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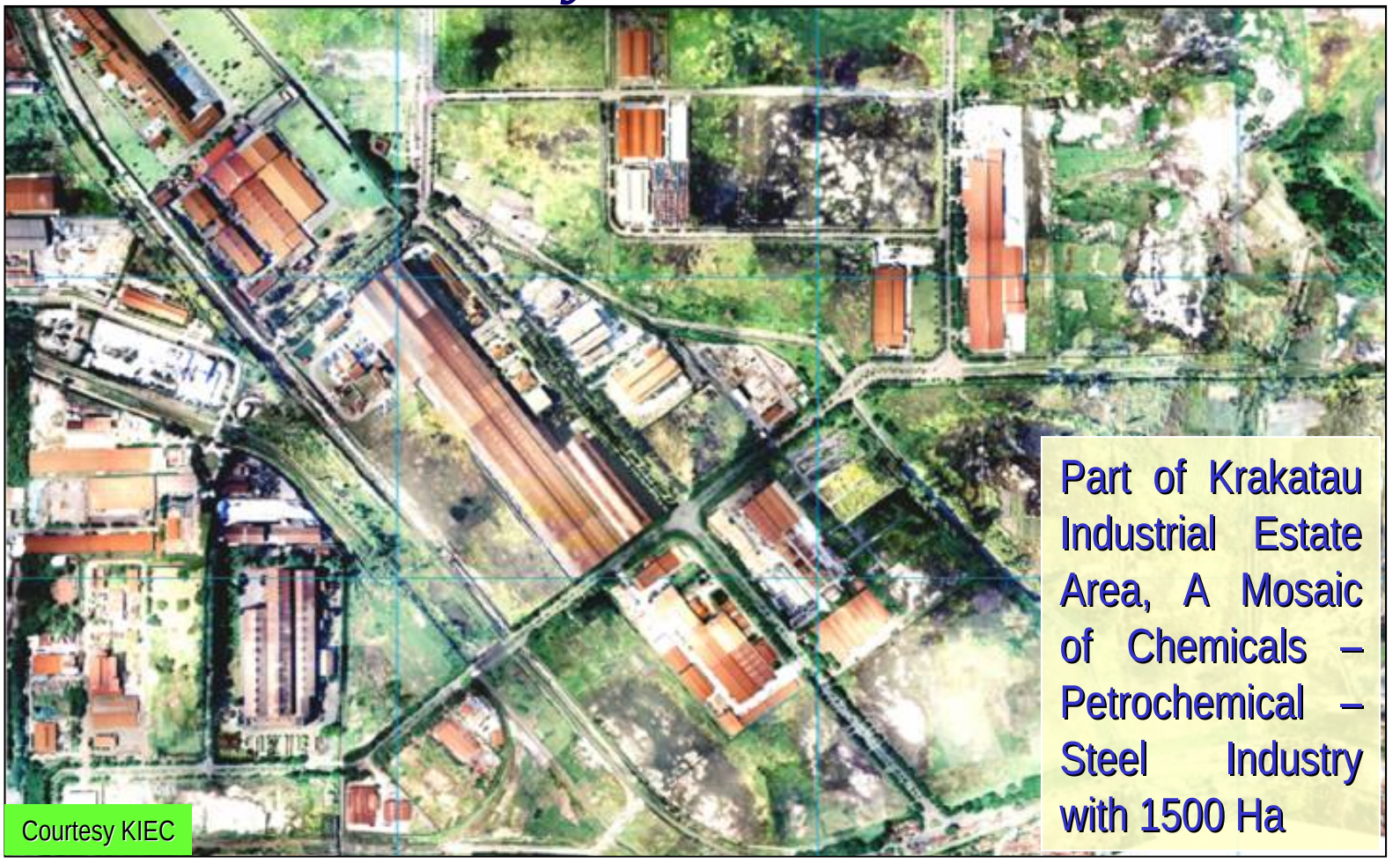
Utilization Industry Hazardous Waste



Part of Krakatau Industrial Estate Area, A Mosaic of Chemicals – Petrochemical – Steel Industry with 1500 Ha

