



ਪੰਜਾਬ ਪ੍ਰਦੂਸ਼ਣ ਕੰਟਰੋਲ ਬੋਰਡ PUNJAB POLLUTION CONTROL BOARD

No. SEE(HQ-2)/F.No.702/2026/.....

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Dated. 08/09/2026

Subject: Empanelment and Recognition of Technical Institutions for conducting Water Audits of the industries, operations and processes in the State of Punjab.

OFFICE ORDER

The State Pollution Control Boards have been constituted and established under the provisions of the Water (Prevention and Control of Pollution) Act, 1974 with the objectives of maintaining and restoring the wholesomeness of water, prevention, control and abatement of water pollution. The Boards have been assigned with certain functions and conferred powers to achieve the objectives of the Water (Prevention and Control of Pollution) Act, 1974.

- 2) The functions of the State Pollution Control Boards have been prescribed u/s 17 of the Water (Prevention and Control of Pollution) Act, 1974 which inter alia provides for planning and securing the execution of comprehensive programmes for prevention, control and abatement of water pollution; inspection of sewage and trade effluents treatment plants; review of treatment and disposal systems; and to evolve economical and reliable methods for treatment, utilization and disposal of sewage and trade effluents;
- 3) The efficient utilization of water resources, reduction in freshwater consumption, minimization of wastewater generation, recycling/ reuse, prevention of contamination of surface water and groundwater, proper operation and maintenance of Effluent Treatment Plants (ETPs), Sewage Treatment Plants (STPs) and Zero Liquid Discharge (ZLD) systems are essential for environmental protection and sustainable industrial development.
- 4) In the performance of its functions, the Punjab Pollution Control Board has prepared a document for carrying out the water audits and water balance study of the industries, operations and processes which will provide scientific assessment of actual water consumption, process/ utility-wise water use, wastewater generation, collection and conveyance, treatment performance, recycling/ reuse, losses and unaccounted streams and facilitates the identification of technically and economically feasible measures for improving water-use efficiency and wastewater management.
- 5) The document prepared by the Board under the title The Water Audit Mechanism (Basic and Specialized) containing various technical aspects relating to water

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audits, wastewater management, assessment and performance of water pollution control systems, disposal and utilization of wastewater, groundwater impact, sampling and testing, responsibilities of the Industries etc. is enclosed as **Annexure-A**.

6) In order to perform its functions in accordance with the mandate of Water (Prevention and Control of Pollution) Act, 1974, the Board has decided to recognize and empanel the technical institutions specified in **Annexure-B**, subject to their willingness, availability and requisite sector-specific expertise, for undertaking Water Audits and Wastewater Management Assessment of industrial units in Punjab in accordance with the provisions of The Water Audit Mechanism (Basic and Specialized), placed at Annexure-A. The recognition/ empanelment of technical institution for the purpose aforementioned shall be subject to the following conditions.

- i. R-17 Industries/ GPI Industries/ ZLD Industries/ Industries covered under EIA Notification/ Large Industries shall carry out the Water Auditing from the above institutes as mentioned in List a) and b) above.
- ii. State Institutes mentioned in c) above are empaneled for carrying out basic audit only and will not be authorized for auditing of large-scale industries and for specialization audit without the prior permission from the Board.
- iii. PPCB may empanel other technical institutions or remove technical institutions from the list, for carrying out the in case of their non-satisfactory performance.
- iv. Inclusion of an institution in Annexure-B shall not be construed as certification by PPCB of every service or discipline offered by that institution. The institution engaged for a particular audit shall possess demonstrable expertise relevant to the industrial sector, manufacturing process, wastewater characteristics and treatment/disposal system concerned.

7) The water audit, technical assessment carried out by the recognized or empaneled institution will not substitute, restrict or prejudice the statutory powers and functions of PPCB to conduct statutory inspection, sampling, determination of compliance/ non-compliance and regulatory/ enforcement action under the Water (Prevention and Control of Pollution) Act, 1974 or any other applicable environmental law.

8) The findings of the auditing institution shall be subject to scrutiny and verification by Punjab Pollution Control Board and shall not, merely by submission or

(Signature)

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acceptance of the Water Audit Report, confer any statutory approval, consent, authorization, exemption or right upon an industrial unit.

