SELF REGULATION – A TOOL: Learning from Developed Countries

By:

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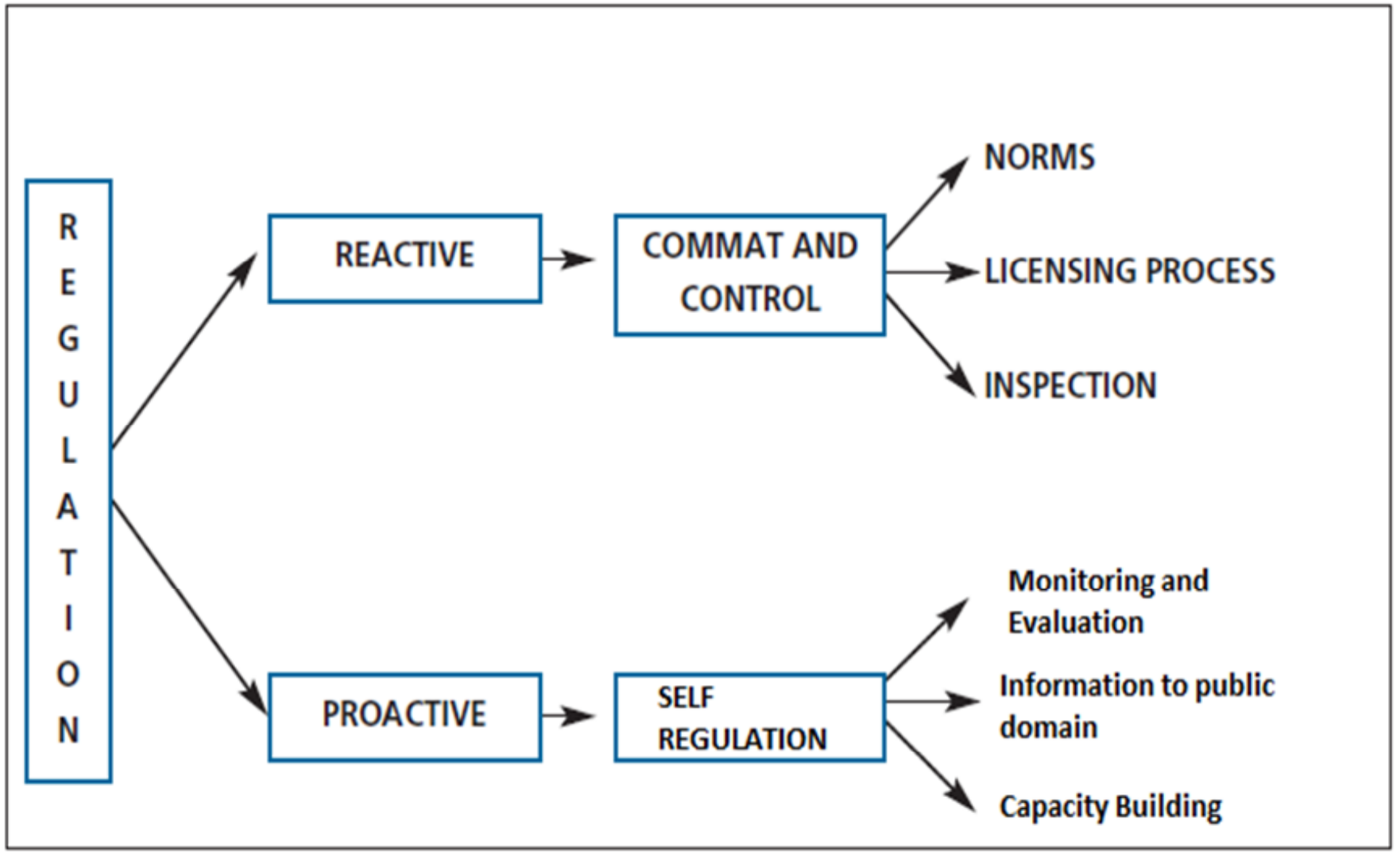
BURDEN OF PROOF SHALL BE WITH POLLUTER

A Paradigm Shift – Regulation by Regulators to Self Regulation by Industry

WHY SELF REGULATION?

- Industry shall be an effective partner on pollution control
- Burden of proof shall be with polluter.
- Bringing transparency to regulators and citizens
- Limitation of regulatory body.

Self Regulation A proactive approach to Regulation



COMPONENTS OF SELF REGULATIONS

- **Organizational and policy**
- **Pollution assessment – monitoring data and management**
- **Waste minimization**
- **Transparency and report writing**

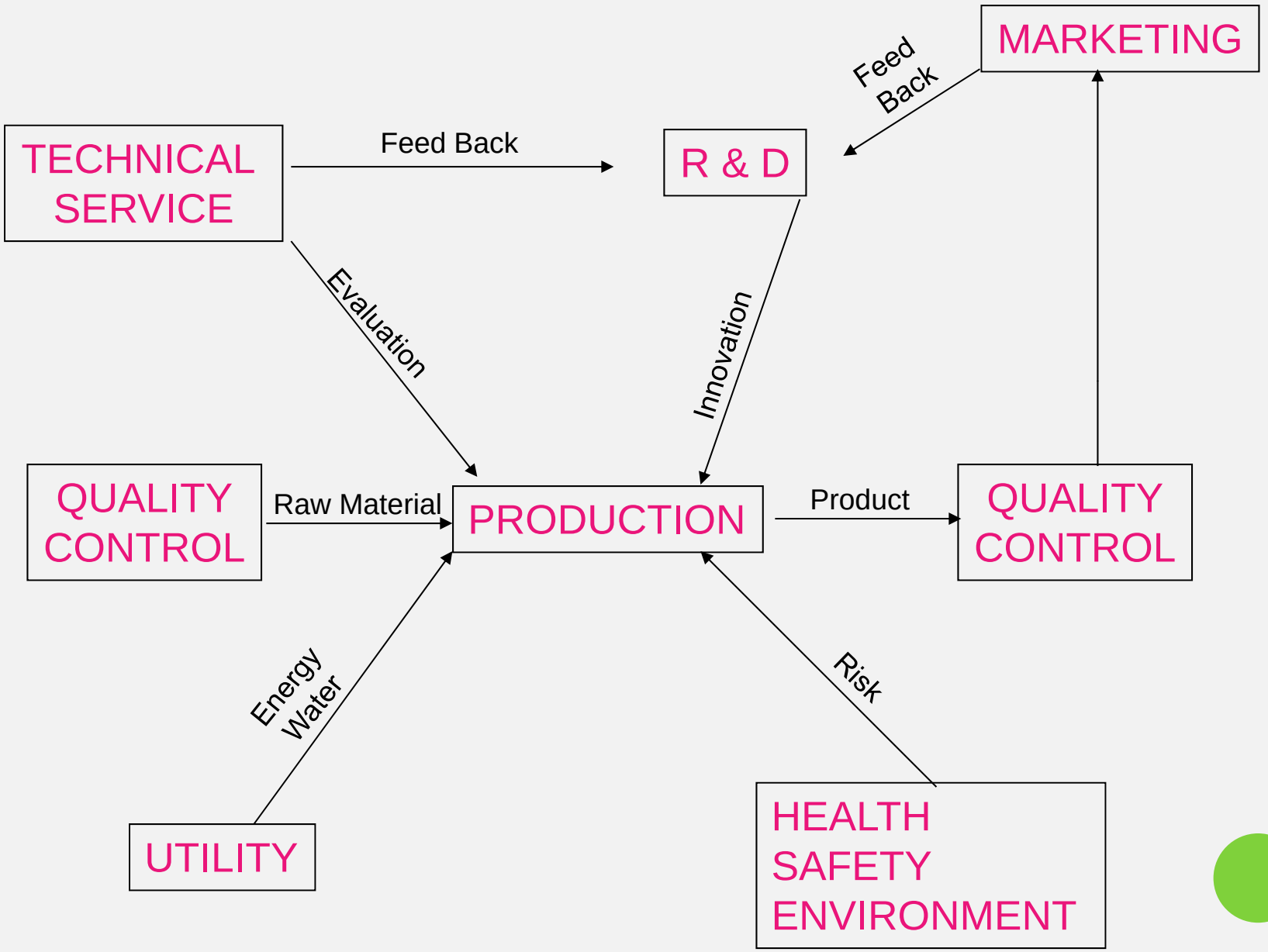
POLICY

- Ensure pollution control norms
- Conservation of resources
- Environmental impact assessment in operation phase
- Develop Environmental Management System
- Integration of all departments on Env. Management

ORGANIZATION THE FIRST STEP

- Integration of all components on Environment management.
- Organisation set up for self regulation
- Data base creation an action plan
- Traning and awareness

