BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
SOUTHERN ZONE, CHENNAI

Original Application No. 70 of 2020 (SZ)

IN THE MATTER OF:

Tribunal on its own motion- SUO MOTU Based on
The News item in the New Indian Express, Chennai
Edition dated 16.05.2020, "Ammonia leak from Madras
Fertilizers Limited worries residents in Chennai's Manali"

… Applicant(s)

Versus

Union of India
Rep. by its Secretary
Ministry of Environment and Forests and
Climate Change, New Delhi and Others

… Respondents(s)

INDEX

DEPONENT

S. SURESH
REGIONAL DIRECTOR
CENTRAL POLLUTION CONTROL BOARD
REGIONAL DIRECTORATE (SOUTH)
MIN. OF ENV. FORESTS & CC, GOVT. OF INDIA
BENGALURU - 560 079. MOB : 9480672128

Place : Bengaluru
Date : 24.11.2020

Report of the Joint Committee

(As per Hon'ble National Green Tribunal, Southern Zone, Chennai Order dated 19.05.2020 & 05.08.2020 in OA no. 70/2020)

1. Background

The Honourable National Green Tribunal, Southern Zone, Chennai, in the matter of OA no. 70 of 2020 directed on 19.05.2020 as;

"……10. Under such circumstances, we feel it appropriate to appoint a joint committee comprising of a Senior Officer of Ministry of Environment, Forest and Climate Change (MoEF&CC), Regional Office, Chennai, Senior Officer of Central Pollution Control Board, Regional Office, Chennai, Senior Officer of Tamil Nadu Pollution Control Board and District Collector, Thiruvallur to inspect the area in question and submit a factual and action taken report, if there is any violations found especially regarding the compliance of the provisions of Hazardous Waste (Management &Transboundary Movement) Rules, 2016 and whether the machineries are in order and the pollution control mechanism provided are working properly.

11. The committee is also directed to take independent steps instead of relying on the data recorded in the Ambient Air Quality Monitoring Stations by themselves and submit a report regarding the Ambient Air Quality prevailing in that area as well. If there is any deficiency found, due to which environment damage has been caused, then they are directed to assess the environment compensation and also give suggestions and recommendations for remedying the same, so as to avoid such incidents in future.

12. The committee is also directed to ascertain as to whether the emissions standard of ammonia gas inside the plant from the respective machineries is within the permissible limit and whether all safety measures have been taken by them to protect the employees as well who are likely to be exposed to the gas during work inside the factory.

13. The committee is directed to file the report within a period of two months. The committee is at liberty to co-opt any of the agencies in the committee whom they feel necessary for the purpose of preparing the report in an effective manner for this purpose.

14. The committee is also directed to submit a report to this Tribunal before the time mentioned above through e-mail or e-filing at ngtszfiling@gmail.com*.*

15. The Central Pollution Control Board will be act as nodal agency for co-ordination and for providing all necessary logistics for this purpose, so as to enable them to comply with the direction….."

In compliance to the Hon'ble tribunal order, the committee has carried out preliminary meeting on July 14, 2020 through VC along with officials of M/s MFL and submitted interim report to the Hon'ble Tribunal with the following suggestions;

1) The industry shall take necessary steps to comply with the directions issued by TNPCB in a time bound manner without further delay.
2) The industry shall take necessary steps for the compliance of the recommendations given in the safety audit report.

And also the committee has requested time for carrying out field inspection considering the pandemic situation. Accordingly, Hon'ble Tribunal granted time and directed to submit the report on or before 25.11.2020.

IIT, Chennai has carried out the study during August 26 to 28, 2020 and submitted the report to the committee. Subsequently, the joint committee members visited the industry on November 17, 2020 and also verified the compliance of the directions issued by TNPCB.

