Chapter-5
Air pollution due to source emission

5.1 Installation of online continuous emission monitoring system

In the era of rapid industrialization, there is a need to regulate pollution compliance by industries with minimal human interventions. One such mechanism is to install online emission and effluent monitoring systems and transfer reliable data to regulatory authorities (SPCBs/CPCB and other government agencies). Online emission and effluent monitoring systems need to be installed and operated by system developers and the industries on the 'Polluter Pay Principle[1]'.

To track the release of pollutants through emissions and effluent discharge from industries with high pollution potential, CPCB directed (February 2014) 17 categories of highly polluting industries and common effluent treatment plants (CETPs), sewage treatment plants (STPs), common bio-medical waste and common hazardous waste incinerators, *etc.* to:

- Install online continuous emission monitoring system (OCEMS) for online monitoring of emission to measure the parameters of PM, NH_3, SO_2, NOx and other sector-specific parameters, and simultaneous transmission of this data to the GPCB and the CPCB by March 31, 2015;

- Installation of surveillance system with industrial-grade internet protocol cameras having Pan-Tilt-Zoom (PTZ) with leased line real-time connection for data streaming; and

- Ensure regular maintenance and operation of the online system with tamper-proof mechanism having facilities for online calibration such as onsite/ offsite and Remote.

CPCB directed (March 2015) GPCB to obtain bank guarantee equivalent to 100 *per cent* of the cost of OCEMS from the targeted units for ensuring timely installation by June 30, 2015. Further, the Ministry notified (January 2018) mandatory installation of OCEMS in the industries using boilers under Environment (Protection) Act, 1986.

As of December 2021, 422 units under these 17 categories were in operation, out of which 67 had not installed OCEMS. GPCB issued notice of direction/ show-cause notice to only 11 units and in case of remaining units, no action was taken by the GPCB. Of all the units having OCEMS, 94 units were connected with GPCB server and remaining were connected with CPCB server.

[1] In environmental law, the polluter pays principle is enacted to make the party responsible for producing pollution responsible for paying for the damage done to the natural environment.

Audit review of records indicated that GPCB has not established any monitoring mechanism to examine the efficacy of the OCEMS installed in 355 units and to check whether the equipment installed were as per the CPCB guidelines. GPCB conducts events such as rallies, exhibition, padyatras, essay competitions, paintings and drawing contests, seminars, workshops, etc., on Earth day, World Environment day, etc., to educate and raise awareness among stakeholders about the various requirements for environment protection and pollution control. However, GPCB has not been able to reach individual industrial units due to limited workforce.

Government stated (January 2022) that GPCB has directed all the ROs to ensure that (i) the units which required OCEMS and its connectivity with the GPCB and CPCB server should install the same at the earliest (ii) defaulter units deposit Bank Guarantee as per the CPCB directions.

The reasons for non-availability of the online emission data of 17 category units in public domain were not furnished to audit.

Facts remained that even after lapse of more than six years since CPCB had issued directions (February 2014), GPCB neither obtained bank guarantee in place of cost of OCEMS nor initiated any action against non-complying units. Also, only 94 units were connected with GPCB server indicating that GPCB had no data on emissions from the remaining units. Not installing OCEMS despite CPCB directions did not fulfil the very purpose of online monitoring of emission of red category units.

GPCB may ensure installation of OCEMS in all the highly polluting industries and ensure its connectivity with CPCB and GPCB server to strengthen monitoring of red category units.

5.2 Insufficient source emission monitoring

The Ministry has prescribed different standards of flue and process emission for different types of activities such as Refineries, Steel, Fertilizer, Thermal Power plants, Chemical, *etc*. through various notifications under the Environment (Protection) Act, 1986. Further, CPCB guidelines (December 1985) stipulate that for emission regulation, the industrial units should monitor Ambient Air Quality and stack emission (Flue/ process) within the industrial premises. The guidelines also stipulate frequency for source emission monitoring-stack sampling[2] for major industries based on plant capacity/boiler capacity. For cement, fertilizer, thermal plants, and other major air polluting units, it ranges from once a week to once in eight weeks. For ensuring compliance with emission norms, the GPCB must carry out air sampling.

Audit analysis revealed that as of March 2021, a total of 32,967 units had been granted CCA under the Air Act, 1981. For ensuring compliance with emission norms by these units, GPCB collected and analysed 4,415 air samples during 2020-21. Audit noticed that under the Water Act, 1974, the GPCB collected

[2] Stack sampling is a method of collecting representative samples of pollutant laden air/gases at the place of origin of pollutants to determine the total amount of pollutants emitted into the atmosphere from a given source in a given time.

and analysed 21,992 samples from 41,993 units which were granted CCA under the Water Act. Thus, the samples analysed for air were quite less as compared to water.

