

MALAYSIA'S REQUIREMENTS ON INDUSTRIAL EFFLUENT TREATMENT SYSTEMS

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by



NFORCEMENT DIVISION

DEPARTMENT OF ENVIRONMENT, MALAYSIA



Institut Alam Sekitar Malaysia
Environment Institute of Malaysia



Scope of Presentation

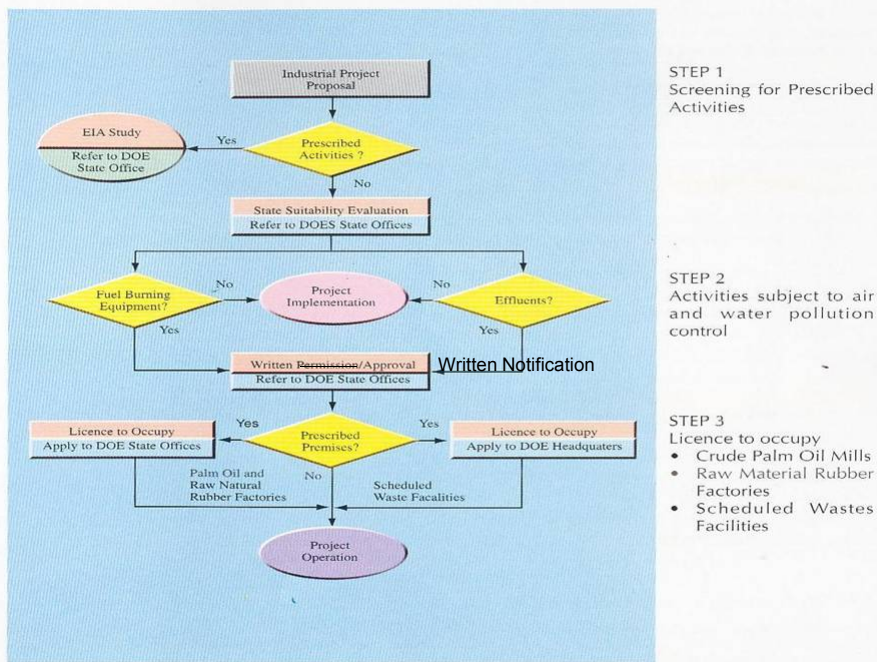
- ◆ Introduction
- ◆ Regulation Requirements
- ◆ Control Based on Engineering Design of IETS
- ◆ Performance Monitoring of IETS
- ◆ Contravention Licence

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Figure 1

APPLICATION PROCEDURE FOR ENVIRONMENTAL REQUIREMENTS IN MALAYSIA



Introduction

- ◆ **Industrial Effluent Treatment Systems:**
 - ◆ any facility including the effluent collection system, designed and constructed for the purpose of **reducing the potential** of the industrial effluent or mixed effluent **to cause pollution**.
 - ◆ “industrial effluent” means any waste in the form of liquid or wastewater generated from manufacturing process including the treatment of water for water supply or any activity occurring at any industrial premises;



INDUSTRIAL EFFLUENT TREATMENT SYSTEMS (IETS)

Section 4 in Industrial Effluent Regulation, 2009 (IE2009)*-
a premise is required to notify DOE for:

- ◆ New sources
- ◆ Increase in production capacity resulting in increase in effluent quantity
- ◆ IETS upgrading resulting in worsened effluent quality
- ◆ *[written notification requirement to replaces the written permission in SIER1979]

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Industrial Effluent Treatment System (IETS)