The office order will come into force with immediate effect and will be placed before the forthcoming meeting of the Board for ratification.

Endst no. 19833-37


o/c Chairperson
Dated 08/09/2026

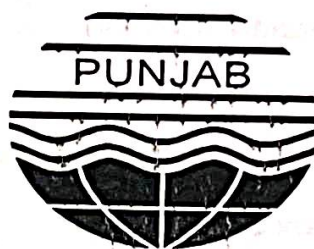
A copy of above is forwarded to the following for information and necessary

action:

- 1) All the CEEs, PPCB
- 2) All the SEEs, PPCB
- 3) All the EEs, PPCB
- 4) EE (Computers), Punjab Pollution Control Board for uploading on the Board's website.
- 5) Concerned Technical Institutions


o/c Member Secretary

The Water Audit Mechanism (Basic and Specialized)



Issued by

Punjab Pollution Control Board

Vatavaran Bhawan,

Nabha Road, Patiala

The Water Audit Mechanism (Basic and Specialized)

1. Classification of Water Audits

A. Basic Audit:

B. Specialized Audit

2. Water Audit and Water Balance

3. Wastewater Generation, Collection and Conveyance

4. ETP/STP Adequacy and Component-Wise Performance Assessment

5. ZLD System Assessment

6. Treated Wastewater Utilization/Disposal on Land for Plantation or Irrigation

7. Groundwater Impact Assessment and Piezometers

8. Water Conservation, Recycling and Reuse

9. Compliance and Environmental-Risk Assessment

10. Field Verification, Sampling and Testing

11. Deliverables

12. Responsibilities of the Industry

13. Independence, Conflict of Interest and Technical Responsibility

14. Scrutiny and Verification by PPCB

15. Empanelment/Recognition and Review

The Water Audit Mechanism (Basic and Specialized)

1. Classification of Water Audits

A. Basic Audit: Unless, PPCB requires a higher-level or specialized audit considering water consumption, wastewater generation, pollution potential or treatment complexity, minimum scope of the basic audit shall cover:

- i. water sources,
- ii. major consumption points, metering network,
- iii. wastewater streams and routing,
- iv. conservation/ reuse arrangements,
- v. disposal arrangements,
- vi. record/ data verification and
- vii. preparation of water balance.

B. Specialized Audit: In addition to basic audit, the specialized audit shall include:

- i. critical flow measurements,
- ii. hydraulic and pollution-load assessment,
- iii. ETP/ STP/ ZLD performance assessment,
- iv. detailed recycling/reuse assessment,
- v. peak and average load assessment,
- vi. verification of segregation/routing of relevant streams,
- vii. targeted sampling/ testing,
- viii. groundwater sampling (wherever required)
- ix. Any issue specifically identified by PPCB

2. Water Audit and Water Balance

- i. Assess all water sources, including groundwater, surface/ canal water, etc and verify applicable abstraction/ procurement permissions.
- ii. Identify process-wise, utility-wise, domestic consumption and other points, verify functionality and calibration status of critical online meters and records.
- iii. Prepare a reconciled water balance covering freshwater intake, process/ utility/ domestic use, evaporation, product retention, recycling/reuse, effluent generation and losses.
- iv. Carry out reconciliation/ mass-balance checks, identify unexplained gaps/streams, determine specific water consumption per unit production, compare with applicable norms/ sectoral benchmarks/ best practices and recommend corrective measures alongwith freshwater-reduction strategies.

3. Wastewater Generation, Collection and Conveyance

- i. Identify and quantify all trade-effluent, domestic-sewage streams & other streams and reconcile freshwater consumption vis-a-vis wastewater generation.
- ii. Verify segregation and routing of trade effluent, sewage, cooling water, boiler blowdown, RO reject, storm water and other relevant streams.
- iii. Verify collection, conveyance, treatment and authorized disposal/reuse arrangements, including tanks, drains, pipelines, pumps, sumps and conveyance integrity.
- iv. Identify bypass, leakages, overflows, unauthorized diversions, dilution or discharge of untreated/ partially treated effluent and assess source-reduction opportunities.
- v. For CETP-connected units, assess wastewater quantity/characteristics and adequacy of collection, storage, conveyance and monitoring arrangements.

