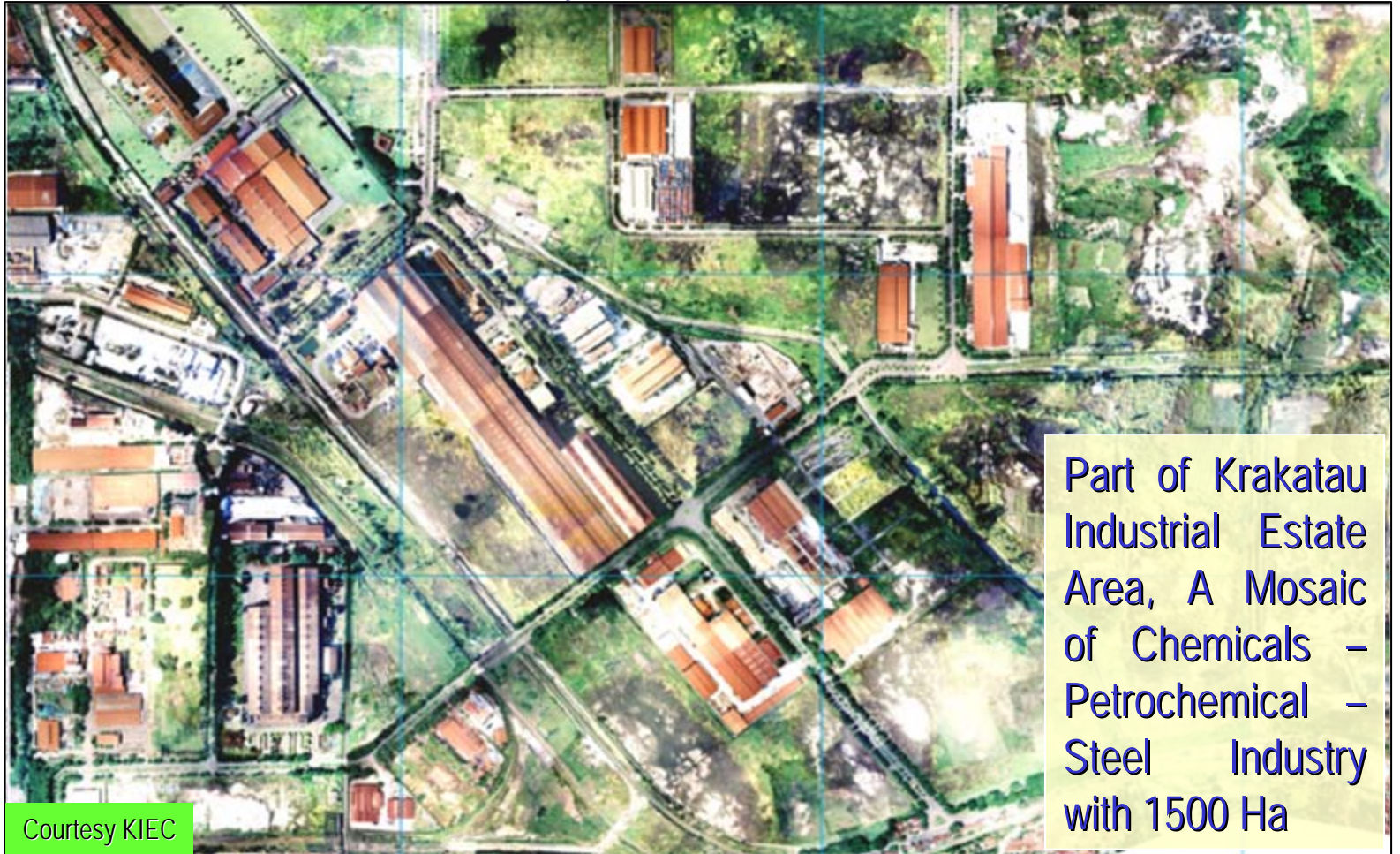


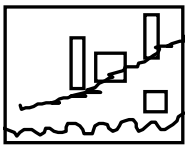
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Utilization Industry Hazardous Waste



Courtesy KIEC

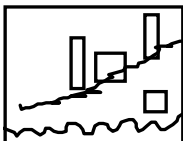


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Out Line Presentation

- Map Indonesia, Demography
- Chemical – Other Industry In Indonesia with Hazardous Waste Potential
- Indonesian Regulation on Hazardous Waste
- Bottom Up Effort to Rationalize waste Disposal Management
- 3R
- Case in Industry Utilization Hazardous waste in Indonesia
 - * Krakatau Steel
 - * Utilization Fly Ash in Cement Plant – Co Processing



Main Product		Number of Factories/Industry			Capacity	
		Indonesia	Banten	Cilegon-Serang	Production 2006 Mio Ton	Product Value +/- Bio USD
Pulp - Paper						
	PULP Industry	14	1	n.a.	6.7	4 (Export)
	Paper Industry	79	2	n.a.	10.3	
Chemicals - Petrochemicals						
	Medium - Big	50			14.3	n.a
	Medium - Big		34		8.1	
	Medium - Big			30	7.4	7.8
Fertilizers Industry		13			7.5	2.6
Steel Industry (Integrated)			1	1	2.5	3
Electricity Generating Plant					5000 MW	
Sugar Industry						
	Rafinated Sugar				1.6	
	Sugar cane base				2.7	1.5

Data Source :

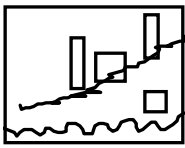
Industrial Strategy Proposal on Petrochemical Industry in Indonesia - 2007