2.0 Compliance status of the directions issued by TNPCB:

Sl No.	TNPCB Directions	Compliance Status
(i)	To restart the unit only after installation of at least two ammonia sensors at the rear end of the unit towards the village direction where complaint received.	The unit has installed ammonia sensors.
(ii)	To restart the unit only after obtaining approval of updated safety audit report containing the information specified in schedule-8 from the competent authority notified in scheduile-5 as per the rule 10 of the Manufacture, Storage and Import of Hazardous Chemical Rules 1989 as amended.	Complied.

(iii)	The unit shall comply with the directions issued vide Proc. Dated 12.05.2020.	Compliance details submitted below.

1.	The unit shall operate and maintain the Sewage Treatment Plant (CETP as stated by the unit) components efficiently and continuously so as to achieve the treated sewage standards prescribed by the Board consistently and ensure that the treated sewage is completely utilized for gardening within the unit premises without any stagnation.	Complied. The treated sewage samples collected from the STP by the TNPCB in the past periods are meeting all the standards prescribed by the Board.
2.	The unit shall provide RO plant for the entire quantity of trade effluent generated from Cooling Tower as Cooling Water Blow down (4800KLD), Boiler Blow down (30KLD) and DM plant regeneration (300KLD) as reported which is one of the CEPI long term action plan.	Civil structure completed. Yet to install machinery. Unit committed to complete by January 2021.
3.	The unit shall ensure zero liquid discharge of trade effluent, thereby no discharge of untreated/ treated trade effluent on land or into any water bodies either inside or outside the premises at any point of time.	Gutter water recovery sump about 100kl capacity constructed. However, the unit shall provide separate drainage system for storm water, steam condensate and process leakage/spillage water.
4.	The unit shall connect all EMFMs provided to Care Air Centre, TNPCB and CPCB	It is informed that the output from EMFMs available locally but could not be uploaded due to outdated model instruments. Hence latest EMFMs procurement initiated and tendering in progress. Unit committed to complete by January 2021.
5.	The unit shall stop the discharge of underground pipe line leakages (Fire water) into old SEP's	It is informed that the underground pipe line leakages were attended.

	(lagoons) and to plant green belt by planting native & local specific species immediately.	One acre of land is earmarked in ETP and 150 saplings were planted as part of Green belt area development.
6.	The unit shall replace the furnace oil usage with LNG for the boilers of capacity 55T/ Hr each before June 2020, as reported.	It is informed that Tender floated and the installation expected to be completed by June 2021.
7.	The unit shall apply for renewal of authorisation under the provisions of Hazardous & Other Wastes (Management, &Trans boundary Movement) Rules 2016.	Renewal HWA application was submitted, but was returned with queries by TNPCB. As per TNPCB directive, proposal was sent to MFL Board and approval obtained for disposing HW through authorised recyclers. The unit is in the process of selecting the vendors.
8.	In order to prevent the formation and accumulation of toxic gases inside the tanks and to prevent the occurrence of fatal accidents, while cleaning the tanks, adequate ventilation arrangements should be provided in all the concealed tanks located both above and below ground level which are meant for storing/ holding the effluents, rejects, sludge, permeate water and raw water etc.,. The sludge accumulated in the ETP components should be cleaned mechanically only and manual cleaning of the sludge should not be carried out under any circumstances.	The unit has ensured to comply.
9.	The unit shall obtain & furnish certificate of stability from the competent authority as notified in sub rule (3) of Rule 12 B of the Tamil Nadu Factories Rules, 1950 for the pollution abatement measures provided in the unit.	Complied. The unit has obtained certificate of stability from the competent person as authorized by DISH as notified in sub rule (3) of Rule B of the Tamil Nadu Factories Rules, 1950 vide dated 31.01.2020 for three years.

10.	The unit shall complete the target of short term and long term Action plan in CEPI area as committed by the unit without fail.	Action taken details are furnished below.

