Chapter-6
Air pollution due to fugitive emission

Introduction

Fugitive emissions are unintended emissions from facilities or activities that cannot reasonably pass through a vent, stack, or chimney system to reduce emissions. These mainly consist of PM_{10} and $PM_{2.5}$. The type of activities causing fugitive emissions, reasons and mitigation measures are shown in **Table 8** as under: -

Table 8: Fugitive Emission

Sl No	Type of activity	Institutions responsible for enforcement of regulation	Reasons of fugitive Emission	Mitigation measures
1	Highway construction	Roads and Building department, National highway authority of India, Local Bodies	Loss of tree coverage and top soil, encroachment on water bodies, hot mix plants, stone crushers, and transportation of road construction material and generation of waste.	Barricading the site, regular water sprinkling, and transportation of construction material in a closed vehicle and debris disposal as per the Indian Road Congress guidelines and applicable specifications.
2	Infrastructure activities	Urban Local bodies		
3	Solid waste	Urban Local Bodies	Heaping up solid waste near the urban areas, rivers and seas ultimately pollute the environment and the eco-system due to the emission of foul and methane gas.	Scientific disposal of solid waste, segregation of waste at source, development of Treatment, Storage, and Disposal Facilities.
4	Hot Mix plants	Roads and Building department, National Highway Authority of India, Local Bodies	Dust and noise pollution due to not providing enclosures and non-compliance of the siting criteria in addition to flue gas emission as they operate on fossil fuels.	Strict compliance to Siting criteria, providing enclosures to the work area, and compliance to the SOP.
5	Brick kilns	Revenue Department, Local Bodies	Movement of tractors and trucks on the unpaved areas.	Adoption of Induced Draft Brick kiln (zigzag brick setting with the rectangular shape of the kiln)

				technology and paving of all moving areas within the premises of the kiln.
6	Stone crushers	Commissioner of Geology and Mining	Stone crushers generate fine dust.	Planting trees, constructing metal roads within the premises, making wind-breaking walls, sprinkling water, and covering the conveyor belt.
7	Sawmills and wood dependent industrial units	Forests and Environment Department issues license to operate under the Forests Act 1927.	Sawmills generate a vast quantity of bark; sawdust, shavings and trimmings, toxic and non-toxic particulates, veneer dryer emission and glue waste disposal.	Providing Bag Filters, Cyclone Collectors, and wet scrubbers.
8	Ice making and cold storage plants	Power distribution companies release power connections without ensuring CCA of the GPCB	Leakage of ammonia and gases.	Strict compliance to the gas leakage detection system.

Specific audit observations on each type of fugitive emission are as under: -

6.1 Emission due to highway construction

The site of the ongoing six laning of the Ahmedabad-Rajkot Highway passes near the AAQ monitoring station, Changodar, Ahmedabad. The AAQ data (24 hours average of PM_{10}) at the station before commencement of work (September 2017) ranged between 100 and 125 $\mu g/m^3$. However, when work was in progress (July 2018-February 2019), it ranged[1] between 141 and 311 $\mu g/m^3$ against the norms of 100 $\mu g/m^3$. Thus, the concentration level of PM_{10} increased during highway construction.

6.2 Emission due to infrastructure activities

At the request of Audit (February 2021), GPCB undertook air sampling (February-March 2021) at seven different locations where infrastructure activities were in progress in Ahmedabad and Gandhinagar. It was observed that concentration of PM_{10} level ranged between 117 and 232 $\mu g/m^3$ (24 hours average) against the norms of 100 $\mu g/m^3$. The GPCB issued (June 2021) show cause notice to the implementing agencies for poor ambient air quality.

[1] Source: AAQ monitoring reports under NAMP and SAMP.

The increased levels of PM_{10} during road construction and infrastructure activities indicate that required mitigation measures such as watering, barricading the site, *etc*, was not enforced by the local bodies/Roads & Building Department.

GPCB instructed (June 2021) ROs to monitor fugitive emissions and to ensure that the local bodies and implementing agencies take necessary action to control them.

GPCB may develop a reporting mechanism involving agencies and departments engaged in infrastructure activities for strict enforcement of mitigation measures.