TEMPO - 16 September 2007

Indonesian BPS

Various Data Internet

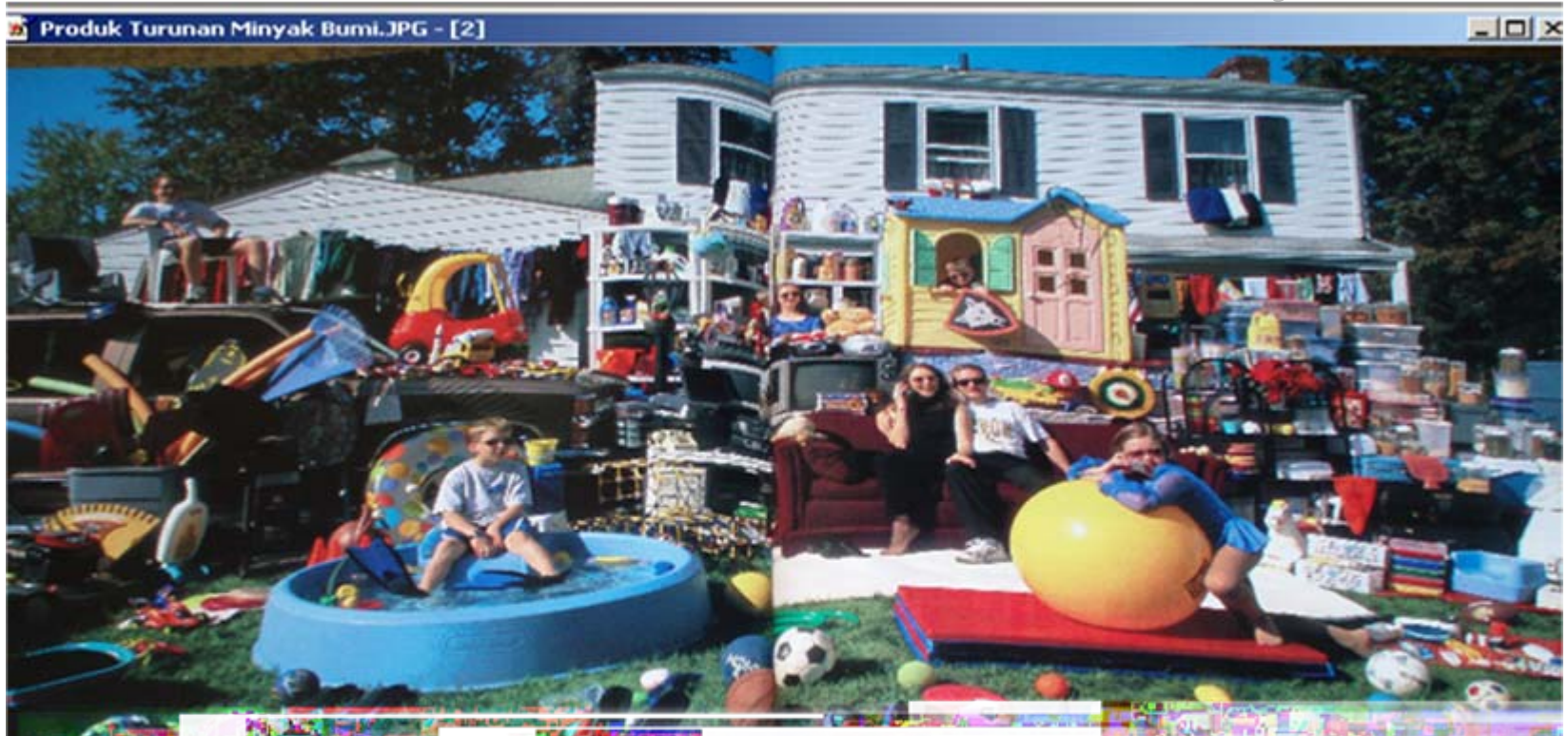
Fertilizer Industry - Kompas 21.12.2007



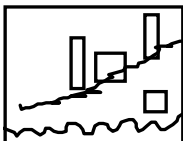
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*Petrochemical Products ease our Modern Life **



*National Geographic Magazine, June 2004

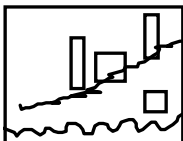


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Country	Capacity Producing Ethylene (as per 2006)			Consumption
	Capacity	As per World	Ranks	Plastic (2005)
	Million Ton/Year	Procentage (%)		Kg per kapita
INDONESIA	0.53	0.4	34	9.5
Japan	7.60	6.3	2	82
United States of America	28.74	23.9	1	169
China	7.27	6	3	29
India	3.53	2.9	10	3
South Korea	6.01	5	5	107
Thailand	2.26	1.9	17	42
Singapore	1.90	1.6	18	80
Malaysia	1.70	1.4	19	64
Arab Saudi	6.95	5.8	4	47
Rest of The world	55.00	45.3		
Total	121.48	100		31

Source : Industrial Strategy Proposal on PetroChemicals Industry in Indonesia - 2007



3 R Implementation from bottom Up View

Concern On
indication of illegal
Industrial Waste
Disposal

>AMC/CMA initiate
process improvement

by bottom up effort
>Review regulation &
its detail

>> Check TCLP

>> Check LD 50
>Bring issue to get
Political support

Heidelberg Acquire
Semen Cibinong
Holcim Acquire
Indocement

Technology of Solid
Waste
Co Processing
introduced

SK 928 KLH on Permit
Processing
Iron Slag with
Atomizing

Technology Signed

2002 and beyond

>Very High Waste
Disposal Cost
>Only single
Company for Disposal
>Only single Class of
Waste Disposal
>Only Industry Liquid
Waste used for
Fuel Blending in
Cement Kiln

> Krakatau Steel
Group establish
Purna Baja Hecket to
process its waste

2003

2004

>Initiate AMC
Meetings
>Organize visit local
Parliament
(Legislative body to
PPLI)
>Communicate to
Industrial
Community

2005

>Co Processing in
Cement Kiln is
initiated

2006

Inception Meeting 3 R
For Indonesian

> Invite Holcim to
AMC//CMA meeting

> MoE Indonesia
granted
PBH No objection
letter
for Export Iron
Concentrate

> Various Effort to
Reuse - Recycle
Industry Hazardous
Waste is
Through PPLI - TLI -
Cement Industry

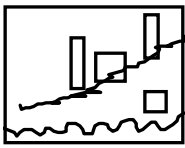
2007

> MoE issue no
objection letter
Processing and
Utilization steel Slag

2008

> PBH revise its
Company Statuta
To produce and sell
Steel Slag - slurry
residue in Indonesia
as well Export

2009



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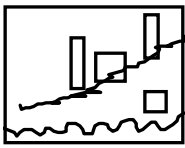


Documentation of Visit AMC//CMA
with Chairman – Members of DPRD
(Parliament) Cilegon /Banten to
PPLI , 12th July 2004

(Indonesian Waste Management System)

Main Objectives to support Industry
Campaign getting reasonable – realistic
Hazardous Waste Disposal cost , that PPLI
only provide Class I for all kind Industrial
wastes which drives illegal disposal due
to high waste disposal cost .

Then after shared to Mo E Indonesia
possibility to review
amend Regulation PP 18 - 85/1999 on
criteria Industrial Hazardous Waste

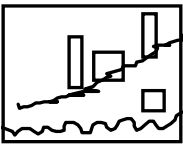


AMC//CMA

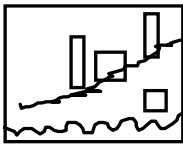
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Indication Illegal Waste Disposal - Dumping





- The objective preparing a Category II Landfill is to provide a **competitive priced** and needed service to industrial and commercial waste producers, at that time in Indonesia only have three options :
 - ① Disposal in Category I Landfill
 - ② On site disposal
 - ③ Illegal disposal
- At the same time the aim is to increase the volume of waste treated by providing a more economical option for customers. While Indonesian legislation dictates that hazardous (B3) waste must be correctly treated and disposed, **the high costs of proper waste disposal mean that much B3 waste is improperly disposed at inadequate facilities.**
- By designating landfill facility for Category II waste, waste producers will have the ability to dispose suitable waste at a more reasonable cost than a Category I landfill. The Category II landfill should be in compliance with World Bank, WTO, Indonesian and other international standards. This will encourage more waste producers to utilise the proper treatment and disposal facilities.