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

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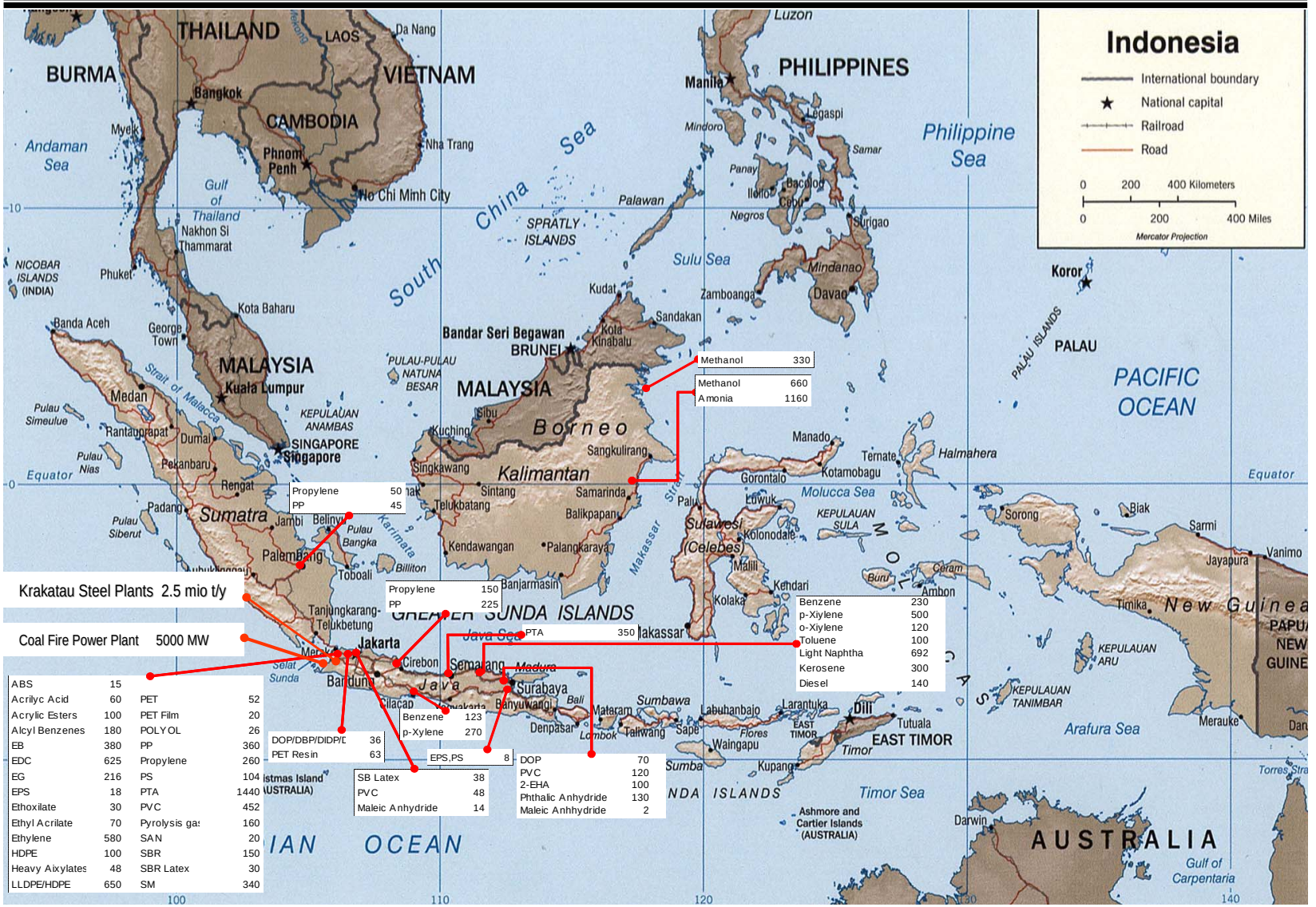
Upstream PetroChemical Distribution in Indonesia



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Industry Related Scope

Main Product		Number of Factories/Industry			Capacity	
		Indonesia	Banten	Cilegon-Serang	Production 2006	Product Value +/-
					Mio Ton	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
Singapure	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

