Report of the Expert Committee constituted for "Systematic study on functioning of the State Pollution Control Boards, as well as the Pollution Control Committees in the Delhi NCR"

Commission for Air Quality Management in NCR and Adjoining Areas

July, 2025

Contents

List of Abbreviations

AAS	Atomic Absorption Spectroscopy
ACS	Additional Chief Secretary
AI	Artificial Intelligence
AOD	Aerosol Optical Depth
AOX	Adsorbable Organically bound Halogens
API	Application Programming Interface
AQI	Air Quality Index
AQICCC	Air Quality Integrated Command and Control Centre
ASG	Anti-Smog Gun
BC	Black Carbon
BS	Bharat Stage
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
CAAQMS	Continuous Ambient Air Quality Monitoring Station
CAMS	Copernicus Atmosphere Monitoring Service
CAQM	Commission for Air Quality Management in NCR and Adjoining Areas
CEMS	Continuous Emission Monitoring System
CETF	Coordination and Environment Task Force
CETP	Common Effluent Treatment Plant
CO	Carbon Monoxide
COP	Conformity of Production
CPCB	Central Pollution Control Board
CPGRAMS	Centralized Public Grievance Redress and Monitoring System
CSIR	Council of Scientific & Industrial Research
CTE	Consent to Establish
CTO	Consent to Operate
DCMC	Dust Control & Management Cell
DG	Diesel Generator
DOS	Department of Space
DPCC	Delhi Pollution Control Committee
EC	Environmental Compensation
EC/OC	Elemental Carbon/Organic Carbon
EDXRF	Energy-Dispersive X-ray Fluorescence
EOS	Earth Observation Satellites
ESA	European Space Agency
FTIR	Fourier Transform Infrared Spectroscopy
GC	Gas Chromatography
GC-MS	Gas Chromatography-Mass Spectrometry
GIS	Geographic Information System
GNCTD	Government of National Capital Territory of Delhi
GPS	Global Positioning System
GRAP	Graded Response Action Plan
GTA	Graphite Tube Atomizer
GVP	Garbage Vulnerable Point

HARSAC	Haryana Space Applications Centre
HDV	Heavy-Duty Vehicle
HPLC	High-Performance Liquid Chromatography
HR	Human Resource
HRGC	High-Resolution Gas Chromatography
HRMS	High-Resolution Mass Spectrometer
HSPCB	Haryana State Pollution Control Board
HVS	High Volume Sampler
IARI	Indian Agricultural Research Institute
IC	Ion Chromatography
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry
IIM	Indian Institute of Management
IITM	Indian Institute of Tropical Meteorology
IMD	India Meteorological Department
INSAT	Indian National Satellite System
IP	Internet Protocol
ISRO	Indian Space Research Organisation
IT	Information Technology
LIDAR	Light Detection and Ranging
LIMS	Laboratory Information Management System
LVS	Low Volume Sampler
MCD	Municipal Corporation of Delhi
MERRA	Modern-Era Retrospective analysis for Research and Applications
MIS	Management Information System
MODIS	Moderate Resolution Imaging Spectroradiometer
MoEF&CC	Ministry of Environment, Forest and Climate Change
MoHUA	Ministry of Housing and Urban Affairs
MoRTH	Ministry of Road Transport and Highways
MRS	Mechanized Road Sweeping
MRSM	Mechanical Road Sweeping Machine
MS	Mass Spectrometry
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
NABL	National Accreditation Board for Testing and Calibration Laboratories
NAMP	National Air Quality Monitoring Programme
NASA	National Aeronautics and Space Administration
NCAP	National Clean Air Programme
NCR	National Capital Region
NEERI	National Environmental Engineering Research Institute
NMHC	Non-Methane Hydrocarbon
NO	Nitric Oxide
NOx	Nitrogen Oxides
NPL	National Physical Laboratory
OBD	On-Board Diagnostics

OCEMS	Online Continuous Emission Monitoring System
OMI	Ozone Monitoring Instrument
PAHs	Polycyclic Aromatic Hydrocarbons
PAN	Peroxyacetyl Nitrate
PEMS	Portable Emissions Measurement System
PG	Public Grievance
PM	Particulate Matter
PRSC	Punjab Remote Sensing Centre
PTZ	Pan-Tilt-Zoom
PUC	Pollution Under Control
PUCC	Pollution Under Control Certificate
PUF	Polyurethane Foam Sampler
QA/QC	Quality Assurance and Quality Control
RO	Regional Officer
RSD	Remote Sensing Device
RSPCB	Rajasthan State Pollution Control Board
SLF	Sanitary Landfill
SODAR	Sound Detection and Ranging
SOP	Standard Operating Procedure
SPCB	State Pollution Control Board
SPM	Suspended Particulate Matter
SRSAC	State Remote Sensing Applications Centre
STP	Sewage Treatment Plant
SWM	Solid Waste Management
TD GCMS	Thermal Desorption Gas Chromatography Mass Spectrometry
TEOM	Tapered Element Oscillating Microbalance
THC	Total Hydrocarbon
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TOR	Terms of Reference
TOX	Total Organic Halogen
TPP	Thermal Power Plant
TROPOMI	Tropospheric Monitoring Instrument
ULBs	Urban Local Bodies
UPPCB	Uttar Pradesh Pollution Control Board
UT	Union Territory
UV	Ultraviolet
VC	Ventilation Coefficient
VIIRS	Visible Infrared Imaging Radiometer Suite
VOCs	Volatile Organic Compounds
WP	Writ Petition
XRF	X-ray Fluorescence
ZLD	Zero Liquid Discharge

Executive Summary

A comprehensive assessment of the functioning of State Pollution Control Boards (SPCBs) and Pollution Control Committee (PCC) in the National Capital Region (NCR) has been carried out in the present report. The primary objective is to investigate equipment and technological adequacy along with institutional capacity with respect to air quality management, following the directive of the Hon'ble Supreme Court of India (order dated 8th May 2025 in WP(C) No. 13029 of 1985), which emphasized the need to strengthen the functioning of SPCBs/PCC in terms of modern equipment and up-to-date technologies.

The Expert Committee, constituted by the Commission for Air Quality Management in NCR and Adjoining Areas (CAQM), held a series of consultative meetings during May-July 2025. The Expert Committee examined and identified gaps in the operational frameworks of SPCBs/DPCC, including air quality and emission monitoring infrastructure, inadequate staffing, inspection and enforcement, data dissemination and training mechanisms.

The current report offers a review of the current status of the operational framework, regulatory responsibilities and technical capacities of the SPCBs of Haryana, Rajasthan, Uttar Pradesh and Delhi Pollution Control Committee (DPCC) and provide recommendations to improve the functioning of SPCBs/DPCC though effective use of modern equipment and technologies along with data driven approach for the effective monitoring and enforcement actions to reduce air pollution in the NCR.

The recommendations of the Committee are mainly focused on three areas including technological interventions to modernize air quality and emission monitoring, strengthening sectoral enforcement mechanisms and human resource development. Recommendations are focused to strengthen both continuous and manual air quality monitoring systems via regular calibration, quality assurance and digital performance auditing, while ensuring data verification through advanced tools like AI and ML. Emphasis has also been given on the development of centralized, real-time AQI dashboards and data protocols for wider dissemination, as well as mobile monitoring capabilities. Modern methods and technologies including atmospheric dispersion monitoring, satellite-based remote sensing, reanalysis datasets, and drone surveillance are also suggested. It is also recommended that SPCBs/DPCC Air Laboratories need to be strengthened with advanced analytical instruments and to be recognized under EPA 1986. Further, it is recommended to constitute a high-level Coordination and Enforcement Task

Force (CETF) to spearhead sectoral enforcement and mandate interdepartmental surveillance. Alongside, it is recommended to enhance data management, use GIS extensively, develop integrated control and command centres for real-time coordinated action, and SMS-based public alerting systems. Furthermore, regular human resource assessments, targeted training through nationally reputed institutions are also recommended.

Conclusively, the report offers comprehensive recommendations for strengthening the functional capacity of the State Pollution Control Boards and Delhi Pollution Control Committee with evidence-based preventive and coordinated actions for air quality management in the Delhi NCR.

The report has been extensively deliberated and approved by all the Members of the Expert Committee.

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Convener, Expert-Committee
Sci-E, CAQM

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Chairman, Expert-Committee
Member-Technical, CAQM

1. Background

The Hon'ble Supreme Court vide its order dated 08-05-2025 in WP(C) No 13029 of 1985 M.C. Mehta vs Union of India, observed that:

> "……. *It is necessary to examine the functioning of the State Pollution Control Boards, as well as the Pollution Control Committees. Perhaps, the Boards and the Committees may be using age-old technology and equipment.*
>
> *We, therefore, direct the Commission for Air Quality Management (hereinafter referred to as "the CAQM") to undertake a systematic study on these aspects. Unless the Pollution Control Boards and the Pollution Control Committees are equipped with modern equipment and unless they start using modern techniques, they will not be able to discharge their statutory duties effectively.*
>
> *The CAQM shall work on this aspect and make its recommendations by the end of July 2025 and forward the same to the CPCB as well as to the Pollution Control Boards of the States of Haryana, Rajasthan and Uttar Pradesh and the DPCC. Based on the recommendations of the CAQM, necessary actions shall be taken, including the acquisition of proper equipment*…….."