SHORT TERM ACTION PLAN:

Sl.	Action Plan	Completion Target	Present Status of Compliance
1	Feed Stock Conversion from Naphtha to LNG which will reduce Energy consumption of Ammonia and Urea plants.	August, 2019	Completed
2	110T/hr ATA and Process Condensate boiler fuel change from Furnace Oil to LNG.	August, 2019	Completed
3	Construction of a sump to recover all the water let out into the gutter which will be pumped to the Cooling Water Blow down Treatment Plant where it will be treated and used for Cooling Water makeup.	December 2019	Construction of a sump Completed. However, the unit shall provide separate drainage system for storm water, steam condensate and process leakage/spillage water.
4	Dedicated RO to treat Cooling Water Blow down Plant Outlet.	June 30, 2020	Civil structure completed. Yet to install machinery. Unit committed to complete by January 2021.

LONG TERM ACTION PLAN:

Sl.No.	Action Plan	Completion Target	Present Status of Compliance
1	Increasing Green Belt area.	1 acre to be brought under Green belt every year.	On progress
2	Change of Fuel from Furnace Oil to RLNG for Boiler 1 and 2 (55T/hr each)	July 31, 2020.	It is informed that Tender floated and the installation expected to be completed by June 2021.

11.	The unit shall continue to develop green belt by identifying land through Revenue Department and always the native species shall be planted.	It was informed that already One acre of land is earmarked inside MFL in ETP and 150 saplings were planted as part of Green belt area development. One acre/Year will be earmarked and new trees will be planted accordingly.
12.	The unit shall undertake CSR activities with priority to provide drinking water facility, Computer facilities and adequate toilet facilities in Girls Schools and Colleges to encourage Women Education especially in rural and semi-urban areas.	The unit informed that, CSR activities are being carried out regularly.
13.	The unit shall provide Reverse plastic vending machines in prominent public places so as to collect waste plastic bottles so as to achieve the target of banning one time use and throw plastics in Tamilnadu and encourage recycling options.	Procurement action initiated and will be provided before December 2020.
14.	The unit shall operate and maintain the existing air pollution control measures provided to the emission sources efficiently and continuously so as to achieve the Ambient Air Quality/ Stack Emission standards prescribed by the Board.	As per the monitoring result carried out by IIT, Chennai during August 26 to 28, 2020, the unit is not complying
15.	The unit shall ensure that the online stack sensors provided for the parameters NH_3 in urea prill tower and HF & PM in NPK train Care calibrated regularly & operated and ensure that the output of the sensors are connected to TNPCB & CPCB server at all times.	Complied. All the three parameters NH_3 in Prill tower Demister, HF & PM of NPK train C Stack are connected to Care Air Centre, TNPCB and CPCB server.
16.	The unit shall re-commission the NPK train A &Bonly after installation of HF& PM online stack sensors in the stack attached to each train.	It is informed that at present Train A & B are not planned for commissioning
17.	The unit shall install PM analyser for the common stack attached with process condensate boiler	• PM analyzer installed in process condensate boiler, 70T/hr& 110T/hr

	70T/hr& 110T/hr boiler and PM, SOx & NOx analyser for the common stack attached with boilers 1 & 2 (55T/hr each) as reported.	boiler. • For boiler 1 & 2 PO issued and expected to be completed before January 2021.
18.	The unit shall install 11 nos. of new ammonia sensors in the ambient air on or before June 2020 as reported as the existing 10 ammonia sensors were not functioning since, 2016 due to Vardha Cyclone.	Complied. 11 sensors installed and functioning since Sep 2020.
19.	The unit shall restore the CAAQMS station with the sensor parameters such as PM10, PM2.5, SOx, NOx, CO, NH3 & O3 as the one station near North gate is in operation and connected to CAC, Chennai and the remaining four stations were not in operation since, 2016 due to Vardha Cyclone.	• Out of 5 CAAQM stations, • North gate station is working. • ETP station partially restored. • For Remaining 3 stations, tender floatedand in the final stage of finalizing the contract The unit committed to complete by March 2021.
20.	The unit shall rectify the roof defects in the temporary Hazardous Waste storage shed for the proper storage of hazardous waste till its disposal.	Defects have been rectified. But sufficient area for storage of HW is not provided. During inspection, waste found stored in drum and kept in open area.

