby communities and Manali Industrial complex. But for the predicted concentrations of SO₂ and NO₂ which were exceeding the NAAQ Standards and the results from AERMOD simulation indicated that these emissions from the CPCL had significant impact on nearby communities and Manali Industrial complex.

Overall combined source mass emission load: The overall combined source mass emission load of SO₂ and NO₂ with the maximum ground level concentrations are exceeding the NAAQ Standards and carrying capacity for these two parameters is not further available in nearby communities and Manali industrial area pertaining to this industry source emission load.

6.1.4. Tamil Nadu Petroproducts Limited (TPL)- PO Division (Annexure-VI)

Ambient Air Quality Monitoring: In Ambient Air Quality monitoring seven sampling locations were identified to assess the GLC of point source emission of Gaseous and Particulate matter. The sampling locations are Near Main Gate 3, Near Fire Water Pump House, Near Ambient Air Station, Near Sub Station, Near PO Bullet South, Near Gate 4, Plant outside Main Gate (Road Side). As per the observation, the values of SO₂, NO₂, PM₁₀, and PM_{2.5} are within the NAAQ Standards.

PM₁₀ and PM_{2.5} are very high in the road side collected samples which is due to lot of heavy vehicle movement specifically container movement towards port. These dust emissions are further dispersed into ambient atmosphere. Whenever the wind direction is from NE, N to SW, S respectively, then the contribution of PM₁₀ and PM_{2.5} to industry is maximum and that dust concentration is not due to industrial emission and it is purely because of outside vehicular emissions. So, the outside vehicular emissions are one of the major contributory sources for PM₁₀ and PM_{2.5}.

Dispersion modelling output: The source dispersion modelling output results showed the pollutants contribution from TPL – PO Division to nearby villages are minimum and the environmental and health impacts are well below within the limit of NAAQ Standards and OSHA / ACGIH occupational exposure limit values. The TPL plant is surrounded by residential areas like 1.Burma Nagar, 2.Manali New Town, 3.Salai Ma Nagar, 4.Thanthai Periyar Nagar and 5.Balakrishna Nagar. From TPL to Burma Nagar aerial distance is 1.1km, to Manali New Town is 2.33km, to Salai Ma Nagar is 1.82km, to Thanthai Periyar Nagar is 2.54km and to Balakrishna Nagar is 1.2km.

Predicted concentrations were not exceeded the NAAQ Standards for PM₁₀ and CO. Results from AERMOD simulation indicated that PM and CO emissions from the TPL PO division had no significant impact on nearby communities and Manali Industrial complex. For Chlorine, there is no ambient air quality standard and the predicted concentrations also in trace level so that the impact on nearby communities and Manali Industrial complex is negligible.

Overall combined source mass emission load: The overall combined source mass emission load of PM and CO with the maximum ground level concentrations are not exceeding the national ambient air quality standards and there is enough carrying capacity pertaining to this industries source emission load. Since the industry is using gaseous fuel, so that the emissions from the combustion sources are very much less.

6.1.5. Tamil Nadu Petroproducts Limited (TPL) - HC Division (Annexure-VII)

Ambient Air Quality: Monitoring: In Ambient Air Quality monitoring six sampling locations were identified to assess the GLC of point source emission of Gaseous and Particulate matter. The sampling locations are Near Security Gate, Near Metro Water Storage Tank, Near CPP Radiator, Salt Yard South Side, Near Fabrication Yard, Ward Plant - West Side, Main Gate (Road Side). As per the observation, the values of SO₂, NO₂, PM₁₀, and PM_{2.5} are within the NAAQ Standards.

PM₁₀ and PM_{2.5} are very high in the road side collected samples which is due to lot of heavy vehicle movement specifically container movement towards port. These dust emissions are further dispersed into ambient atmosphere. Whenever the wind direction is from NE, N to

SW, S respectively, then the contribution of PM₁₀ and PM_{2.5} to industry is maximum and that dust concentration is not due to industrial emission and it is purely because of outside vehicular emissions. So, the outside vehicular emissions are one of the major contributory sources for PM₁₀ and PM_{2.5}.

Dispersion modelling output: The source dispersion modelling output results showed the pollutants contribution from TPL – HC Division to nearby villages are minimum and the environmental and health impacts are well below within the limit of NAAQ Standards and OSHA / ACGIH occupational exposure limit values. The TPL plant is surrounded by residential areas like 1.Burma Nagar, 2.Manali New Town, 3.Salai Ma Nagar, 4.Thanthai Periyar Nagar and 5.Balakrishna Nagar. From TPL to Burma Nagar aerial distance is 1.1km, to Manali New Town is 2.33km, to Salai Ma Nagar is 1.82km, to Thanthai Periyar Nagar is 2.54km and to Balakrishna Nagar is 1.2km.