In pursuance of the above order of the Hon'ble Supreme Court of India, CAQM constituted an Expert Committee vide order dated 23.05.2025 (**Annexure-I**) to undertake a systematic study in reference to the functioning of the SPCBs as well as the DPCC with the following Terms of Reference (TOR):

a) To undertake a systematic study on the broad mechanism of the functioning of the State Pollution Control Boards, as well as the Pollution Control Committees with regard to monitoring, prevention and abatement of air pollution.
b) To examine the existing technology and equipment being used, identify gaps and suggest modern equipment/techniques to enable them to discharge their statutory duties more effectively.

The Committee convened a series of meetings on 29.05.2025, 09.06.2025, 13.06.2025, 18.06.2025, 24.06.2025, 02.07.2025, 18.07.2025 and 24.07.2025 where several critical issues were discussed, including:

1. Gaps and requirements in the existing ambient air quality monitoring infrastructure,
2. Gaps, challenges and requirements in the online emission monitoring and data reporting,
3. Gaps in training and technology being used for data analysis, reporting, effective enforcement and time-bound complaint redressal.

Invaluable inputs from the following Special Invitees are also included in the report:

1. Dr. B. Sengupta, Former MS, CPCB;
2. Dr. Shankar Gopal Aggarwal, Chief Scientist, CSIR-NPL, Delhi;
3. Dr. Sachin Ghude, Scientist-F, IITM Pune.

The Committee deliberated extensively on these shortcomings and made recommendations to improve operational efficiency, regulatory enforcement and technological capabilities of SPCBs and DPCC.

2. Functioning of SPCBs/DPCC

2.1 Functions of SPCBs/DPCC

The functioning of the SPCBs are defined under Section 17 of the Air (Prevention and Control of Pollution) Act, 1981. Under Section 6 of the Air Act, 1981, the Central Board shall exercise the powers and perform the functions of a State Board for the Union territory or Central Board may delegate all or any of its powers and functions to such person or body of persons as the Central Government may specify. The Air Act stipulates the functions of State Boards as under:

(a) To plan a comprehensive programme for the prevention, control or abatement of air pollution and to secure the execution thereof;
(b) To advise the State Government on any matter concerning the prevention, control or abatement of air pollution;
(c) To collect and disseminate information relating to air pollution;
(d) To collaborate with the Central Board in organising the training of persons engaged or to be engaged in programmes relating to prevention, control or abatement of air pollution and to organise mass-education programmes relating thereto;
(e) To inspect, at all reasonable times, any control equipment, industrial plant or manufacturing process and to give, by order, such directions to such persons as it may consider necessary to take steps for the prevention, control or abatement of air pollution;
(f) To inspect air pollution control areas at such intervals as it may think necessary, assess the quality of air therein and take steps for the prevention, control or abatement of air pollution in such areas;
(g) To lay down, in consultation with the Central Board and having regard to the standards for the quality of air laid down by the Central Board, standards for emission of air pollutants into the atmosphere from industrial plants and automobiles or for the discharge of any air pollutant into the atmosphere from any other source whatsoever not being a ship or an aircraft: Provided that different standards for emission may be laid down under this clause for different industrial plants having regard to the quantity and composition of emission of air pollutants into the atmosphere from such industrial plants;

(h) To advise the State Government with respect to the suitability of any premises or location for carrying on any industry which is likely to cause air pollution;
(i) To perform such other functions as may be prescribed or as may, from time to time, be entrusted to it by the Central Board or the State Government;
(j) To do such other things and to perform such other acts as it may think necessary for the proper discharge of its functions and generally for the purpose of carrying into effect the purposes of this Act.

SPCBs/DPCC are the primary authorities responsible for planning, implementing, monitoring and enforcing measures to prevent, control, and abate air pollution. The areas of functioning can be broadly summarised as under:

- Advice to the State Government by providing expert guidance on air pollution prevention, control, and abatement, including suggesting policy modifications and drafting new regulations and policies.
- Development, planning, and implementation of State and National Air quality programmes, including action plans to meet regulatory requirements and address future challenges.
- Conducting R&D activities to improve monitoring techniques and pollution control technologies, development of action plans and advisory to the Government.
- Air quality monitoring through a network of stations, analyzing pollutant concentrations to assess pollution levels and identify areas of concern.
- Emission and compliance monitoring by conducting inspections of industries, equipment, and processes.
- Issuing permits through CTE/CTO and taking enforcement actions against violators, including issuing closures, EC and initiating prosecution.
- Setting up Air Labs to analyze samples collected from ambient air and polluting sources such as industries for compliance.
- Handling public grievances and legal matters.
- Air pollution related data hosting, management, analysis and dissemination.

- Conducting public awareness activities and organizing training programs.
- Internal administrative management and operation, and coordination of activities with stakeholders.

Based on the above, the areas where equipment and technology are needed to strengthen the functioning of SPCBs/DPCC can be broadly categorized as under:

(i) **Ambient Air quality monitoring:** The process includes monitoring through the Continuous Ambient Air Quality Monitoring System (CAAQMS) and manual monitoring followed by sampling, data collection, chemical analysis, scientific assessment and data dissemination. This also involves equipment calibrations, maintenance, auditing of the monitoring stations and deployment of trained staff.

(ii) **Sectoral Source and Emission monitoring:** Source identification and emission monitoring in industries is done through the Online Continuous Emission Monitoring System (OCEMS) and source emission (stack) monitoring by doing inspection, sample collection, chemical analysis, scientific assessment, recommendation and enforcement actions.

(iii) **Strengthening of Air Laboratories:** Air samples once collected are stored and analyzed in Air Laboratories using advanced analytical instruments. These instruments are operated by qualified staff. The lab reports generated are used for taking further actions.

(iv) **Data management:** This process includes the management of vast amount of air pollution and related data generated, either manually or online as a part of air quality management in the Delhi NCR. This includes data storage/hosting, analysis, report generation and dissemination through centralized dashboard/portal.

(v) **Routine work automation using IT:** Time-bound issuance of permits (e.g., CTE, CTO etc.), inspection and enforcement, modern digital collaborative tools and office automation.

(vi) **Training and up-skilling:** Training and up-skilling of the staff is required for handling scientific equipment, procedures and effective use of IT in day-to-day work.

2.2 Organizational Structure

SPCBs and DPCC are headed by a Chairperson, followed by a Member Secretary, who oversees the functioning of the SPCBs/DPCC. These bodies comprise of administrative,

scientific, engineering, and legal staff responsible for monitoring, enforcement and regulatory functions. They also need to coordinate with the stakeholders such as CAQM, Central Ministries, CPCB, State Government Departments (Environment, Transport, Agriculture etc.), ULBs, industries, public sector corporations etc. To manage pollution control across the respective State, Regional Offices (ROs) are established at regional or district levels, serving as local contact points for industries and the public. The workload distribution of SPCBs/DPCC staff, as submitted by SPCBs/DPCC, include, high involvement in key regulatory and enforcement-related tasks such as, field inspections, and monitoring of emissions, legal matters, administrative operations and complaint handling. Medium-level involvement is generally observed in the development and planning of air quality programs, while functions like laboratory work and other miscellaneous pollution-related activities tend to receive comparatively lower focus. Further, during deliberations, it was discussed that their main work focuses on monitoring/inspection of industrial emissions and almost no attention is given to the sources such as road dust, vehicular exhaust emissions, which are also major sources of urban pollution. It was deliberated that there is considerable variation in staffing levels, technical (scientific and engineering) expertise in the air pollution domain and use of IT infrastructure among the SPCBs/DPCC that requires up-skilling and upgradation.

2.3 Human Resource Development

As per the provisions of the Air (Prevention and Control of Pollution) Act, 1981, the Central Pollution Control Board (CPCB) plans and organizes training for the officials of the SPCBs and DPCC on the prevention, control, or abatement of air pollution. These training courses are regularly attended by SPCBs/DPCC staff to enhance their field-level knowledge and skills. However, during the deliberations, it was highlighted that special training is needed for the staff to be acquainted with the new equipment or processes without which the technology can not be used effectively and the equipment may remain unutilised. It was discussed to provide specific training to regular and outsourced staff for the adoption of new technologies or procedures. It was also discussed that all the training should have an examination and certification. As per the data submitted by SPCBs/DPCC, it was also discussed that training may be provided for all the staff on the latest tools and software, to ensure the effective use of IT systems, as and when required. With the introduction of NCAP and increase in the number of specialized courses on air pollution and climate sciences, the availability of experienced/trained manpower in the field of air pollution in India has increased. Accordingly, SPCBs/DPCC may benefit from such trained manpower.

SPCBs/PCCs were initially established to address water and air pollution issues, however, over time, their responsibilities also include other environmental issues related to waste management. Moreover, with the increase in urbanization and polluting activities, the present strength may not be adequate to effectively monitor pollution and enforce environmental regulations and coordination with various stakeholders. Advanced tools such as data driven HR Analytics may be used by SPCBs/DPCC for data driven human resource management. It is recommended to conduct assessment of the workload and staff requirements through reputed institutes. The recommendations of assessments may be placed before the respective State Government/UT for necessary action.

3. Air Quality Monitoring

Ambient air quality monitoring is being done either manually using an air sampler or automatically using the Continuous Ambient Air Quality Monitoring System (CAAQMS), mainly installed and operated by CPCB, SPCBs/DPCC.

3.1 Automatic Monitoring

CAAQMS is a modern system of air pollution monitoring that uses automated air quality and meteorological instruments to measure and report the concentration of various pollutants such as PM_{10}, $PM_{2.5}$, SO_2, NO, NO_2, CO, Benzene, Ammonia,O_3 etc., on a continuous, real-time basis. It continuously transmits data automatically to central servers, where the data are processed, analyzed and disseminated in real-time for decision-making or public use. The details about the CAAQMS are available on the CPCB website (https://airquality.cpcb.gov.in/ccr/) and the list of parameters is given in **Annexure-II**.