2. Summary of the Study Carried out by IIT:

Air quality and hazardous waste management assessment were carried out for MFL during 26th - 28th August 2020. The ambient, workspace, and point source monitoring was performed to assess the air quality and field inspection was carried out to assess the adequacy of hazardous waste and chemical storage facility. Eleven locations were chosen for ambient monitoring which covers the entire boundary of MFL. The locations were chosen based on the pre-dominant wind direction and physical observance of the location.

The results of monitoring showed the PM_{10} and $PM_{2.5}$ values were exceeding the NAAQS limits at 4 and 3 monitored locations respectively, while ammonia levels were exceeding at all the sampling points.

Besides ambient monitoring, stationary monitoring was also carried out for utility, ammonia, urea and NPK stacks. PM and NOx emissions were exceeding the standards prescribed by CPCB for utility boiler stack. However, other pollutants (including ammonia) monitored for the above stacks were within the limits prescribed by CPCB. Pollutants from urea and NPK stacks were well within the CPCB limits. For,110 ATA & PCB boiler stack, it has met the stack height criteria notified *vide* G.S.R. 176(E), dated the 2nd April 1996.

Work place monitoring was carried out to assess the ammonia levels in the work environment. Ammonia concentrations were found well within the limit given by NIOSH in all the sampling points. The hazardous waste and chemical storage yard was examined to check its compliance with specifications given by CPCB. Major categories of waste generated includes spent catalyst, residual oil and oil containing sludge.

The copy of the report submitted by IIT Chennai is enclosed as **Annexure 1.**

Ambient monitoring

- The measured 24-hr PM_{10} concentration varied between 55.3 to 143.6 µg/m^3 and 24-hr $PM_{2.5}$ concentration varied between 27.8 to 86.4 µg/m^3. The measured PM concentrations were found within the NAAQS limit except at few locations ((PM_{10} = New DM plant, RO plant, LPG bullet area, and stripping plant) & ($PM_{2.5}$ =RO plant, LPG bullet area, and stripping plant)). The high PM concentrations at these points may be attributed to location of these points in the direction of predominant winds which brings prominent emission from the plant stacks. Also, emissions from vicinity industry (SRF) and vehicles movement might have also contributed to the PM exceedance.
- The 24-hr NO_2 and SO_2 concentrations varied in the range of 35.4-38.9 and 23.7-26.7 µg/m^3 respectively and were found below the NAAQS limit at all the measured locations. Similarly, 24-hr HF and 1-hr CO concentrations(except LPG bullet area) were found below the detection level at all the measured points.
- The 24-hr ammonia concentration varied between 833.4 to 2977.3 µg/m^3. The ammonia levels were exceeding the NAAQS limits at all the monitored locations. At an average, the ammonia concentration was exceeding 4.3 times the National standard at MFL. The fugitive leaks from stripping plant, ammonia plant and, urea plant and

