Ministry of Industry

Water Resources for Industrial Utilization in Myanmar

World Water Day 2017

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Nay Pyi Taw **13th Mar, 2017**

Contents

- Policy and Guidelines of the Ministry
- Water Management
  - Exploration
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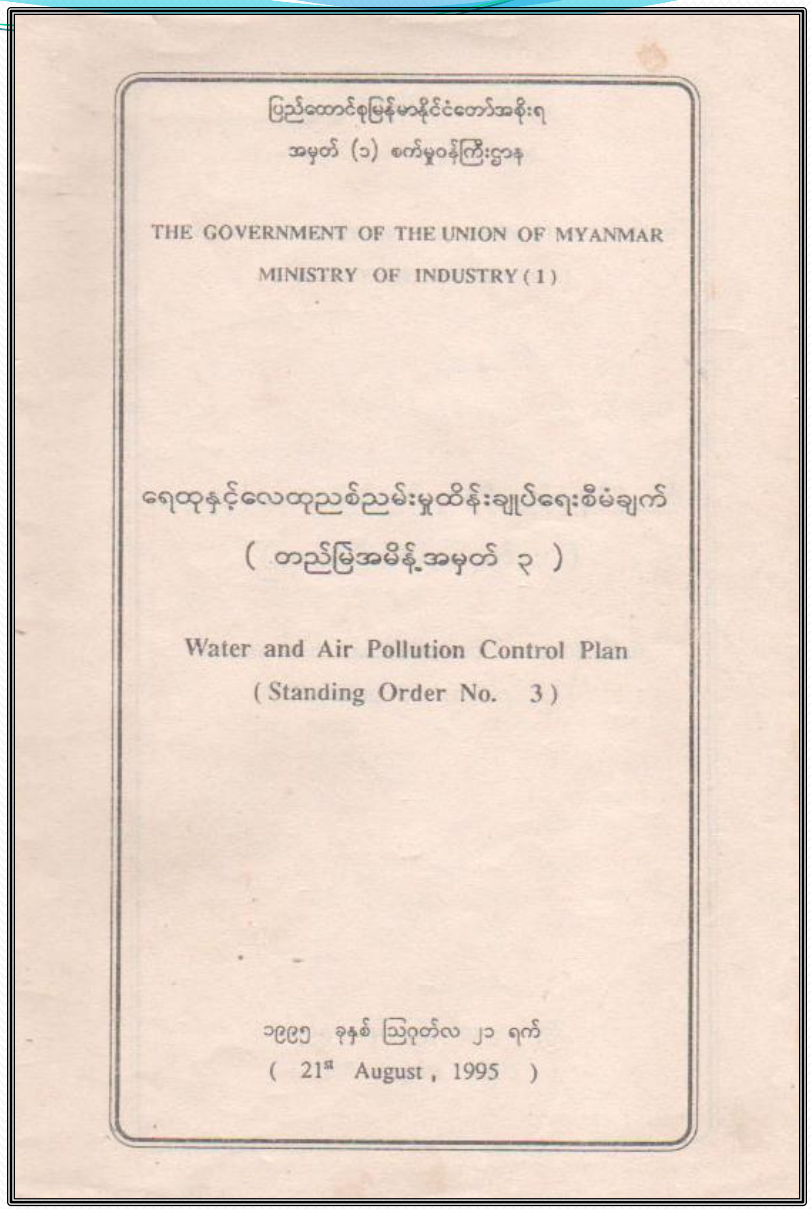
Policy and Guidelines of the Ministry

Water and Air Pollution Control Plan (Standing Order No. 3)

- Enacted by the Ministry of Industry in 1995
- Main Objectives
  - To control wastes
  - To reduce wastes
  - To eliminate wastes



ပြည်ထောင်စုမြန်မာနိုင်ငံတော်အစိုးရ

အမှတ် (၁) စက်မှုဝန်ကြီးဌာန

THE GOVERNMENT OF THE UNION OF MYANMAR

MINISTRY OF INDUSTRY (1)

ရေထုနှင့်လေထုညစ်ညမ်းမှုထိန်းချုပ်ရေးစီမံချက်

(တည်မြဲအမိန့်အမှတ် ၃)

Water and Air Pollution Control Plan

(Standing Order No. 3)

၁၉၉၅ ခုနှစ် သြဂုတ်လ ၂၁ ရက်

(21st August, 1995)

Criteria of Analytical Data of Liquid Effluent

- Temperature
- pH
- Suspended Solid
- Total Solid
- Hardness
- Carbonates
- Sulphates
- Chloride
- Ammonia – N
- BOD_5 (Biochemical Oxygen Demand)
- COD (Chemical Oxygen Demand)
- Chromium
- Heavy Metals
- Oil and Grease