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Industrial Hazardous Waste Tests

PT. (PERSERO) SUPERINTENDING COMPANY OF INDONESIA
GENERAL SERVICE/STATISTICAL SERVICE UNIT

No. 8148805

Page No. 2 of 3

ACUTE TOXICITY TEST LD₅₀ SUMMARY

Client : PT. CLARIANT INDONESIA (CILEGON PLANT)
 Reference : -
 Work Order : 36 / 002040 / 09 / 05
 Test Type : ACUTE TOXICITY TEST LD₅₀
 Test Initiation : October, 2005

SAMPLE
 Identification : FILTER CAKE
 Amount Received : 1 KG
 Date Collected : -
 Date received : September 16, 2005
 Solubility in Water : Not Soluble/suspension
 Dosage Form : Suspension
 Total Dosage : 10 (ten) dosage and 1 (one) control

CONTROL
 Medium : Aquadest
 pH : 6.08

TEST SPECIES INFORMATION
 Organism : *Mus musculus*
 Source : BPLPP - Bogor
 Collect. Date/Batch : October, 2005
 Age : 1.0 - 1.3 months
 Conditioned on Laboratory : 10 (ten) days
 Means of weight : 15.67 gram

TEST CONDITION
 Temperature : 24 - 28 °C
 Humidity : 60.0 - 85.0 %
 Noise : 60.0 - 70.0 dB
 No. Organisms/age : 10

Toxicity Test Result (Calculated by Probit Analysis) : 11,641.16 mg/kg BW
 Base on Acute Toxicity test LD₅₀, this sample has LD₅₀ values above 50.00 mg/kg Body Weight refer to Government Regulation of Indonesia No. 74/2001 is practically non toxic

Successful Laboratory,

KEMAL MUSTAFA

PT. (PERSERO) SUPERINTENDING COMPANY OF INDONESIA
GENERAL SERVICE/STATISTICAL SERVICE UNIT

No. 0129523

Page No. : 2 of 2

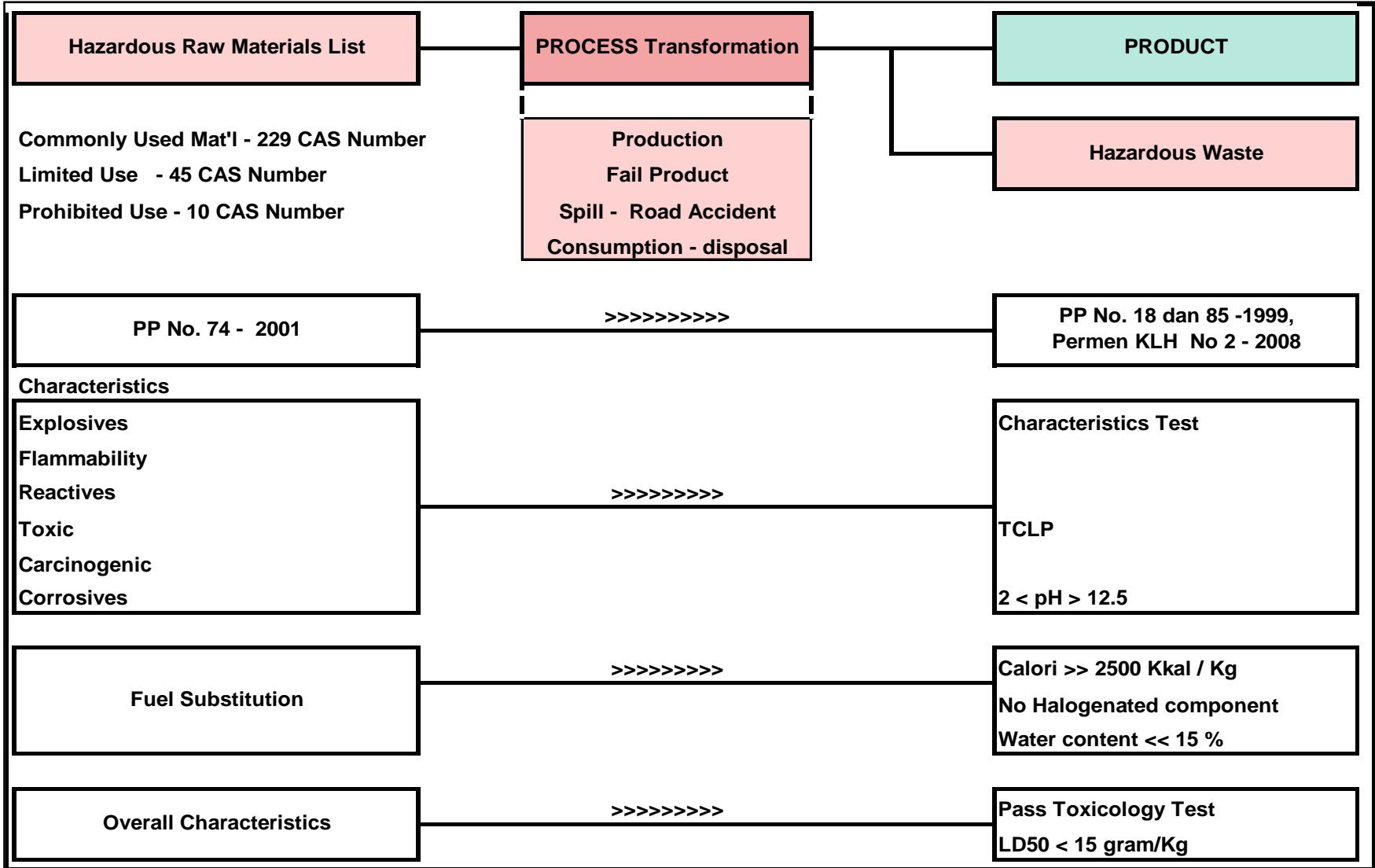
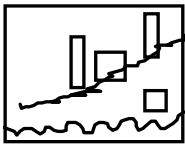
Code	Parameter	Unit	Test Results	Minimum Value	Requirement (%)	Minimum Test Number
01002	Ammonia	mg/L	< 0.05	0.05	2.0	10.000.000.000.000
01003	Iron	mg/L	< 0.10	0.10	100.0	10.000.000.000.000
01004	Benzene	mg/L	< 0.20	0.200	100.0	10.000.000.000.000
01005	Chloroform	mg/L	< 0.50	0.50	1.0	10.000.000.000.000
01006	Chlorobenzene	mg/L	< 0.50	0.50	1.0	10.000.000.000.000
01007	o-Cresol	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01008	m-Cresol	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01009	p-Cresol	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01010	Phenol	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01011	Formaldehyde	mg/L	< 0.10	0.10	1.0	10.000.000.000.000
01012	Hexachlorocyclopentadiene	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01013	Heptachlorocyclopentadiene	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01014	o,p'-DDT	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01015	p,p'-DDT	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01016	Endrin	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01017	Aldrin	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01018	Dieldrin	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01019	Chlordane	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01020	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01021	Heptachlor Hydrolysis Product	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01022	Heptachlor Chloride	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01023	Heptachlor Imines	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01024	Heptachlor Oxidation Product	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01025	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01026	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01027	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01028	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01029	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01030	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01031	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01032	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01033	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01034	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01035	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01036	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01037	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01038	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
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01042	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01043	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01044	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
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01047	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01048	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01049	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
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01053	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
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01058	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01059	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01060	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01061	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01062	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
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01070	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01071	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01072	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01073	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01074	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01075	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01076	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01077	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01078	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01079	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01080	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01081	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01082	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01083	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01084	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01085	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01086	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
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01094	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01095	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01096	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01097	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01098	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01099	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000
01100	Heptachlor Epoxide	mg/L	< 0.10	0.10	10.0	10.000.000.000.000