There are currently 84 CAAQMS in the Delhi NCR operated by CPCB, DPCC, IMD/IITM, HSPCB, UPPCB, RSPCB and MoHUA **(Annexure-III)**. Most of the CAAQMS stations measure 6 to 8 out of the 12 parameters as per National Ambient Air Quality Standards **(NAAQS, Annexure-IV)**, depending on the equipment configuration and site requirements. Although air quality monitoring infrastructure in the NCR has expanded in recent years, many CAAQMS stations face data reliability issues due to lack of regular calibration, auditing and quality assurance according to the report of the Comptroller and Auditor General of India on Performance Audit of 'Prevention and Mitigation of Vehicular Air Pollution in Delhi', for the year ended on 31 March 2021. The data reliability and calibration issues were also deliberated by the Expert Committee members during the meetings. Data reliability in air quality monitoring is crucial for accurate calculations and assessments of ambient air quality levels. Therefore, there is a need to improve the data reliability of the CAAQMS operated by CPCB, DPCC, IMD/IITM, HSPCB, UPPCB, MoHUA and RSPCB in the NCR. The respective agencies should ensure that the CAAQMS are operating as per the CPCB guidelines. They should also ensure regular calibration, maintenance and audit of the CAAQMS and maintain an online audit logbook. Further, advanced data science tools such as AI/ML techniques can be used for real-time data verification and ratification.

3.2 Manual Monitoring

Manual stations do not provide real-time data. Instead, ambient air samples are collected manually, typically twice a week as per CPCB Guidelines for the Measurement of Ambient Air Pollutants Volume I & II and later analyzed in laboratories. These stations primarily monitor four key pollutants: Particulate Matter (PM_{10} and $PM_{2.5}$), Sulphur Dioxide (SO_2), and Nitrogen Dioxide (NO_2). The Central Pollution Control Board (CPCB) operates this network in coordination with State Pollution Control Boards and Pollution Control Committees under the National Air Monitoring Programme (NAMP). There are currently 56 manual monitoring stations under NAMP in the Delhi NCR **(Annexure-III)**.

Several gaps persist in the manual monitoring of ambient air quality in the Delhi NCR. Regular calibration and auditing of manual monitoring stations, as mandated by CPCB protocols, are not regularly conducted. The NAAQS pollutants, such as Lead (Pb), Benzo(a)Pyrene (BaP), Arsenic (As), and Nickel (Ni), which are measured manually, are not monitored at all manual sites. The report of the Comptroller and Auditor General of India on Performance Audit of 'Prevention and Mitigation of Vehicular Air Pollution in Delhi', for the year ended on 31 March 2021 highlighted the non-availability of Lead (Pb) and irregularity in the measurement of other pollutants. The manual monitoring infrastructure including air laboratories should be strengthened to monitor the essential air quality parameters.

SPCBs/DPCC collect regular air samples of PM (PM_{10}, $PM_{2.5}$) as a part of NAMP. These samples can be further analyzed using sophisticated instruments for composition analysis of PM in the air labs to quantify the contribution of various pollution sources using Source Apportionment techniques. CPCB issued Standard Operating Procedure (SOP) for conducting source apportionment studies which may be followed by SPCB / DPCC. Further, an advanced real-time source apportionment technique may also be explored. While real-time source apportionment can provide source contribution of broad categories, it is not able to forecast air quality levels. Therefore, dynamic model-based Decision Support Systems, with emission inventory, can be utilized to identify pollution sources and its location.

3.3 Measurement of Atmospheric Dispersion

The Ventilation Coefficient (VC) is an atmospheric parameter that indicates the capacity of the atmosphere to disperse pollutants. VC is calculated by multiplying the mixing height by the average wind speed. Accurate monitoring of the mixing height helps in understanding

the vertical extent and dispersion of pollutants. Therefore, it is important to monitor the VC on a regular basis. A monostatic SODAR (Sound Detection and Ranging) system is operated by CPCB. A network of Ceilometers, a LIDAR (Light Detection and Ranging) based technique to measure the mixing height and vertical aerosols, is operated by IMD. The data from the same should be used by the SPCBs/DPCC to assess atmospheric dispersion.

3.4 Satellite and Reanalysis Air Quality Products

Satellite monitoring is an advanced method used to assess air pollution over large geographical areas using Earth observation satellites. It provides a comprehensive, synoptic view of atmospheric conditions, enabling the detection and tracking of spatio-temporal variation in pollutants that may not be captured by ground-based monitoring stations. Major pollutant's trends that can be monitored via satellites include aerosols (typically assessed through Aerosol Optical Depth (AOD)), Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), Carbon Monoxide (CO), Ozone (O_3) and Methane (CH_4). Prominent satellite systems used for air quality monitoring in India include INSAT-3D, MODIS, VIIRS, OMI and TROPOMI etc. operated by space agencies like ISRO, NASA and ESA etc. These data play an important role in monitoring crop residue burning, analyzing pollution patterns, transboundary pollution and enhancing air quality forecasting models. While satellite observations can provide an overview of the pollution trend, hotspots and transport of the pollutants, they are often limited by factors like cloud cover, vertical resolution and inability to directly measure ambient concentrations. To overcome these limitations, Global reanalysis datasets, such as MERRA-2 (Modern-Era Retrospective analysis for Research and Applications), CAMS (Copernicus Atmosphere Monitoring Service) etc. may be used. These datasets combine satellite observations, ground-based measurements and atmospheric models to produce gridded, continuous estimates of air pollutant concentrations over time and space. Reanalysis data help in filling temporal and spatial gaps, allowing to analyze trends, perform exposure assessments. Satellite data, with reanalysis products and air quality forecasts offer a powerful framework for understanding air pollution dynamics on a local, regional to global scale. However, their accuracy remains a challenge over the Delhi NCR and it needs further validation. While this data cannot be used for compliance monitoring, it can complement ground-based monitoring by bridging spatial data gaps and providing inputs for air quality assessment, airshed management, policymaking and planning. However, the utilization of such data by SPCBs and DPCC has remained inadequate due to limited domain expertise and nonavailability for

operational use. There is a need to train the SPCBs/DPCC staff to use satellite, reanalysis and forecast datasets for air quality management.

3.5 Drone and Satellite Imagery Coupled with AI Analysis

Drone and satellite imagery can be powerful tools for source identification and monitoring in confirming/non-conforming areas. Drones equipped with cameras/sensors can collect high-resolution imagery over an area during the flight. Moreover, high resolution satellite imagery can provide temporal-spatial coverage. AI algorithms can analyze the images captured by drones and satellites, recognizing polluting sources such as industries, brick kilns, waste burning, traffic congestion, road dust etc. Incorporating these technologies into the operations by SPCBs/DPCC could substantially enhance their capacity for continuous surveillance and targeted enforcement.

3.6 Mobile CAAQMS Van

Mobile Van, equipped with sophisticated instruments capable of measuring major air pollutants such as $PM_{2.5}$, PM_{10}, CO, SO_2, O_3, NO_x etc. allows SPCBs/DPCC to monitor air quality in the hotspots and other areas as per the requirement. At present, DPCC and RSPCB have one and two numbers of such mobile vans, respectively. However, UPPCB and HSPCB have larger areas in the NCR and do not have any such vans. Both the UPPCB and HSPCB may induct one Mobile Van each with the capability of measuring major air pollutants for pollution episode or hotspot monitoring.

4. Emission Sources and Monitoring

The major sectors affecting the ambient air quality in the Delhi NCR include vehicular emissions, C&D activities, dust resuspension from road and open areas, industries including thermal power plants, brick kilns, diesel generator sets, municipal solid waste burning and open burning of biomass, household emissions, crop residue/biomass burning etc.. DPCC/SPCBs in the Delhi NCR primarily focus on industrial pollution as their core mandate of regulating industries and ensuring compliance. They coordinate with ULBs, Transport and other State Departments to manage the pollution from other sources. In this section, the sector-wise emission monitoring and challenges are discussed.

4.1 Industries Including TPPs and DG sets

Industries such as power, cement, iron & steel, chlor-alkali, pharmaceuticals, fertilizers, refineries, pesticides, distilleries, sugar, pulp & paper, textile, tanneries and other categories release a large quantum of pollutants through air emissions and effluent discharge (CPCB, 2018). In order to regulate such emissions and discharges to safe limits, SPCBs and DPCC have prescribed standards for various pollutants emitted/ discharged by the industries as notified under the Environment (Protection) Act, 1986. In order to track and self-regulate to immediately address the release of pollutants from industries with high pollution potential, CPCB mandated the installation of OCEMS in 17 categories of highly polluting industries (Pulp & Paper, Distillery, Sugar, Tanneries, Power Plants, Iron & Steel, Cement, Oil Refineries, Fertilizer, Chloral Alkali Plants, Dye & Dye Intermediate Units, Pesticides, Zinc, Copper, Aluminum, Petrochemicals and Pharma Sector, Common Effluent Treatment Plants (CETP), Sewage Treatment Plants (STPs), Common Bio Medical Waste and Common Hazardous Waste Incinerators) to ensure regular maintenance and operation of the online continuous emission and effluent monitoring system. CPCB also directed SPCBs/DPCC to enforce the installation of OCEMS for Red category air polluting industries (large and medium scale) in the Delhi NCR. In addition, it was directed to install surveillance systems with industrial grade Internet Protocol (IP) cameras having PAN, Tilt, Zoom (PTZ) with leased line real-time connection for data streaming and transmission of the same in case of industries claiming Zero Liquid Discharge (ZLD). Further, the MoEF&CC under Environment (Protection) Act, 1986, strengthened the regulatory framework for controlling industrial emissions by mandating installation of CEMS particularly from boilers used in the industries namely sugar, cotton textile, composite woolen mills, synthetic rubber, pulp &

paper, distilleries, leather industries, calcium carbide, carbon black, natural rubber, asbestos, caustic soda, small boilers, aluminum plants, tanneries, inorganic chemicals & other such industries, by mandating continuous monitoring and prescribing specific emission standards. Parameters required to be monitored in the stack emissions using a Continuous Emission Monitoring System are industry specific.