Allowable Waste Effluent Standards

Parameter	Unit	Range		Remark
B. O. D(5 days at 20°C)	ppm	20~60	max	Depending on geography of waste discharging point
Suspended Solids	ppm	30	max	
Dissolved Solids	ppm	2000	max	
pH Value		5~9		
Permanganate value	ppm	60	max	
Sulphide (as H_2S)	ppm	1	max	
Cyanide (as HCN)	ppm	0.2	max	
Oil and Grease	ppm	5	max	
Tar			none	
Formaldehyde	ppm	1	max	
Phenols and Cresols	ppm	1	max	
Free chlorine	ppm	1	max	
Zinc	ppm	5	max	
Chromium	ppm	0.5	max	
Arsenic	ppm	0.25	max	
Copper	ppm	1	max	
Mercury	ppm	0.005	max	
Cadmium	ppm	0.03	max	
Barium	ppm	1	max	
Selenium	ppm	0.02	max	
Lead	ppm	0.2	max	
Nickel	ppm	0.2	max	
Insecticides			none	
Radioactive materials			none	
Temperature	℃	40	max	
Colour and Odour				Not Objectionable when mixed in receiving water

- **Waste water from the factories shall not be discharged directly into the river, creek, lake and pond unless it has been pre-treated when they are in the following conditions;**

(a) High acidity

(b) High alkalinity

(c) High temperature

(d) Presence of toxic chemicals (e.g Cyanide, Arsenic, Mercury, Cadmium, Lead, Chromium, P C Bs : Polychlorinated Biphenyl)

- **The following relevant treatment methods shall be used before discharging;-**

(a) Elimination of *suspended solid*

Sedimentation, vacuum and pressure floatation methods

(b) Elimination of *colloidal solid*

Chemical coagulation and adsorption

(c) Elimination of *inorganic dissolved solid*

Neutralization , pH control, oxidation – reduction methods, ion – exchange method, passing through activated carbon

(d) Elimination of *organic dissolved solid*

Lagooning, activated sludge, oxidation ditch, trickling filter method, natural treatment method using the water hyacinth ponds

Industrial Policy (February 2016)

Chapter IX

Standing on as the Green Industries

- **Disposal of waste water after treating;**
- Managing to use the suitable methods for solid waste, liquid and vapour to minimize the environmental impact;
- Control of emission of toxic gas, vapour and dust;
- Obtaining prior permission to operate business or preliminary surveying the environment or assessing the environmental impact and designing the procedure of environmental conservation;
- Designing the supporting procedure assessing the social impact, the effect of health and natural disaster impact;
- Establishing service companies to be carried out environmental management.

Industrial Policy (February 2016)

Chapter IX

Standing on as the Green Industries

The following environmental conservation measures shall be done;

- Measuring cleanliness of air;
- **Testing water resources;**
- Monitoring the ecosystem of aquatic animals;
- Surveying the socio – economic development;
- Surveying the public health;

Water Management

Water Exploration

Management

- **Permanent Secretary of Ministry of Industry participates as a member of the National Water Resources Committee (NWRC).**
- **An officer of the Ministry participates in the Expert Group of NWRC.**
- **Submitting monthly report to NWRC.**

Exploration

- **Most of the factories under the Ministry of Industry use the resource water from the rivers and creeks due to their location of short distance from rivers and creeks.**

- **The factories in the Thagaya Industrial Zone utilize the resource water from Sittaung River. We do emphasis on cooperation with the Directorate of Water resources & Improvement of River System (DWIR) for the sustainable water management.**

- **Some factories especially private factories / enterprises which are far from the rivers are using underground water.**

Water pumping System

No.(31) Heavy Industry (Thayet)

Water Pumping Station

No.(35) Heavy Industry (Chauk)

Ayeyarwaddy River Bank

Established in 2007

Water Pumping Station
Thagaya Industrial Zone

- 3 Heavy Industries
- 1 R & D Center
- 1 ITC

Pontoon House
at the Sittaung River Bank
Established in 2008

Water Pumping Station
No.(21) Heavy Industry (Tha-Htone)

Pontoon House
at Doan Tha Mi Creek

No.(21) Heavy Industry (Tha-Htone)

Pipe Line

Centrifugal Pump

Water Storage and Filteration

No.(21) Heavy Industry (Tha-Htone)

Raw Water Pumping Station

Sedimentation Tank

No.(21) Heavy Industry (Tha-Htone)