Between April 2014 and November 2019, GPCB had carried out only 906 stack sampling **(Appendix I)** in 46 out of 55 units, test checked under 17 categories in Audit. No stack sampling was done in nine units. Audit observed that GPCB has not stipulated any norms for the frequency of air sampling of stacks for different types of industrial activities. Thus, air sampling for monitoring compliance with emission norms of air pollution was inadequate.

Government stated (January 2022) that stack sampling as a part of the regulatory mechanism of GPCB was hampered due to acute shortage of technical staff in GPCB and stack sampling is time consuming. GPCB further stated that though major industrial units were being monitored on real time basis through installation of OCEMS, stack sampling in other units remained insufficient due to the stated reasons.

Audit is of view that in view of inadequate staff and infrastructure, GPCB may devise a suitable mechanism for stack sampling to monitor the concentration of emission and ensure compliance with emission norms and to sensitize and encourage highly polluting industrial units for self-monitoring.

5.3 Monitoring and regulation of the use of pet coke as fuel

Pet coke, a by-product of the oil refining process, has over 90 *per cent* carbon content. It is cheaper than coal and has a very high calorific value which makes it susceptible to use by industries without specific permission of the PCBs. On burning, it emits 30 to 40 *per cent* more CO_2 per unit of weight. Further, due to its high Sulphur content, it poses a health hazard. All the Sulphur will be released into the atmosphere if an industry uses pet coke without having any Sulphur abatement facility[3].

NGT issued (May 2017) directions to the PCBs on the use of pet coke as 'industrial fuel' because of the non-regulated use of pet coke. Accordingly, the GPCB notified (October 2017 and February 2018) use of Pet coke as approved fuel subject to the following conditions: -

- Sulphur content shall not be more than seven *per cent*.
- Use of pet coke shall not be permitted in Eco-Sensitive Zone.
- Compliance with Siting[4] criteria for new projects authorized to use pet coke.
- Use of pet coke in specific industries[5].

[3] Desulfurization or Circulating Fluidized Bed Combustion technology.
[4] Related to site.
[5] (i) Cement manufacturing units (ii) Thermal power plants/ captive power plants of capacity above 25 MW, cogeneration plants as combined heat and power (CHP) where boiler steam generation capacity should be 80 Ton per hour or more (iii) Glass manufacturing up to 25 *per cent* of total fuel consumption (iv) Refractories, etc.

Further, the Ministry also issued (September 2018) guidelines for regulation and monitoring of imported pet coke in India which *inter alia* included the following: -

(i) Only registered industrial units with valid consent from SPCBs/ Pollution Control Committees (PCCs) shall be permitted to directly import pet coke and the consignment shall be in their name and for their use only.

(ii) Authorized importers of pet coke shall furnish details of opening and closing stock of imported pet coke to the concerned SPCBs/ PCCs on quarterly basis.

(iii) SPCBs/ PCCs shall develop an electronic record system for uploading of consent, registration, and record of use of imported pet coke by the industrial units and share this data with the CPCB on quarterly basis.

As per the information provided by Gujarat Maritime Board, during 2017-21, 72.10 lakh MT pet coke was imported by the users through the ports in Gujarat.

As informed (November 2019) by GPCB, no quarterly reports were submitted by the authorized importers of pet coke. GPCB further stated that units falling under the criteria specified in the notification are allowed to use pet coke and if any industry is found using pet coke without permission, legal action is taken including closure of the unit. GPCB issued (January 2015/July 2019) notices to two units for unauthorised use of pet coke in the ceramic industries at Morbi.

After the matter was pointed out by Audit, in pursuance of directions of the Ministry, GPCB directed (June 2021) the bulk consumers (cement industries) of pet coke to upload consumption data of pet coke on CPCB website.

Government stated (January 2022) that the issue would be taken up in line with other PCBs and data would be uploaded as per the MOEF&CC guidelines.

GPCB may evolve a mechanism to get data on import of pet coke in the State from the Gujarat Maritime Board and the Director-General of Foreign Trade. It may also ensure that bulk consumers of pet coke upload consumption data so that use of pet coke can be monitored and regulated.

5.4 Non-reduction in emission standards of units operating in eco-sensitive zone of Thol Wildlife Sanctuary

For the Eco-Sensitive Zone (ESZ), norms for ambient air quality are stricter and the prescribed limit of annual concentration of SO_2 and NO_2 in ambient air is 20 $\mu g/m^3$ and 30 $\mu g/m^3$, respectively[6]. The Ministry had notified (18 October 2013) the area up to 2.244 kilometres from the boundary of the protected area of the Thol Wildlife Sanctuary[7] as ESZ and prohibited establishment of sawmills, industries causing pollution (Water, Air, Soil, Noise), the establishment of commercial hotels, discharge of untreated effluent and solid waste in natural water bodies or terrestrial area. The Norms Committee of

[6] National Ambient Air Quality Standards issued by the CPCB (November 2009).