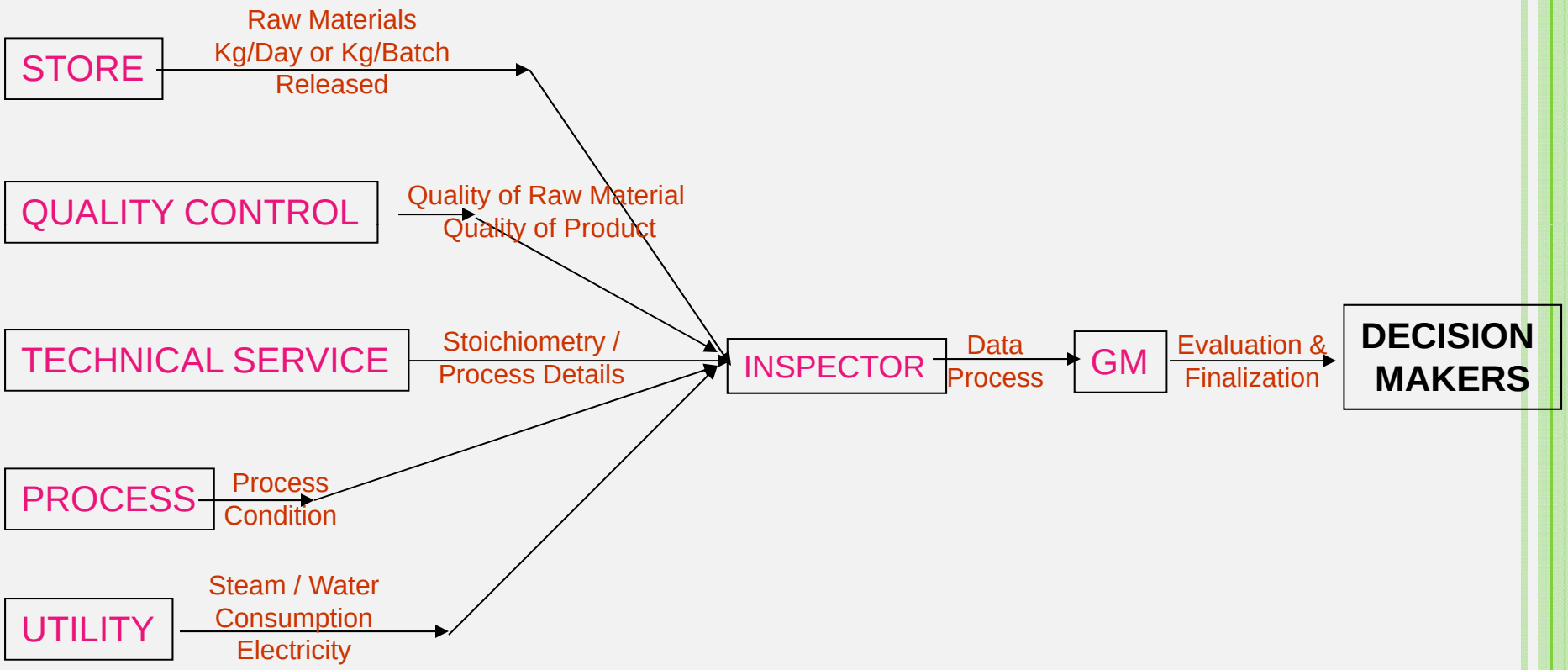
INDUSTRIAL SYSTEM AND ORGANISATION



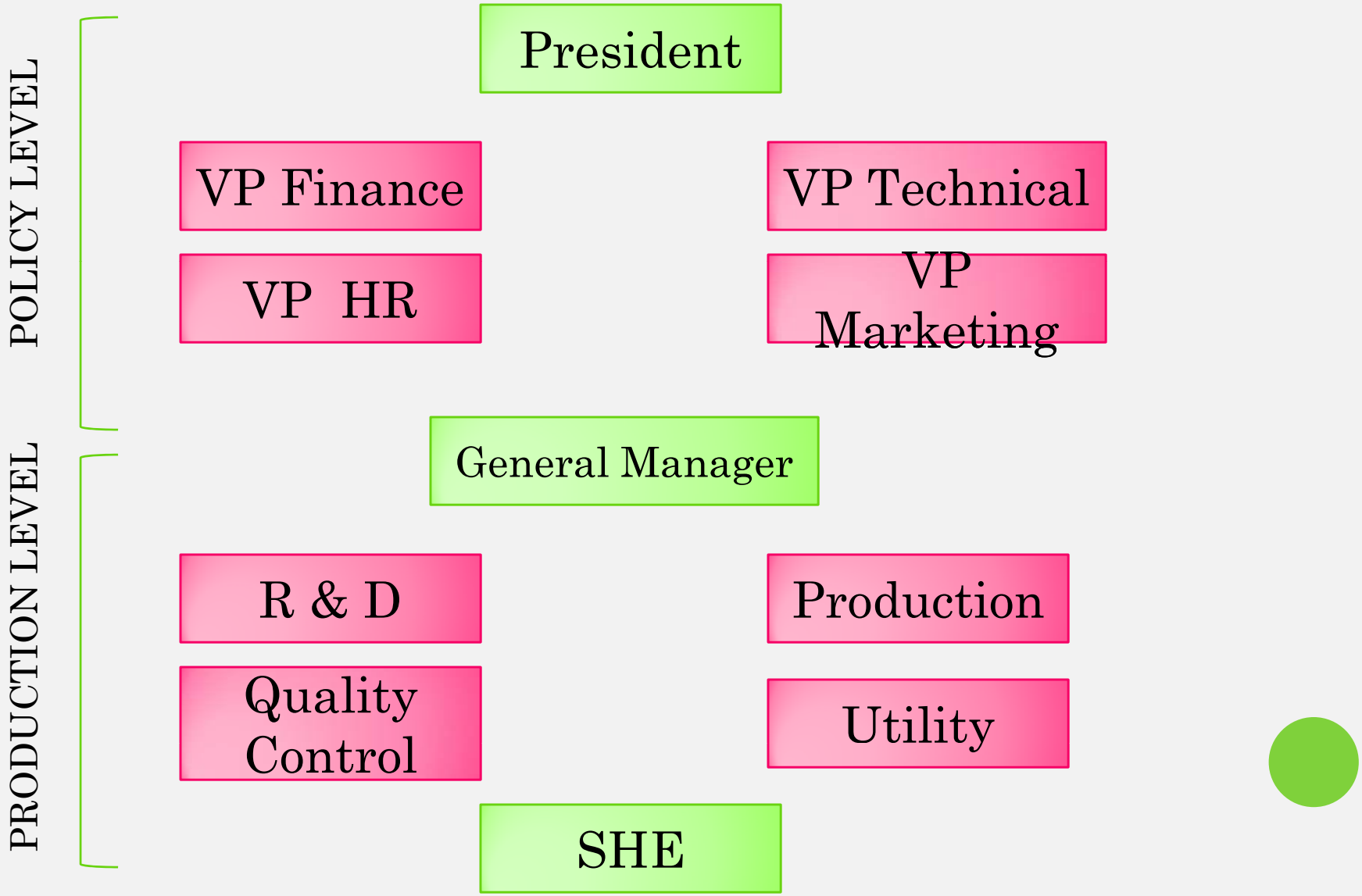
TASK TO BE GIVEN

Management	– Information
Utility	– Water balance
	Energy balance
Technical Service	– Material balance
Quality control	– Laboratory service
HSE	– Monitoring and evaluation

INFORMATION NETWORK FOR MASS BALANCE



ORGANIZATION – AN EXAMPLE



Monitoring a tool for Evaluation

MONITORING – WHAT IT IS?

Monitoring is a programme for a systematic observation in order to draw inference (prediction) about the experiment or the phenomena for which it is designed.

By systematic observation means a periodic observation with regular intervals.

➔ **When (how often) to observe ? → frequency of observation**

By observation in science means measurement

➔ **What to measure?** → **parameters to be defined**

The third component of monitoring is the location

- **Where to sample?**

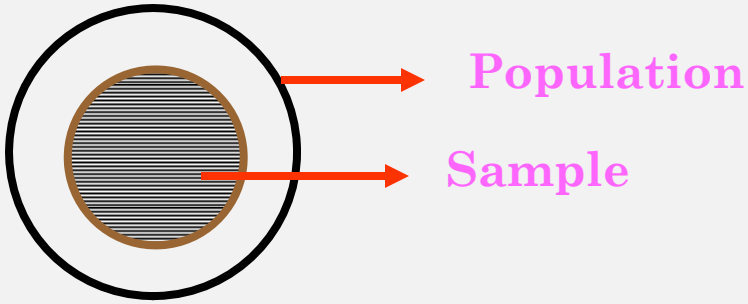
Monitoring is, therefore, a programme, or an experimental design composed of

- **Location of sampling – Where to sample?**
- **Frequency of sampling – How often?**
- **What to sample – What are parameters?**

