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Updates on Water Environment Governance in Industrial Wastewater Management

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กรมควบคุมมลพิษ
POLLUTION CONTROL DEPARTMENT

1.1 Regulatory framework for wastewater management

Law & Regulations

- Enhancement and Conservation of National Environmental Quality Act, 1992
- Ministerial Notification on Effluent Standards amended 2016)
- Pollution Control Committee provisional standards

Scope

- Apply to all factories, estates, zones nationwide
- General + industry-specific standards
- Provisional measures for upgrading systems

Key Agencies

- MNRE – national policy & oversight
- PCD – standards drafting, enforcement, monitoring
- Local Governments – inspections & reporting

Coordination

- MNRE – PCD – Local government, Industry associations acadimia, NGOs, use of “blind data” for

Approach

- Legal enforcement + cooperation with industry
- Science-based, internationally aligned
- Provisions for future updates

About Organization: Pollution Control Department

PCD

Water Quality Management Division (WQM)

- Inland Water Subdivision
- Marine Water Subdivision
- Administrative Subdivision
- Domestic Wastewater Subdivision
- Industrial Wastewater Subdivision
- Agricultural Wastewater Subdivision
- Planning and Evaluation Subdivision

Responsibilities : water pollution control and management

Establish water pollution control policy

Formulate water quality standards and strategies

Monitor water quality & water pollution

Provide water pollution advice

Environment and Pollution Control Office 1 -16

(Regional across the country)

Responsibilities : water pollution control and management

Create a local environmental pollution management plan.

Suggest standards based on local sources.

Monitor and report on local water quality and environmental conditions and Provide water pollution advice

12 Water Quality Standard

Environment Standard (Section 32)

- Water Quality Standard for River, Canal, Creek, Swamp, and Reservoir
- Coastal/Marine Water Quality at the river's mouth

Type of Pollution Sources (Section 69)

Duty of Pollution Source Owner

Effluent Standards (Section 55)

Domestic Wastewater

- Allocated land
- Central Treatment Plant
- Gas Stations
- Some size and type of building

Agriculture Wastewater

- Coastal aquaculture pond
- Brackish aquatic animal breeding pond
- Freshwater aquaculture pond
- Pig Farm

Industrial Wastewater

- General Factories
- Pulp and Paper Factory
- Sea water desalination
- Bleaching, polishing, or coating the leather
- Animal Feed Production

1.3 State of Water Quality

Current Situation

Surface Water Quality Standard

Proportions of Water Quality Meeting and Not Meeting Standards in Thailand (2024)

2024, Results of water quality monitoring of major water sources were compared with surface water standards

59 water sources found that

51 water sources

non standard

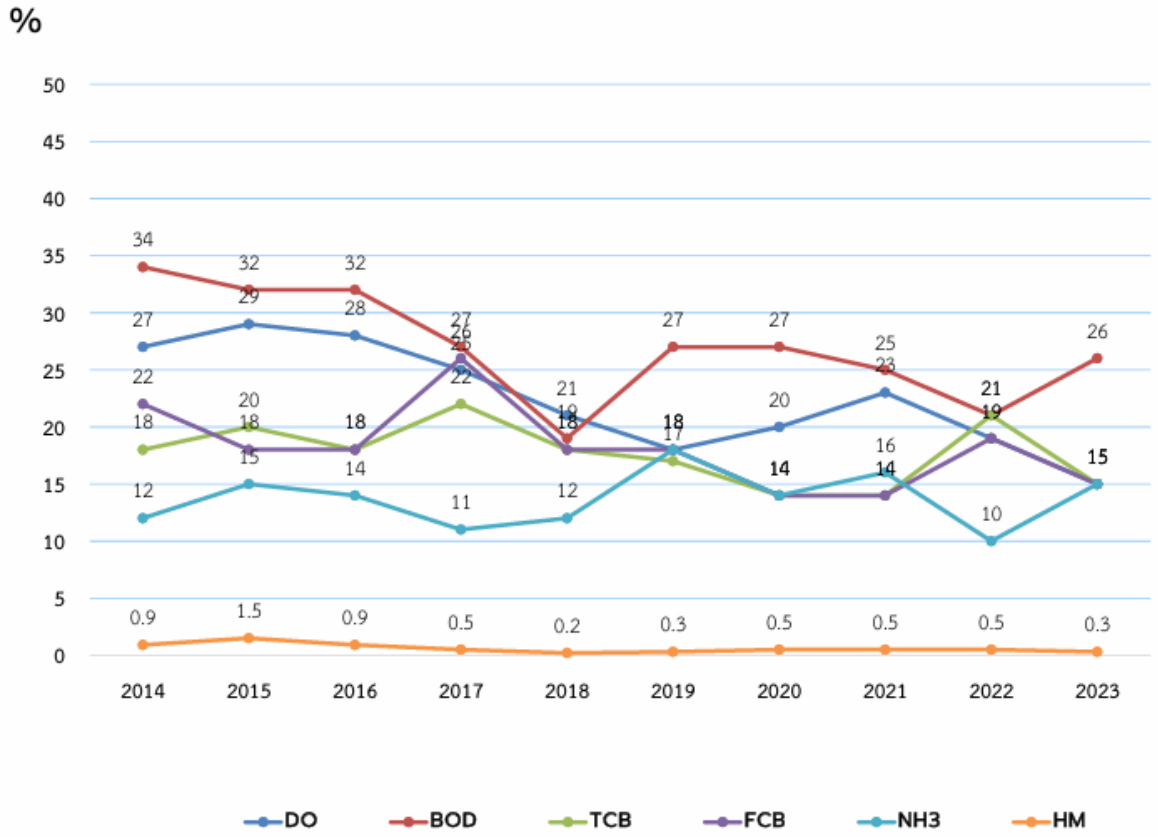
(86%) did not meet the Surface Water Quality Standards.