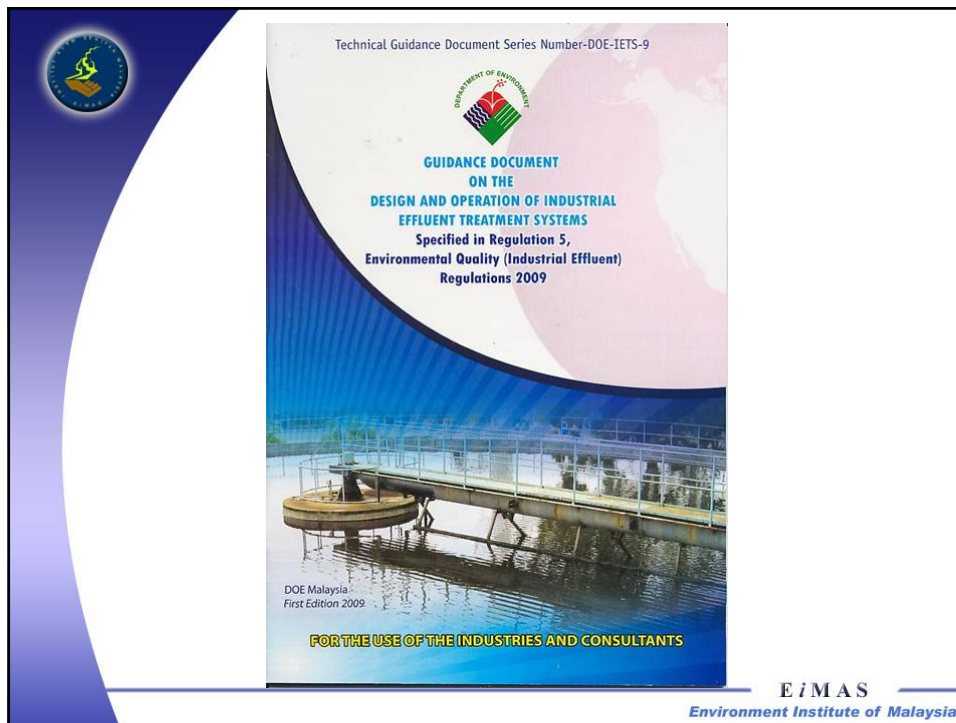
Section 5 and Section 6: Specification on IETS
-Design and Operation-

- Needs to comply with the Guidance Document on Design and Operation (GDDO);
- Undertaken by professional engineers;
- IETS must comply with stipulated operational characteristics

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Written Declaration on Design and Construction of IETS (NEW and ALTERED SOURCES OF EFFLUENT DISCHARGE)

-Declare that the industrial effluent treatment system has been designed and constructed in strict compliance with the minimum requirements and specifications as specified in the Guidance Document by:

- Owner
- Engineer responsible for the treatment design process
- Engineer responsible for the structural design
- Engineer responsible for the design of mechanical components
- Engineer responsible for the design of mechanical and electronic components

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(Regulation 12)

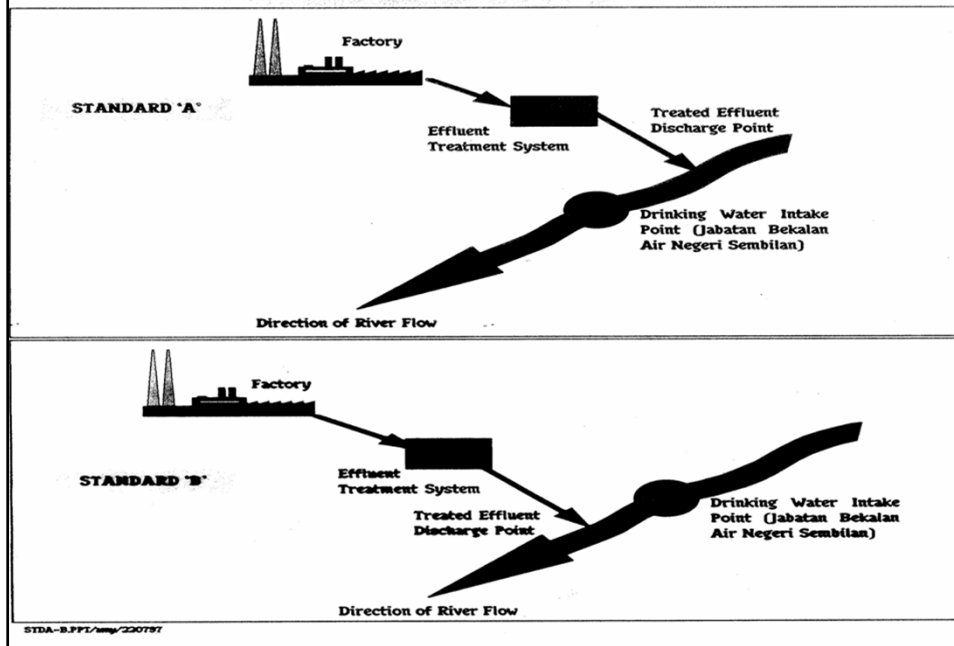
ACCEPTABLE CONDITIONS FOR DISCHARGE OF INDUSTRIAL EFFLUENT
CONTAINING CHEMICAL OXYGEN DEMAND (COD) FOR SPECIFIC TRADE
OR INDUSTRY SECTOR