[7] It is an important protected wetland and a potential Ramsar site, supporting more than 20,000 waterfowl, 15 bird species which are globally rare, vulnerable, threatened, and endangered.

GPCB identified seven units (five units of Red category and two units of Orange category) in ESZ of the Sanctuary and decided (December 2014) to reduce emission norms for PM_{10} for stack emission[8] from 150 mg/Nm^3 to 100 mg/Nm^3.

Audit observed (September 2019) that the norms of SO_2 and NO_2 for AAQ were not modified in the CCA of the seven units while the emission norms of PM_{10} for stack were modified in one case only. Further, neither GPCB nor the units themselves were monitoring AAQ. Therefore, compliance with the AAQ standards within the ESZ could not be ascertained by Audit. However, analysis of stack air emission data from 2014-19 revealed that in four units[9], concentration of PM_{10} (of stack) was substantially above the norms (ranging between 20 mg/Nm^3 to 1052 mg/Nm^3 against the norms of 100 mg/Nm^3) and in one unit[10], the concentration of SO_2 ranged between 48.85 ppm and 300 ppm, against the norms of 20 ppm. Out of 28 samples taken for PM_{10}, only eight samples were within the norms in these four units.

At the instance of Audit, GPCB revised (December 2019) CCA of all these seven units. Further, GPCB stated that RO, Gandhinagar has been directed to carry out monitoring of AAQ in ESZ of the Thol Wildlife Sanctuary.

The Government stated (January 2022) that revised norms were being monitored by the field offices on regular basis.

The GoG may set up a mechanism to regularly monitor AAQ in ESZ of Thol Wildlife Sanctuary to maintain its ecology as a potential Ramsar site.

5.5 Non-preparing vision documents for emission control

As per Section 17 of the Air Act, GPCB is required to collect and disseminate information relating to air pollution and prepare a comprehensive programme for prevention, control and abatement of air pollution and ensure execution of this comprehensive program. This could be done through Source Apportionment Studies (SAS) and the preparation of vision documents. SAS includes preparation of emission inventories, monitoring of ambient air quality for various pollutants, chemical speciation of ambient PM_{10} and $PM_{2.5}$ of source emissions to assess the contribution from various sources.

Source apportionment studies

In pursuance of the provision of the Air Act, GPCB collects data on air pollution to assess the quality of air only at selected locations. However, SAS are necessary to assess the future projections of emission level, develop cost-effective action plans and interventions for mitigating emission and evaluation of various control options were not being done by the GPCB except for Ahmedabad and Surat.

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8 Stack emission is monitored at the source of emission *i.e.,* at the stack and ambient monitoring is done at open-air in the premises.

9 Units operating without PNG, (i) Turakhiya Overseas Pvt Ltd (ii) Jalaram Ceramics Limited (iii) Shah Tiles Limited and (iv) Olympic Laminates Limited.

10 Olympic Laminates Limited.

Vision documents

The GoG has not prepared any vision document except preparation of Air Action Plan for Ahmedabad and Surat which were prepared in pursuance of the order of NGT (October 2018). It was under preparation (December 2021) for Vadodara and Rajkot under NCAP. Action Plan for prevention, control, and abatement of air pollution for other polluted areas/cities of the state and industrial clusters were not prepared (January 2022).

Audit further observed that based on the AAQ data, no interventions either in form of policy or schemes were made. Any interventions during 2014-15 to 2020-21 for improvement of AAQ in Gujarat were initiated by the NGT *viz.* Air Action Plan for Ahmedabad and Surat, regulation of use of pet coke as solid fuel, regulation of use of fuel in ceramic industry in Morbi, NCAP, regulation of construction and demolition of waste, disposal of municipal solid waste or unit-specific directions by CPCB based on OCEMS data captured by them. GPCB has *Suo-moto* not intervened to bring air quality within the norms prescribed by CPCB and prevent deterioration of air quality where it was within the norms in the State.

Government stated (January 2022) that Air Action Plan of Ahmedabad and Surat were under implementation and SAS of Vadodara and Rajkot were under preparation.

Fact remained that Air Action Plan and SAS prepared by the GoG were under National Clean Air Programme.

Audit is of the view that considering the rapid urbanization and industrial growth of the State, a comprehensive policy with time-bound targets must be formulated by the State Government for abatement of air pollution.

Conclusion

Sixty-seven highly polluting units have not installed OCEMS, though it is mandatory. The source monitoring by GPCB was found inadequate. The use of Pet coke in the State is not being monitored. The GoG has not prepared vision documents as a long-term policy measure for regulation and control of air pollution in the State.