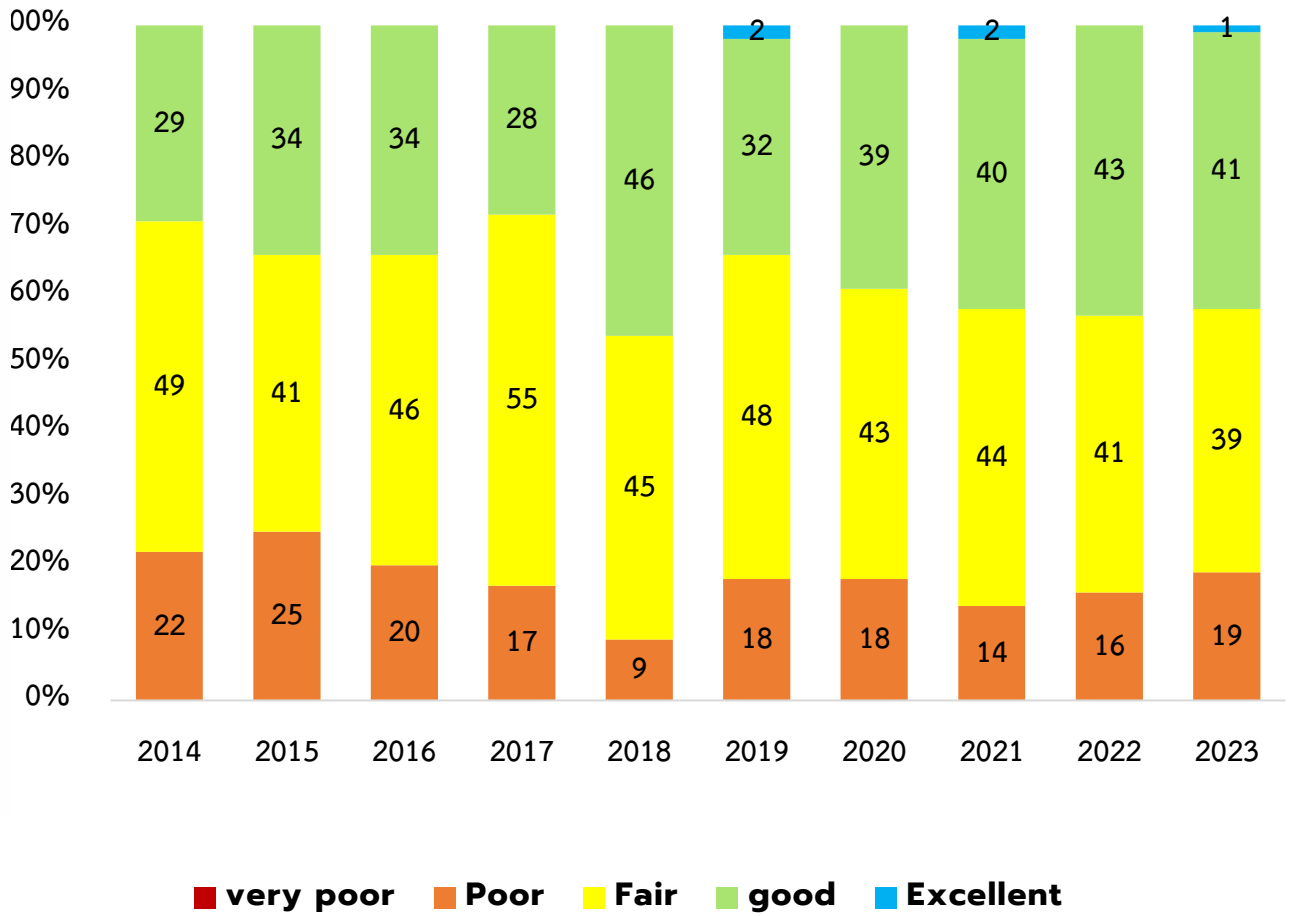
8 water sources

standard

(14%) that meet Surface Water Quality Standards.