Predicted concentrations were not exceeded the National ambient air quality standard for PM, SO₂ and NO₂. Results from AERMOD simulation indicated that PM, SO₂ and NO₂ emissions from the TPL HC division had no significant impact on nearby communities and Manali Industrial complex. For Chlorine, there is no ambient air quality standard and the predicted concentrations also in trace level so that the impact on nearby communities and Manali Industrial complex is negligible.

Overall combined source mass emission load: The overall combined source mass emission load of PM, SO₂ and NO₂ with the maximum ground level concentrations are not exceeding the national ambient air quality standards and there is enough carrying capacity pertaining to this industries source emission load. Since the industry is using gaseous fuel, the emissions from the combustion sources are very much less.

6.1.6. Tamil Nadu Petroproducts Limited (TPL) – LAB Division (Annexure-VIII)

Ambient Air Quality Monitoring: In Ambient Air Quality monitoring seven sampling locations were identified to assess the GLC of point source emission of Gaseous and Particulate matter. The sampling locations are Near Gate 2, Near Guard Pond, Near PACOL Heater, Tank No 1920 A South Side, 1901 A West Side, 1906 A West Side, Visitor Gate (Road Side). As per the observation, the values of SO₂, NO₂, PM₁₀, and PM_{2.5} are within the NAAQ Standards.

PM₁₀ and PM_{2.5} are very high in the road side collected samples which is due to lot of heavy vehicle movement specifically container movement towards port. These dust emissions are further dispersion into ambient atmosphere. Whenever the wind direction is from NE, N to SW, S then the contribution of PM₁₀ and PM_{2.5} to industry is maximum and that dust concentration is not due to industrial emission and it is purely because of outside vehicular

emissions. So the outside vehicular emissions are one of the major contributory sources for PM₁₀ and PM_{2.5}.

The source dispersion modelling output results showed the pollutants contribution from TPL – LAB Division to nearby villages are minimum and the environmental and health impacts are well below within the limit of NAAQ Standards and OSHA / ACGIH occupational exposure limit values. The TPL plant is surrounded by residential areas like 1.Burma Nagar, 2.Manali New Town, 3.Salai Ma Nagar, 4.Thanthai Periyar Nagar and 5.Balakrishna Nagar. From TPL to Burma Nagar aerial distance is 1.1km, to Manali New Town is 2.33km, to Salai Ma Nagar is 1.82km, to Thanthai Periyar Nagar is 2.54km and to Balakrishna Nagar is 1.2 km.

Predicted concentrations were not exceeded the National ambient air quality standard for PM, SO₂ and NO₂. Results from AERMOD simulation indicated that PM, SO₂ and NO₂ emissions from the TPL LAB division had no significant impact on nearby communities and Manali Industrial complex. For Chlorine there is no ambient air quality standard and the predicted concentrations also in trace level so that the impact on nearby communities and Manali Industrial complex is negligible.

Overall combined source mass emission load: The overall combined source mass emission load of PM, SO₂ and NO₂ with the maximum ground level concentrations are not exceeding the NAAQ Standards and there is enough carrying capacity pertaining to this industry source emission load. Since the industry is using gaseous fuel the emissions from the combustion sources are very much less.

6.1.7. Manali Petrochemicals Limited (MPL) – Unit-I (Annexure-IX)

Ambient Air Quality: In Ambient Air Quality monitoring eight sampling locations were identified to assess the GLC of point source emission of Gaseous and Particulate matter. The sampling locations are Near Car Parking, Near RO Plant Opposite, Near Weigh Bridge, Near ETP- Raw Water Unloading Area, Near RVDF Opposite, Near Drumming Plant, Visitor Gate and Material Gate. As per the observation, the values of SO₂, NO₂, PM₁₀, and PM_{2.5} are within the NAAQ Standards.

PM₁₀ and PM_{2.5} are very high in the road side collected samples is due to lot of heavy vehicle movement specifically container movement towards port. These dust emissions are further dispersed into ambient atmosphere. Whenever the wind direction is from NE, N to NNW, E then the contribution of PM₁₀ and PM_{2.5} to industry is maximum and that dust concentration is not due to industrial emission and it is purely because of outside vehicular emissions. So, the outside vehicular emissions are one of the major contributory sources for PM₁₀ and PM_{2.5}.