6.3 Non-scientific disposal of solid waste by Gandhinagar Municipal Corporation

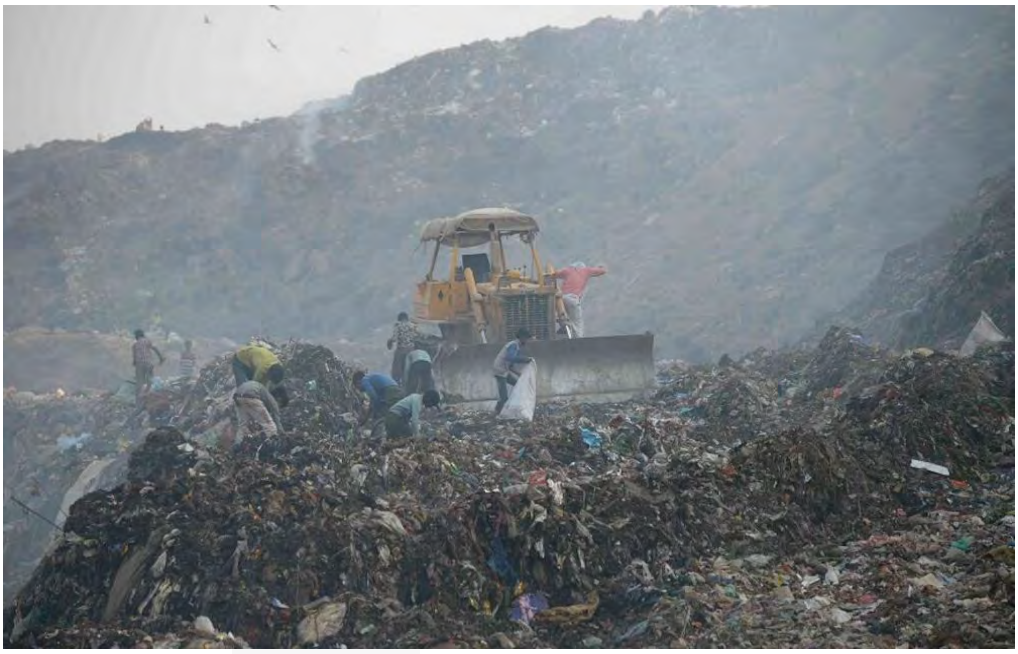
Gandhinagar Municipal Corporation (GMC) dumps Municipal Solid Waste (MSW) near the bank of river Sabarmati at Gandhinagar. GPCB observed (October 2016 and May 2019) pungent smell, burning of waste causing smoke, presence of stray animals, non-segregation of plastic waste, *etc.* at the dumping site. GPCB observed (February 2017) concentration of PM_{10} and $PM_{2.5}$ as 323 and 139, $\mu g/m^3$ respectively, which was high in comparison to AAQ standards[2]. In June 2021, the PM_{10} level at the dumping site was 333 $\mu g/m^3$. Thus, the existing MSW site was a source of air pollution and foul smell, causing discomfort to the residents of the nearby areas and a cause of fugitive emission. CPCB had directed (October 2017) the Commissioner, GMC to provide hazardous waste deposition facilities for safe handling and disposal of domestic hazardous waste. However, the same remained to be developed (November 2021).

6.4 Non-disposal of legacy solid waste by Ahmedabad Municipal Corporation

Ahmedabad Municipal Corporation (AMC) is dumping and stacking unsegregated solid, construction, demolition, and industrial waste of Ahmedabad city at Pirana since 1982. Over the period, the waste has occupied 84 acres of land in the form of three 75 feet high mounds of solid waste aggregating 95 lakh MT. Fugitive emissions from landfills are a significant source of non-methane volatile organic compounds (NMVOCs) in urban environments. NMVOCs play an important role in atmospheric chemistry, and elevated concentrations of some compounds are responsible for air quality deterioration. It has been causing air pollution due to the burning of waste.

[2] Standard values (24-hour average) for PM_{10} and $PM_{2.5}$ are 100 $\mu g/m^3$ and 60 $\mu g/m^3$, respectively.

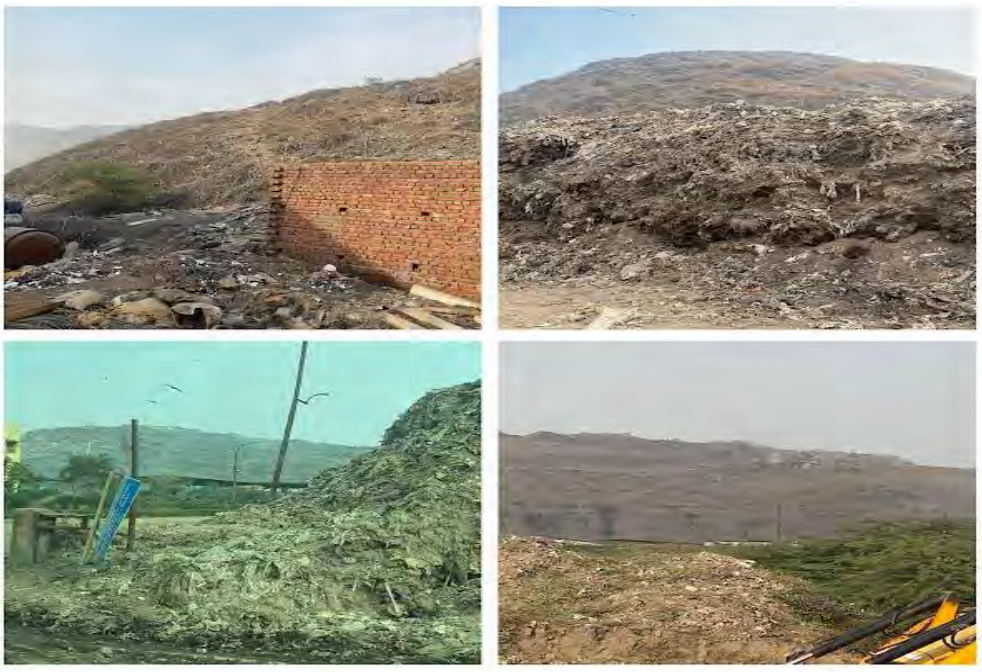
Picture-1: Municipal Solid Waste dumping site, Ahmedabad (August 2019)