Water Treatment Plant

Drinking Water Pump

Water Reservoirs

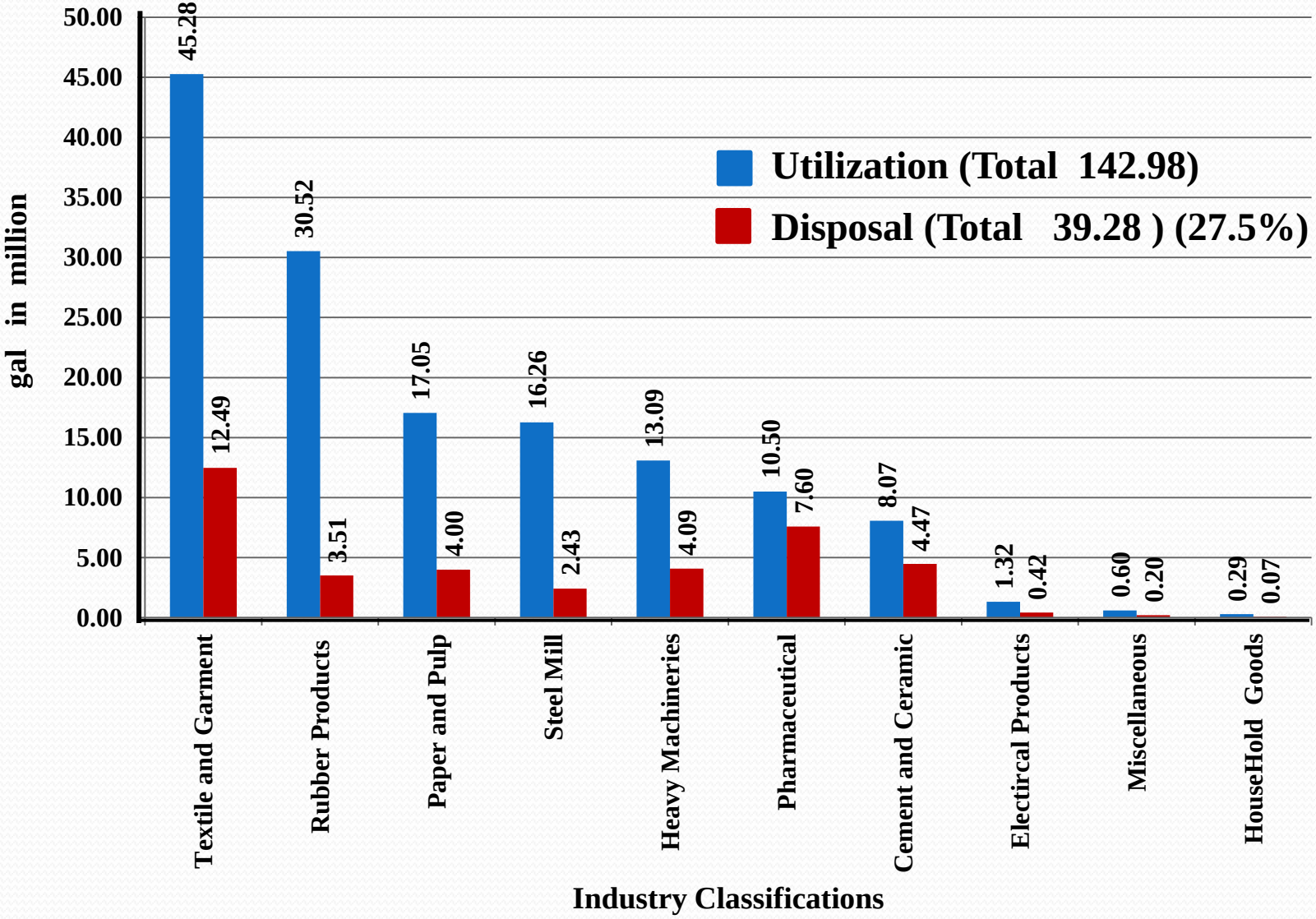
Ministry of Industry
Utilization and Disposal Water of Industries

≅ gals in million

Sr No	Industry Classifications	Number of Factories	Utilized Water (per month)	Disposal (per month)
1	Textile and Garment	29	45.28	12.49
2	Tyre & Rubber Products	2	30.52	3.51
3	Paper and Pulps	2	17.05	4.00
4	Steel Mill	2	16.26	2.43
5	Heavy Machineries	4	13.09	4.09
6	Pharmaceutical	4	10.50	7.60
7	Cement and Ceramic	4	8.07	4.47
8	Electrical Products	4	1.32	0.42
9	Miscellaneous	6	0.60	0.20
10	Household Goods	2	0.29	0.07
	Total	59	142.98	39.28

(27.5%)

Ministry of Industry
Utilization and Disposal Water of Industries (Monthly)