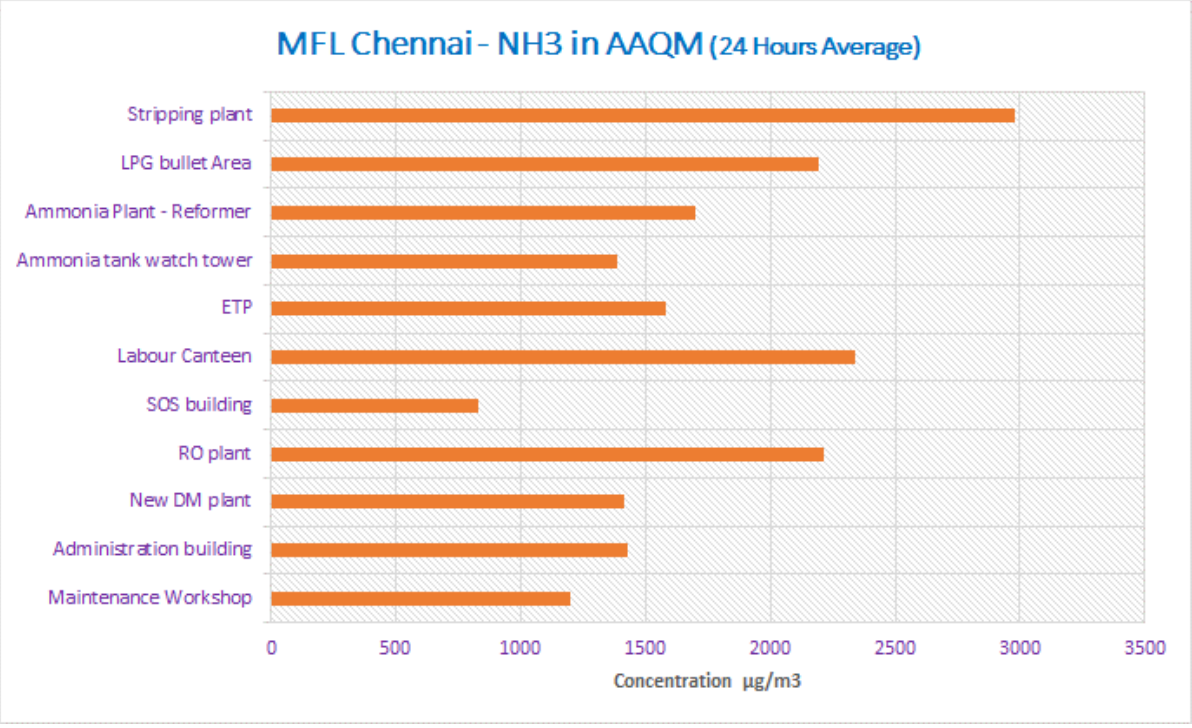
liberation of ammonia from process water near LPG bullet area were responsible for high ambient ammonia concentration besides the emission from the plant stacks.

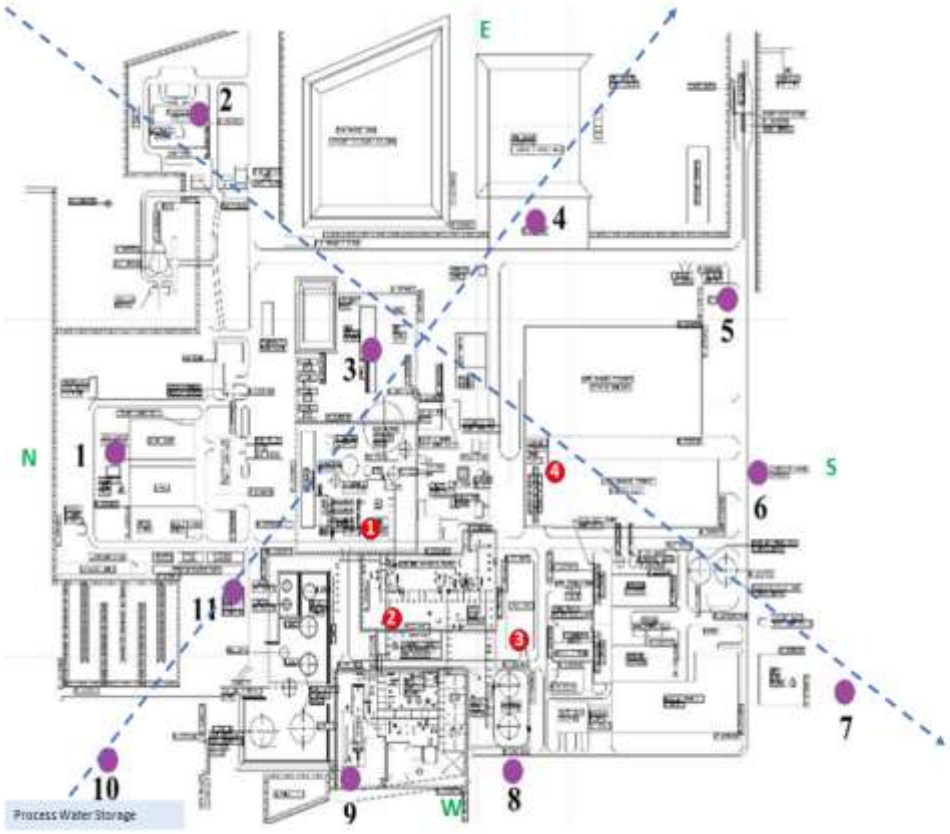
- Though the ammonia concentrations in ambient were exceeding the National standard but it is found within the standard of 25 ppm prescribed by NIOSH.