(gujaratinews18.com AUGUST 28, 2019)

CPCB directed (October 2017) AMC to dispose of MSW as per the existing rules and to submit a time-bound action plan before 25 October 2017. However, AMC did not initiate any action till July 2019. The issue of non-disposal of legacy waste came to finality when NGT directed (July 2019) GoG to constitute a Committee to clear the legacy waste (segregation of waste and its end utilization) and as a measure of punitive action directed to transfer a sum of ₹ 75 crores to an Escrow account. Till February 2021, AMC had completed segregation of 24 lakh MT of legacy waste and cleared 14-acre land.

Picture-2: Municipal Solid Waste dumping site, Ahmedabad as on 27 December 2021



(Photos taken during site inspection)

Thus, AMC did not initiate any *Suo-moto* action but acted only after the intervention of the NGT in the matter. The Pirana dumpsite, included in the approved Air Action Plan of Ahmedabad city is a major source of air pollution in Ahmedabad.

6.5 Emission due to hot mix plants

As per the extant directions (October 2009) of the Roads & Buildings (R&B) Department, a certificate for establishing Hot Mix Plants should be issued by the SE, Mechanical (R&B) after the operator obtains CTE and CCA from the GPCB and complies with applicable air pollution control measures.

Audit observed (June 2019) that the SE, Mechanical (R&B) had issued 526 certificates (during April 2016 to March 2019) for establishing HMPs with the condition that the concerned agency will obtain CTE and CCA from the GPCB within three months from the date of issue of certificate failing which their certificate for establishing the HMP would stand cancelled.

Audit verified (March 2019) the records of GPCB and observed that only 275 HMPs obtained CCA and the remaining 251 HMPs were operating without CTE and CCA. During a test check of the records of Regional Office Vatva, Ahmedabad, Audit observed (September 2019) that out of 17 HMPs operating in their jurisdiction, only five units had CTE and CCA while the remaining 12 units were operating without CTE and CCA. Audit examined the Inspection Report of four HMPs inspected by the GPCB in October 2019 and noticed that none of the units were complying with the air pollution control measures.

Thus, SE, Mechanical (R&B), did not insist upon obtaining CTE and CCA before issuing the certificate, contrary to the instructions of the R&B Department.

Government reply (January 2022) to the draft performance audit report was silent on this issue.

GPCB may ensure that the provisions of the Air Act, 1981 and the directions of R&B Department are strictly complied with.

GPCB may also establish a mechanism in consultation with R&B Department to collect real-time production data of HMPs to check the evasive polluters.

6.6 Emission due to brick kilns

Audit examined (August-September 2019) records of three test-checked ROs of Ahmedabad (East) Vatva, Ahmedabad (Rural), and Gandhinagar. It was noticed that only four (out of 40), 12 (out of 137), and three (out of 108) brick kilns respectively had valid CCA. Audit also observed that:

- Under RO Ahmedabad (East), Vatva, during 2014-19, GPCB did not carry out stack emission and ambient air quality sampling in any of the 40 brick kilns.

- In 2020-21 too, GPCB did not carry out stack emission and ambient air quality sampling in any of the brick kiln units operating under the jurisdiction of the ROs at Vadodara, Ahmedabad (Rural) and Gandhinagar.

- Under RO Ahmedabad (Rural), two brick kilns monitored by GPCB were operating without adopting anti-pollution measures and one of these was operating without renewal of CCA.

- Under RO, Gandhinagar, seven brick kilns monitored by the GPCB were operating without adopting anti-pollution measures and six of these were operating without CTE.

On being pointed out by Audit, GPCB, directed (June 2021) the brick manufacturers through Gujarat Bricks Manufacturers Federation, Gandhinagar to adopt cleaner technology. GPCB stated (June 2021) that it had issued 465 show cause notices/closure notices/ closure directions to brick kiln units operating without consent.