CEMS/OCEMS data are used as a tool to monitor the performance of pollution control systems as well as to generate alarms on exceedances with respect to notified standards, so that immediate action can be taken to address the exceedance by the respective industries as part of self-regulation. At present, CEMS data are not used directly for regulatory purposes. However, CEMS data help regulatory bodies in close surveillance of industries based on a messaging/alarm system, leading to manual stack monitoring to check for compliance with the emission standards. SPCBs/DPCC ensure compliance with the industrial emission standards as notified by the MoEF&CC. Their responsibilities include issuing CTE/CTO, monitoring real-time emissions through OCEMS and through stack monitoring and taking enforcement actions against non-compliant industries including inspection, sampling and monitoring, imposing penalties or even ordering closures.

SPCBs/DPCC face challenges in ensuring compliance with industrial emissions. One of the main challenges is the accuracy of the OCEMS data transmitted by industries. The CSIR-NPL has been designated as the OCEMS certification agency, the process of certification for OCEMS is likely to start soon. At present, the international certification of OCEMS is available. Absence of OCEMS accreditation and auditing raises data reliability and consistency issues. However, to address this issue, CPCB has come out with guidelines on the calibration of OCEMS and validation of its data using manual monitoring. The whole mechanism of industrial emission monitoring needs to be strengthened as per CPCB guidelines (1st Revised Guidelines for Continuous Emission Monitoring Systems August 2018) to enhance the compliance monitoring by SPCBs/DPCC.

4.2 Vehicular Emissions

Vehicular emission control is done through setting Bharat Stage (BS) emission standards by the MoRTH, which mandates progressively stricter emission limits for various pollutants. Compliance with the emission norms is done through the PUC (Pollution Under Control) Certification program, which requires periodic emission tests at authorized centers to verify

compliance with these standards. The vehicular emissions are monitored through authorized PUC centres by the State Transport Departments with MoRTH providing a framework for the PUC system having a uniform format for the PUC Certificate (PUCC) across the country and linked with the National Register of Vehicles.

While the PUCC system in India is the only way to monitor vehicular emissions, it faces several challenges and gaps, including uncalibrated testing centers, faulty systems and dummy test report generation. The sensors or probes are often not properly calibrated or securely fixed, resulting in inaccurate calibration and erroneous emission measurements. Furthermore, vehicular exhaust emission norms set by MoRTH do not capture all pollutants, it mandates checking emissions of CO, HC+NO_x for passenger cars and 2/3 wheelers and CO, HC, NO_x, and PM for Heavy-Duty Vehicles (HDVs). There is a growing emphasis to strengthen the PUCC system to accurately measure vehicular emissions to comply with the emission norms. There is also a need to monitor major pollutants such as PM_{10}, $PM_{2.5}$, NOx, CO, HC, BC, and use real-world emission monitoring using systems like Remote Sensing Devices (RSD), Portable Emission Measurement Systems (PEMS), for capturing emissions under actual driving conditions. Additionally, On-Board Diagnostics (OBD) systems are available to monitor emissions and ensure compliance. The SPCBs/DPCC need to play an important role in vehicular emission monitoring and validating the equipment efficiency. They may coordinate with Traffic/Transport Departments to regularly analyse the traffic data and also jointly inspect PUCC centers.

4.3 C&D dust

SPCBs/DPCC coordinate with ULBs to monitor compliance with the C&D Waste Management Rules, 2016; CPCB Guidelines on Dust mitigation measures in handling Construction material and C&D wastes, 2017 and Directions (No. 01-05, 11-18, 44, 51-52, 69, 79, 85 and 86) issued by CAQM. The SPCBs/DPCC should prioritize monitoring and enforcement, particularly for projects with a plot area equal to or greater than 500 square metres and ULBs should focus on smaller C&D sites having plot area less than 500 square metres.

The monitoring of the C&D projects with plot area equal to or greater than 500 square metres is done through a dedicated web-portal as well as by conducting regular inspections to check for the compliance of the dust mitigation measures such as mandatory registration, video

fencing, air quality monitoring with low cost sensors, deployment of Anti-Smog Guns (ASGs) as per the total area of construction, covering of active construction zone with dust screens, covering of construction material, waste and loose soil etc., installation of wind breakers along project boundary, regular water sprinkling and use of dust suppressants etc.

The Central Government has notified Environment (C&D) Waste Management Rules, 2025, which shall be implemented from 01.04.2026. As per Rule 16(2), Local bodies, Developmental Authorities are responsible for the implementation of these rules and timely grant of approvals to waste management and utilization plans in online mode for projects above 20000 sq m. As per rule 16(3), SPCBs/DPCC shall be responsible for enforcement of these rules.

Despite the existing guidelines for managing C&D waste, the gap remains in monitoring the C&D activities causing pollution. The SPCBs/DPCC may coordinate with ULBs to review and inspect the C&D activities in their jurisdiction.

4.4 Road Dust and Open Areas

Currently, road dust is being managed through the deployment of Mechanical Road Sweeping (MRS) machines (MRSMs), water sprinklers, anti-smog guns (ASGs) etc. in line with the Directions (No. 19-28) issued by the CAQM. The dust control measures are implemented and monitored through the "Dust Control & Management Cell (DCMCs)" and reviewed regularly by the CAQM as per the data submitted by SPCBs and GNCTD in case of Delhi. At present, there are no specific rules or standards for road dust for compliance monitoring of permissible amounts of dust on the road.

There is absence of standards for permissible silt load/road dust on roads. Currently, no universal or binding global standards exist for permissible silt load/ road dust on road. Dust control activities lack a unified mechanism for physical inspection, sampling and monitoring. The movement and efficiency of dust control machines such as MRSMs are not monitored. Also, the collection and disposal of road dust are poorly tracked. Moreover, the lack of geotagged dumpsites, GPS-enabled tracking, real-time reporting systems and integrated data submission tools hinder effective dust control measures in the Delhi NCR. The system to track the road dust and control measures needs to be strengthened to reduce the dust pollution on the roads and open areas. SPCBs/DPCC may coordinate with the road owning agencies/DCMCs to review and inspect the road dust control measures in their jurisdiction.

4.5 MSW and Open Burning

The solution to Municipal Solid Waste and its open burning lies in the proper management of MSW as per the Solid Waste Management (SWM) Rules, 2016. These rules aim to make waste management more efficient, sustainable and environment friendly by focusing on source segregation, collection, transportation, processing and disposal of municipal solid waste thereby minimizing the environmental impact. Direction No. 91 issued by the CAQM aims towards the prevention and control of fire in Sanitary Landfill sites/dumpsites and open Municipal Solid Waste/ Bio-mass burning in the Delhi NCR. The SPCBs/DPCC play an important role in monitoring and enforcing the rules/directions within their respective States, while ULBs are responsible for the infrastructure development for the collection, storage, segregation, transportation, processing and disposal of solid waste within their respective jurisdiction.

While the SWM Rules 2016 are in force, significant gaps still exist in MSW management resulting in open dumping and burning of MSW. Currently, MSW management lacks a comprehensive tool to track collection and disposal. The burning activities of waste, other than at designated Sanitary Landfills/dumpsites, are tackled through complaints and as such no regular monitoring mechanism exists. Moreover, the lack of geotagged Garbage Vulnerable Points (GVPs), SLFs/dumpsites, GPS enabled scheduling and tracking, real-time data reporting systems reduces the efficiency and effective monitoring of MSW management. Despite existing protocols for managing landfill sites and municipal solid waste, substantial gaps remain in proactive surveillance and emergency response. The system needs to be improved for real-time tracking of the MSW from collection to disposal and effective monitoring by ULBs with an aim to achieve zero burning of MSW. SPCBs/DPCC may coordinate with ULBs to review and inspect the implementation of the SWM Rules and the Direction of the CAQM.

4.6 Stubble Burning

CAQM has developed a comprehensive framework to tackle paddy stubble burning in the NCR including the entire States of Punjab and Haryana. The State Action Plans are prepared by the State Governments based on the framework developed by CAQM and realized by the State Governments each year with an aim to eliminate stubble burning. The Action Plan inter-alia, includes both in-situ and ex-situ crop residue management methods, along with robust

monitoring and enforcement measures. Currently paddy residue burning is being monitored through satellites as per the protocol developed by IARI/ISRO. CAQM deploys central teams and flying squads of CPCB to inspect and enforce/monitor the Action Plan at the field level. SPCBs coordinate the actions among the various Government Departments including agriculture, rural departments etc., and are also responsible for the imposition and realization of Environmental Compensation from the violators. Real-time mapping of crop residue management including crop harvesting, residue generation and utilization using IT and satellite technology along with adequate training of SPCBs staff to use geo-spatial data is needed to improve inter-agency coordination to eliminate the crop residue burning events.