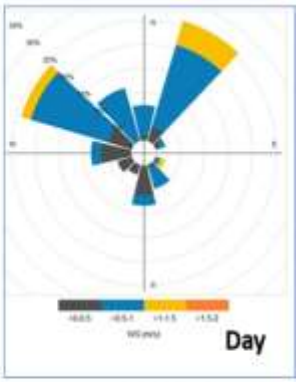
The source emissions also will be contributor for the ambient air quality ammonia concentration, generally in the night time during inversion the ground level concentration will be very high as well as whenever the diffusion takes place during that time also ammonia concentration on nearby locations will be very high.

During the night time the predominant wind direction is from SE to NW, and the ammonia emissions from the process areas move towards the maintenance workshop, Administrative Building and DM plant areas. That is the reason why only the high ammonia concentration detected in these locations.

On the average around 1000µg/m3 of Ammonia present in the ambient air on the boundary of the plant.





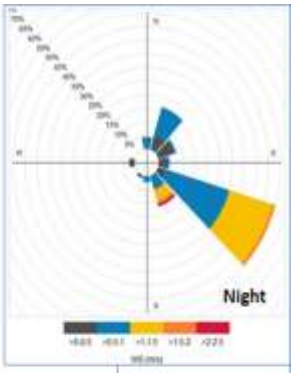


Monitoring of ammonia concentration at workspace

1. Utility plant
2. Ammonia plant
3. Urea plant
4. Urea bagging area

Ambient monitoring location

1. Maintenance work shop
2. Administration building
3. New DM plant
4. RO plant
5. SOS building
6. Labour canteen
7. ETP
8. Ammonia watch tower
9. Ammonia plant reformer
10. LPG bullet area
11. Hydrolyser stripper plant



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9. Ammonia plant reformer
10. LPG bullet area
11. Hydrolyser stripper plant

Stationary monitoring (Source Emission)

- The PM and NOx emission from utility boiler stacks (PM =487.4 mg/Nm^3& NOx = 429.57 mg/Nm^3at 3% dry O_2) was exceeding the CPCB emission standard by 3.24 and 1.4 times respectively. Other pollutants (CO & SO_2) from utility boiler were below the CPCB norms. The use of furnace oil for combustion in utility boiler emits PM significantly. The high amount of excess air (utility boiler, O_2 =15.4% & ammonia boiler, O_2 =8.6%) used during the combustion process is responsible for high NO_X formation in the utility boilers.
- The PM emission from 110 ATA & PCB common stack were within the CPCB norms, CO and NH_3 were found within the below detection limit. There is no standard specified for sulphur dioxide and oxides of nitrogen for boilers using natural gas, it is required to meet stack height criteria notified *vide* G.S.R. 176(E), dated the 2nd April 1996. The 110 ATA & PCB common stack have height greater than the prescribed height of 11m.
- The $NH_3$and PM emissions measured from the urea demister were found well below the CPCB emission norms and CO, NOx, and SO_2 were below the detection limit.
- The PM, NOx, CO, and NH_3 emission complied with the CPCB emission standards at the NPK stack. The SO_2 and HF were below the detection limit.