GPCB may disseminate directions of CPCB on the adoption of new technology to the brick kiln manufacturers. Besides, non-agriculture permission granted by the revenue authorities to the brick manufacturers may include a condition for adoption of cleaner technology.

6.7 Emission due to stone crushers

CPCB issued guidelines (February 2009) based on the Ministry's notifications of August/December 1990 for Siting[3] criteria for stone crushing units and prevention and control of emissions due to those. As per guidelines, the concentration of PM in ambient air at 3 to 10 meters from the crusher/ quarry shall not exceed 600 $\mu g/m^3$. Further, the stone crusher units must ensure compliance with the Siting criteria. As per GPCB database of November 2021, 1,681 stone crusher units were issued CCA in the State.

Audit scrutiny (November 2019) of inspection reports of 15 stone crushing units revealed that in every unit, GPCB had observed heavy dusting, non-installation of equipment/ mechanism required for control of fugitive emission, not watering of the operating area, insufficient plantations, and not covering of conveyer belt. Thus, none of the units were complying with the Siting criteria. Further, without sampling and measuring fugitive emission, GPCB in its inspection report stated that ambient air quality is insufficient.

GPCB has not provided any reply on the issue (December 2021).

GPCB in coordination with Commissioner, Geology and Mining may ensure that the stone crushing units follow siting criteria strictly. Further, a system needs to be developed for self-regulation and self-monitoring by the stone-crushing units.

[3] Related to site.

6.8 Emission due to sawmills and wood dependent industrial units

As per the database of the GPCB, as of January 2020, only 347 sawmills and wood-dependent industrial units had valid CCA. However, as per Gujarat Forests Statistics 2018-19, 5,714 sawmills and wood-dependent industrial units were having licenses[4] to operate. Thus, 5,367 sawmills and wood-dependent industrial units were operating (January 2020) without the consent of GPCB. The GPCB confirmed (June 2021) that it had not brought to notice of the Principal Chief Conservator of Forests & Head of Forest Force (PCCF&HoFF) the applicability of provisions of the Air Act for operating sawmills and wood-dependent industrial units.

GPCB may consider bringing sawmills and wood-dependent industrial units under the ambit of the Air Act by issuing CCA in coordination with the PCCF&HoFF.

6.9 Emission due to ice making plants and cold storages

To ensure strict compliance of provisions of the Air Act by cold storage and ice-making plants, GPCB had directed (December 2014) the power distribution companies not to release power connection to such plants without ensuring that the operator has obtained CCA from the GPCB.

Audit observed (November 2019) that in May 2019, 2,690 ice-making plants and cold storage were operative in the State (as per the details furnished by the DISCOMs of Gujarat[5] excluding Torrent Power Limited). However, as per the database of the GPCB, only 290 CCA were issued to such plants. Thus, 2,400 cold storage and ice-making plants were operating without CCA.

GPCB stated (December 2019) that boilers are not used in such plants and therefore they do not cause considerable air pollution. It was added that however, these would be covered under the Air Act. The reply is not convincing. The ammonia-based ice plants may cause loss of human life in case of leakage of ammonia and are also a source of air pollution.

Thus, many activities which cause considerable fugitive emissions were operating without CTE and CCA primarily due to lack of coordination and dissemination of information/data between various departments and the GPCB and due to the inability of GPCB to check/monitor all these activities. A system needs to be evolved to ensure better coordination among various departments of GoG and GPCB through sharing of data continuously and involving them in enforcing the Air Act.

In response to audit observation on air pollution due to fugitive emission, the Government stated (January 2022) that (i) various sources of fugitive emission as enumerated by audit had been covered in consent mechanism and control on fugitive emission is done through close inspection of units, (ii) various SOPs

[4] Sawmills (5322), veneer units (57), veneer plywood units (248), plywood (76) and particle board manufacturing units (9), MDF (2).

[5] Madhya Gujarat Vij Company Ltd, Paschim Gujarat Vij Company Ltd, Uttar Gujarat Vij Company Ltd and Dakshin Gujarat Vij Company Ltd except Torrent Power Limited.

had been prepared by GPCB for the control of fugitive emission and SOP made by the CPCB for various sectors were also followed through prescribing conditions in the consent, and (iii) Brick Kiln manufacturers have been directed to adopt new technology.

Audit acknowledges the positive response of the Government. However, Audit is concerned that the various sources of fugitive emission are poorly regulated, operating out of consent mechanism and therefore remained non-monitored.

Conclusion

Fugitive emission is another controllable source of air pollution. The GPCB must evolve administrative departments for regulating fugitive emissions. Infrastructure activities, highway construction, hot mix plants, slow action in the disposal of solid waste, bricks kilns, stone crushers, sawmills, and ice-making plants, which are a major source of fugitive emission, need to be regulated.