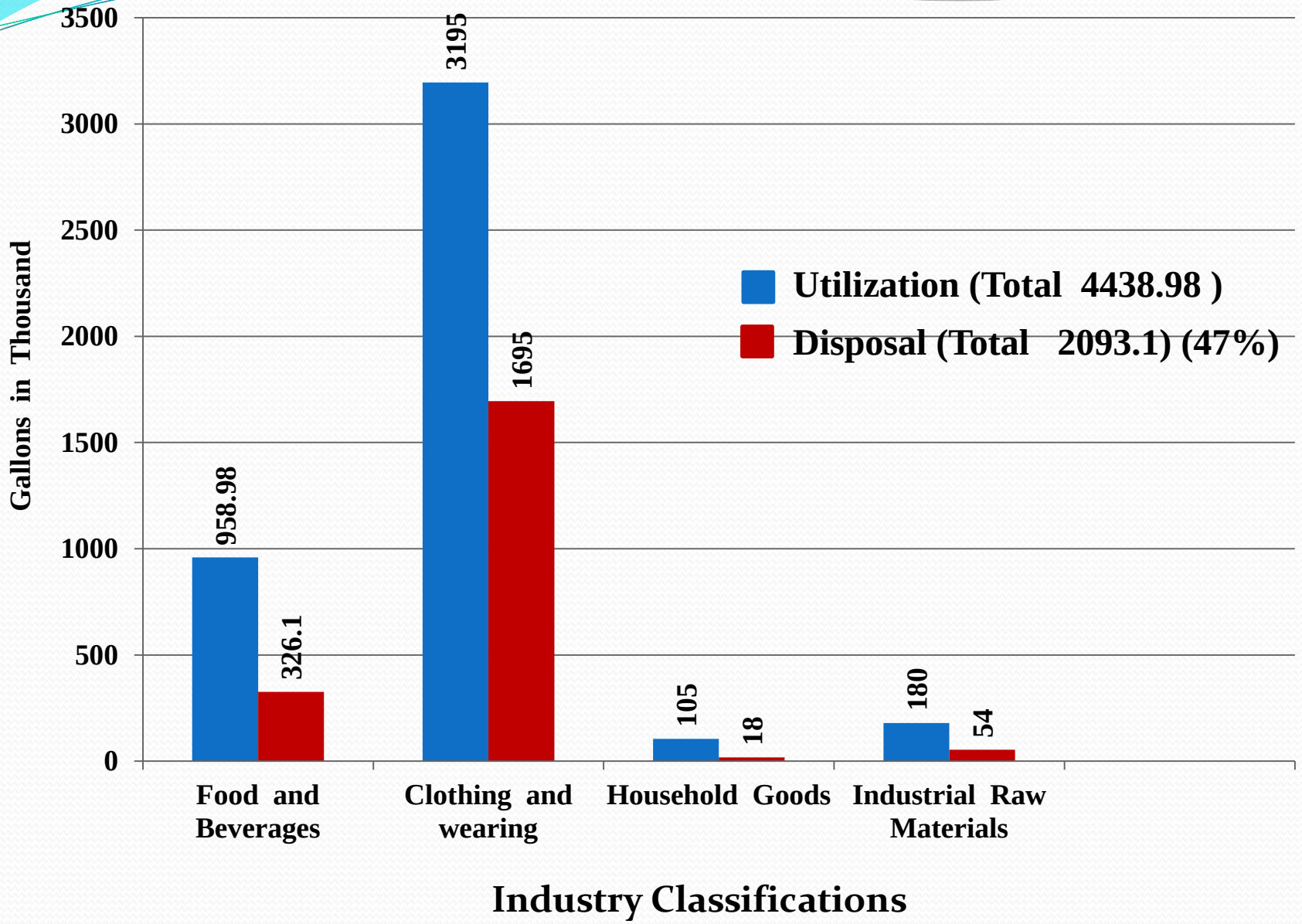
Utilization and Disposal Water of Registered Private Industries inspected by the Directorate of Industrial Supervision and Inspection (January, 2017)

≅ gallons

Sr No	Industry Classifications	Number of Factories	Utilization	Disposal
1	Food and Beverages	27	958,980	326,100
2	Clothing and Wearing Apparel	3	3,195,000	1,695,000
3	Household Goods	2	105,000	18,000
4	Industrial Raw Materials	4	180,000	54,000
	Total	**36**	**4,438,980**	**2093,100**

(47%)

Utilization and Disposal Water of Registered Private Industries inspected by the Directorate of Industrial Supervision and Inspection (January, 2017)



Water Management

Waste Water Treatment

Inspection

By the Directorate of Industrial Supervision and Inspection (DISI), Ministry of Industry

- The Industrial Waste and Waste Water discharged from registered private factories are regularly inspected in accordance with the enacted Standing Order of the Ministry of Industry, Myanmar National Water Policy and National Environmental Quality (Emission) Guidelines.
- Waste Water is treated by Physical Process, Chemical Process, Biological Process before discharged and disposed into waste water collecting tanks, plantation yards, creeks, drainage lines and specific areas defined by the City Development Committees through the waste water pipelines.

Evidential Show Case

- "Yaung Ni" Distillery Factory (Ayeyawaddy Region)'s Waste Water Treatment System

Criteria	EQG Standard	Treatment Result before Cooperation	Treatment Result after Cooperation
C.O.D	250 ppm	700 ppm	200 ppm
B.O.D	50 ppm	3200 ppm	
T.S.S	50 ppm	477.5 ppm	
T.D.S	2000 ppm	10 ppm	10 ppm

ရောင်နီအရက်ချက်စက်ရုံ၏ ပြုပြင်ပြီး Waste Water Treatment System

နောက်ဆက်တွဲ(က)

1. Decanter + Filter Press
(အနည်းစစ်ခြင်းဖြင့် COD, TSS ပမာဏလျှော့ချရန်)

Sludge + Waste Water (70°C – 80°C)

COD (70000-80000 mg/L)

Sludge

Waste Water

2.Plate Heat Exchanger
(Temperature လျှော့ချရန်) 70°C -40°C

COD (60000-70000 mg/L)