(1) Trade/Industry	(2) Unit	(3) Standard A	(4) Standard B
(a) Pulp and paper industry			
(i) pulp mill	mg/L	80	350
(ii) paper mill (recycled)	mg/L	80	250
(iii) pulp and paper mill	mg/L	80	300
(b) Textile industry			
	mg/L	80	250
(c) Fermentation and distillery industry			
	mg/L	400	400
(d) Other industries			
	mg/L	80	200

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"STANDARD 'A'" AND "STANDARD 'B'" FOR
TREATED EFFLUENT DISCHARGE





Control Based on Engineering Design of IETS



Engineering Design of IETS

Common Industrial Effluent Treatment System
used in industries in Malaysia

1. Physcio-Chemical Treatment Processes

- Chemical Precipitation
- Oxidation/reduction
- Dissolved Air Floatation (DAF)

2. Biological Treatment Processes

- ☺ Activated Sludge
- ☺ Sequential Batch Reactor
- ☺ Oxidation Ponds
- ☺ Trickling filters
- ☺ Anaerobic Upflow Sludge Blanket (AUSB)



Engineering Design of IETS

Common Industrial Effluent Treatment System
used in industries in Malaysia

3. Advanced Treatment Processes

- Ion Exchange
- Activated Carbon Adsorption
- Filtration

4. Treatment of Sludge

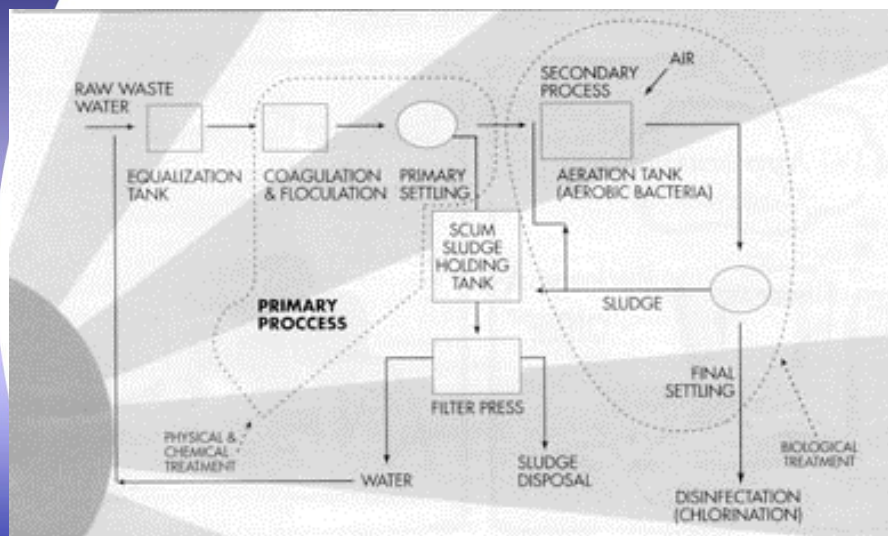
- Sludge drying bed
- Filter Press
- Belt press
- Centrifugal separation