Dispersion modelling output: The source dispersion modelling output results showed the pollutants contribution from MPL – Unit-I to nearby villages are minimum and the environmental and health impacts are well below within the limit of NAAQ Standards and OSHA / ACGIH occupational exposure limit values. The MPL Unit I is surrounded by residential areas like 1.Manali New Town, 2.RM Nagar, 3.Salai Ma Nagar, 4.Chinnasekkadu and 5.Kanniyammanpettai village. From MPL to Manali New Town aerial distance is 2.18km, to RM Nagar is 1.27km, to Salai Ma Nagar is 1.33km, to Chinnasekkadu is 1.66km and to Kanniyammanpettai village is 3.23km.

Predicted concentrations were not exceeded the National ambient air quality standard for PM₁₀, NO₂ and CO. Results from AERMOD simulation indicated that PM, NO₂ and CO emissions from the MPL Unit-1 had no significant impact on nearby communities and Manali Industrial complex.

Overall combined source mass emission load: The overall combined source mass emission load of PM, NO₂ and CO with the maximum ground level concentrations are not exceeding the national ambient air quality standards and there is enough carrying capacity pertaining to this industry source emission load. Since the industry is using gaseous fuel in most of the emissions sources the emissions from the combustion sources are very much less.

6.1.8. Manali Petrochemicals Limited (MPL) – Unit-II (Annexure-X)

Ambient Air Quality: In Ambient Air Quality monitoring eight sampling locations were identified to assess the GLC of point source emission of Gaseous and Particulate matter. The sampling locations are Near Security Gate, Near Control Room, Near MMS Transformer, Near Furnace Oil Storage Tank, Near ETP Area, Near Raw Material Godown, Near Main Gate (Road Side). As per the observation, the values of SO₂, NO₂, PM₁₀ and PM_{2.5} are within the NAAQ Standards.

PM₁₀ and PM_{2.5} are very high in the road side collected samples is due to lot of heavy vehicle movement specifically container movement towards port. These dust emissions are further dispersed into ambient atmosphere. Whenever the wind direction is from NE, N to NNW, E then the contribution of PM₁₀ and PM_{2.5} to industry is maximum and that dust concentration is not due to industrial emission and it is purely because of outside vehicular emissions. So, the outside vehicular emissions are one of the major contributory sources for PM₁₀ and PM_{2.5}.

Dispersion modelling output: The source dispersion modelling output results showed the pollutants contribution from MPL – Unit-II to nearby villages are minimum and the environmental and health impacts are well below within the limit of National Ambient Air Quality standards and OSHA / ACGIH occupational exposure limit values. The MPL Unit-II is surrounded by residential areas like 1.Manali New Town, 2.Indira Gandhi Nagar, 3.Shastri

Nagar, 4. Tendral Nagar and 5. Bhaktavatsala Nagar. From MPL to Manali New Town aerial distance is 4.47km, to Indira Gandhi Nagar is 2.11km, to Shastri Nagar is 1.69km, to Tendral Nagar is 2.01km and to Bhaktavatsala Nagar is 1.85km.

Predicted concentrations were not exceeded the National ambient air quality standard for PM_{10} , NO_2 and CO. Results from AERMOD simulation indicated that PM, NO_2 and CO emissions from the MPL Unit-II had no significant impact on nearby communities and Manali Industrial complex.

Overall combined source mass emission load: The overall combined source mass emission load of PM, SO_2 , NO_2 and CO with the maximum ground level concentrations are not exceeding the national ambient air quality standards and there is enough carrying capacity pertaining to this industry source emission load. Since the industry is using gaseous fuel in most of the emissions sources the emissions from the combustion sources are very much less.

6.1.9. Madras Fertilizers Limited (MFL), Manali (Annexure-XI)

(i) **Air Pollution Monitoring at MFL Unit, Manali:** In Ambient Air Quality monitoring eight sampling locations were identified to assess the GLC of point source emission of Gaseous and Particulate matter. The sampling locations are NNE Side of the Plant, NW Side of the Plant, WSW Side of the Plant, ENE Side of the Plant, SE Side of the Plant, SSW Side of the Plant, Near Main Gate (Road Side) and Beside Road Towards Moolakadai (Road Side). As per the observation, the values of SO_2 , NO_2 , PM_{10} , $PM_{2.5}$, NH_3 are within the NAAQ Standards.

PM_{10} and $PM_{2.5}$ are very high in the road side collected samples is due to lot of heavy vehicle movement specifically container movement towards port. These dust emissions are further dispersed into ambient atmosphere. Whenever the wind direction is from NE, N to NNW, E then the contribution of PM_{10} and $PM_{2.5}$ to industry is maximum and that dust concentration is not due to industrial emission and it is purely because of outside vehicular emissions. So, the outside vehicular emissions are one of the major contributory sources for PM_{10} and $PM_{2.5}$.