3.Primary Settling Tank
(အနည်ထိုင်ခြင်းဖြင့် COD, TSS လျှော့ချရန်)

Sludge

COD (60000-70000 mg/L)

4.Equalization Tank
(လေမှုတ်ခြင်းဖြင့် COD, TSS ပမာဏကို တသတ်မတ်တည်း တည်ငြိမ်စေရန်)

pH-3.27

COD (50000 mg/L)

COD (40000 mg/L)

5.Buffer Tank
(pH -4 to 5 ဝန်းကျင်သို့ ညှိရန်၊ ပိုးများထပ်မံဖြည့်သွင်းရန်နှင့် ပိုးများအာဟာရဖြည့်ရန်)

6(a).Gas Boiler
(3 ton/hour)

Biogas

6(b).Flare Stack
(ပိုလျှံ gas များမီးရှို့)

6.Anaerobic Reactor
(COD ပမာဏလျှော့ချရန်) pH-7.4

Sludge

7.Degasifier
(လေမှုတ်ခြင်းဖြင့် ပျော်ဝင်ဓာတ်ငွေ့ကို ဖယ်ထုတ်ရန်)

8.Lamella Clarifier
(ပိုးပါသော အနှစ်များ ခွဲထုတ်ရန်)

9. Aeration Tank
(လေမှုတ်ခြင်းဖြင့် အနည်ထိုင်အားကောင်းပြီး COD, TSS ပမာဏလျှော့ချရန်)

10.Lagoons(15)Nos
(သဘာဝမြေသားကန်များ တွင်အနည်ထိုင်စေရန်)

15 10

Sludge

COD(4000mg/L)

COD(5000mg/L)

COD(1000mg/L)

COD(<200mg/L)

COD(400mg/L)

COD(700mg/L)

12.Activated Carbon Filter (2)Nos
(COD, TSS လျှော့ချရန်)

11.Gravel and Sand Filter
(COD,TSS ပမာဏလျှော့ချရန်)

13. Chlorine Dosing Pot and Holding Tank
(ပိုးသတ်ရန်)

ယခု စွန့်ပစ်ခြင်း

ရောဝတီမြစ်

ယခင်စွန့်ပစ်ခြင်း

လျှို့ဝှက်

မူလရှိသည့် Treatment System

Check Point (7) Nos

အသစ်ဖြည့်စွက်သည့် Treatment System

COD ပမာဏ

Waste Water Measuring with pH Meter

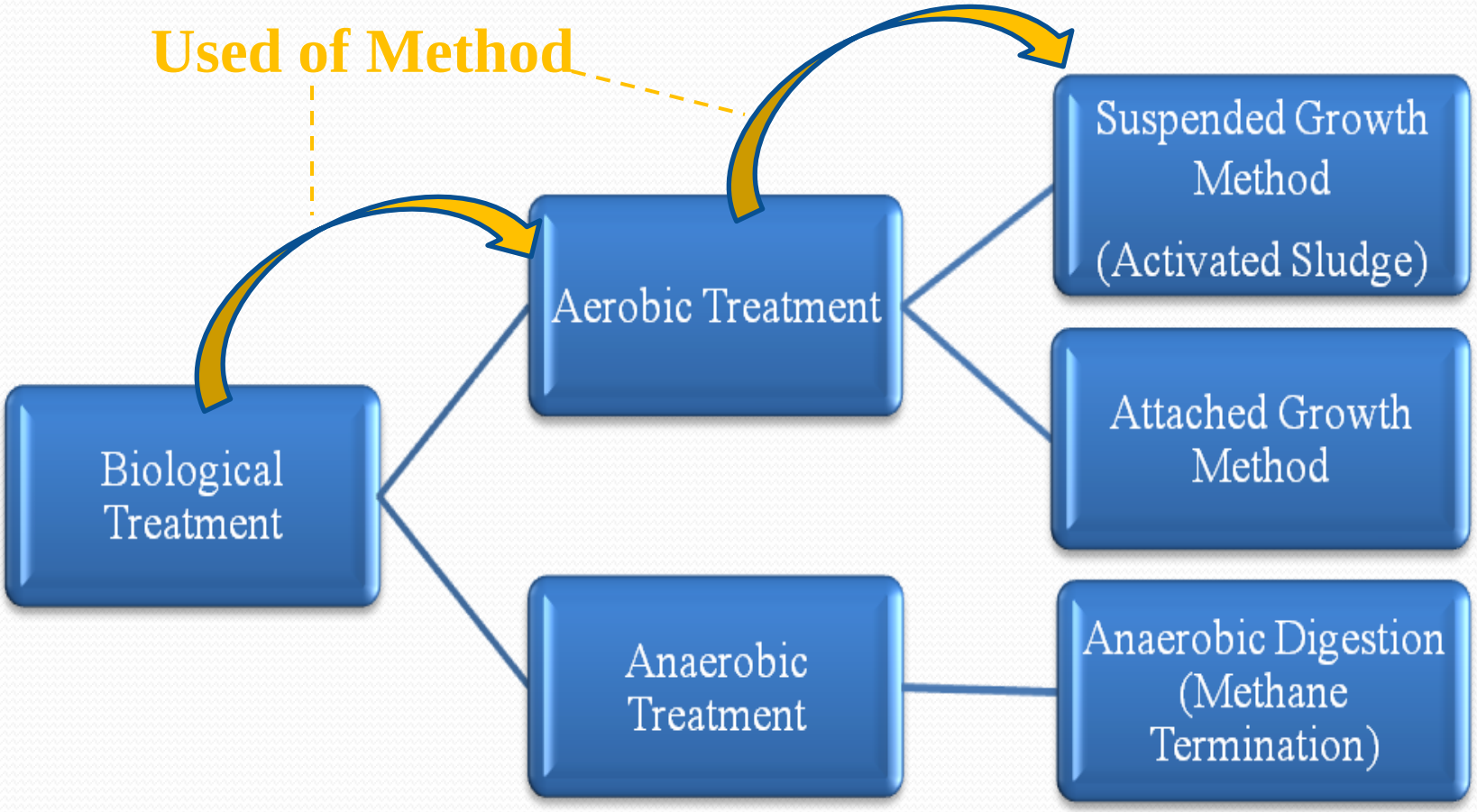
“Yaung Ni”