POPULATION, SAMPLE AND SAMPLING

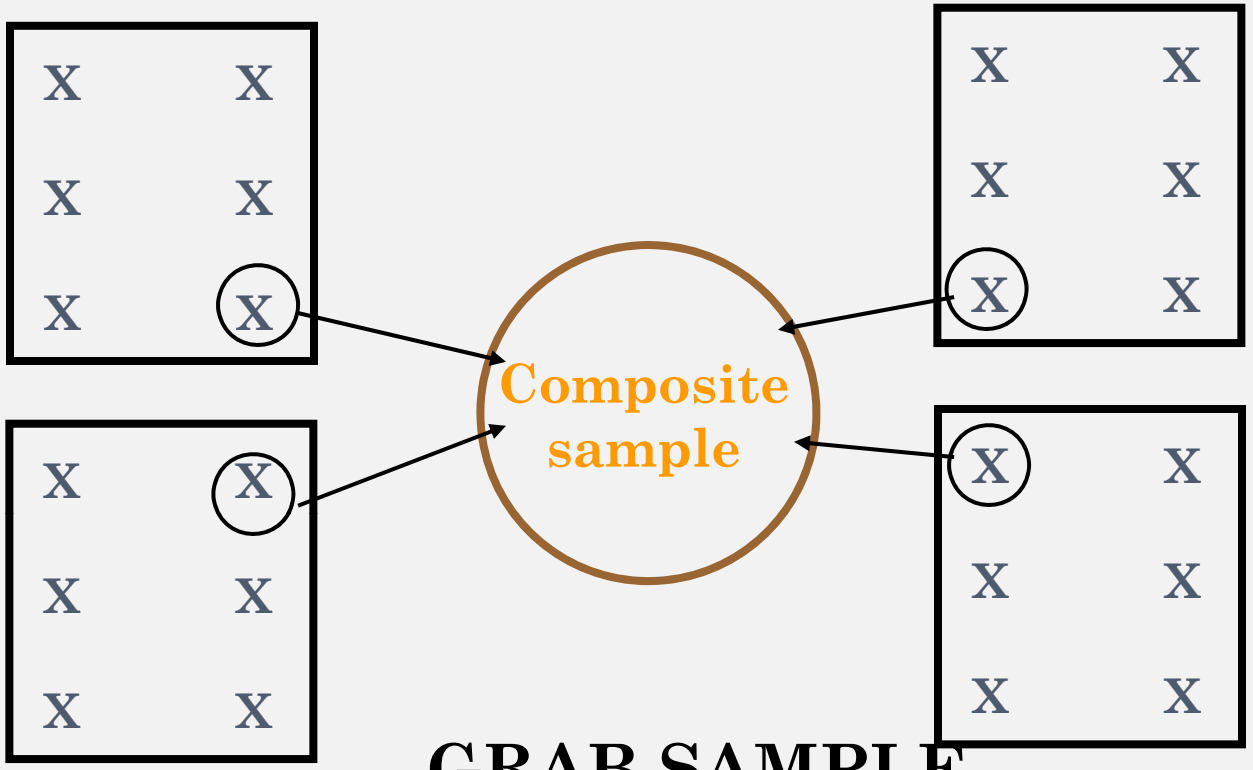
- Population is a larger body of collection of items or objects.

- Sample is specified number of items (objects or bits of information) is drawn from population

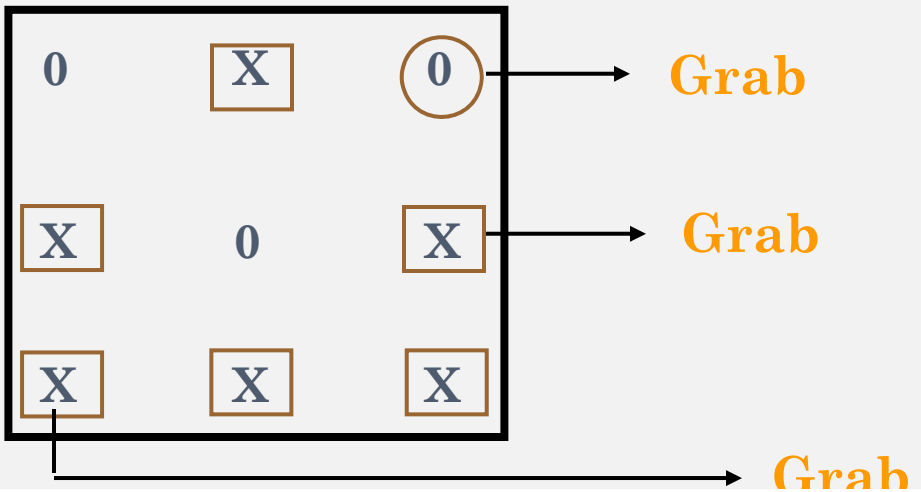


- Sampling involves selection of elements from a collection in such a way that every element of the collection has the same chance of being selected.

COMPOSITE SAMPLE



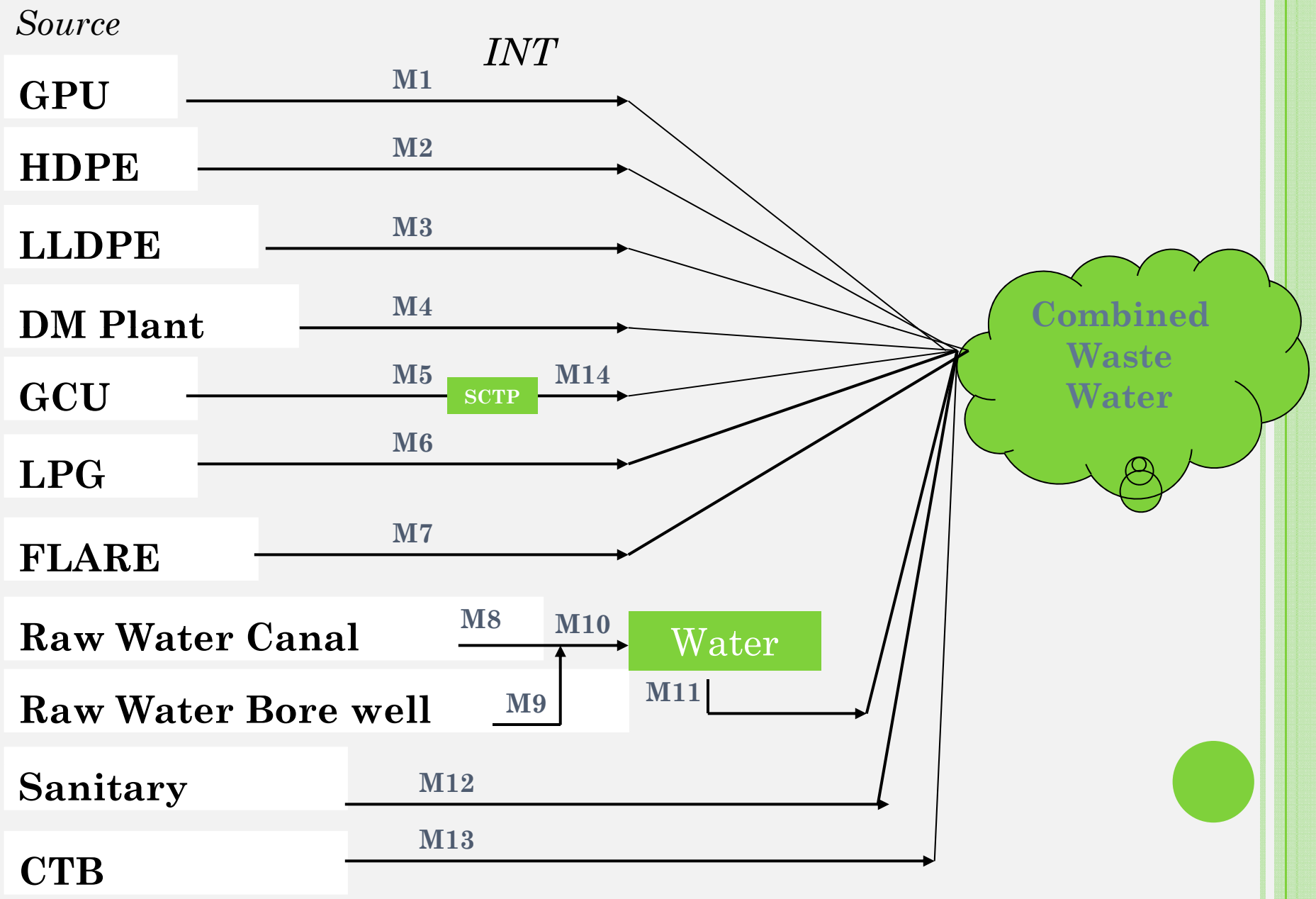
GRAB SAMPLE



ASSESSMENT OF POLLUTION LOAD IN WATER AND WASTEWATER

- How much wastewater generated per unit of each product or per plant basis?
- How much pollution load is generated per unit of each product (in terms of BOD, COD, Oil & Grease)?
- How much wastewater is blow-down from cooling tower and boiler blow-down per day basis ?
- How much wastewater and waste load generated in terms of BOD, COD, TDS and Oil & Grease for sanitary purpose?
- How much water is consumed from bore well and canal separately TSS, TDS load determination from each cases heavy metals and chlorinated pesticides?

POLLUTION LOAD ASSESSMENT PROGRAMME IN PETROCHEMICAL COMPLEX - WHERE TO SAMPLE?