In the source emission of Urea demister, Ammonia Boiler and NPK stacks are emitting at the rate of 11.1mg/m^3, 2.1mg/m^3 and 13.7mg/m^3. The ammonia emission load as follows;

Urea Demister = 11.1mg/Nm3 x 510664Nm3/Hr= 136 kg/day

NPK Stack = 13.7mg/Nm3 x 191255Nm3/Hr= 62.9kg/day

The overall Ammonia Emissions from Point Source = 198.9 kg/day

Workspace ammonia monitoring

- The 8-hr ammonia levels at workspace varied between 2.97 to 4.90 ppm and were found well below the NIOSH limit.

Hazardous waste storage adequacy

- Wastes were labelled and categorized according to the classification given by CPCB.
- Majority of the storage requirements prescribed by CPCB were not met with respect to spacing of storage containers, fire extinguishers etc.

Dispersion Modelling

Dispersion model was used to understand the spatial dispersion of emission from the stationary sources of MFL. The model was ran to predict 24-hr average pollutant concentration (SO_2, NO_X, PM and NH_3) during the calm condition of the year.

- The highest 24-hr average pollutant levels (PM= 80µg/m^3, NH_3= 0.55µg/m^3, SO_2 =2.5µg/m^3, NO_X =14µg/m^3) under unstable condition occurred at a distance between 0.5-1km from the MFL.
- The highest 24-hr average pollutants levels (PM= 3µg/m^3, NH_3= 0.035µg/m^3) under neutral condition occurred at a distance between 4-5km from the MFL.
- The highest 24-hr average pollutants levels (PM= 22µg/m^3, NH_3= 0.045µg/m^3, SO_2 =0.5 µg/m^3, NO_X =1.4µg/m^3) under stable condition occurred at a distance between 4-5km from the MFL.
- All the predicted pollutants concentration (SO_2, NO_X, PM and NH_3) under different vertical stability were found within the NAAQS limits.

4. Environmental Compensation Calculation:

Considering the above violations, the committee calculated interim environmental compensation as per CPCB In-house Methodology for Assessing Environmental Compensation.

The pollution index formula is;

EC = PI x N x R x S x LF

PI = Pollution Index of industrial sector, since it is Red Category **(PI = 80)**

N = Number of days of violation took place, from date of monitoring 26.08.2020 to date of last committee meeting 17.11.2020 **(N = 83 days)**

R = A factor in Rupees (₹) for EC **(R = 250)**

S = Factor for scale of operation, Large Scale **(S = 1.5)**

LF = Location factor, 5 - 10 million populations (For the industrial unit located within municipal boundary or up to 10 km distance from the municipal boundary of the city/town) **(LF = 1.5)**

for 83 days,	EC = 80 x 83 x 250 x 1.5 x 1.5 **EC = Rs 37, 35,000/-**
for 01 day,	EC = 80 x 1 x 250 x 1.5 x 1.5 **EC = Rs 45,000/-**

Interim compensation calculated for 83 days upto 17.11.2020 is Rs 37,35,000/- (Thirty-Seven Thirty-Five Thousand) and thereon, each day Rs 45,000/- to remit until fully compliance of norms.

5. Conclusions/ Suggestions:

1. The unit of M/s. Madras Fertilizer Limited has been in operation continuously during the Covid19Lockdown as per the directions of Department of Fertilizers.
2. On 14.05.2020 at 7.30pm, the cooling water pump motor bearing in the urea plant process became hot and pump got stopped and urea plant was shut down immediately. It was informed that all the vents are connected to sump and sent to ammonia stripper for recovery. The additional steam charged to vent stack to dilute any let out vapours. During TNPCB visit noticed icing from one of the Ammonia Recirculation pump discharge safety valve. The suspected safety valve was serviced and fixed back.
3. The industry has not complied with most of the directions issued by TNPCB and submitted time schedule to complete the implementation.