5. Air Laboratories

The Air (Prevention and Control of Pollution) Act, 1981, empowers SPCBs under Section 17(2) of the Act to establish or recognize Air Laboratories for sampling and analyzing air and emission samples. It also empowers the State Governments under Section 28 of the Act to establish or designate State Air Laboratories for the same purpose. These laboratories have a suite of advanced analytical instruments operated by trained scientific/technical manpower responsible for conducting various analyses related to air pollution, including ambient air monitoring, source emission monitoring etc. The analysis reports generated by these labs are used for compliance monitoring, issuing CTE/CTO authorization and regulatory actions.

As per the Environmental Protection Act, 1986, CPCB guidelines provide the list of mandatory and optional instruments in the Air Laboratory. The number of SPCBs/DPCC Air Laboratories including Central and Regional Laboratories in the NCR is shown in **Annexure-V**. DPCC, HSPCB, UPPCB and RSPCB have 1, 4, 5 and 3 numbers of Air Laboratories within NCR respectively. The Central Laboratory for all SPCBs is situated in their respective capitals. The number of Air Laboratories in the Delhi NCR is significantly lower in proportion to the number of red category air-polluting industries, as reported by the respective SPCBs and DPCC. This gap in infrastructure limits the capacity for effective ambient air and emission monitoring and regulatory compliance. In view of this, it is imperative that the laboratory infrastructure in the region be strengthened and expanded to ensure proportionate representation relative to the number of industries. Such enhancement is essential for ensuring robust control and timely regulation of air pollutant emissions across the NCR region.

Most SPCBs/DPCC labs are equipped to monitor ambient air pollutants such as Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), PM_{10}, and $PM_{2.5}$. However, monitoring of pollutants such as, Polycyclic Aromatic Hydrocarbons (PAHs) like Benzo(a)Pyrene, Benzene, Heavy Metals (Pb, Ni & As) and Non-methane Hydrocarbons (NMHCs) etc. is either limited to specific boards or absent altogether.

Similarly, the SPCBs/DPCC have facilities for stack emission monitoring of mandatory parameters like Particulate Matter, SO_2, NO_x, CO, CO_2, Oxygen, stack gas velocity, flow and temperature. However, the facilities to monitor emission parameters such as Carbon

Monoxide, Ammonia, Hydrogen Sulphide, Chlorine, Fluorides, Hydrochloric Acid and Total Hydrocarbons are not uniform across all Air Labs in the Delhi NCR.

While meteorological monitoring is a part of CAAQMS and also being done by IMD, all the SPCBs/DPCC need to be equipped with on-site monitoring of the meteorological parameters. One of the major findings of the study is that none of the SPCBs/DPCC are equipped with the facilities to monitor the vehicular emissions parameters such as carbon monoxide, smoke density, hydrocarbons and nitrogen oxides etc. The list of parameters measured in SPCBs/DPCC Labs is given in **Annexure-VI.** The number of lab equipment/instruments and facilities to measure essential parameters is found to be non-uniform across SPCBs/DPCC labs. It was found during the deliberations that SPCBs/DPCC labs are yet to be recognised under the Environmental Protection Act, 1986.

Important analytical instruments such as Gas Chromatograph Mass Spectrometer (GC-MS), Atomic Absorption Spectrophotometer (AAS) and High-Performance Liquid Chromatography (HPLC), required for trace metal and other chemical analysis, are not uniformly available with SPCBs/DPCC. The SPCBs/DPCC need to equip their laboratories with advanced instruments such as High-Resolution Mass Spectrometer (HRMS), Inductively Coupled Plasma Mass Spectrometry (ICP-MS), Fourier-Transform Infrared Spectroscopy (FTIR), X-ray Fluorescence (XRF), Thermal Desorption-Gas Chromatography Mass Spectrometry (TD-GCMS), Ion Chromatography (IC) etc. as per the need. Additionally, the labs may also be equipped with robust calibration facilities for CAAQMS like calibration gases, zero gas generators, permeation tubes and multipoint calibration systems.

To strengthen monitoring and enforcement, SPCBs/DPCC should prioritize the establishment of fully-equipped advanced research laboratories accredited by NABL and recognised by CPCB as per the Environmental Protection Act, 1986. Additionally, the staff involved in operating the advanced instruments should be trained for operation, calibration and maintenance of such instruments/equipment.

6. Online Portals and Data Management

6.1 Online Data Portals/Dashboards

The SPCBs and DPCC in the Delhi NCR currently manage various websites/portals, such as air quality dashboards, CTE/CTO issuance systems, complaint redressal system etc. The weblinks of the portals available and managed by the SPCBs/DPCC are shown in **Annexure-VII**. It has been found that all the information related to the air pollution activities is not available at a single portal and there is a need to consolidate all the pollution related information through a single website/portal.

Further, it is discussed that despite the increase in the data collection by SPCBs/DPCC through various independent platforms, SPCBs/DPCC often lack a standardized GIS infrastructure and geotagged information of polluting sources with spatial attributes and enabling location-specific monitoring and enforcement. Additionally, a central data repository does not exist with the SPCBs/DPCC as a single point of pollution data for the State and most of the data is available with limited access.

Data reporting and sharing among various stakeholders/agencies is a major issue. The data are shared in traditional format and the use of digital technologies is very limited. Multiple records of the same data are often being kept resulting in data ambiguities and delays in analysis and decision making. The data should be kept on a central server accessible to all the stakeholders with options for report generation.

In view of this, there is an urgent need to integrate all such links and portals into a centralized server at each State level. Doing so will streamline regulatory functions, enable real-time monitoring and support data-driven policy action for effective air quality management across the Delhi NCR.

The Geographic Information System (GIS) is an important tool for urban planning and air quality management as it integrates diverse spatial data like land use, demographics, road network, traffic, industries and other polluting sources into a geo-spatial platform. This allows for the visualization of complex relationships between various factors affecting urban air quality. GIS can help in identifying pollution hotspots, analyze trends and assessing the impact of urban development. GIS data for Delhi NCR are available on various platforms, namely, Geospatial Delhi Limited (GSDL), National Capital Region Planning Board

(NCRPB), State GIS portal etc. It is recommended to extensively use GIS technology to capture, store, analyze, manage, and visualize the air quality and sector-specific data hosted on a Central server with an Application Programming Interface (API) facility. All data shall be maintained in the GIS format with essential sector-specific attributes. GIS experts may be inducted or existing staff may be trained for such purposes. While the SPCBs/DPCC maintain the air quality monitoring and industry data, the GNCTD and the State Government of Haryana, UP and Rajasthan have urban planning and air quality management data from all sectors such as land use, demographics, road network, traffic, industries, SLF, C&D sites, DG sets etc.

6.2 Inspection and Enforcement

The inspections are carried out by SPCBs/DPCC as per the inspection policy developed by SPCBs/DPCC. These inspections and analysis reports are used for issuing permits through CTE/CTO and taking enforcement actions against violators, including issuing closures, EC and initiating prosecution. Incognito inspections are also carried out by the flying squad teams of the Commission to check for compliance of environmental statutes related to air pollution. The workflow of the inspection and monitoring can be improved further using a digital platform, integrated with a mobile application with SMS capability for timely actions. Further, the SPCBs/DPCC may constitute State level coordination and enforcement task force to coordinate with the Transport Department, Traffic Police, Environment Department, Agriculture Department, Road Owning Agencies, ULBs etc. to regularly review, enforce and analyse the compliance status of the Directions of CAQM/CPCB. This task force may also conduct incognito joint inspections for all the polluting sources, such as road dust, construction and demolition (C&D) activities, municipal solid waste (MSW) burning, stubble burning, DG sets and other localized pollution hotspots.

7. Recommendations

The recommendations to improve the functioning of SPCBs/DPCC by effective use of modern technology and equipment are summarised as under:

7.1 Technological Interventions to modernize Air Quality and Emission Monitoring

a) Strengthening the Automatic Air Quality Monitoring

(i) It is recommended to ensure Quality Assurance (QA) and Quality Control (QC) of the monitoring stations by regular calibration (as per CPCB technical handbook, NAAQMS-45-2016-17) and performance auditing of the Continuous Ambient Air Quality Monitoring System (CAAQMS) annually by third party. The respective agencies (CPCB/SPCBs/DPCC/IMD/IITM/ MoHUA) should ensure regular calibration and auditing of the CAAQMS and maintain audit logs online for each station. CPCB shall issue guidelines for operationalization of the same.

(ii) Development of data verification and rectification protocol by using advanced data science tools such as Artificial Intelligence (AI) / Machine Learning (ML) for the removal of erroneous concentration data in the real-time measurement of CAAQMS. The protocol may be developed by CPCB and integrated with a centralized AQI data portal/dashboard in consultation with SPCBs/DPCC.

(iii) Development of the NCR specific Air Quality Index (AQI) data portal/dashboard by CPCB for real-time data dissemination on the air quality parameters to the public and stakeholders.

(iv) Inducting/establishing a mobile CAAQMS (Mobile Van) by each SPCBs/DPCC for monitoring of the hotspots and other areas as per requirement. UPPCB and HSPCB not having any mobile van may induct at least one Mobile Van each. The SPCBs/DPCC may further assess their additional requirements and induct more mobile vans.

b) Strengthening the Manual Air Quality Monitoring

(i) It is recommended to ensure regular calibration of the instruments (as per CPCB guidelines) and auditing of the manual monitoring stations and maintaining the audit logs online for each station. CPCB shall issue guidelines for operationalisation of the same.

(ii) It is recommended that the air samples collected from manual monitoring stations in the NCR may be analysed by SPCBs/DPCC for metals, ions etc. as per the recommended protocol/guidelines. The analysis results may also be explored for quantifying the contribution of various pollution sources.