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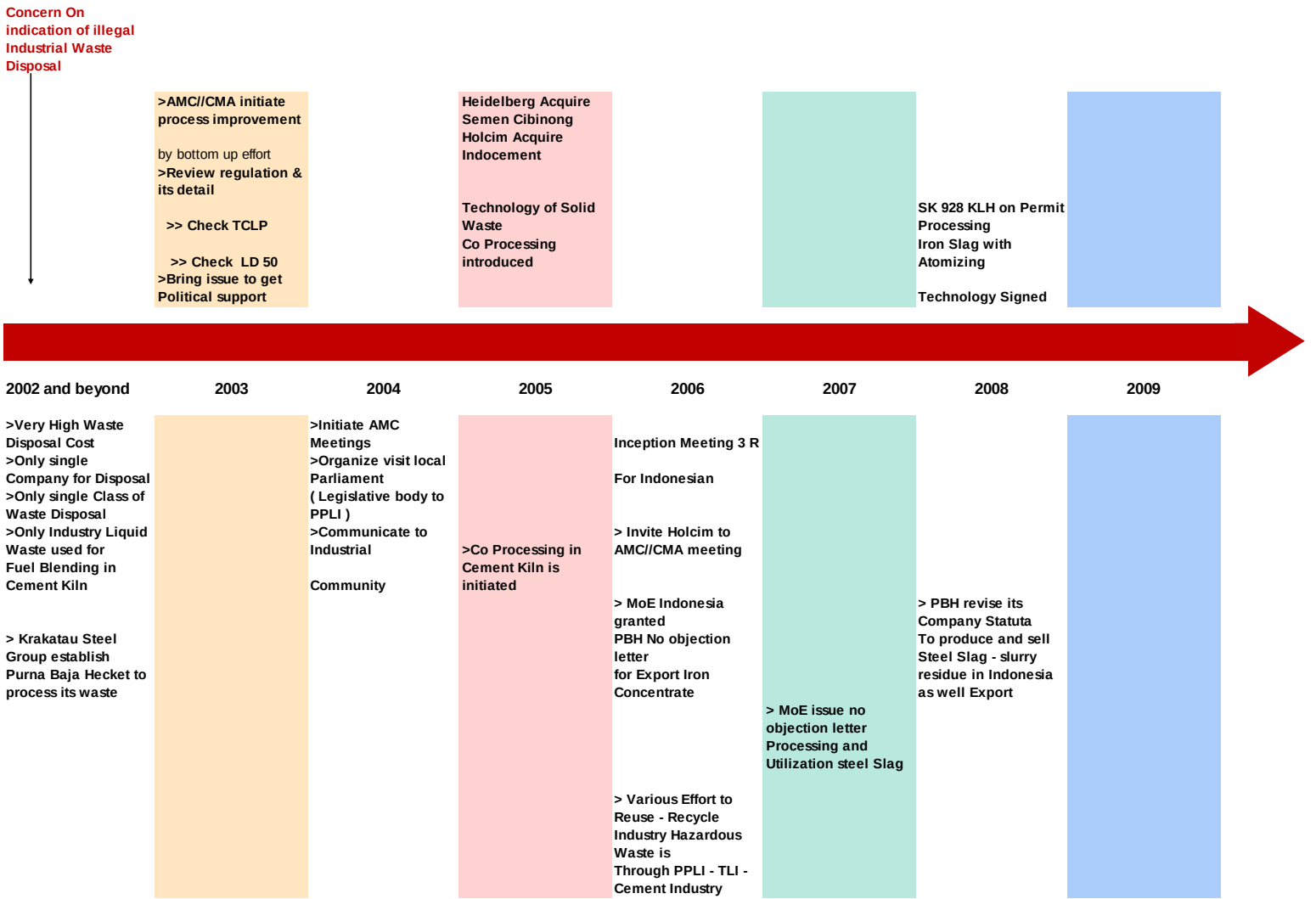
3 R Implementation from bottom Up View



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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 too 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

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 SERVICES STRATEGIC BUSINESS UNIT

No. 01488805

Page No. 2 of 3

ACUTE TOXICITY TEST LD_{50} SUMMARY

Client	: PT. CLARIANT INDONESIA (CILEGON PLANT)
Reference	: -
Work Order	: 36 / 002040 / 09 / 05
Test Type	: ACUTE TOXICITY TEST LD_{50}
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	: Aquabidest
pH	: 6.00

TEST SPECIES INFORMATION

Organism	: Mus musculus
Source	: BPLPP - Bogor
Collect. Date/Batch	: October, 2005
Age	: 1.0 – 1.5 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. Organism/cage	: 10

Toxicity Test Result (Calculated by Probit Analysis) : 11,641.26 mg/kg BW
Base on Acute Toxicity test LD_{50} this sample has LD_{50} values above 50.00 mg/kg Body Weight refer to Government Regulation of Indonesia No. 74/2001 is practically non toxic

Sucofindo Laboratory,

KEMAL MUSTAFA

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PT. (PERSERO) SUPERINTENDING COMPANY OF INDONESIA
GENERAL SERVICES STRATEGIC BUSINESS UNIT