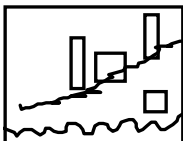
*1) Standard Methods, AP-1600-1995, APHA, 19-100, 1992
 *2) Requirement value based on test value of parameter is 100% required by requirement Government Regulation No. 18/19/96 Jo. 36, 81/1999
 ** - Last time the detection limit has not set
 11/2005

Successful Laboratory,

LELVA

DRA. LELVATININGRIB
NPP : 81.54.08475



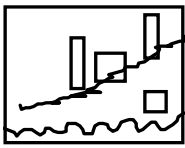


STATUS Hazardous Material in INDONESIA *

Based On Government Regulation PP no 74 tahun 2001

Prohibited	Limited	Common Use
10 Tipe - generik	45 Tipe - generik	209 Tipe - generik
Example : Aldrin DDT Endrin PCB	Ehylene dibromide Penta chloroPhenol Ethylene Oxide Ethylene Dichloride Carbon tetra Chlorida CFC, Halon Methyl Bromide	Methanol - Propanol - Ethanol Chlorine , Formalin KOH, NaOH Asam (Akrilat, Asetat, Formiat Chlorida,Phospat , dll) Ethyl Acrylate, Amoniak, Vinyl Acetate Acryl Nitril, Dimethyl Sulphate Benzena, Toluena

* Catatan :Not include percusor, food, pharmaceuticals



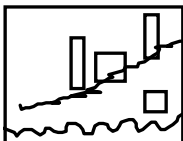
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Hazardous Waste Based on Government Regulation

(PP 18/1999, PP 85/1999), soon may need to be reviewed with adaptation of UN-GHS

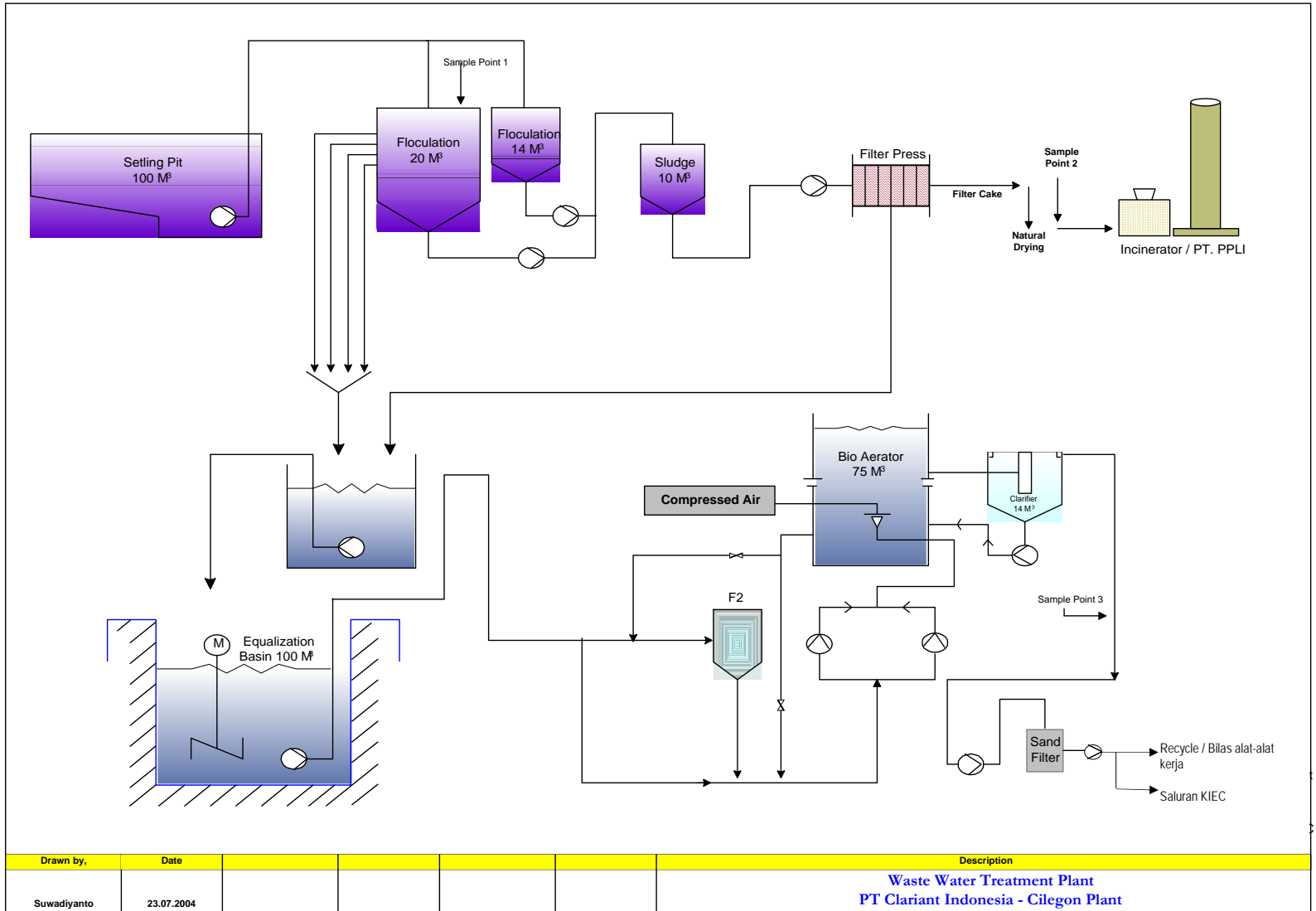
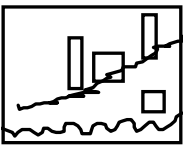
- ✚ Exhibits characteristics such as being explosive, ignitable, reactive, toxic, by Toxicity Leaching Characteristics Procedure (TLCP, Infectious, Corrosive, and/or toxicity by Lethal Doses-50 (LD₅₀) test ;
- ✚ Is a non specific source which includes generic wastes generated by a variety of general process, such as spent halogenated solvents tetrachloroethylene, trichloroethylene, etc;
- ✚ Is a specific source which is generated from specific industrial process, such as bottom sediment sludge from the treatment of wastewaters from wood preserving industry process that use pentachlorophenol ; and
- ✚ Is a specific commercial chemical product or intermediate, discarded commercial chemical products, off-specification species, container residues, and spill residues thereof.