(iii) Advanced techniques may also be explored by SPCBs/DPCC for real-time source apportionment.

c) Atmospheric Dispersion and Air Quality Forecasting

(i) It is recommended to integrate the data from the network of Ceilometers operated by IMD/IITM and Sound Detection and Ranging (SODAR) by CPCB with the Central data portal of CPCB for real-time dissemination of mixing height and ventilation coefficient for use by SPCBs/DPCC.

(ii) Air quality forecasts provided by IMD/IITM may be utilised by SPCBs/DPCC for early warning and preventive measures.

d) Use of Remote Sensing Satellite, Reanalysis Datasets and Drones

(i) It is recommended that the space-based satellite data/products for pollutants such as Aerosols (AOD), NO_2, SO_2, CO, dust etc. from various national and international instruments/satellites (such as INSAT-3D, OCM-3 and EOS-6 of ISRO/DOS and MODIS, VIIRS, TROPOMI, etc.) may be utilized for spatial gap filling and trend analysis of the pollutants after ground validation. The SPCBs/DPCC may work with the State Remote Sensing Centers such as HARSAC, PRSC, SRSAC and DOS/ISRO for the effective utilization of satellite products. The data protocols and Application Programming Interface (API) may be provided by DOS/ISRO along with training to use such products for air quality management.

(ii) It is also recommended to use Global re-analysis datasets, such as MERRA-2, CAMS etc. for filling temporal and spatial gaps. It can complement ground-based monitoring by bridging spatial data gaps and providing inputs for air quality management within the airshed.

(iii) It is suggested to use drone/satellite imagery combined with AI technology to monitor polluting activities in conforming as well as non-conforming areas.

e) Monitoring of Industrial Emissions

(i) SPCBs/PCC to ensure that all the air polluting industries falling under 17 categories and Red category (large and medium) within the Delhi NCR should have Online Continuous Emission Monitoring System (OCEMS) to monitor the air pollutant emissions. CPCB's Direction in this regard to all SPCBs/DPCC in the Delhi NCR needs to be complied with.

(ii) The audit, calibration of analysers and data reliability of the OCEMS should be strengthened as per the CPCB's revised guidelines. Further, stack monitoring should be done by the SPCBs/DPCC at regular intervals to validate the OCEMS data.

(iii) SPCBs/DPCC should ensure that all the air polluting industries are geo-tagged and provided with a unique ID aligned with CPCB's common online consent mechanism portal with essential information and mapped.

(iv) The CAQM, through Direction No. 65, has mandated a standard list of approved fuels for various applications across the NCR. It is recommended to mandate the fuel audit of the industrial processes by the concerned SPCBs/DPCC to identify and address the enforcement gaps. The guidelines regarding the "Fuel Audit" shall be prepared by CPCB in consultation with the stakeholders.

f) Strengthening of SPCBs/DPCC Air Laboratories

(i) It is recommended to strengthen the existing Air Laboratories of SPCBs/DPCC with a list of mandatory and optional instruments/equipment (as per **Annexure-VIII**). SPCBs/DPCC may further expand the network of Air Laboratories as per requirements.

(ii) All the SPCBs/DPCC Air Labs should have recognition under the Environment (Protection) Act, 1986.

(iii) It is recommended that all the Air Labs of SPCBs/DPCC should go paperless and use a Laboratory Information Management System (LIMS) or similar systems and integrate the same with Management Information System (MIS) and a web-based interface to view the lab reports, as and when required.

7.2 Strengthening Sectoral Enforcement Mechanism

a) Constitution of Coordination and Enforcement Task Force (CETF)

(i) State Govt./ GNCTD may constitute and operationalise State level Coordination and Enforcement Task Force (CETF) at the level of ACS (Environment) to coordinate with all relevant departments viz. Transport Department, Traffic Police, Environment Department, Agriculture Department, Road Owning Agencies, ULBs etc. to regularly review, enforce and analyse the compliance status of the Directions of CAQM. The Member Secretary of SPCBs/ DPCC should be the Convener of CETF.

(ii) This Task Force shall also conduct incognito joint inspections through inter-departmental teams led by SPCB/ DPCC for all the polluting sources including road dust, construction and demolition (C&D) activities, municipal solid waste (MSW) burning, stubble burning, DG sets and other localized pollution hotspots and take strict action against violators as per the extant legal provisions. The state level CETF shall furnish a quarterly report to CAQM regarding the inspections conducted and action taken by it.

b) Extensive Use of GIS (Geographic Information System) Technology for Data Management

(i) It is recommended that SPCBs/DPCC use GIS technology to manage and visualize the air quality and industry data. Further, urban planning and other data such as land use, demographics, road network, traffic, SLF, C&D sites, DG sets etc. from Government Departments/ULBs may be integrated by the State Governments/ GNCTD on a single GIS platform along with Air Quality and industries data maintained by SPCBs/DPCC.

(ii) The GIS data may be hosted on a central server with an Application Programming Interface (API) facility. Data shall be maintained in the GIS format with essential

sector-specific attributes and should have options to generate reports. GIS experts may be inducted or existing staff may be trained for such purposes.

c) Setting up an Air Quality Integrated Control and Command Centre (AQICCC)

(i) It is recommended that the SPCBs/DPCC may set up an Air Quality Integrated Control and Command Centre (AQICCC) having GIS platform in consultation with CPCB, with a dashboard displaying real-time AQI and air pollutant concentrations, meteorological parameters and AQI forecasting with an early warning system. The AQICCC should have adequate and trained manpower.

(ii) The AQICCC may coordinate with various stakeholders for the enforcement of actions during GRAP. They may also send SMS alerts for AQI and health advisories.

7.3 Human Resource Development

(i) It is recommended to conduct an annual assessment of the workload and training requirements of the SPCBs/DPCC staff to induct human resources regularly and provide specific training to the staff for the adoption of new technologies or procedures.

(ii) Training should be organised through accredited or recognised Training Institutes/ Agencies such as NPL, NEERI, IITs etc. and should have a stringent examination and certification at the end of the course, failing which the training will not be considered completed.

(Dr. Vikas Singh)
Convener, Expert-Committee
Sci-E, CAQM

(Dr. S. D. Attri)
Chairman, Expert-Committee
Member-Technical, CAQM

8. List of Annexures

Annexure I

F.No 110021/01/2025-MERD/97/VS

राष्ट्रीय राजधानी क्षेत्र और निकटवर्ती क्षेत्रों में वायु गुणवत्ता प्रबंधन आयोग

Commission for Air Quality Management in NCR & Adjoining Areas

17वीं मंज़िल, जवाहर व्यापार भवन (एस.टी.सी. बिल्डिंग) टॉलस्टॉय मार्ग, नई दिल्ली – 110001

17th Floor, Jawahar Vyapar Bhawan, (STC Building), Tolstoy Marg, New Delhi – 110001

Date: 23/05/2025

ORDER

Subject: - Constitution of an Expert Committee in compliance with the Hon'ble Supreme Court's order dated 08-05-2025 regarding to undertake a systematic study in reference to the functioning of the SPCBs as well as the PCCs.

The Hon'ble Supreme Court vide its order dated 08-05-2025 in WP(C) No 13029 of 1985 MC Mehta Vs Union of India, noted that the Boards and Committees may be using age-old technology and equipment and directed the Commission to undertake a systematic study on these aspects. The Hon'ble Court further noted that unless the Pollution Control Boards and the Pollution Control Committees are equipped with modern equipment and unless they start using modern techniques, they will not be able to discharge their statutory duties effectively.

2. The Hon'ble Court further directed that CAQM shall work on this aspect and make its recommendations and forward the same to the CPCB as well as to the Pollution Control Boards of the States of Haryana, Rajasthan and Uttar Pradesh and the DPCC. Based on the recommendations of the CAQM, necessary actions shall be taken, including the acquisition of proper equipment.

3. Accordingly, an **Expert Committee** is hereby constituted for the said purpose as under:

S. No.	Name and Designation	
1	Dr. S. D. Attri, Member-Technical, CAQM	Chairman
2	Member-Secretary, Central Pollution Control Board (CPCB)	Member
3	Member-Secretary, Delhi Pollution Control Committee (DPCC)	Member
4	Member-Secretary, Haryana State Pollution Control Board (HSPCB)	Member
5	Member-Secretary, Uttar Pradesh Pollution Control Board (UPPCB)	Member

6	Member-Secretary, Rajasthan State Pollution Control Board (RSPCB)	Member
7	Dr. S. K. Goyal, Chief Scientist, CSIR-NEERI, Delhi	Member
8	Dr Vijay Kumar Soni, Scientist-F, IMD, Delhi	Member
9	Prof. Mukesh Sharma, Professor, IIT Kanpur	Member
10	Dr. Sri Harsha Kota, Asso Prof, IIT Delhi	Member
11	Dr. Radhakrishnan S. R., Pr. Scientist, NPL, Delhi	Member
12	Dr. Vikas Singh, Scientist-E, CAQM	Convener

4. The Terms of Reference of the Expert Committee are as under:

   a) To undertake a systematic study on the broad mechanism of functioning of the State Pollution Control Boards, as well as the Pollution Control Committees with regard to monitoring, prevention and abatement of air pollution.
   b) To examine the existing technology and equipment being used, identify gaps and suggest modern equipment/techniques to enable them to discharge their statutory duties more effectively.

5. The Expert Committee may co-opt instrumentation experts as per requirement.
6. The Expert Committee shall submit its recommendation by 30th June, 2025.

This issues with the approval of competent authority.