No. : 0129823

Page No. : 2 of 2

Code	Parameter	Unit	Test Results	Detection Limit	Requirement **)	Method Part Number
	Inorganic :					
[illegible]	Arsenic	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Barium	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Boron	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Cadmium	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Chromium	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Copper	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Free Cyanide	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Fluoride	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Lead	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Mercury	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Nitrate + Nitrite	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Nitrite	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Selenium	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Silver	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Zinc	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
	Organic :					
[illegible]	Aldrin + Dieldrin	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Benzene	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Carbon Tetrachloride	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Chlordane	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Chlorobenzene	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Chloroform	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	o-Cresol	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	m-Cresol	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	p-Cresol	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Total Cresol	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2,4-D	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Endrin	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Heptachlor + H. Epoxide	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Hexachlorobenzene	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Hexachlorobutadiene	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Hexachloroethane	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Lindane	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Methoxychlor	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Methyl Ethyl Ketone	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Methyl Parathion	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Pentachlorophenol	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Pyridine	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Parathion	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PCBs	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Tetrachloroethylene	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Toxaphene	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Trichloroethylene	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Trihalomethanes	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2,4,5-Trichlorophenol	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2,4,6-Trichlorophenol	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2,4,5-TP (Silvex)	mg/L	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Vinyl Chloride	mg/L	[illegible]	[illegible]	[illegible]	[illegible]

*) Standard Methods, 20th Edition 1998, APHA-AWWA-WEF
**) [illegible]
< = Less than the detection limit indicated

LL-pp.th-

Sucofindo Laboratory,

DRA. LELYATININGSIH
NPP : 81.34.00475

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Material Transformation

Hazardous Raw Materials List	PROCESS Transformation	PRODUCT
Commonly Used Mat'l - 229 CAS Number Limited Use - 45 CAS Number Prohibited Use - 10 CAS Number	Production Fail Product Spill - Road Accident Consumption - disposal	Hazardous Waste

PP No. 74 - 2001	>>>>>>>>>>	PP No. 18 dan 85 -1999, Permen KLH No 2 - 2008
Characteristics		
Explosives Flammability Reactives Toxic Carcinogenic Corrosives	>>>>>>>>>	Characteristics Test TCLP 2 < pH > 12.5
Fuel Substitution	>>>>>>>>>	Calori >> 2500 Kkal / Kg No Halogenated component Water content << 15 %
Overall Characteristics	>>>>>>>>>	Pass Toxicology Test LD50 < 15 gram/Kg

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	Ehylene dibromide	Methanol - Propanol - Ethanol
DDT	Penta chloroPhenol	Chlorine , Formalin
Endrin	Ethylene Oxide	KOH, NaOH
PCB	Ethylene Dichloride	Asam (Akrilat, Asetat, Formiat
	Carbon tetra Chlorida	Chlorida,Phosphat , dll)
	CFC, Halon	Ethyl Acrylate,
	Methyl Bromide	Amoniak, Vinyl Acetate
		Acryl Nitril, Dimethyl Sulphate
		Benzena, Toluena

* Catatan :Not include percusor, food, pharmaceuticals

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 (LD_{50}) 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.