(ii) **Stack Emission Monitoring at MFL Unit, Manali:** In stack emission monitoring at all stack, they are complying with all the parameters against the emission limit values.

(iii) **Source Dispersion Modelling at MFL Unit, Manali:** The source dispersion modelling output results showed the pollutants contribution from MFL to nearby villages are minimum and the environmental and health impacts are well below within the limit of National Ambient Air Quality standards and OSHA / ACGIH occupational exposure limit values. The MFL plant is surrounded by residential areas like 1. Manali New Town, 2. RM Nagar, 3. Salai Ma Nagar, 4. Bank Colony and 5. Kosappur. From MFL to Manali New Town aerial distance is 2.51km, to

RM Nagar is 2.76km, to Salai Ma Nagar is 2.08km, to Bank Colony is 3.27km and to Kosappur is 3.62 km.

The overall combined source mass emission load of PM, SO₂, NO₂, CO and NH₃ with the maximum ground level concentrations are not exceeding the national ambient air quality standards and there is enough carrying capacity pertaining to this industry source emission load.

7. **Ambient Air Quality -Manali Industrial Area:**

In order to ascertain the quality of air in Manali area, AAQ assessment was carried out by the Committee. Detailed report is given in **Annexure-XIII**. The findings of the AAQ assessment are given below:

7.1. **DAY-1 Ambient Air Quality**

In Ambient Air Quality monitoring nineteen sampling locations were identified to assess the GLC of point source emission of Gaseous and Particulate matter. The sampling locations are Fire Station, Praveena House rajendra prasad Street , Government School Padasalai Street, CPCL –ETP, CPCL-TTP, CPCL-Gas Plant, CPCL-Polytechnic College, TKP Nagar 2nd Street (Sathyamoorthy Nagar), Precision Tools, Primary Health Centre Kalaingar Nagar, Ramesh House Kargil Nagar, Parameshwar Nagar, Near Container Corporation of Indoa Ltd - Thiruvottiyur, Rajiv Nagar 3rd Street, 29th Division Chinnasekadai, Parthasarathy Street Chinnasekadai, Mahatma Gandhi Memorial School Manali, Victory Metric School Village Street and KCP Polytechnic College.

- *Sulphur Dioxide as SO₂*: Ambient Air Quality measurement values of SO₂ are ranging from 27.5 to 35.1µg/m³. Highest value of 35.1µg/m³ is obtained and however the values are within the NAAQM standards.
- *Nitrogen Dioxide as NO₂*: Ambient Air Quality values of NO₂ are ranging from 38.5 to 48.2µg/m³. Highest value of 48.2µg/m³ is obtained and however the values are within the NAAQM standards.
- *Particulate Matter (PM₁₀)*: Ambient Air Quality values of PM₁₀ are ranging from 50.3 to 67.9µg/m³. Highest value of 67.9µg/m³ is obtained and however the values are within the NAAQM standards.
- *Particulate Matter (PM_{2.5})*: Ambient Air Quality values of PM_{2.5} are ranging from 31 to 38.9µg/m³. Highest value of 38.9µg/m³ is obtained and however the values are within the NAAQM standards.

7.2 DAY-2 Ambient Air Quality

In Ambient Air Quality monitoring nineteen sampling locations were identified to assess the GLC of point source emission of Gaseous and Particulate matter. The sampling locations are Fire Station, Praveena House rajendra prasad Street, Government School Padasalai Street, CPCL –ETP, CPCL-TTP, CPCL-Gas Plant, CPCL-Polytechnic College, TKP Nagar 2nd Street (Sathyamoorthy Nagar), Precision Tools, Primary Health Centre Kalaingar Nagar, Ramesh House Kargil Nagar, Parameshwar Nagar, Near Container Corporation of Indoa Ltd - Thiruvottiyur, Rajiv Nagar 3rd Street, 29th Division Chinnasekadai, Parthasarathy Street Chinnasekadai, Mahatma Gandhi Memorial School Manali, Victory Metric School Village Street and KCP Polytechnic College.

- *Sulphur Dioxide as SO₂*: Ambient Air Quality measurement values of SO₂ are ranging from 29.7 to 33.5µg/m³. Highest value of 33.5µg/m³ is obtained and however the values are within the NAAQM standards.
- *Nitrogen Dioxide as NO₂*: Ambient Air Quality values of NO₂ are ranging from 39.6 to 47.9µg/m³. Highest value of 47.9µg/m³ is obtained and however the values are within the NAAQM standards.
- *Particulate Matter (PM₁₀)*: Ambient Air Quality values of PM₁₀ are ranging from 49.5 to 74.7µg/m³. Highest value of 74.7µg/m³ is obtained and however the values are within the NAAQM standards.
- *Particulate Matter (PM_{2.5})*: Ambient Air Quality values of PM_{2.5} are ranging from 29.1 to 40.7µg/m³. Highest value of 40.7µg/m³ is obtained and however the values are within the NAAQM standards.