4. ETP/ STP Adequacy and Component-Wise Performance Assessment

- i. Evaluate design capacity vis-a-vis average and peak hydraulic load, design pollution load vis-a-vis actual influent pollution load, treatment efficiency, compliance, sludge management, chemical/ energy consumption, instrumentation and standby arrangements.
- ii. Wherever technically required, undertake component-wise/unit-wise performance assessment by representative flow measurement and sampling at the inlet and outlet of individual treatment stages, having regard to the treatment process and pollutants involved.
- iii. Identify hydraulic overloading/underloading, shock loading, short-circuiting, inadequate retention time, improper aeration/ mixing, sludge-related problems, chemical-dosing deficiencies and other design/ operational limitations.
- iv. Identify the treatment component(s) responsible for inadequate overall performance and determine whether operational optimization, modification, augmentation, replacement or revamping would improve overall ETP/ STP efficiency.
- v. Assess whether any existing unit is redundant, technically unsuitable or adversely affecting downstream performance. Any recommendation for removal, replacement or bypassing shall be supported by engineering assessment and shall not result in violation of statutory standards or consent conditions.
- vi. Distinction between deficiencies rectifiable through O&M and those requiring process modification, augmentation or capital intervention, supported by existing/ recommended treatment-flow diagrams and calculations.

5. ZLD System Assessment

- i. Prepare and verify a complete water/wastewater mass balance covering ETP-treated effluent, RO feed/permeate/reject and recovery, MEE/MVR feed/condensate/concentrate, ATFD/ crystallizer feed/condensate and salt/ residue generation.
- ii. Verify reuse of recovered water, reject/concentrate/salt/residue management, storage capacity, operating hours and capacity of critical equipment,
- iii. Assess specific energy and chemical consumption.
- iv. Identify bypass/unauthorized discharge/disposal and reconcile freshwater intake, wastewater generation, recovered water, evaporation and residue generation.
- v. Clearly conclude whether the installed system is technically capable of achieving ZLD at the assessed production/wastewater load and whether ZLD was actually maintained during the assessment period.

6. Treated Wastewater Utilization/Disposal on Land for Plantation or Irrigation

- i. Where treated wastewater is utilized/disposed onto land for plantation, horticulture, irrigation or other land-based application, assess the long-term sustainability and environmental adequacy of the land-application system, in addition to wastewater quality and quantity.
- ii. Verify the actual and effectively usable land area and assess its adequacy with reference to wastewater quantity/quality, crop or plantation water requirement, seasonal variation, rainfall, evapotranspiration, soil characteristics and site-specific conditions.
- iii. Assess the suitability of plantation/crop species and recommend sustainable application rate, irrigation schedule, rotation/resting period and any additional land or alternative reuse/disposal arrangement required.
- iv. Plantation-area adequacy shall not be determined solely through a fixed KLD-per-acre criterion; it shall be supported by site-specific water requirement, soil, climatic, effluent-quality and hydrogeological assessment.

7. Groundwater Impact Assessment and Piezometers

- i. Assess potential leaching/percolation of pollutants to groundwater considering wastewater characteristics and quantity, application rate, soil properties, depth to groundwater, aquifer vulnerability and local hydrogeology.
- ii. Review available historical groundwater-quality data and establish baseline

groundwater level/quality wherever feasible.

- iii. Prepare a technically justified proposal for installation of an adequate number of piezometers/groundwater monitoring wells at suitable locations.
- iv. Recommend groundwater-level and quality monitoring frequency and relevant parameters including pH, EC/TDS, major ions, nutrients, heavy metals and industry-specific pollutants, as applicable.
- v. Assess temporal trends and recommend restriction/discontinuation of land application, remediation or alternative wastewater management where monitoring establishes adverse groundwater impact.

8. Water Conservation, Recycling and Reuse

- i. Review existing conservation measures and apply Reduce-Reuse-Recycle principles, wherever technically feasible.
- ii. Identify process optimization, counter-current washing/rinsing, condensate recovery, cooling-water recycling, treated-effluent reuse and sector-specific opportunities.
- iii. Quantify potential freshwater saving and wastewater reduction and assess technical/ economic feasibility.