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Engineering Design of IETS





Sequential Batch Reactor



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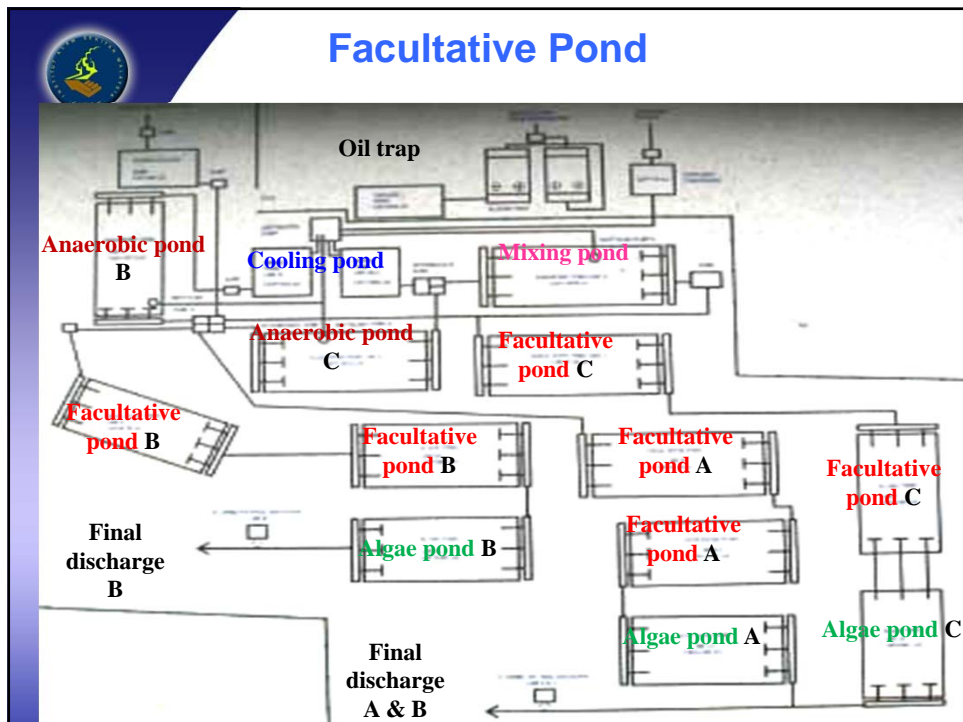
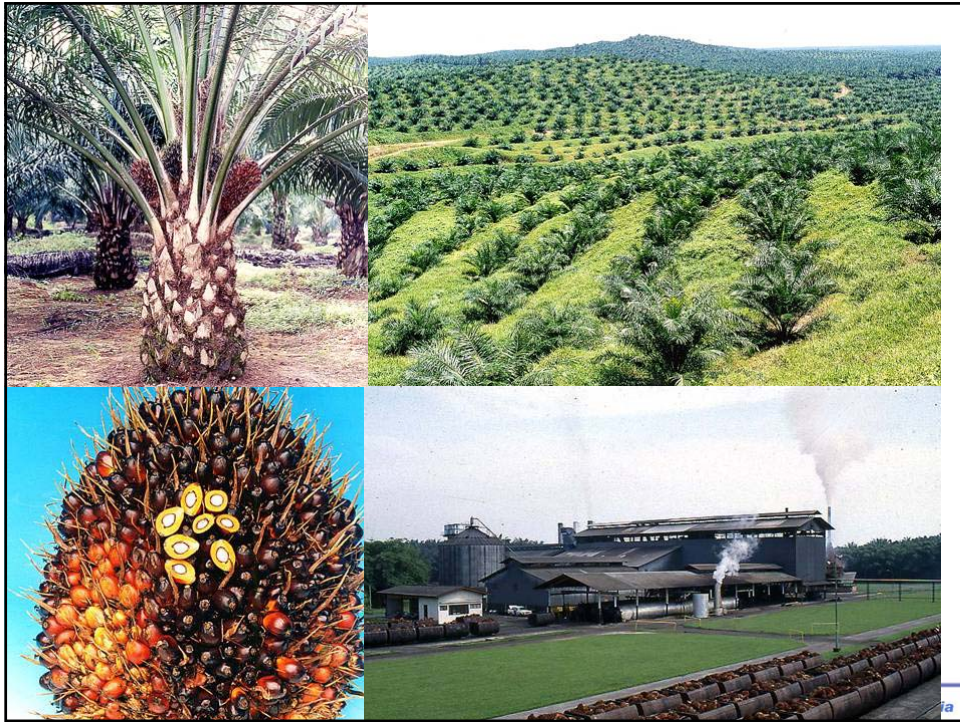
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Industrial Effluent Treatment Systems

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Engineering Design of IETS Ponding System



Oil trap



Cooling pond



Mixing pond



Anaerobic pond

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Facultative pond



Algae pond

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Discharge Monitoring Section 7 IE2009

- A. To monitor the **quantity** and **quality** of effluent discharged on a weekly basis
- B. Relevant **parameters** are to be monitored based on guidance given in the Guidance Document on Performance Monitoring (GDPM)
- C. **On line** the monthly discharge monitoring report (**MDMR**) needs to be submitted to DOE on a monthly basis



Proper Operation of IETS -Section 8 IE2009-

to operate and maintain the IETS in good working condition within the **acceptable ranges/characteristics** as specified in the Guidance Document on Performance Monitoring



SECTION 9 IE2009

Operation of Industries and Performance Monitoring of IETS

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Technical Guidance Document Series Number:DOE-IETS-1



**GUIDANCE DOCUMENT ON
PERFORMANCE MONITORING OF INDUSTRIAL
EFFLUENT TREATMENT SYSTEMS**
Specified in Regulation 9 (a)
Environmental Quality (Industrial Effluent)
Regulations, 2009

DOE Headquarters
Second Edition November 2009

FOR THE USE OF THE INDUSTRIES AND CONSULTANTS

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Operation of Industrial Effluent Treatment Systems

WHAT IS PERFORMANCE MONITORING?