During the survey of Ambient Air Quality at individual industries in the Manali area, it was observed that PM₁₀ contribution was more at the outside of the industries and nearby road. The major contribution is due to the vehicular movement in that area. In order to control the road dust emission, the following suggestions may be considered:

- Manali Industrial Association shall take necessary steps along with the Greater Chennai Corporation for periodical cleaning of road dust through mechanical sweeping.
- Damaged roads shall be repaired periodically.
- Necessary steps shall be taken at time of road construction to reduce particulate emission.
- Industries should take necessary steps to control the fugitive emission in the loading & unloading area.
- Greenbelt development along the road side & mediator lines (appropriate species shall be planted to control particulate matter).

8. CARRYING CAPACITY STUDY WITH REFERENCE TO AIR POLLUTION IN MANALI INDUSTRIAL AREA CONSIDERING THE NATURE OF POLLUTION LOAD CREATED ON ACCOUNT OF SIX MAJOR INDUSTRIES.

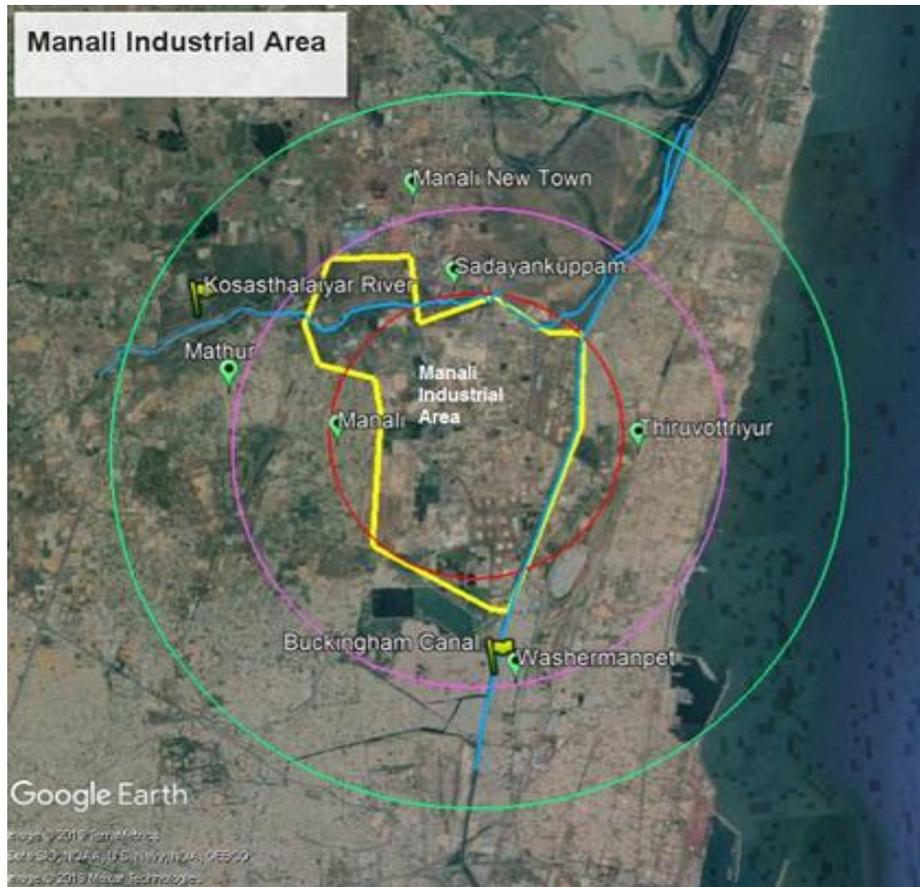
With regard to the above particular direction, the Joint Committee has conducted a study on Carrying Capacity in Manali Industrial area with specific reference to air pollution and pollution load created on account of six major industries viz., Tamil Nadu Petroproducts Limited (TPL), Manali Petrochemicals Limited (MPL), Madras Fertilizers Limited (MFL), Chennai Petroleum Corporation Limited (CPCL), North Chennai Thermal Power Station (NCTPS) Stage 1 & NTECL Vallur Power Plant.