9. Compliance and Environmental-Risk Assessment

- i. Evaluate compliance with applicable environmental standards, consent conditions and relevant statutory requirements.
- ii. Identify risks associated with water abstraction, wastewater collection, treatment, recycling, reuse, land application and disposal, and recommend corrective/preventive measures with an indicative implementation schedule.
- iii. Any audit observation regarding non-compliance shall be a technical finding for PPCB's consideration; statutory determination and consequential action shall remain with PPCB.

10. Field Verification, Sampling and Testing

- i. The assessment shall be independent and impartial and shall not rely solely on data supplied by the industry.
- ii. Physically verify water sources, manufacturing processes, water-consuming operations, wastewater-generation points, collection/conveyance, treatment,

- reuse and disposal facilities.
- iii. Undertake appropriate calibrated flow measurements and representative/targeted sampling where technically required; record date, time, location, operating condition and production status.
 - iv. Maintain field notes, photographs and supporting evidence, and verify industry records against meter readings, production data and field measurements.
 - v. Testing for audit purposes shall be through an appropriately recognized/accredited laboratory, as applicable. Audit sampling shall not substitute statutory sampling by PPCB wherever statutory sampling is required.

11. Deliverables

- i. Executive summary highlighting key findings, deficiencies, environmental risks and prioritized recommendations.
- ii. Manufacturing-process description and production capacity; source-wise water availability/abstraction and authorization status; process/utility-wise water consumption; verified existing water balance and optimized water balance.
- iii. Wastewater-generation, collection, conveyance, treatment, reuse and disposal assessment; hydraulic/pollution-load assessment; component-wise ETP/STP performance where undertaken; and ZLD assessment, as applicable.
- iv. Land-application adequacy, soil characterization, groundwater-impact assessment and piezometer proposal/monitoring plan, wherever applicable.
- v. Gap analysis identifying unaccounted streams, losses, bypasses/diversions; water and financial savings matrix; chemical/energy reduction opportunities; prioritized implementation plan.
- vi. Field observations, photographs, flow measurements, sampling/testing results, supporting engineering calculations, assumptions and limitations.
- vii. A clear conclusion regarding adequacy of water management, wastewater treatment and disposal/reuse arrangements and the technical/environmental sustainability of continued land application, wherever applicable.
- viii. The report shall be signed by the authorized representative/team leader with names, qualifications and relevant experience of professionals who actually conducted the audit.

12. Responsibilities of the Industry

- i. Provide complete and correct records, drawings, permissions, production data, water/ wastewater records, treatment-system details and laboratory reports, and provide safe access to all relevant facilities.
- ii. Facilitate flow measurements, sampling and physical verification and not conceal, alter or misrepresent any stream, bypass, pipeline, facility or record.
- iii. Consider and implement technically feasible corrective measures/ recommendations as may subsequently be directed by PPCB under applicable law.
- iv. Submission of an audit report shall not absolve the industry from compliance with the Water Act, consent conditions or any other applicable environmental requirement.

13. Independence, Conflict of Interest and Technical Responsibility

- i. The institution shall conduct the audit independently, objectively and impartially and disclose any actual or potential conflict of interest.
- ii. PPCB may require engagement of another institution where conflict may affect independence or credibility.
- iii. The institution shall remain responsible for the technical accuracy, integrity and authenticity of observations, measurements, calculations and recommendations.

14. Scrutiny and Verification by PPCB

- i. PPCB may scrutinize the report, seek clarification/ additional information, require additional measurements/ studies, conduct independent inspection/ sampling, or reject findings/ recommendations found technically inadequate, unsupported or inconsistent with field conditions or statutory requirements.
- ii. Acceptance/ submission of an audit report shall not confer any right for grant, renewal or variation of consent or any other statutory approval.

15. Empanelment/ Recognition and Review

- i. Institutions listed in Annexure-A shall be eligible subject to willingness, availability and appropriate sector-specific technical expertise.
- ii. PPCB may prescribe additional qualification, experience or sector-specific requirements; add, suspend or remove institutions; require reassessment by another institution; and issue sector-specific guidelines, formats, checklists or additional Terms of Reference.