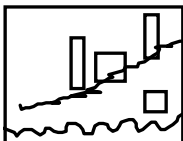
AMC//CMA

AMC Chemical Manufacturer's Association

HAZARDOUS Raw Material - Waste	Criteria Hazardous Materials - Waste		INDONESIAN GOVERNMENT REGULATION			
	Hazards	Unit - Measurement	HAZARDOUS Raw Materials Status		Hazardous WASTES	
			Man Power Reg.186 -1999	PP 74 - 2001	PP 18 - 85 - 1999	KLH 02-2008
			Managing Hazard. Materials	Hazardous Management		3 R Related
Prohibited				10 CAS Number		
Limited Utilization				45 CAS Number		
Common Utilization				209 CAS Number		
Hazardous Raw Materials	Practically Non Toxic			5001 - 15 000 mg/Kg		
	Slightly Toxic			501 - 5000 mg/Kg		
STATUS	Toxic	LD50	25 - 200 mg/Kg	51 - 500 mg/Kg		
		LC50	0.5 - 2 mg/L			
		Store Quantity Level (NAK)	10 Ton			
	Highly Toxic	LD50	< 25 mg/Kg	1 - 50 mg/Kg		
		LC50	<0.5 mg/L			
		Store Quantity Level (NAK)	5 Ton			
	Extremely Toxic	LD50		< 1 mg / Kg		
	Extremely Flammable			T< 0 oC		
	Highly Flammable	Titik Nyala, 1 atm	< 21 o C	0< T <21 oC		
		NAK	100 Ton			
	Flammable	Titik Nyala, 1 atm	21oC< T < 55 oC	21oC< T < 60oC		
		Store Quantity Level (NAK)	200 Ton			
	Readily to Explode	Store Quantity Level (NAK)	10 Ton			
	Oksidator	Store Quantity Level (NAK)	10 Ton			
	Reaktif	Store Quantity Level (NAK)	50 Ton			
	Flammable Gas	Store Quantity Level (NAK)	50 Ton			
Hazardous Waste	Toxicity	LD 50			<< 15 000 mg/Kg	
	Corrosive	pH		pH<2 or pH > 12.5	pH<2 or pH > 12.5	
	Exemption	Caloric Value, Kcal/Kg				2500
	Exemption	Halogenated Component				None



Drawn by,	Date					Description
Suwadiyanto	23.07.2004					Waste Water Treatment Plant PT Clariant Indonesia - Cilegon Plant

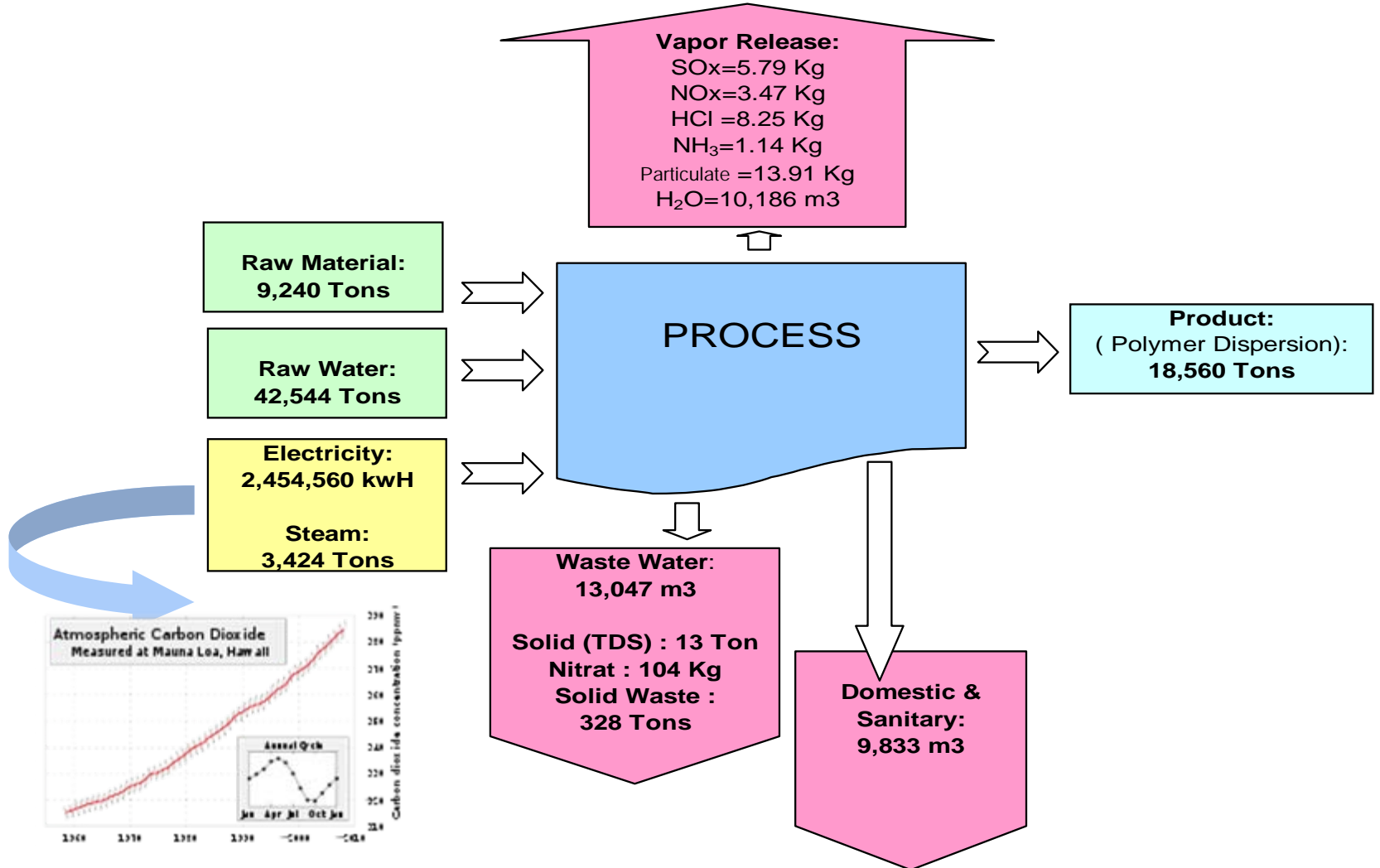
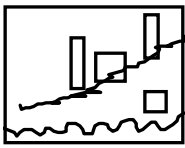


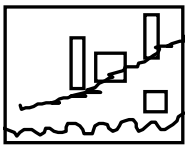
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Typical WWT Process In Production Site