The detailed study report titled “Air Pollution Monitoring and Source Dispersion Modelling at Manali Industrial Area (TPL, MPL, MFL & CPCL)” is given at **Annexure-XII**. The summary of the carrying capacity study is given below:

The summary of the carrying capacity study with specific reference to air pollution:

8.1. About Manali Industrial Area: Manali (latitude: 13°10'4"N, longitude: 80°15'43"E) is one of the major Indian industrial clusters located in the northern side of Chennai City, Tamil Nadu with a total population of around 36,000 (Census of India, 2011). This area has a typical tropical climate, with persistent higher temperatures throughout the year. The extent of Manali area is 20 km², in which more than 33% of the area is occupied by industries. A total of 26 major industries are located in Manali industrial area. SO₂, NO₂ and particulate matter (aerodynamic diameter <10 µm; PM₁₀) pollutants were identified as the three primary air pollutants that are significantly released from industries at this area.

Manali Industrial Complex is bounded by Buckingham canal & Tiruvottiyur on the east side and, south by Chennai city, north by Kosasthalaiyar River and Ponneri Taluk and west by villages of Manjambakkam, Mathur and Madhavaram of Chennai District. Further this industrial complex is connected by east with Ennore High Road, and west by Chennai Kolkata NH-5A, north by Ponneri - Manali high road, and south by Madhavaram – Manali road. The Ennore port is situated at a distance of 15km from this industrial Complex and the nearest railway station is Tiruvottiyur at 3km.



8.2 Methodology followed for carrying capacity study with specific reference to air pollution:

- (i) Sampling and monitoring for all six industries were carried out as per the prescribed standards with the help of MoEFCC/CPCB approved laboratory (G-lens Innovation Labs Pvt Ltd, Chennai)
- (ii) **Collection of the information for modelling AERMOD 5.2 to arrive at the Carrying Capacity:** AERMOD is the preferred dispersion model for general industrial modelling scenarios. Its performance was evaluated against observed concentrations for impacts emitted from stacks of above six (6) Industries. For the present case simulations, the required source data input includes source type, emission rate, and location, stack height, stack gas exit velocity, stack inside diameter, stack gas temperature and elevation.
- (iii) **Quantification of Assimilative Capacity using Dispersion Model:** Critical assimilative capacity can be defined as the maximum pollutant emission (load) an area can take at a given point of time without exceeding the permissible limits. In the present study, the National Ambient Air Quality Standards (NAAQS) prescribed by CPCB were considered

as the permissible standards (24-hr NAAQS for $\text{SO}_2 = 80 \mu\text{g}/\text{m}^3$, $\text{NO}_2 = 80 \mu\text{g}/\text{m}^3$, $\text{PM}_{10} = 100 \mu\text{g}/\text{m}^3$; CPCB, 2012).

- (iv) **Monitoring of Ambient Air and Stack emissions and its analysis:** Samplers have been sited to meet the goals of the specific monitoring requirement. For this study, sampling is carried out to determine the compliance with the National Ambient Air Quality Standards (NAAQS) and sampler sitting as described in CPCB guidelines. The monitoring has been done outside the zone of influence of sources located within the designated zone of representation for the monitoring site.
- (v) **Stack Emission Monitoring:** The assessment is carried out as per the technical and quality aspects to meet the requirements of standard test method.

8.3. Expert consultation: The Joint Committee also consulted, through online meeting on 20th Sep 2021, with experts from NIT (Calicut), IIT Chennai and Scientist from CPCB (Retired) who are working in the subject area of air pollution and modelling applications. The methodology followed for carrying capacity study was discussed. It was suggested by the experts that dispersion modelling being applied, is suitable to carry out the carrying capacity of that area.

8.4. Findings of the carrying capacity study at Manali industrial area:

This study is aimed to evaluate ground level concentrations of Particulate Matter (PM_{10} & $\text{PM}_{2.5}$), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2) and Carbon Monoxide (CO) emitted from factories in Manali Industrial complex and that too specific to Tamil Nadu Petroproducts Ltd, Manali Petroproducts Ltd, Chennai Petroleum Corporation Ltd and Manali Fertilizers Ltd based on Honourable NGT order. Contributions of each factory to the maximum ground level concentration are analysed. These findings are useful in prioritization of appropriate mitigation measures to control and bring down the emissions to achieve the required carrying capacity in Manali Industrial area.

AERMOD Model: The AERMOD modelling system was used for environmental impact assessment of NO_2 , SO_2 , PM and CO emissions from Petrochemical and Fertilizer industries in Manali Industrial complex. The Simulated values of SO_2 , NO_2 , PM and CO concentrations were compared with those obtained from measurements. It was found that the quantile-quantile plot of concentrations is not fit because always the predicted concentrations are higher than the actual ambient air quality measurement values which may be due to obstruction in wind flow pattern.