23/5/2025

(विकास सिंह / Vikas Singh)
वैज्ञानिक -'इ' / Scientist-'E'
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011-23446811

To:

All members of the Expert Committee

Copy for information to:

1. Chairperson and full time Members, Commission for Air Quality Management in NCR and Adjoining Areas

Annexure II

Standard list of Parameters measured by CAAQMS

S. No.	Parameter Name	Parameter Abbreviation	Unit	Conversion Factor at 25°C
1	Rack Temperature	Temp	°C	--
2	Carbon Monoxide	CO	mg/m³	1 ppm = 1.145 mg/m³
3	Sulphur Dioxide	SO_2	µg/m³	1 ppb = 2.62 µg/m³
4	Nitric Oxide	NO	µg/m³	1 ppb = 1.23 µg/m³
5	Nitrogen Dioxide	NO_2	µg/m³	1 ppb = 1.88 µg/m³
6	Oxides of Nitrogen	NO_X	ppb	--
7	Ozone	Ozone	µg/m³	1 ppb = 1.96 µg/m³
8	Particulate Matter less than 10-micron size	PM_{10}	µg/m³	--
9	Wind Speed	WS	m/s	--
10	Wind Direction	WD	deg	--
11	Ambient Temperature	AT	°C	--
12	Relative Humidity	RH	%	--
13	Barometric Pressure	BP	mmHg	--
14	Solar Radiation	SR	W/mt²	--
15	Rain Fall	RF	mm	--
16	Vertical Wind Speed	VWS	m/s	--
17	Particulate Matter less than 2.5-micron size	$PM_{2.5}$	µg/m³	--
18	Benzene	Benzene	µg/m³	1 ppb = 3.19 µg/m³
19	Toluene	Toluene	µg/m³	1 ppb = 3.77 µg/m³
20	Xylene	Xylene	µg/m³	1 ppb = 4.34 µg/m³
21	Ethyl Benzene	Eth-Benzene		1 ppb = 4.34 µg/m³
22	M+P-Xylene	MP-Xylene		1 ppb = 4.34 µg/m³
23	Methane	CH_4	µg/m³	1 ppb = 0.65 µg/m³
24	Ammonia	NH_3	µg/m³	1 ppb = 0.70 µg/m³
25	Formaldehyde	HCHO	µg/m³	1 ppb = 1.23 µg/m³
26	Mercury	Hg	µg/m³	1 ppb = 8.20 µg/m³

Annexure III

Number of CAAQMS and Manual Stations in Delhi NCR

Sr. No.	State	No. of Districts	CAAQMS		Manual	
			Existing stations	Operating Agencies	Existing stations	Operating Agencies
1.	Delhi	Delhi	40	CPCB/DPCC/IITM/IMD/ MoHUA	7	CPCB
2.	Haryana	14 Districts	22	HSPCB/IMD	24	HSPCB
3.	Rajasthan	5 Districts	4	RSPCB	9	RSPCB
4.	UP	8 Districts	18	UPPCB/IMD	16	UPSPCB
	Total		84		56	

Annexure IV

National Ambient Air Quality Standards (NAAQS) 2009

Pollutants	Time Weighted Average	Concentration in Ambient Air (Industrial, Residential, Rural & Other Areas /	Ecologically Sensitive Areas (Notified by Central Government)	Methods of Measurement
Sulphur Dioxide (SO_2), µg/m^3	Annual* 24 Hours**	50 80	20 80	Improved West and Gaeke Method, Ultraviolet Fluorescence
Nitrogen Dioxide (NO_2), µg/m^3	Annual* 24 Hours**	40 80	30 80	Modified Jacob & Hochheiser (Na-Arsenite), Chemiluminescence
PM_{10}(size less than 10 um, µg/m^3	Annual* 24 Hours**	60 100	60 100	Gravimetric, TEOM, Beta attenuation
$PM_{2.5}$ (size less than 2.5 µm)µg/m^3	Annual* 24 Hours**	40 60	40 60	Gravimetric, TEOM, Beta attenuation
Ozone (O_3), µg/m^3	8 Hours** 1 Hour**	100 180	100 180	UV Photometric, Chemiluminescence, Chemical Method
Lead (Pb), µg/m^3	Annual* 24 Hours**	0.50 1.0	0.50 1.0	AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper, ED-XRF using Teflon filter
Carbon Monoxide (CO), mg/m^3	8 Hours** 1 Hour**	02 04	02 04	Non Dispersive Infra Red(NDIR) Spectroscopy
Ammonia (NH_3), µg/m^3	Annual* 24 Hours**	100 400	100 400	Chemiluminescence, Indophenol blue method
Benzene (C_6H_6), µg/m^3	Annual*	05	05	Gas Chromatography based continuous analyzer, Adsorption and Desorption followed by GC analysis
Benzo(a)Pyrene (BaP), ng/m^3	Annual*	01	01	Solvent extraction followed by HPLC/GC analysis
Arsenic (As), ng/m^3	Annual*	06	06	AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
Nickel (Ni), ng/m^3	Annual*	20	20	AAS/ICP Method after sampling on EPM 2000 or equivalent paper

* Annual Arithmetic mean of minimum of 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24-hourly or 8-hourly or 1-hourly monitored value, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

NOTE: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigations.

Source: CPCB, https://cpcb.nic.in/uploads/National_Ambient_Air_Quality_Standards.pdf

Annexure V

Number of Air Laboratories and Industries in the NCR

S. No.	Details	DPCC	HSPCB	UPPCB	RSPCB
1.	No. of Air Labs	1	4	5	3
2.	No. of Industries	27,402	8,382	5,905	5,594
3.	No. of Air Polluting Industries (Red Category)	133	1,487	1,038	1,190
4.	No. of Air Polluting Industries (Orange Category)	1,055	3,189	1,573	2,272
5.	No. of 17 categories of Polluting Industries	3	96	141	17
6.	No of 17 categories of Polluting Industries with OCEMS	3	96	127	17
7.	No. of Industries other than 17 categories with OCEMS	8	285	126	52
8.	Frequency of Stack Emission Monitoring	Half Yearly	17 Category: Quarterly Red: Half yearly Orange: Yearly Green: Once in 2 years	Half Yearly	17 category: Quarterly Red (other than 17 category): Half yearly Red MSME and Orange large category: Yearly Orange MSME category: Once in 2 years Green category: Need based.

Annexure VI

List of parameters measured in the SPCBs/DPCC Labs in Delhi-NCR

S. No.	Parameters	DPCC	HSPCB	UPPCB	RSPCB
A. Ambient Air / Fugitive Emissions					
I. Mandatory Parameters					
1	Nitrogen dioxide as NO_2	Yes	Yes	Yes	Yes
2	Sulphur dioxide (SO_2)	Yes	Yes	Yes	Yes
3	Total suspended particulate matter	Yes	Yes	Yes	Yes
4	Respirable suspended particulate matter (PM_{10})	Yes	Yes	Yes	Yes
II. Secondary Parameters					
1	Ammonia	Yes	No	Yes	Yes
2	Carbon Monoxide	Yes	Yes	Yes	No
3	Chlorine	No	No	No	No
4	Fluoride	No	No	No	No
5	Non methane hydrocarbon	No	Yes	No	No
6	Lead	No	Yes	Yes	No
7	Methane	No	Yes	No	No
8	Ozone	Yes	Yes	Yes	Yes
9	Benzene Toluene Xylene (BTX)	Yes	Yes	Yes	No
10	Polycyclic Aromatic Hydrocarbons (PAHs) Benzo-a-pyrene & others	No	Yes	No	No
11	$PM_{2.5}$	Yes	Yes	Yes	Yes
12	Volatile Organic Compounds	No	No	No	No
B. Stack Gases/Source Emission					
I. Mandatory Parameters					
1	Particulate Matter	Yes	Yes	Yes	Yes
2	Sulphur Dioxide	Yes	Yes	Yes	Yes
3	Velocity & Flow	Yes	Yes	Yes	Yes
4	Carbon Dioxide	Yes	Yes	Yes	Yes
5	Carbon Monoxide	Yes	Yes	Yes	Yes
6	Temperature	Yes	Yes	Yes	Yes
7	Oxygen	Yes	Yes	Yes	Yes
8	Oxides of Nitrogen	Yes	Yes	Yes	Yes
II. Secondary Parameters					
1	Acid Mist	Yes	Yes	Yes	Yes
2	Ammonia	No	No	No	Yes
3	Chlorine	No	No	Yes	Yes
4	Fluoride (Particulate)	No	No	Yes	Yes
5	Fluoride (Gaseous)	No	No	Yes	Yes
6	Hydro-chloric acid	No	No	Yes	Yes
7	Total Hydro carbon	No	Yes	No	Yes
8	Hydrogen Sulphide	No	No	No	Yes
9	Carbon disulphide	No	No	No	No
10	Mercaptan	No	No	No	No

C. Meteorological Monitoring					
I. Mandatory Parameters					
1	Ambient Temperature	Yes	No	Yes	Yes
2	Wind Direction	Yes	No	Yes	Yes
3	Wind Speed	Yes	No	Yes	Yes
4	Relative Humidity	Yes	No	Yes	Yes
II. Secondary Parameters (Minimum required at least one parameter)					
1	Solar Radiation	Yes	No	Yes	No
2	Rainfall	Yes	No	Yes	No
D. Vehicular Emission Monitoring					
I. Mandatory Parameters					
1	Carbon Monoxide	No	No	No	No
2	Smoke Density	No	No	No	No
3	Hydrocarbon	No	No	No	No
II. **Secondary Parameters (Optional)**					
1	Oxides of Nitrogen	No	No	No	No