Typical Waste Parameters	Equalization	1st Step Physical Separation Flocculation-Filtration	2nd Step Chemical Degradation Of Waste	3rd Step Clarifier dan Filtration	Standard Effluent
Average waste Characteristic within Outlet Process, COD in ppm	10 000 - 20 000	800 - 1 400	60 - 140	60 - 140	300
Total Dissolved Solid in ppm			4000 - 10000	1000 - 2000	4 000
Outlet BOD in ppm	5 000 - 10 000			11 - 50	150
Outlet Nitrat in ppm				3 - 15	30
Outlet Nitrit in ppm				1 - 2	3
pH	4 - 5			7 - 8	6 - 9
Hydolic Flow in M3 per day	20 - 500				not specified
COD Flow in Kg per day					
Process Efficacy		100.00%	100.00%	100.00%	
Effectiveness COD Reduction		92.00%	92.00%	99.00%	



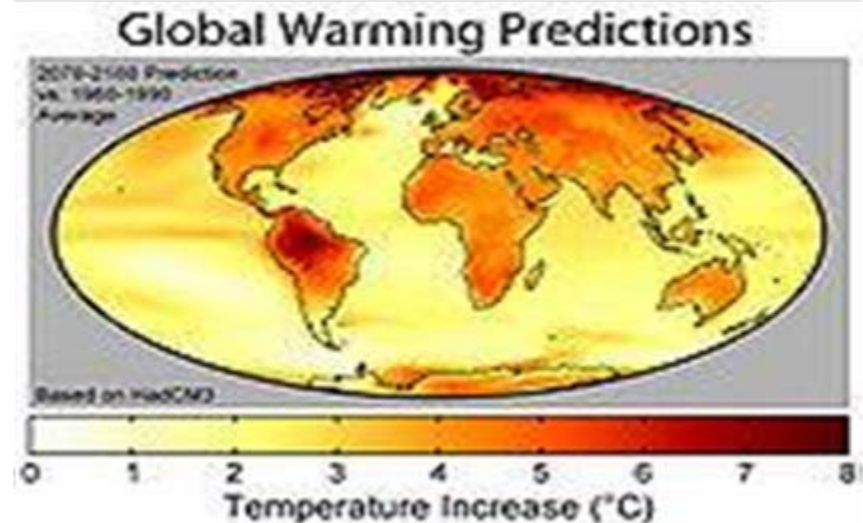
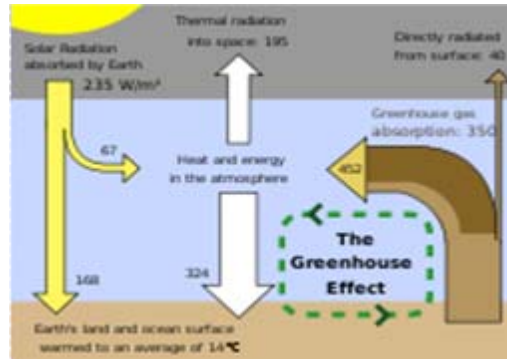


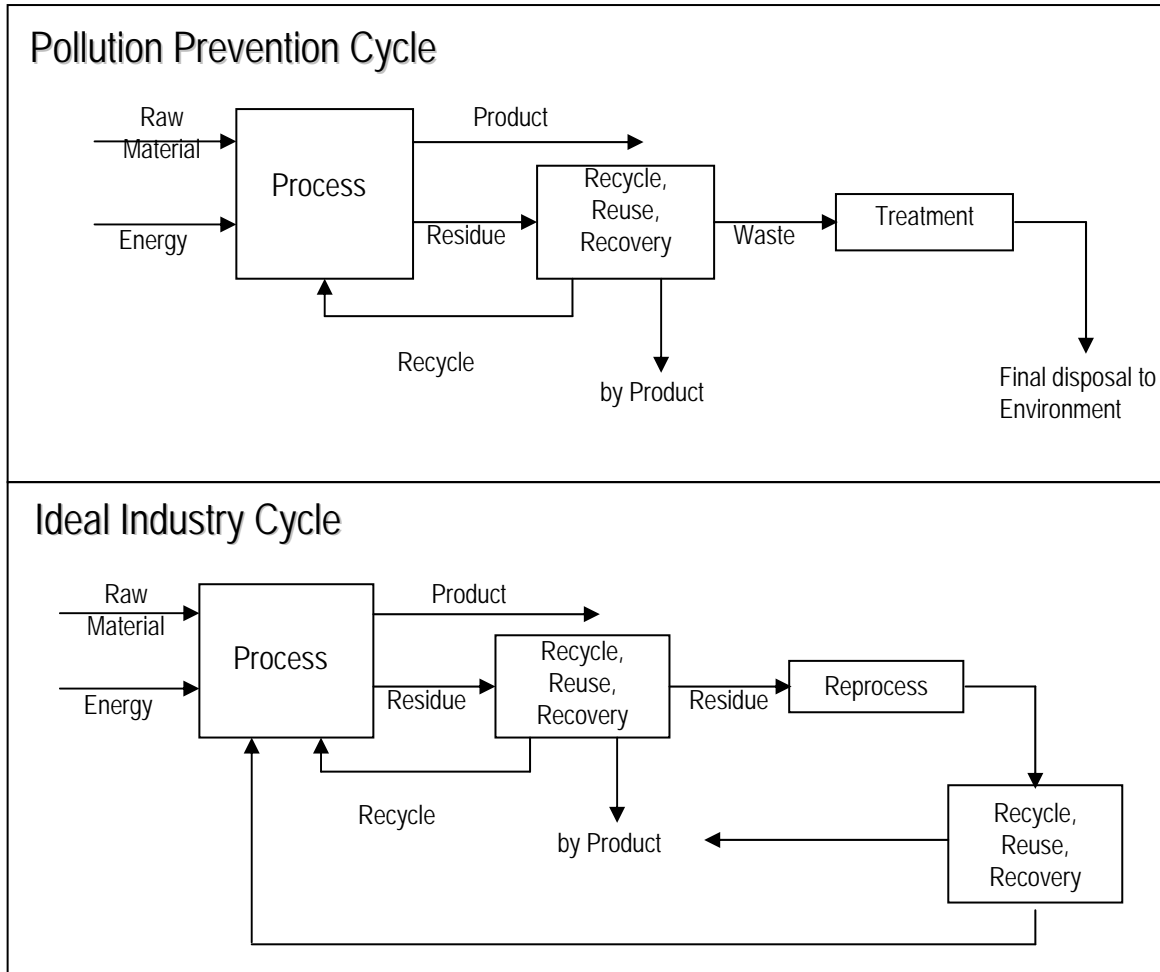
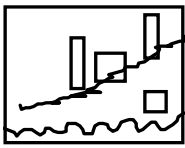
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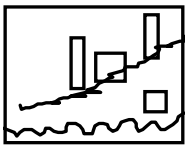
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We target our 3R Program contributes to Environment **Sustainability** through Economic Concept emphasizing to fulfill our **reasonable need** and ; Ecology Concept emphasizing on **Ecosystem Balance - Environment Conservation**