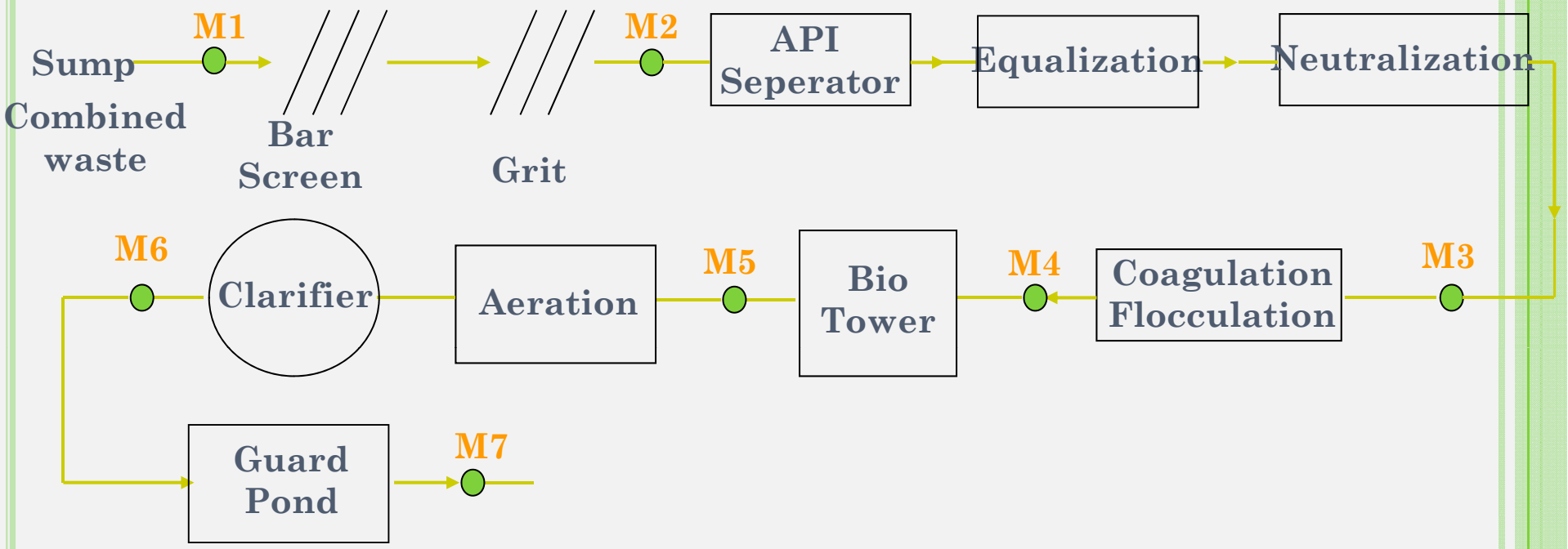
MONITORING PROGRAMME ON POLLUTION ASSESSMENT
(WHEN TO SAMPLE & WHAT TO SAMPLE)

PLANT	TYPE OF DISCHARGE	FREQUENCY	PARAMETER
GPU	Continuous / intermittent	3 hours composite for a day (3 days in week) once in each discharge (grab) (3 days in week)	pH, BOD, COD, TDS, O & G, Flow
HDPE	Continuous / intermittent	-do-	pH, BOD, COD, TDS, O & G, Flow
LLDPE	Continuous / intermittent	-do-	pH, BOD, COD, TDS, O & G, Flow
DM PLANT	Continuous / intermittent	3 hours composite (once in a week) once in each discharge (once in week)	pH, TDS, O & G, Flow
CT BLOW DOWN	Intermittent	Once in each discharge	pH, TDS, O & G, COD, BOD, Flow
COMBINED WASTEWATER	Continuous	Once in a week (2 hours composite, grab)	Flow, pH, TDS, O & G, COD, BOD, Heavy metals

OUTCOME FOR POLLUTION ASSESSMENT

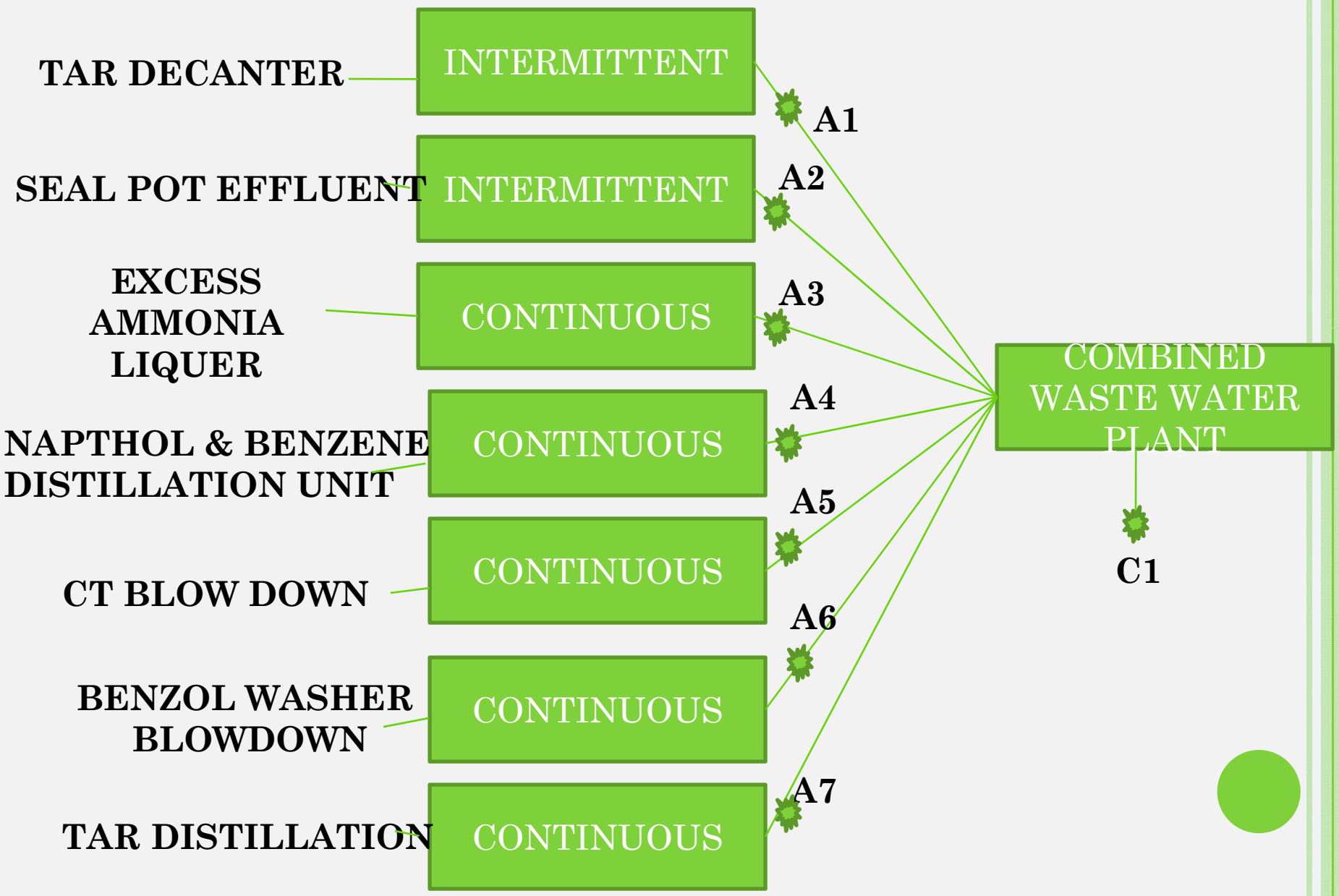
- COD, TDS, BOD, O & G balance
- Load assessment
- Quality control chart and costing, fine
- Comparison between predicted load and actual load
- Waste minimization programme