- ◆ Handle proper operation and maintenance
- ◆ **Proactive & preventive monitoring** of certain parameters to **provide a diagnostic indication** to ensure that each component of **Industrial Effluent Treatment Systems** are operating optimally.
- ◆ Parameters to monitor our “health status”= “health of unit operations/processes” of IETS

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Analytical Requirements

- ◆ Performance monitoring is based on **in-situ measurements** using portable equipment or on-line sensors
- ◆ **Final effluent** samples to follow Standard Methods

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COMPETENT PERSON Regulatory Requirements on Performance Monitoring (Section 10 IE2009)

- ◆ The operation of an IETS needs to be supervised by a **competent person (CP)**
- ◆ -any person who has been certified by the Director General
- ◆ -on duty at any time of the IETS in operation
- ◆ -monitor all components, unit processes/operations of the IETS
- ◆ *[Nominated CP by premise needs to attend 10 days course program executed by EiMAS, practical training attachment and submission a project works before certified as CP by the GD of DOE]



Performance Monitoring of Biological Processes

3 different types of monitoring parameters:

- ◆ to ensure **biological process are functioning optimally** e.g. pH, DO, and nutrients
- ◆ to provide **diagnostic check** on the “health” status of various unit operations and unit processes e.g. MLSS & MLVSS, SVI
- ◆ To indicate **overall efficiency** of the treatment system e.g. BOD & COD.



Dissolved Oxygen

- ◆ DO **concentration** of about 1.5 to 4.0 mg/L; typically 2 mg/L
- ◆ Insufficient oxygen promotes growth of **filamentous organisms** affecting **sludge settleability**
- ◆ using a **portable** hand-held DO meter or measured continuously by **on-line** DO sensor

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Sludge Volume Index **SVI**

- ◆ SVI is used as an indication of **settling characteristics** of sludge and to determine **recirculation ratio**
- ◆ Poor settling sludge results in a **reduced BOD removal efficiency**
- ◆ **SVI :<50 excellent, 50-100 good, 100-150 satisfactory, >150 very poor (bulking of sludge)**

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Nutrients

- ◆ Many industrial effluents **lack in nutrients**
- ◆ **Nutrient balance** should be periodically checked
- ◆ The **rule of thumb** for BOD5: N: P ~ 100: 5: 1.
- ◆ Typical signs of **nutrient deficiency** are filamentous growth and bulking of activated sludge.

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Performance Monitoring of Physical and Chemical Processes

Heavy Metals Removal by Precipitation and Coagulation Reactions

- ◆ Coagulation and precipitation reactions work best within narrow pH range
- ◆ Solubility of metals is controlled by the solution pH where it is lowest at the point of **minimum solubility**
- ◆ **pH** is the most useful parameter monitored

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Performance Monitoring and Testing Guide for Biological Unit Processes

Activated Sludge

◆ PH	Daily
◆ DO	Daily
◆ MLSS	Daily/weekly
◆ MLVSS	Weekly/monthly
◆ OXYGEN UPTAKE	Weekly/monthly
◆ NUTRIENTS	Weekly/monthly
◆ SVI	Weekly/monthly

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PRACTICE OF PERFORMANCE MONITORING WILL...

- ◆ Cultivate the maintenance culture
- ◆ Cultivate self monitoring & regulation
- ◆ Ensure continued optimal performance (**TIP-TOP**) of IETS
- ◆ Ensure continued regulatory compliance
- ◆ Help avoid IETS failure
- ◆ Help avoid costly recovery action
- ◆ Help avoid regulatory enforcement

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SECTION 15 IE2009

Contravention Licence

- Polluter pay principle
- Licence to pollute
- New or Upgrading IETS

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....last not least.....IE2009

SECTION 32

.....besides compound (RM 2000 each);
conviction through **court action** carries a
maximum penalty of RM100,000 PLUS 5 year
jail.....



*Thank You
Very Much*

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