- 👍 Safe
- 👍 Universaly Accepted
- 👍 Stable
- 👍 Technology that benifits all
- 👍 Antipollution
- 👍 Improvement in Quality of Life
- 👍 Nontoxic
- 👍 Awareness
- 👍 Beautiful
- 👍 Indeginious Knowledge
- 👍 Least Cost Production
- 👍 Income
- 👍 Total Quality
- 👍 Youth



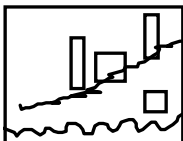




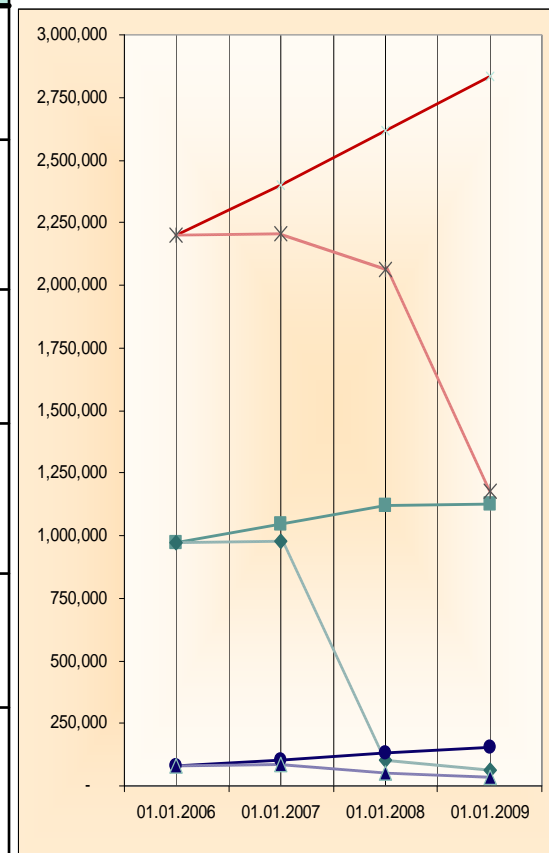
Utilization Industry Hazardous Waste – 3 R Potential (Implemented) in AMC Area

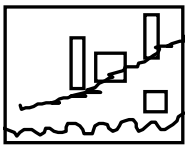
Plant Type	Manageable Waste with 3R approach	Generation T/d
Chemical / Petro Chemical Plants	<ol style="list-style-type: none">1. Contaminated Packaging, Junk Chemical, Lamp, etc. to Land Fill or Recycle Disposal.2. Sludge / Filter Cake from WWT Plant	+/- 20
Coal Fire Steam Power Plant	<ol style="list-style-type: none">1. Fly – Bottom Ash, with average 600 000 Ton stock in Site, manage through Co Processing	+/- 1600
Integrated Steel Plants	<ol style="list-style-type: none">1. Steel Sludge2. Steel Slag3. EAF Dust	+/- 1000





		01.01.2006	01.01.2007	01.01.2008	01.01.2009
Iron Sludge	Stock without 3 R Management	970,000	1,043,000	1,118,000	1,124,000
	Stock with 3 R Management	970,000	977,526	101,558	64,287
EAF Dust	Stock without 3R Management	80,000	104,000	129,000	157,000
	Stock with 3 R Management	80,000	88,433	51,630	37,021
Steel Slag	Stock without 3 R Management	2,200,000	2,402,500	2,614,500	2,836,950
	Stock with 3R Management	2,200,000	2,207,526	2,062,061	1,178,875

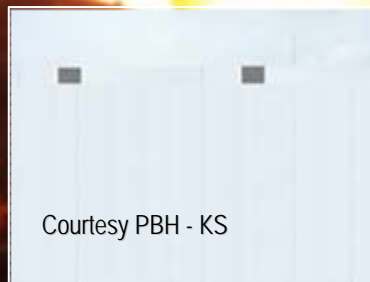




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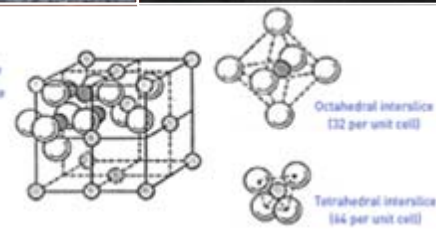
← STEEL SLAG Processing