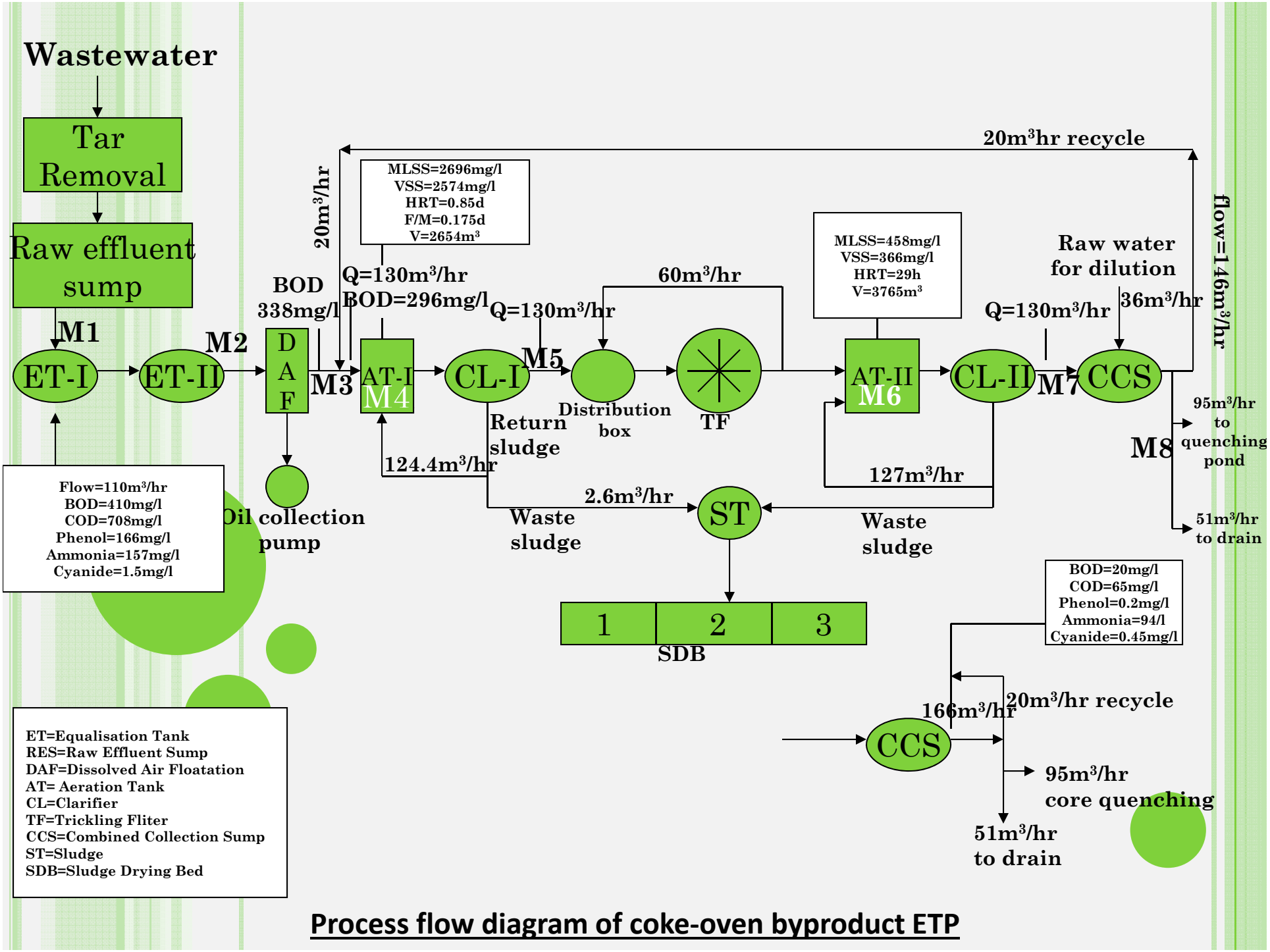
MONITORING NETWORK DESIGN FOR EFFLUENT TREATMENT PLANT PERFORMANCE



M1	pH, BOD, COD, O & G, TDS, TSS (2 hours grab & 24 hours composite, every day)	M2	TSS (grab, once in a week)
M3	pH, BOD, COD, O & G, TSS (grab, once in a day)	M4	BOD, COD, O & G (once in a day)
M5	BOD, COD, O & G (once in a day)	M6	BOD, COD, O & G (once in a day)
M7	pH, BOD, COD, O & G, TSS (2 hours grab, 25 hours composite, every day)	Aeration Tank - DO, MLSS, MLVSS	

Pollution Assessment from coke oven Byproduct plant





Process flow diagram of coke-oven byproduct ETP

AIR EMISSION ASSESSMENT – THE POSSIBLE INVENTORY

- What are the possible point sources (channelised) in the complex?
- What are the sources of combustion, how much load of particulate matter, sulfur dioxide, nitrogen oxides and carbon di-oxides are generated (in terms of tonnes per day?
- What are the sources of conventional parameter from channelised sources of process?
- Identification of most probable pollutants from vent off and purge gases.
- Budget of fugitive emission.

EMISSION PROFILE

Classification of pollutants			Sources of air pollutants
Emissions	Point Sources	Combustion	Cracking units
			Incineration
			Gen set etc.
			Flare
		Process	Channelised emissions
			Vent off
			Purge gases
	Fugitive	VOCs	Equipment leaks
			Loading
			Storage tanks
			ETP

SOURCES OF EMISSIONS

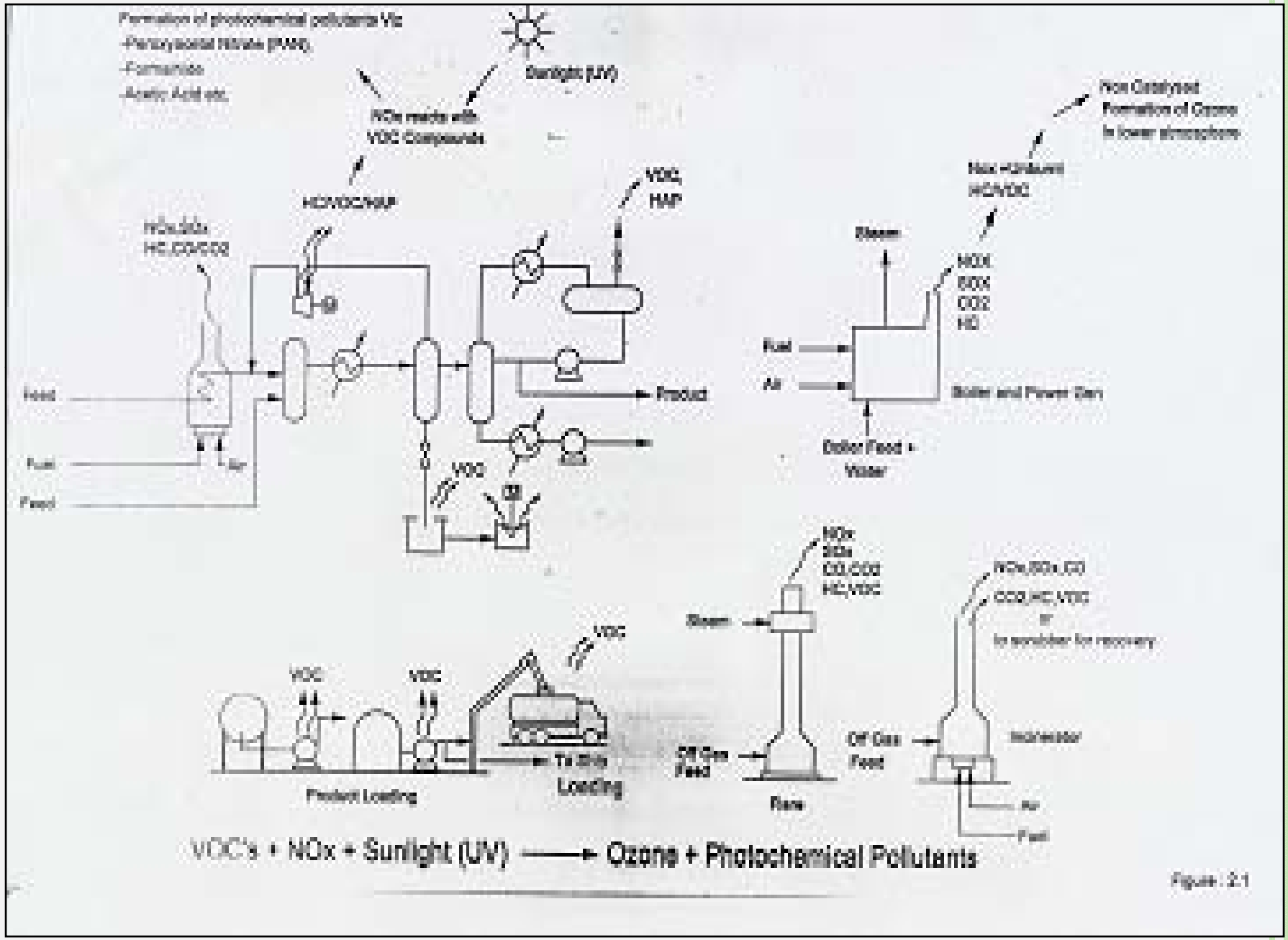


Figure : 2.1

TYPICAL RANGE OF AIR EMISSIONS

(All figures are in tonnes / Annum)

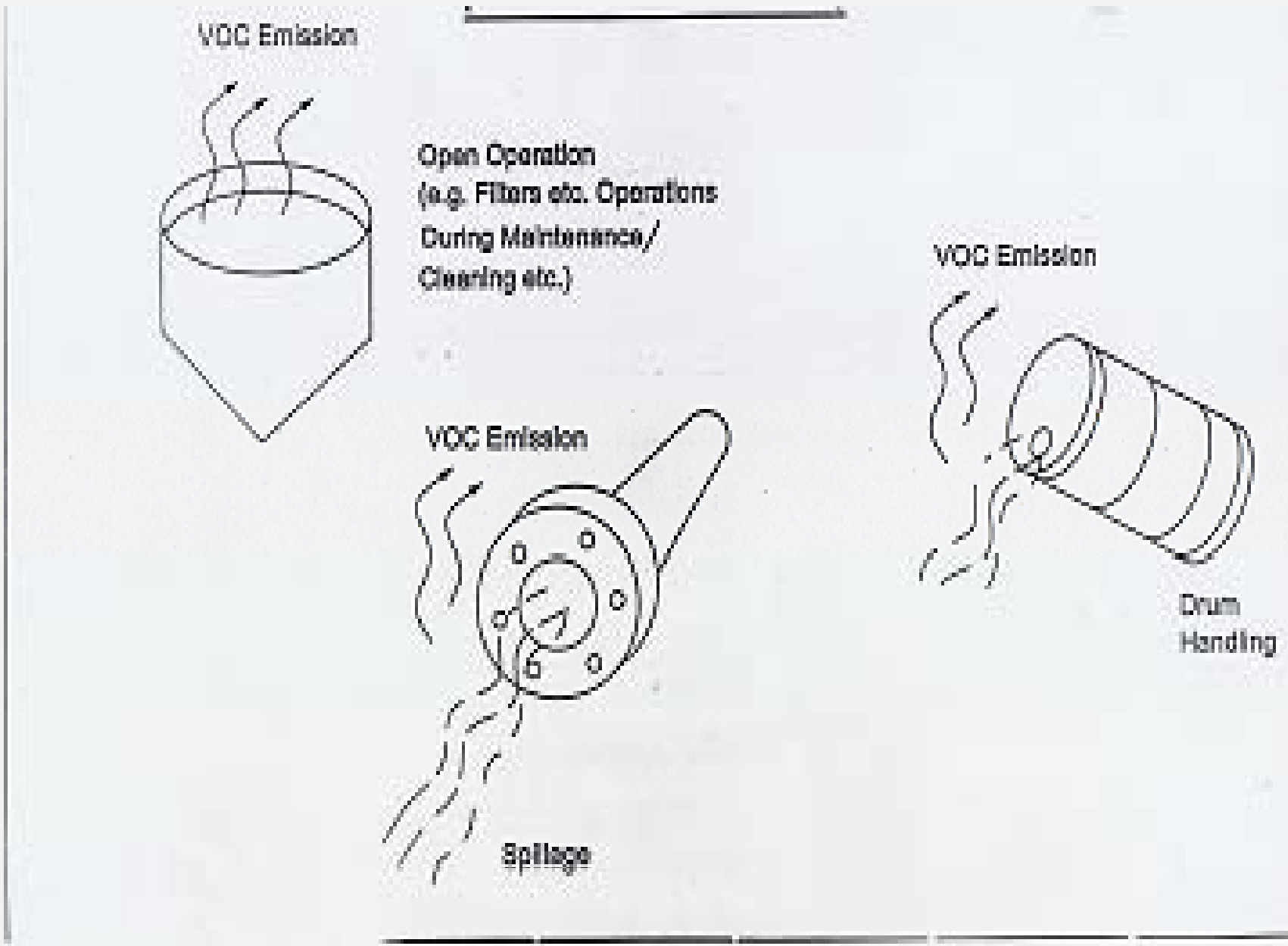
S.No	Feed	Naphtha/ Gas Oil	Gas (C2+C3)	Naphtha
1.	Type of the Complex	Olefin	Olefin	Aromatics
2.	Capacity (1000 TPA as Ethylene)	400 –500	400 -500	300
3.	Uncontrolled organic release (C2 -C6 HC) from complex	6000 to 8000(+)	3000 - 4000(+)	2500 -3700
4.	Sulphur Oxides (SO2)	25 -40 (+)	18 -20 (+)	15 -25 (+)
5.	Nitrogen Oxide (Nox)	80 -450 (+)	100 -350	-
6.	Carbon Monoxide (CO)	22 -47 (+)	15 -25 (+)	12 -18 (+)