1.3 State of Water Quality





Percentage of water quality parameters that non-compile with the Surface water quality standard class 3

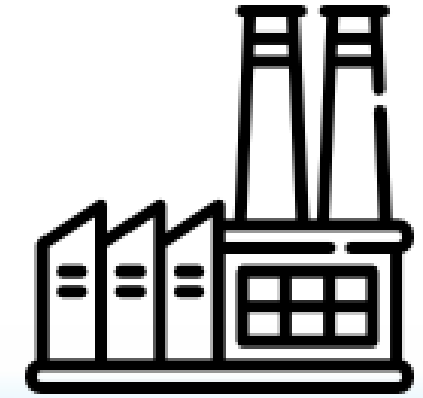
Proportions of water quality from 59 water bodies which failed to meet the surface water quality standard class 3

1.4 Basic regulations on industrial wastewater management

Wastewater Effluent General std.

Wastewater Effluent Specific Std.

- Filtration and polishing
- Desalination of seawater to produce fresh water
- Paper tissue
- Hydroelectric power generation, slaughterhouses /animal processing plants/animal feed production /starch-based food production/seasoning production
- Small-scale enterprises or businesses



1.4 Effluent quality standard parameters : General s

Thailand – Notification of the Ministry of Natural Resources and Environment, effective 6 June 2017

Effluent Standards

- Cover 27 parameters
  - Physical >> pH, temperature, color ,TDS
  - Organic pollution >> BOD, COD, TSS, Oil & Grease, TN, TP
  - Toxicity >> Phenols, Cyanide, Sulfide, Formaldehyde, Free Chlorine, Pesticides
  - Heavy metals >> Zn, Cu, Cd, Ba, Pb, Ni, Mn, Cr^{6+}, Cr, As, Se

Coverage

- General standards apply nationwide; specific standards for certain sectors

2016 Amendment

- Introduced numeric color limit; abolished odor standard; clarified measurement methods

Provisional Measures

- Cover 27 parameters

  Temporary allowances for some industries to upgrade treatment systems before meeting full standards

Legal Basis

- Issued under Environmental Quality Act;
- Enforced by PCD with coordination from local governments

1.4 Basis for the standards

Category	Parameter	Standard Limit	Unit
Basic Parameters	pH	5.5 – 9.0	-
	Temperature	≤ 40	°C
	Color	≤ 300	ADMI
	Total Dissolved Solids (TDS)	≤ 3,000 (general water bodies) ≤ 5,000 (naturally high TDS)	mg/L
	Total Suspended Solids (TSS)	≤ 50	mg/L
Pollution Load Parameters	Biochemical Oxygen Demand (BOD_5)	≤ 20	mg/L
	Chemical Oxygen Demand (COD)	≤ 120	mg/L
	Oil & Grease	≤ 5	mg/L
	Total Kjeldahl Nitrogen (TKN)	≤ 100	mg/L
Toxic Substances	Phenols	≤ 1	mg/L
	Cyanide	≤ 0.2	mg/L
	Sulfide	≤ 1	mg/L
	Formaldehyde	≤ 1	mg/L
	Free Chlorine	≤ 1	mg/L
	Pesticides	Not detectable	-

1.4 Basis for the standards

Category	Parameter	Standard Limit	Unit
Heavy Metals	Zinc (Zn)	≤ 5.0	mg/L
	Copper (Cu)	≤ 2.0	mg/L
	Cadmium (Cd)	≤ 0.03	mg/L
	Barium (Ba)	≤ 1.0	mg/L
	Lead (Pb)	≤ 0.2	mg/L
	Nickel (Ni)	≤ 1.0	mg/L
	Manganese (Mn)	≤ 5.0	mg/L
	Chromium VI	≤ 0.25	mg/L
	Total Chromium	≤ 0.75	mg/L
	Arsenic (As)	≤ 0.25	mg/L
	Selenium (Se)	≤ 0.02	mg/L
	Mercury (Hg)	≤ 0.005	mg/L