Distillery Factory
Ayeyawaddy Region

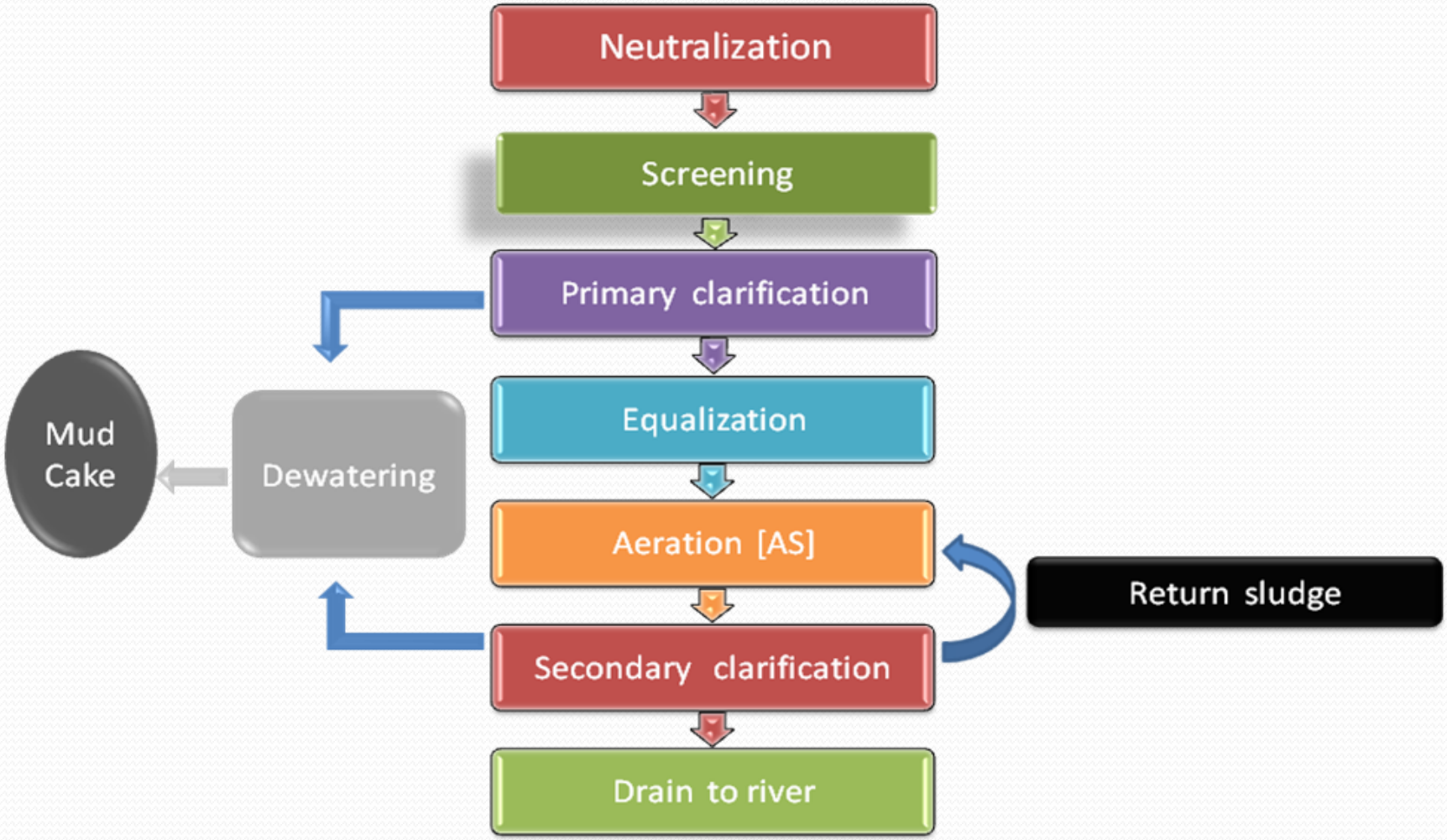
Practices of the State Own Enterprises (SOEs) under the Ministry of Industry