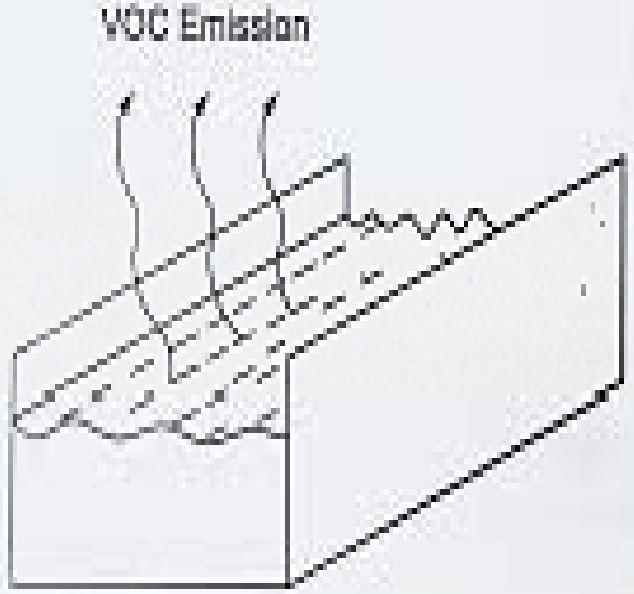
Notes: 1) Excludes balance of Plant Facilities viz. Power etc.

FUGITIVE EMISSION BUDGET

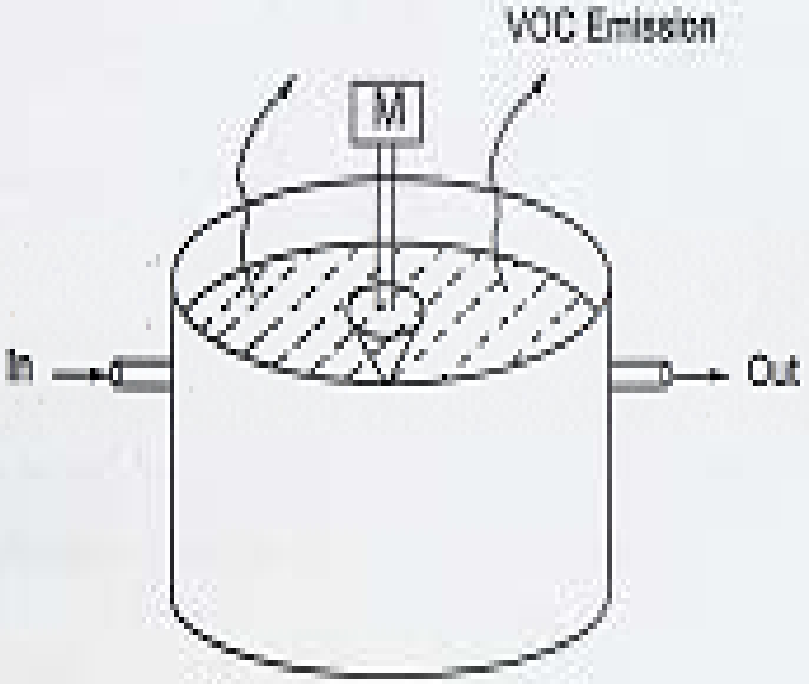
TYPICAL PERCENT SHARE OF EMISSIONS

S.NO	Source	% Typical
1	Fugitive emissions from equipment	40-60
2	Process vents	5-15
3	Storage tanks	5-15
4	Loading /unloading facilities	15-25
5	WWTP	10-20

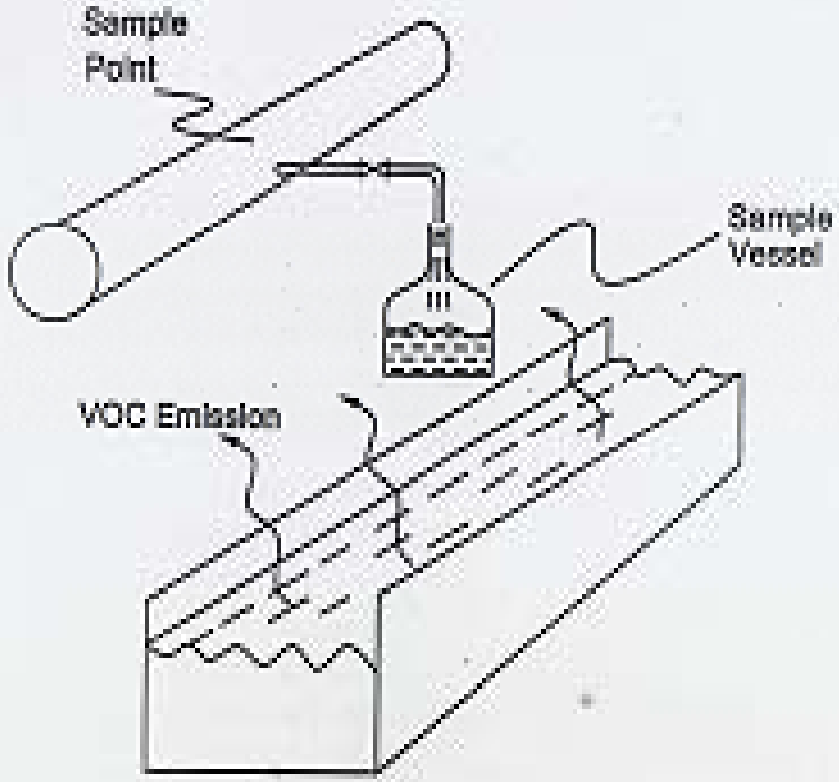

VOC Emission
Open Operation
(e.g. Filters etc. Operations
During Maintenance/
Cleaning etc.)
VOC Emission
VOC Emission
Drum
Handling
Spillage