- The unit shall provide RO plant for the entire quantity of trade effluent generated from Cooling Tower as Cooling Water Blow down (4800KLD), Boiler Blow down (30KLD) and DM plant regeneration (300KLD) as reported which is one of the CEPI long term action plan.

(Target: January 2021)

- The unit shall connect all EMFMs provided to Care Air Centre, TNPCB and CPCB

(Target: January 2021)

- The unit shall replace the furnace oil usage with LNG for the two utility boilers of capacities 55 T/ Hr each to reduce the emissions.

(Target: June 2021)

- The unit shall restore the CAAQMS station with the sensor parameters such as PM10, PM2.5, SOx, NOx, CO, NH_3& O_3 as the one station near North gate is in operation and connected to CAC, Chennai and another station near ETP is in partial operation. The remaining stations were not in operation since, 2016 due to Vardha Cyclone.

(Target: March 2021)

4. As per the monitoring results, the industry is not complying with AAQ Standards and exceeding the discharge norms of source emission from utility boiler. Based on the study conducted in M/s MFL, the following recommendations are suggested by the committee

- On-line monitoring at critical emission points shall be installed to provide information about the effect of malfunctions in the process and consequently the process conditions can be corrected.
- Proper fuel to air combustion ratio should be maintained to keep down the NOx generation in the boiler.
- All liquid wastes (water in the gutter) should be properly treated and recycled into the process, so that stripping of ammonia from the process water can be minimized.
- The unit has provided collection tank for process water spillage/ seepage and informed, the collected water is taken back for treatment. But during inspection, it is observed that the spillage water is collected through the storm water drain, so the unit shall provide separate drains for spillage & storm water.
- The unit must take continuous effort on monitoring the plant and carrying out periodical inspection of the valves, gaskets, and pipelines of the ammonia and urea plant to avoid ammonia leakages in the plant.
- The unit shall revamp the plant equipment and re-design the process to abate the pollution problem.
- As the unit's NPK fertilizer manufacturing buildings and utilities including pipelines are in dilapidated condition and requires complete revamping.
- The unit shall obtain authorization under the provisions of Hazardous & Other Wastes (Management, &Trans boundary Movement) Rules 2016.
- It was informed that validity of HW Authorization expired on 23.11.2014, since then the spent catalyst generated is stored in the unit premises. The unit shall take necessary action for disposal of spent catalyst.
- The hazardous waste facility should be provided with leak/spill management systems to avoid any accidents that may occur due to spillage.
- The spacing between the containers can be increased as per the provision given by CPCB.
- Additional shed can be constructed to store the hazardous waste containers and spent catalyst accumulated in the hazardous waste shed so that storage of these wastes in open space can be avoided.

- The waste containers must also be named along with the characteristics of the hazardous waste stored so that the safety protocols can be followed accordingly during transportation and handling of the waste.

The MFL is operating its plant without proper authorization which is a major violation of the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 issued under the Environment (Protection) Act, 1986. The industrial plant was found to have violated the ambient air quality standards established under the Air (Prevention and Control of Pollution) Act, 1981 (particularly the Ammonia concentrations in ambient air quality were exceeding the National standards) thereby causing accumulation of aerosols in the atmosphere. Further, non-compliance of the most of the directions given by TNPCB even after committed timeline by the industry, may not be acceptable and leading continued violations. In view of the above, the TNPCB may be directed to issue closure directions to the plant till compliance of HW Rules provisions, AAQ Standards & source emission norms. TNPCB may also be asked to impose the interim environmental compensation of Rs 37,35,000/- calculated by the committee for 83 days and thereon, each day Rs 45,000/- until fully compliance of norms/ closure direction.

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