- **Discharging into the rivers and creeks after waste water treatment system according to the specified quality standards.**
- **Sedimentation and evaporation of the water to the air by using the reservoirs and sedimentation tank.**
- **Using the ways of Physical Chemical and Biological Processes.**
- **Using close circuit to reduce the water utilization quantity and to conserve the environment.**

High Grade Paper Mill (Thabaung)
Biological Treatment Process



Operation Process of Waste Water Treatment in the Paper Mill



Mesh Screen (Mesh 1000 mm x 1800mm - 16 Nos)

Primary Clarifier (ϕ 42 m, Depth 4.5m)

Cooling Tower

Primary Sludge Tank
(6m x 6 m , Depth -5m)

Excessive Sludge Tank
(5 m x 5m, Depth -4. 5m)

Hydrolysis Tank
(25m x 17 m, Depth 6m x 2 Nos)

Aeration Tank (73.5 m x 24 m , Depth -9m - 2 Nos)

Blower House (Air Blower - 4 Nos)
Flow rate - 80 m^3/min , Max; Pressure - 0.5 MPa

Distribution Well
(4 m x 4 m, Depth -6 m)

Secondary Clarifier (ϕ 37m, Depth -3m - 2 Nos)

Secondary Sludge Tank
(8 m x 8m , Depth -5m)

Sludge Thickener
(ϕ 17m , Depth -3m)

Dewater House

Belt Press Machine
Capacity -800 kg Sludge Cake /hr

Quality of Water Disposal

Before treatment

BOD	**-**	**401 mg/l**
COD	**-**	**1700 mg/l**
pH	**-**	**6 ~ 9**
Ss	**-**	**766 mg/l**
T	**-**	**50º C**