Influent Collection Sewers



Effluent Treatment

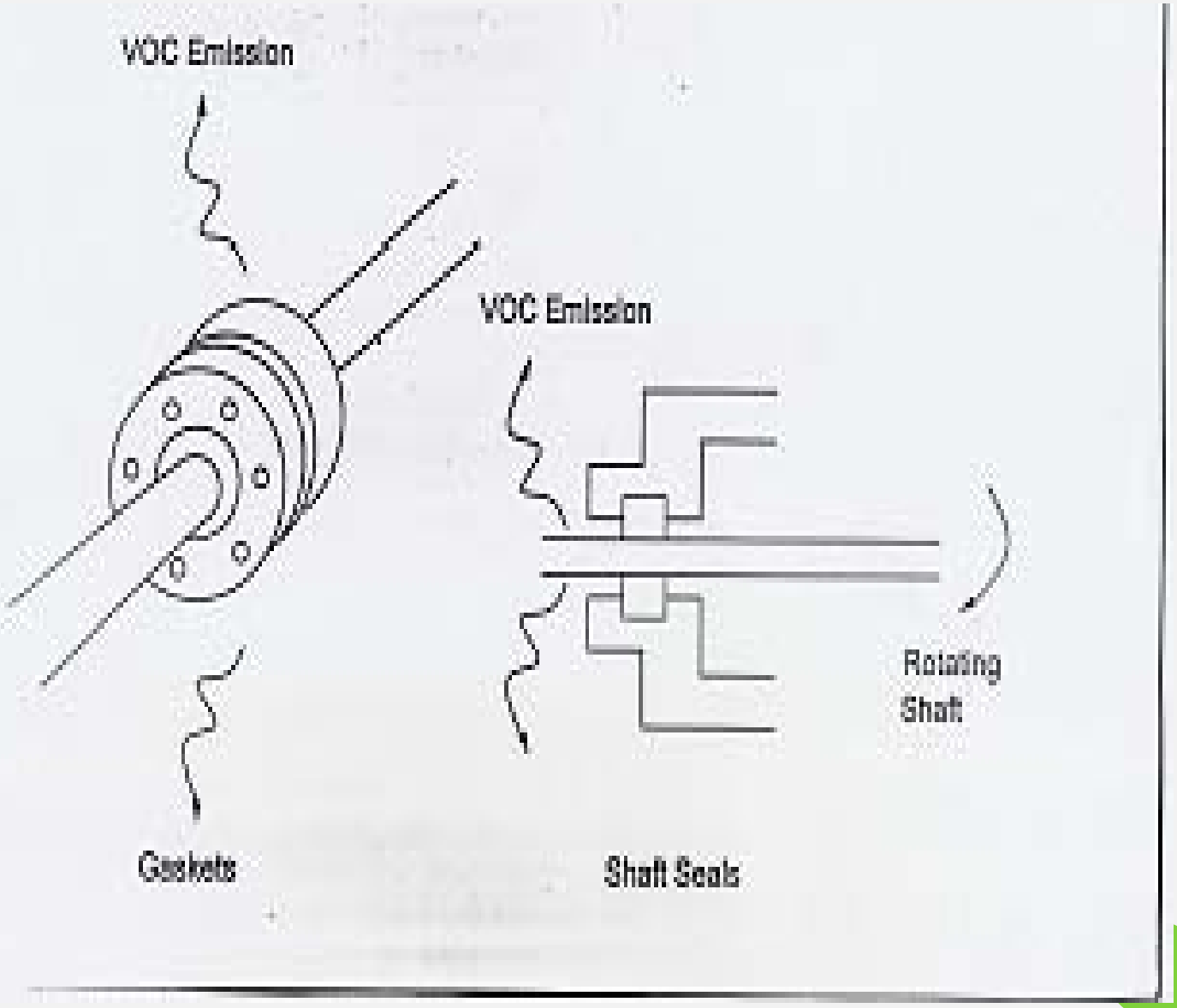


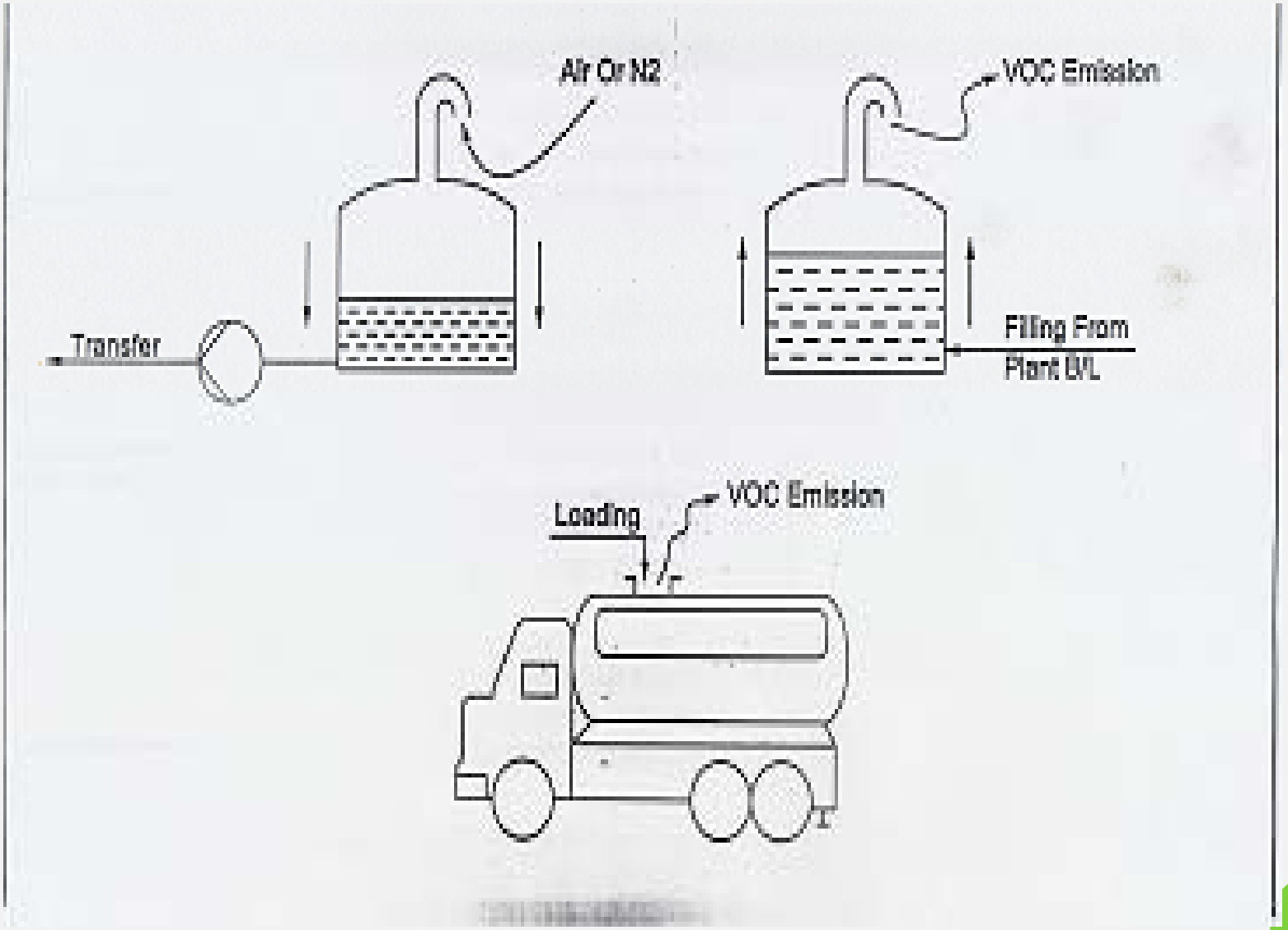
Notes

Sampling Waste

* First Flush The Sample Equipment, Then Taken The Sample

(In Petrochemical Plants Sampling Can Be One Off The Significant Source Of Emission)


VOC Emission
VOC Emission
Rotating
Shaft
Gaskets
Shaft Seals


Air Or N2
VOC Emission
Transfer
Filling From
Plant D/L
Loading
VOC Emission

ASSESSMENT OF FUGITIVE EMISSIONS

S. No.	Equipment type	Process Fluid Service	Average Emission factor in (kg/hr/source)
1	Valves	Gas	0.0056
		Light liquid	0.0071
		Heavy liquid	0.00023
2	Pump Seal	Light liquid	0.0494
	Pump Seal	Heavy liquid	0.0214
3	Compressor Seal	Gas / Vapour	0.228
4	Pressure Relief Valves	Gas / Vapour	0.104
5	Flanges	Gas / Light liquid / Vapour	0.00083
6	Open ended piping	Gas / Light liquid / Vapour	0.0017

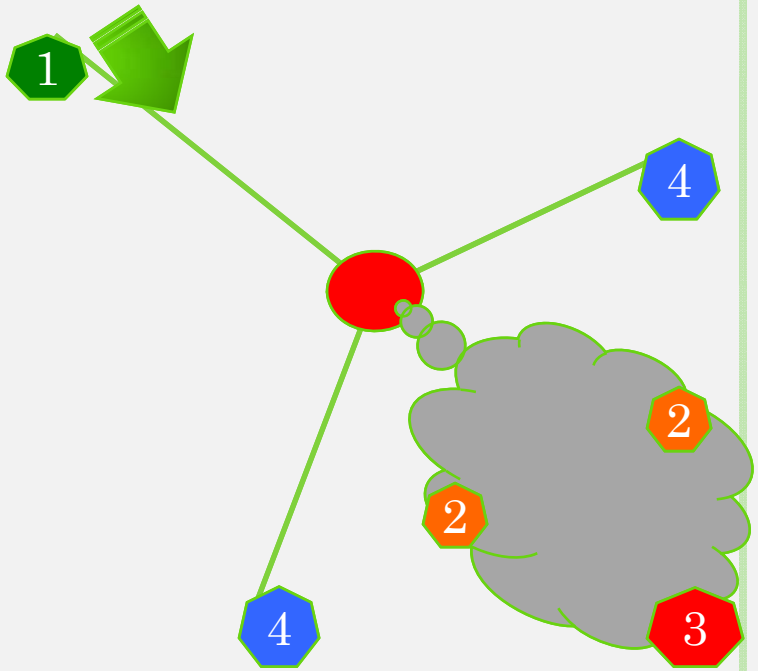
MONITORING THE IMPACT OF A SOURCE

Local Meteorology

& Topography such as Hillocks should be considered.