In this study, dispersion of PM, SO_2 , NO_2 and CO were modelled to evaluate their maximum ground level concentrations in the Manali industrial area. Statistical analysis was employed to determine performance of the model in predicting overall concentrations and extreme high-end concentrations.

It is observed that spatial distributions of annual concentration of SO₂ and NO₂ were also relevant to wind characteristics in the study area. During the wet season (October - February) this area is governed by the north east wind. However, in the dry season (March – September) the south west wind plays as the dominant wind direction. Therefore, it was found from model simulation that mostly of air pollutants were transported to the north and northeast directions from emission sources.

Study limited to pre-monsoon season: The model was done for only pre-monsoon and found the maximum ground level concentration is exceeded with the National Ambient Air Quality Standards (NAAQS) and it will be still worse in other two seasons. So, the study is limited to pre-monsoon only.

Contribution of those four industries to the concentrations of PM, SO₂ and NO₂ were larger than the power plants (NTECL & NCTPS-1) located far away (more than 5km) from Manali industrial area and even though their emissions were almost 10 times lower than emissions of power plants. This could be because of heights of stacks of the power plants are much taller than petrochemical plants. These characteristics enhanced the dilution abilities of emissions from power plant and reducing concentrations of air pollutants at the ground surface level. Transportation of plume emitted from the power plants probably might not reach the ground level within the modelling domain because it has to travel longer distance to reach the study area.

In order to evaluate the influence of power plants to the ground level concentrations, AERMOD was also simulated to acquire the maximum concentration of PM, SO₂ and NO₂ in the study area.

North Chennai Thermal Power Station (NCTPS) Stage 1: For NCTPS (Stage-1), the model results indicated that the maximum ground level concentration of SO₂ is 79.1µg/m³ & 86.4 µg/m³ at a GLC distance of 1.99km, NO_x is 20µg/m³ & 25 µg/m³ at a GLC distance of 2.10km and PM is 173 µg/m³ & 56.7 µg/m³ at a GLC distance of 2.2km.

NTECL Vallur Power Plant: For NTECL, the model results indicated that the maximum ground level concentration of SO₂ is 43.4 µg/m³, 60.0µg/m³ & 63.4 µg/m³ at a GLC distance of 1.7km, NO_x is 10.3 µg/m³, 13.9µg/m³ & 14.4µg/m³ at a GLC distance of 1.7km and PM is 1.18 µg/m³, 1.12 µg/m³ & 1.15µg/m³ at a GLC distance of 1.9km. These predicted values are much lower than the NAAQ Standards and contribution of these power plant sources are negligible to Manali industrial area.

TPL PO Division, TPL HC Division, TPL LAB- Division, MPL Unit-1 & 2 and MFL: Predicted concentrations were not exceeding the National Ambient Air Quality Standard for PM₁₀, SO₂, NO₂ and CO as individual point source emissions. The combined source emission results from AERMOD simulation indicated that PM, SO₂, NO₂ and CO emissions from the TPL

PO division, TPL HC Division, TPL LAB division, MPL Unit-1 & 2 and MFL had no significant impact on nearby communities and Manali Industrial complex. Specific to MFL Fertilizer industry the Ammonia source emission results based on the AERMOD simulation had no significant impact on nearby communities and Manali Industrial complex. The combined ground level concentration of each individual industry mentioned above are complying with National ambient air quality standards and had much carrying capacity for PM, SO₂, NO₂ and CO.

Chennai Petroleum Corporation Limited (CPCL): Predicted concentrations were not exceeded the National Ambient Air Quality Standard for PM and CO as individual point source emissions at CPCL, Manali. The combined source emission results from AERMOD simulation indicated that PM and CO emissions from CPCL had no significant impact on nearby communities and Manali Industrial complex. But for the combined source emission results from AERMOD simulation indicated that SO₂ and NO₂ emissions from CPCL had significant impact on nearby communities and Manali Industrial complex.

There is no further carrying capacity specific to SO₂ and NO₂ in Manali Industrial complex, as the predicted combined source emissions results from AERMOD for SO₂ and NO₂ emissions from CPCL alone exceeded the National ambient air quality standards.

Overall combined source mass emission load of Particulate Matter: The overall combined source mass emission load of PM is 3654.62kg/day for which the combined maximum ground level concentration is 497.3µg/m³ and exceeding the National Ambient Air Quality Standards for about 5 times. The carrying capacity for particulate matter is not available at Manali industrial area as the predicted particulate matter emission from the four industries (TPL, MPL, MFL and CPCL) itself exceeded 5 times more than the National Ambient Air Quality Standards during the pre-monsoon study period and this will still higher in winter period.