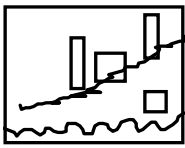


Courtesy PBH - KS

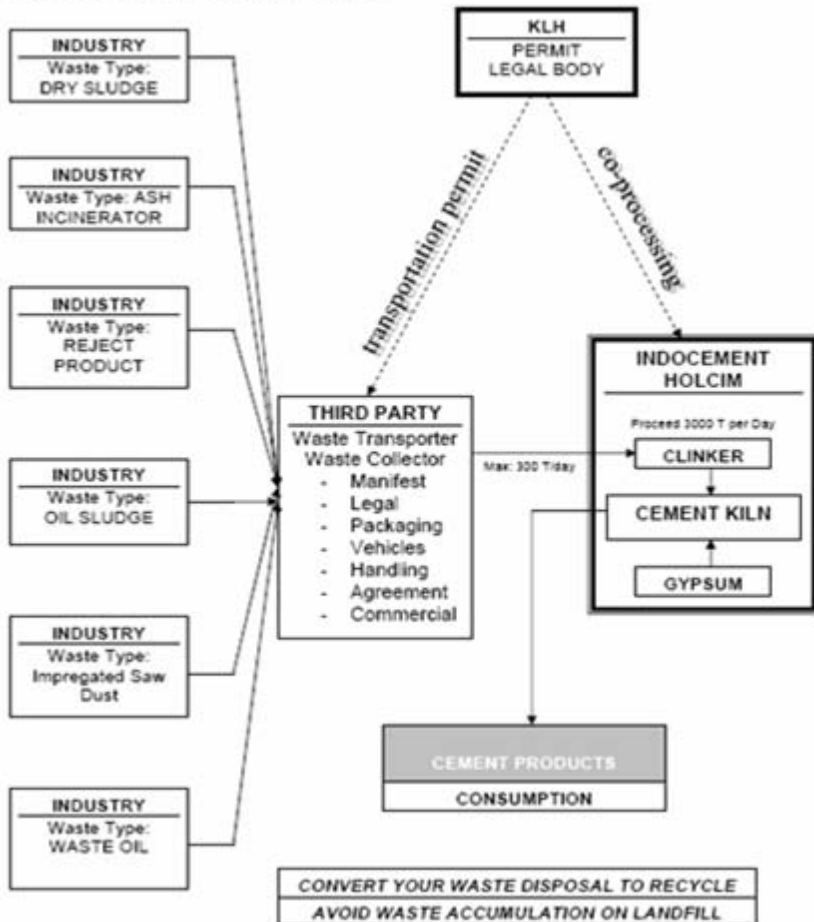


- Oxygen
- Calcium in octahedral site
- Calcium in tetrahedral site

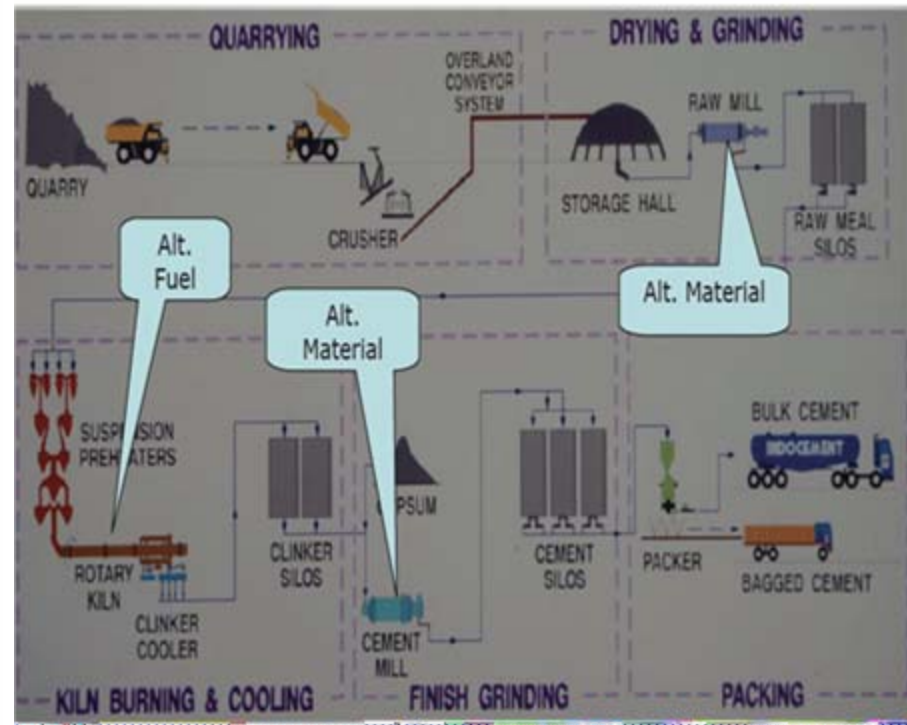


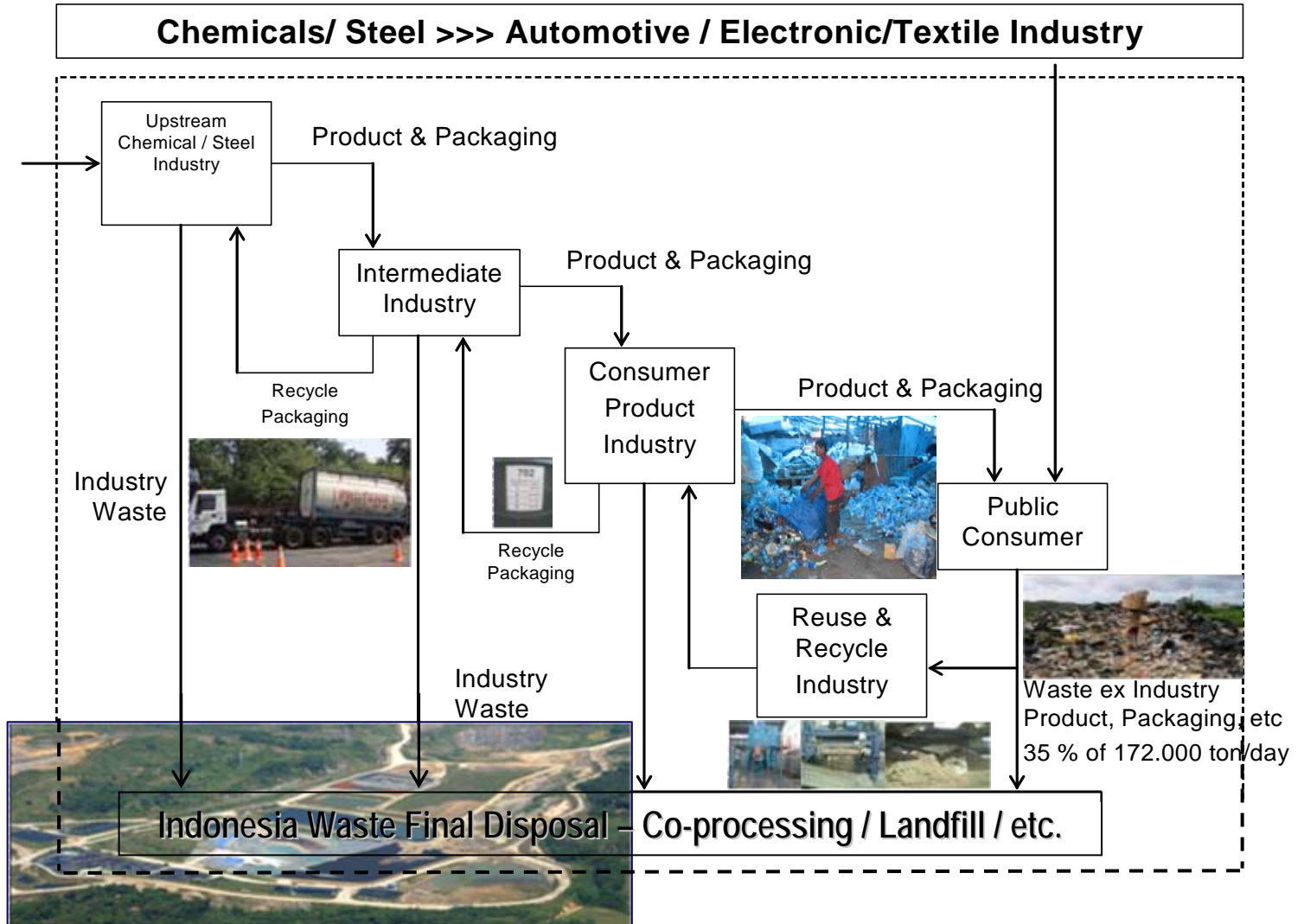
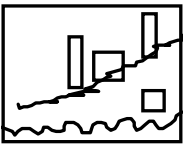


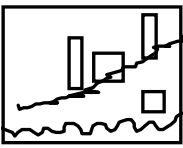
SCHEME OF AFR COPROCESSING



Feed Point Alternative Fuels and Raw Materials on Cement Manufacturing





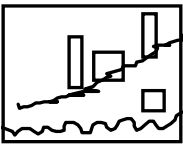


Landfill Processes



- Secure Landfills Class I and Class II – construction standard US-EPA (United States Environmental Protection Agency)
- Guaranteed Closure and Post Closure Funds for waste disposal at secure landfills for 30 years
- Mandatory monitoring for :
groundwater, surface water leachate, air quality, landfill gas, effluent discharge





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Thank You.ppt