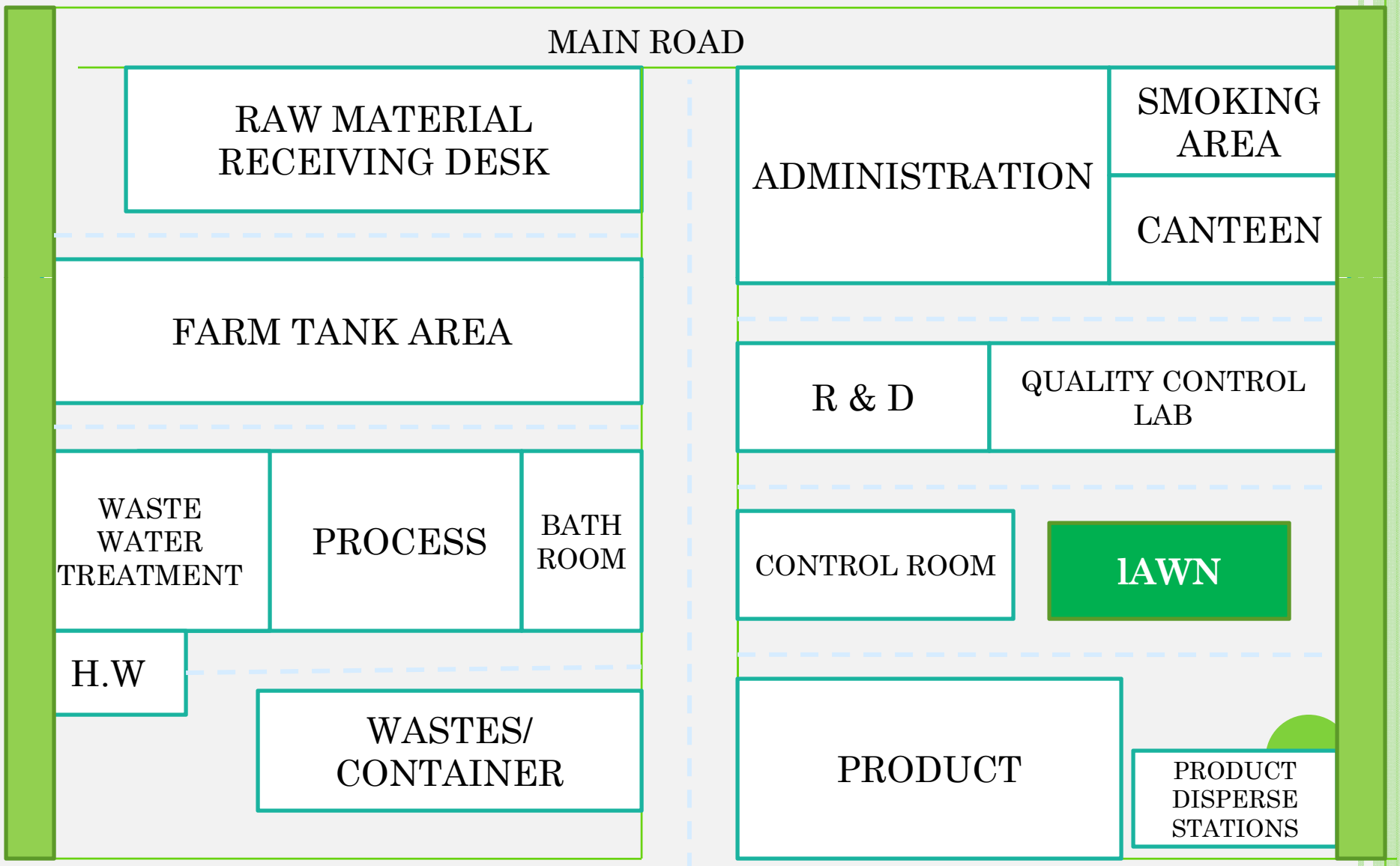
Location of Stations UPWIND & DOWNWIND of a source.

1. UPWIND / BACKGROUND STATION.
2. STATIONS in AFFECTED area.
3. MAX GLC expected.
4. At least one Crosswind Station is recommended.



HOUSE KEEPING

LAYOUT PLAN


MAIN ROAD
RAW MATERIAL RECEIVING DESK
FARM TANK AREA
WASTE WATER TREATMENT
PROCESS
BATH ROOM
H.W
WASTES/ CONTAINER
ADMINISTRATION
SMOKING AREA
CANTEEN
R & D
QUALITY CONTROL LAB
CONTROL ROOM
lAWN
PRODUCT
PRODUCT DISPERSE STATIONS

STORAGE OF RAW MATERIALS

FACTORS GOVERNING GREENBELT DEVELOPMENT

- Sensitivity / tolerance to pollutant
- Habitat
- Height
- Growth rate
- Regeneration
- Evergreen/ deciduous
- Duration of foliage
- Flowering season
- Crown surface area & shape
- Leaf area
- Stomatal index

- For further reference, refer to CPCB guidelines on Greenbelt development →PROBES/75/199-2000

External assistance

- Environmental Audit
- ISO 9000 & 14000
- NABL accreditation of laboratories

Rapid Assessment System

- Reconnaissance Survey –

1. Inspection of Storm water drain
2. Visiting Biological Treatment Plant
   - Color of sludge
   - Settling of solids
   - Observation of foaming
   - Foul Smell
   - Turbidity of effluent
   - Flow
3. Observation of stack
4. Housekeeping practices
5. Sludge Handling Process

ULTIMATE OUTCOME : THE BALANCE

Consumption → **Yield** + **Waste**

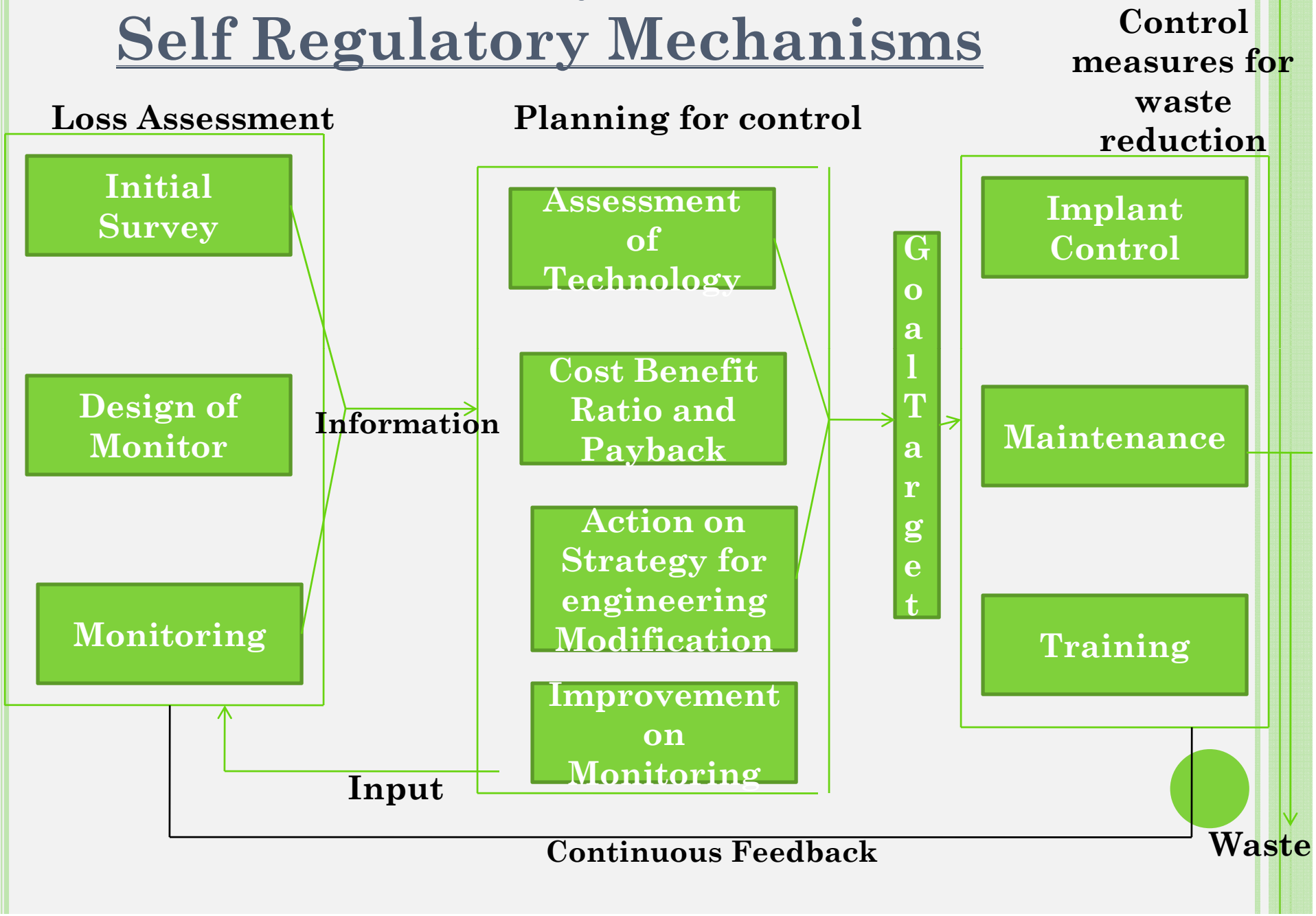
- Raw Materials
- Energy
- Water

- Product

- Non-consumption of raw material
- Wastewater
- Waste heat
- Emission of gases, un-burned fuel
- Un-recovered product

- **Water balance**
- **Material balance**
- **Energy balance**

Feedback System for Self Regulatory Mechanisms



"The Whole problems with the world is that the fools and fanatics are always so certain of themselves and wiser people so full of doubts" – Bertrand Russel.

THANK YOU