Overall combined source mass emission load of Nitrogen Dioxide: The overall combined source mass emission load of NO_x (considering 100% conversion of NO₂) is 22939kg/day for which the combined maximum ground level concentration is 2424µg/m³ and exceeding the NAAQ Standards for about 30 times.

The carrying capacity for Nitrogen Dioxide is not available at Manali industrial area as the predicted Nitrogen Dioxide emission from the four industries (TPL, MPL, MFL and CPCL) itself exceeded 30 times more than the National Ambient Air Quality Standards during the pre-monsoon study period and this will still higher in winter period.

Overall combined source mass emission load of Sulphur Dioxide: The overall combined source mass emission load of SO₂ is 33607kg/day for which the combined maximum ground level concentration is 2914µg/m³ and exceeding the NAAQ standards for about 36 times.

The carrying capacity for Sulphur Dioxide is not available at Manali industrial area as the predicted Sulphur Dioxide emission from the four industries (TPL, MPL, MFL and CPCL) itself

exceeded 36 times more than the National Ambient Air Quality Standards during the pre-monsoon study period and this will still higher in winter period.

Results from this analysis revealed that in order to manage SO₂ and NO₂ pollution in the industrial area, controlling of emission from Refinery should be given the first priority.

8.5. Committee's suggestions on whether any more such industries can be accommodated in that area, considering the nature of pollution load created on account of existing units:

Though the values of PM, SO₂ and NO₂ predicted through model study indicates that the Manali industrial area doesn't have carrying capacity with respect to PM, SO₂ and NO₂ emission, the actual measurement of PM₁₀, PM_{2.5}, SO₂ and NO₂ in the Ambient Air of the Manali Industrial area are within the National Ambient Air Quality Standards. However, the following suggestions are made to implement in order to reduce the emissions and pollution load further to the extent possible:

1. Use of cleaner fuel i.e Conversion of usage of liquid fuel (such as HSD, LDO, FO etc.) into gaseous fuel.
2. Use of low Sulphur fuel till conversion to gaseous fuel.
3. Improving the combustion efficiency with controlled air-fuel ratio
4. Installation of low NO_x burner.
5. Other large/medium red category industries (Air polluting) in Manali industrial complex shall install CEMS and connect to SPCB & CPCB servers.
6. The industries shall develop the green belt in and around the Manali area as well as road side plantation in consultation with Greater Chennai Corporation. The Green Belt Model such as Source oriented approach & Receptor oriented Approach shall be adopted to reduce the impact of emission and accordingly the suitable species shall be selected based on the Guidelines for Developing Greenbelt.
7. Only Orange and Green category industries and Red category Industries which are not emitting the SO₂ and NO₂ emissions shall be allowed in the area.
8. Existing Industries with no increase in pollution load as well as reducing the SO₂ & NO₂ emissions by 30 to 50% only can be allowed for expansion.
9. Each industries in Manali industrial area shall evolve the action plan within a month on the above points individually in addition to the CEPI action plan along with time schedule to implement the same within a year.
10. Greater Chennai Corporation shall identify the areas to be developed as green belt in and around Manali Industrial area and furnish the same to Manali Industry Association for green belt development.
11. The Greater Chennai Corporation/ High Ways Dept. shall evolve action plan for continuous maintenance of the Roads (with green belt) in Manali Industrial area, as the same are frequently damaged due to Heavy Truck movements, so as to achieve the Ambient Air

Quality Standards prescribed by the CPCB in respect of particulate matter emission in that area.

12. Suggestions based on Carrying Capacity Study at Ennore Power Plants: The carrying capacity in terms of Particulate Matter & SO₂ are not available based on the monitoring of M/s NCTPS Stage-1 & M/s NTECL respectively. Particulate matter emissions from NCTPS Stage-1 is exceeding the prescribed standards. Hence, the industry need to augment the ESP Air Pollution Control Device to achieve the prescribed standards. Carrying capacity in terms of Sulphur dioxide emission could be achieved, once the FGD system is installed by the power plants. It is suggested that both the power plants shall expedite the process of installation of FGD system.

By considering the above facts and observation of the Joint Committee, the Hon'ble Tribunal may pass appropriate Order (s)/Direction (s) as deemed fit.



Sh. M. Malayandi, Joint Chief Environmental Engineer (Monitoring), Tamil Nadu Pollution Control Board, Chennai



Professor Dr. S. Kanmani
Director Centre for Environmental Studies
Anna University, Chennai



Shri.R. Rajkumar
Scientist 'D'
Regional Directorate, CPCB, Chennai.



Dr. R. Sridhar
Scientist 'D'
Integrated Regional Office (IRO),
MoEFCC, Chennai