Annexure VII

Online portals/websites of SPCBs/DPCC

DPCC

S. No.	Details	Link of the portal or website
1.	SPCBs/DPCC website	https://www.dpcc.delhigovt.nic.in/
2.	Air quality data portal/dashboard	https://www.dpccairdata.com/dpccairdata/display/AallStationView5MinData.php?stName=UG9vdGhLaHVyZEJhd2FuYQ==
3.	Industries portal/link	---
4.	TPPs portal/link	---
5.	OCEMS portal/link	https://dpcccems.nic.in/
6.	CTE/CTO portal/link	https://dpccocmms.nic.in/
7.	C&D portal/link	https://dustcontroldpcc.delhi.gov.in.nic.in/
8.	MSW/open burning portal	---
9.	DG set portal	---
10.	Complaint redressal portal	https://greendelhi.nic.in/
11.	Air Lab web link	https://www.dpccairdata.com/dpccairdata/display/AallStationView5MinData.php?stName=UG9vdGhLaHVyZEJhd2FuYQ==
12.	Vehicular pollution link	---
13.	Stubble/Crop residue burning link	---
14.	Road dust portal/link	---
15.	Other portal/link	---

HSPCB

S. No.	Details	Link of the portal or website
1.	HSPCB website	https://www.hspcb.org.in/
2.	Air quality data portal/dashboard	https://dustapp.hspcb.org.in/
3.	Industries portal/link	https://hrocmms.nic.in/OCMMS/ , https://investharyana.in/#/
4.	TPPs portal/link	https://coalash.cpcb.gov.in/
5.	OCEMS portal/link	http://www.hspcbcems.nic.in/login
6.	CTE/CTO portal/link	https://hrocmms.nic.in/OCMMS/ , https://investharyana.in/#/
7.	C&D portal/link	https://dustapp.hspcb.org.in/
8.	MSW/open burning portal	-
9.	DG set portal	-

10.	Complaint redressal portal	https://cmharyanacell.nic.in/
11.	Air Lab web link	-
12.	Vehicular pollution link	-
13.	Stubble/Crop residue burning link	https://agriharyana.gov.in/dashboardcrm
14.	Road dust portal/link	https://dustapp.hspcb.org.in/
15.	Other portal/link	-

UPPCB

S. No.	Details	Link of the portal or website
1.	SPCBs/DPCC website	https://uppcb.up.gov.in/en
2.	Air quality data portal/dashboard	https://airquality.cpcb.gov.in/NAMP/#/login
3.	Industries portal/link	https://www.cpcbinspection.co.in/gpi/
4.	TPPs portal/link	https://coalash.cpcb.gov.in/
5.	OCEMS portal/link	https://upocmms.nic.in/
6.	CTE/CTO portal/link	https://upocmms.nic.in/UPOCMMS/userMaster/grantedApplicationSearch
7.	C&D portal/link	https://dustapp.upecp.in/
8.	MSW/open burning portal	-
9.	DG set portal	-
10.	Complaint redressal portal	https://pcms.datahosts.in/
11.	Air Lab web link	https://upocmms.nic.in/UPOCMMS/indexLab.gsp
12.	Vehicular pollution link	-
13.	Stubble/Crop residue burning link	https://creams.iari.res.in/
14.	Road dust portal/link	-
15.	Other portal/link	www.upecp.in

RSPCB

S. No.	Details	Link of the portal or website
1.	SPCBs/DPCC website	https://environment.rajasthan.gov.in/content/environment/en/rajasthan-state-pollution-control-board.html.html#
2.	Air quality data portal/dashboard	https://environment.rajasthan.gov.in/content/environment/en/rajasthan-state-pollution-control-board/EnvironmentalReport/airqualityindex.html

3.	Industries portal/link	https://environment.rajasthan.gov.in/content/environment/en/rajasthan-state-pollution-control-board/OnlineMonitoringOfIndustries.html
4.	TPPs portal/link	Reported through OCEMS/consent links
5.	OCEMS portal/link	https://environment.rajasthan.gov.in/content/environment/en/rajasthan-state-pollution-control-board/OnlineMonitoringOfIndustries.html
6.	CTE/CTO portal/link	https://rspcbmis.environment.rajasthan.gov.in/ONLINECONSENT/OnlineStatus_FindID.aspx?HeaderId=2&MenuId=70
7.	C&D portal/link	http://103.246.106.130/CONESS/Login/ro
8.	MSW/open burning portal	In NCR to address the air pollution problems, state has provided SAMEER Portal. However, State has a common portal for addressing all Air pollution problems. ihttps://sampark.rajasthan.gov.in/Login (Sampark Portal), SMEER Portal.
9.	DG set portal	No dedicated portal has been provided for DG set. However, the DG sets are monitored presently in the consent mechanism.
10.	Complaint redressal portal	https://rpcb.nic.in/Grievances.aspx
11.	Air Lab web link	RSPCB has a Management Information System (MIS) integrated with a lab module, Operated through an SSO ID by officers of the RSPCB. However, dedicated web link for Air Laboratory is not available.
12.	Vehicular pollution link	No dedicated link is available for vehicular pollution.
13.	Stubble/Crop residue burning link	No dedicated link is available in the RSPCB. However, cases of stubble burning are seen through RICE Bulletin.
14.	Road dust portal/link	No dedicated link is available in the RSPCB.
15.	Other portal/link	https://rpcb.nic.in/

Annexure VIII

List of Instruments/Equipment to be installed in the Air Labs of SPCBs/DPCC

S. No.	Name of the Instruments/Equipment
	Mandatory List
1	Fine dust samplers $PM_{2.5}$ (*4 Nos)
2	Respirable Dust Sampler PM_{10} (*4 Nos)
3	High Volume Sampler (SPM) (*4 Nos) - CPCB standard
4	Handy Sampler with glass impingers (*2 Nos)
5	Low Volume Sampler (LVS)
6	Tedlar bags - different sizes
7	Meteorological tower (All-in-one Mast) with sensors (Wind, Temp, RH, Solar, Rainfall)
8	Portable Nitrogen Cylinder
9	Activated Charcoal Tubes / Tenax
10	Barometer (Digital)
11	Isokinetic Stack Monitoring Kit with full assembly
12	Modified S-type Pitot Tube with Assembly
13	Rotary Design Vacuum Pump (Monoblock type)
14	Orsat Apparatus
15	Source Emission Monitoring - Impinger Train (100 ml & 225 ml)
16	Heated Stainless Steel Sampling Probes (short & long)
17	Flue Gas Analyzer
18	Thermometer / Thermocouple
19	Calibrator for Noise Meters
20	Digital Sound Level (Noise) Meters
21	Portable TOC Analyzer (Emission Monitoring)
22	Polyurethane Foam (PUF) Sampler
23	Atomic Absorption Spectrometer (AAS) - Flame, Hydride & GTA
24	Binocular Stereo Zoom Microscope
25	Bomb Calorimeter
26	BTX Analyzer with BTX Calibrator
27	Flame Photometer
28	Flash Point Apparatus
29	Gas Chromatograph Mass Spectrometer
30	High Performance Liquid Chromatography (HPLC)
31	Inductively Coupled Plasma (ICP) Spectrometer - OES
32	Ion Chromatography - Anion & Cations
33	Methane and Non-Methane (NMHC) Analyzer
34	CO (NDIR based) Analyzer
35	Specific Ion Analyzer with Ion Selective Electrodes
36	Spectrophotometer Visible (Portable)
37	TKN Analyzer Semi-Automatic with Aluminum Block Digester
38	UV-Vis Spectrophotometer

Optional List	
1	Anemometer
2	Weather Monitoring System
3	Wind speed/wind direction monitor
4	Continuous Ambient Air Monitoring System, Fixed
5	Continuous PM_{10} Analyzer
6	Continuous Ambient Air Monitoring System, Mobile
7	Continuous $PM_{2.5}$ Analyzer
8	Ambient Nitrogen Oxides (NO-NO_2-NOx Analyzer)
9	Ambient Ozone Analyzer
10	Ambient BTEX Analyzer
11	Multipoint Gas Calibration System
12	Ambient Sulphur Dioxide Analyzer
13	Ambient Carbon Monoxide & Carbon Dioxide Analyzer
14	Total Hydrocarbon Analyzer
15	Ambient Ammonia Analyzer
16	Zero Gas Generator
17	Synthetic Air Cylinder
18	Calibration Gas Cylinders (SO_2, NO, CO, NH_3, Benzene, Toluene)
19	Continuous Emission Monitoring Equipment
20	19-inch Rack Mounting System for Air Analyzers
21	Dry Gas Meter
22	Diesel Exhaust Analyzer
23	Exhaust CO/HC Analyzer with Sampling Probe
24	Automated Noise Monitoring System
25	Integrating Sound Level Meter
26	Continuous PM_{10}&$PM_{2.5}$ Monitoring Analyzer (TEOM system)
27	Top Loading Orifice Kit for Calibration of HVS
28	Permeation Tubes (SO_2, NO-NO_2-NOx, NH_3, BTEX)
29	Carbon, Hydrogen, Nitrogen and Sulphur (CHNS) Elemental Analyzer
30	EDXRF Analyzer / WDXRF Analyzer
31	Fourier-transform Infrared Spectrometer (FTIR)
32	Toxic Gas Analyzer
33	Organic Halogen (AOX/TOX) Analyzer
34	TOC Analyzer
35	High Resolution Mass Spectrometer (HRGC-HRMS)
36	Inductively Coupled Plasma Mass (ICP-MS) Spectrometer
37	X-Ray Fluorescence (XRF) Spectrometer (Portable)

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