14 Basis for the standards

Key Parameter	Basis for Standard Value
pH (5.5–9.0)	From international standards; protect aquatic life; prevent corrosion/scale
Temperature (≤ 40°C)	Prevent oxygen depletion & ecosystem stress from high temp
Color (≤ 300 ADMI)	Converted to measurable value for enforceability (2016 revision)
Total Dissolved Solids (TDS)	Avoid salinity/dissolved solids harmful to aquatic organisms
Total Suspended Solids (≤ 50 mg/L)	Reduce sedimentation & protect habitats
BOD	Reflect treatment capacity; updated to align with new technologies
COD	Based on treatable organic/oxidizable substances; protect downstream water
Oil & Grease (≤ 5 mg/L)	Prevent surface films inhibiting oxygen transfer
Free Chlorine (≤ 1 mg/L)	Prevent chlorine toxicity to aquatic life
Total Nitrogen (TN)	Prevent eutrophication in nutrient-sensitive waters
Total Phosphorus (TP)	Prevent algal blooms; benchmarked with IFC, EU, China
Toxic Substances / Heavy Metals	Limited application; aligned with national capacity & readiness

1.5 Policies and Measures to Improve Compliance with Industry Regulations

Standards & Requirements

- Update effluent discharge standards to match current treatment technologies, environmental capacity, and international benchmarks
- Develop sector-specific discharge limits reflecting pollutant characteristics and production processes
- Require regular monitoring, on-site sampling, and submission of effluent quality reports to authorities
- Introduce nutrient control parameters (e.g., TN, TP) for sensitive water bodies

Capacity Building & Support

- Provide training programs, workshops, and technical manuals for industry operators
- Promote adoption of Best Available Techniques (BAT) and cost-effective pollution control technologies
- Support industry-led initiatives for cleaner production and resource efficiency
- Engage stakeholders through consultations, focus groups, and advisory committees

Enforcement & Collaboration

- Strengthen enforcement with clear legal procedures, penalties, and compliance timelines
- Conduct joint inspections with local authorities and environmental agencies
- Establish transparent compliance tracking systems and public disclosure of performance
- Encourage cooperative agreements between regulators and industries for continuous improvement

1.6 Compliance: Incentives and Penalties

Incentive

Public recognition and awards

- Green Industry Award
- Thailand Green Label

Financial incentives

- Tax reduction for certified green factories
- Low-interest loans for pollution control equipment

Institutional incentives

- Priority handling of permits and licenses
- Reduced inspection frequency for high performers

Other benefits

- Recognition via official websites or media
- Inclusion in government supplier lists

Penalty

Imprisonment

- For severe or repeated violations under environmental laws

Fines

- Monetary penalties per regulations
- Daily fines for exceeding effluent standards

Other measures

- Temporary/permanent suspension of operations
- License revocation
- Mandatory corrective actions

Public disclosure

- Publishing names of non-compliant facilities

1.7 Other Relevant Measures in Industrial Wastewater Management

- Public–Private Partnerships (PPP) – Gov–industry cooperation
- Zero Discharge & Circular Water – Reuse & closed-loop
- Eco-Industrial Town Program – Integrated environmental management
- Advanced Treatment Technologies – MBR, RO, wetlands
- Digital Monitoring Systems – Real-time tracking
- Capacity Building & Training – Skills & compliance

2 Establishment of Effluent Discharge Standards for Animal Feed Production Plants

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1.3 Basic regulations on industrial wastewater management

Subject to regulation	
Types of industries	☒ All industries ☐ Selected industries Standards are applied to factory Group II and III categories and all industrial estates under the Factory Act B.E. 2535 (1992).
Applicable effluent volume	Please specify if there are any differences in the enforcement of standards depending on effluent volume.
How are the standard values set?	☒ Uniform ☒ Depend on sectors ☐ Other (specify:)
Possibilities of setting more stringent standards	☒ Yes ☐ No Local governments (provincial and municipal) have the authority to set stricter wastewater discharge standards than national standards.
Transition periods, provisional standards, or other (to give industries time to adapt to emission standards)	☒ Transition period ☐ Provisional standards ☐ Other (specify:) (Please explain in a separate slide and indicate the slide number here)
Relevant laws to regulate effluent qualities from industries	• Factory Act B.E. 2535 (1992) • Decree on Industrial Effluent Control Standard B.E. 2559 (2016) • Regulations of Industrial Pollution Control Facilities (1982)

Monitoring and inspection	
Monitoring method	☐ Self (automated) ☒ Gov. or 3rd party
Monitoring parameter(s)	General effluent standard: 15 parameters and 16 heavy metals Type specific effluent standards: ??? (Please specify the parameters in a separate slide and indicate the slide number here)
Frequency	???
Inspecting agency	DIW (Department of industrial works) is the main role of inspection. In case of complaint, PCD always contact DIW firstly before starting inspection procedure
Inspection	???
Reporting obligation	???
Reporting to (whom)	Likely submitted to DIW???
Number of regulated facilities	140,000 factories in 77 provinces (FY2023)