Quality of Water Disposal

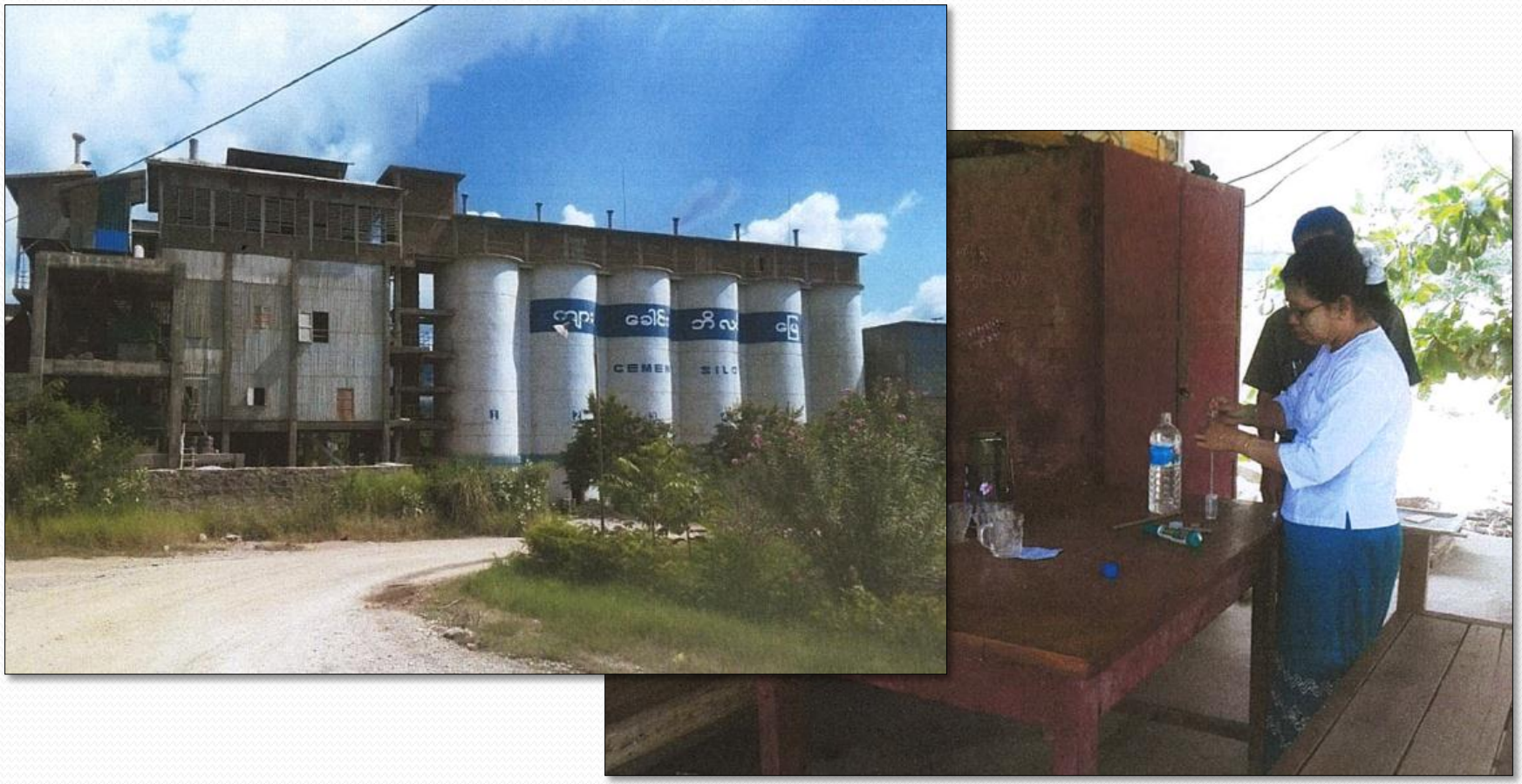
After treatment

BOD	**<**	**100 mg/l**
COD	**<**	**400 mg/l**
pH	**-**	**6 ~ 9**
Ss	**<**	**100 mg/l**
T	**-**	**30°C**

Waste Water Measuring with pH Meter

“Tiger Head”
Cement Factory
Mandalay Region

Waste Water Temperature Measuring by using Thermometer



Tiger Head Cement Factory Mandalay Region

Waste Water Measuring with pH Meter

“Linn Yaung Ni”

Cold Storage Factory
Mandalay Region

Waste Water Temperature Measuring by using Thermometer

U Hla Win
Ice Factory
Tanintharyi Region

15.12.2016

Waste Water Temperature Measuring by using Thermometer

U Aye Cho
Packaging Paper Industry
Magway Region
(2.12.2016)

U Phyu Nu
Rice Noodles (Monghingar) Industry
Rakhine Region

Waste Water Measuring with pH Meter

E-Lan Co., Ltd.
Soap Industry
Yangon Region
(3.1.2017)

Golden Lotus
Drinking Water Industry
Nay Pyi Taw
(18.1.2017)

Noise Measuring with Noise Level Detector

U Hla Than
Boat Yard
Tanintharyi Region
(16.12.2016)

No.(35) Heavy Industry (Chauk)
Waste Water Drains

No.(31) Heavy Industry (Thayet)
Waste Water Drain

Water Management

Flood Protection

Activities on Flood Protection

- **Trees Plantation at the boundary of factories those are near from the rivers as the flood and storm preventer;**
- **Building the retaining wall and land elevation within the factory area, and trees plantation at the retaining track.**
- **Construction dam to control the flood near rivers and creeks.**
- **Relocation of things from the lower side to elevated location.**
- **Making drains around the factory.**

Activities on Flood Protection (Cont;)

- Preparedness of water pumps.
- Pre-inspection of transformers and cable lines.
- Inspection and maintenance of roofs of stores and warehouses.
- Placing the sandbags, cleaning the drains around the store and warehouse and residential areas.
- Caring readiness of telecommunication and manual communication on natural disasters.

Activities on Flood Protection (Cont;)

- **Organizing, undertaking, motivation and informing according to the weather announcement of Myanma Meteorology Department .**
- **Undertaking to be the systematic records arranging system.**
- **Education and awareness on preparedness , prevention, mitigation.**
- **Project planning for prevention and resettlement.**

No.(31) Heavy Industry (Thayet)
Concrete Embankment for Flood Protection

Future Plan

Water Crisis Occurred in Thagaya Industrial Park under the Ministry of Industry in 2016

- It must be taken care on falling down of water level of Sittaung River when the rare rainfalls and poor water input from the Paunglaung Dam.
- As a result, sand-dune and mud cloud appear so that pontoon station could not operate pumping the water and water supply to the industrial zone (Thagaya) was cut-off.

Measures to be undertaken

- **In this regard, the followings shall be done with the firm cooperation of the Directorate of Water Resources and Improvement of River System (DWIR);**

Ministry Side

- **Defining minimum standard water level near the pump station and watching daily and move the pontoon appropriately.**
- **Digging the sand-dune around the 25 meters from the pontoon.**
- **Drains making for water inlet.**

DWIR Side

- **Care control and management of water flow in Sittaung River.**

Other Activities

- **Recycling and reusing of water, after treatment to specified standards.**
- **Discharging the waste water systematically after recycling.**
- **Testing the waste water by using testing instruments in accordance with the National Environmental Quality (Emission) Guidelines.**
- **Inspection and surveying on requirements of establishment of waste water treatment plant in the factories in accordance with the Environmental Conservation Rule 41.**

Other Activities (Cont;)

- Instruction and guidance on Environmental Impact Assessment (EIA) as of the Environmental Conservation Rule 52.
- Instruction and Guiding to the industries those were established before the provision of the regulation of Environmental Conservation Law to be inline with such specified rules.
- Coordinating with relevant departments to discuss and share on knowledge of waste water.

Requirements

We Need;-

- Statistic System
- Measuring and Testing Equipments
- Trainings and Capacity Building
- Waste Water Treatment Technology
- Experts and Auditors Trainings


Thank You