- iii. For specialized/ complex treatment systems, PPCB may specify the institution or category of institutions possessing requisite expertise.
- iv. The cost of audit shall ordinarily be borne by the concerned industrial unit unless otherwise specifically decided by PPCB. Payment by the industry shall not affect independence or bind PPCB to accept the findings.

A) Empanelled Technical Institutions by CPCB

1. Indian Institute of Technology, Delhi
2. Indian Institute of Technology, Roorkee, Uttarakhand
3. Indian Institute of Technology (BHU), Varanasi, Uttar Pradesh
4. Indian Institute of Technology, Kanpur, Uttar Pradesh
5. Indian Institute of Technology (ISM), Dhanbad, Jharkhand
6. Institute of Chemical Technology (ICT), Mumbai
7. Indian Institute of Engineering Science and Technology, Shibpur, West Bengal
8. National Institute of Technology, Patna (NIT Patna), Bihar
9. Motilal Nehru National Institute of Technology, Prayagraj (Allahabad), Uttar Pradesh
10. National Institute of Technology, Delhi
11. Central Pulp & Paper Research Institute (CPPRI), Saharanpur, Uttar Pradesh
12. National Sugar Institute (NSI), Kanpur, Uttar Pradesh
13. CSIR-National Environmental Engineering Research Institute (CSIR-NEERI), Delhi
14. CSIR-Indian Institute of Toxicology Research (CSIR-IITR), Lucknow, Uttar Pradesh
15. Delhi Technological University (DTU), Delhi
16. CSIR-Central Leather Research Institute (CSIR-CLRI), Chennai
17. Jadavpur University, Kolkata, West Bengal
18. Aligarh Muslim University, Aligarh, Uttar Pradesh
19. Harcourt Butler Technical University, Kanpur, Uttar Pradesh
20. Vasantdada Sugar Institute, Pune, Maharashtra
21. Jamia Millia Islamia, Delhi
22. Pollution Control Research Institute, BHEL, Haridwar, Uttarakhand
23. Central University of South Bihar (CUSB), Gaya, Bihar
24. Muzaffarpur Institute of Technology (MIT), Muzaffarpur, Bihar
25. G. B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand.
26. Jambheshwar University of Science and Technology, Hisar, Haryana

B) List of Other Top Institutes as per National Institutional Ranking Framework not included in above list

1. Indian Institute of Technology, Madras, Chennai
2. Indian Institute of Technology, Bombay
3. Indian Institute of Technology, Kharagpur
4. Indian Institute of Technology, Hyderabad
5. Indian Institute of Technology, Guwahati
6. Indian Institute of Technology, Jammu
7. Indian Institute of Technology, Ropar
8. Indian Institute of Technology, Mandi, Himachal Pradesh
9. Indian Institute of Technology, Gandhinagar
10. Indian Institute of Technology, Jodhpur
11. National Institute of Technology, Tiruchirappalli
12. Birla Institute of Technology & Science, Pilani, Rajasthan
13. Council of Scientific and Industrial Research-Indian Institute of Petroleum, Dehradun
14. National Productivity Council, Delhi
15. Centre for Science & Environment, New Delhi
16. The Energy & Resources Institute, New Delhi
17. South India Textile Research Association, Tamil Nadu

C) Punjab State and other neighboring States Institutes

1. Panjab University, Chandigarh
2. National Institute of Technology, Hamirpur, Himachal Pradesh
3. National Institute of Technology, Kurukshetra
4. National Institute of Technology, Jalandhar
5. Indian Institute of Science Education & Research, Mohali
6. National Institute of Technical Teachers Training & Research, Chandigarh
7. Punjab Engineering College, Chandigarh
8. Central University of Punjab, Bathinda
9. Guru Nanak Dev University, Amritsar
10. Punjab Agricultural University, Ludhiana
11. Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana
12. Guru Nanak Dev Engineering College, Ludhiana
13. Thapar Institute of Engineering and Technology, Patiala
14. Maharaja Ranjit Singh Punjab Technical University, Bathinda