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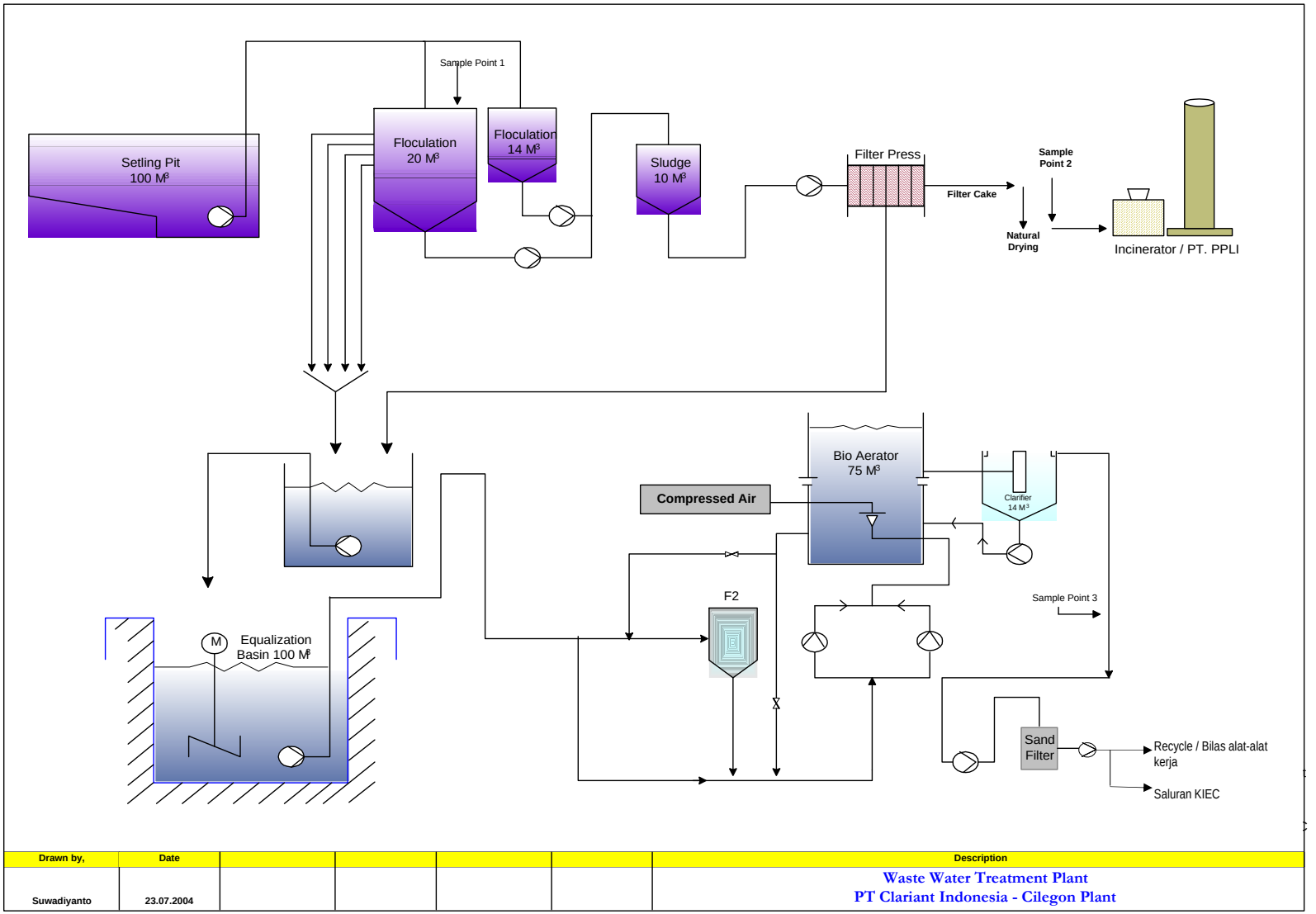
HAZARDOUS Raw Material - Waste	Criteria Hazardous Materials - Waste		INDONESIAN GOVERNMENT REGULATION			
			HAZARDOUS Raw Materials Status		Hazardous WASTES	
	Hazards	Unit - Measurement	Man Power Reg.186 -1999	PP 74 - 2001	PP 18 - 85 - 1999	KLH 02-2008
			Managing Hazard. Materials	Hazardous Management		3 R Related
Prohibited				10 CAS Number		
Limited Utilization				45 CAS Number		
Common Utilization				209 CAS Number		
Hazardous	Practically Non Toxic			5001 - 15 000 mg/Kg		
Raw Materials	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			
	Reaktive	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	
	Excemption	Caloric Value, Kcal/Kg				2500
	Excemption	Halogenated Component				None

Typical In Site Production WWT Plant



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

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%	

Typical Material – Energy Balance of Production Plant

Vapor Release:
SOx=5.79 Kg
NOx=3.47 Kg
HCl =8.25 Kg
NH_3=1.14 Kg
Particulate =13.91 Kg
H_2O=10,186 m3

Raw Material:
9,240 Tons

Raw Water:
42,544 Tons

Electricity:
2,454,560 kwH

Steam:
3,424 Tons

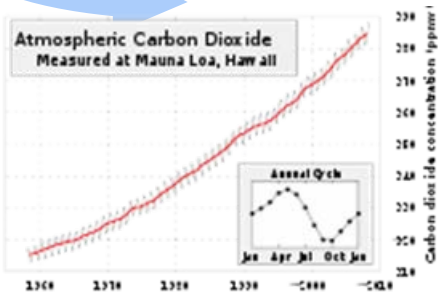
PROCESS

Product:
(Polymer Dispersion):
18,560 Tons

Waste Water:
13,047 m3

Solid (TDS) : 13 Ton
Nitrat : 104 Kg
Solid Waste :
328 Tons

Domestic & Sanitary:
9,833 m3



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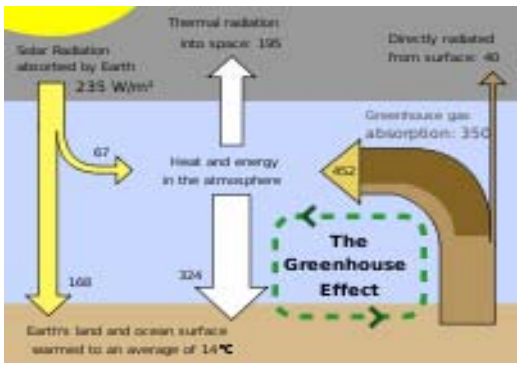
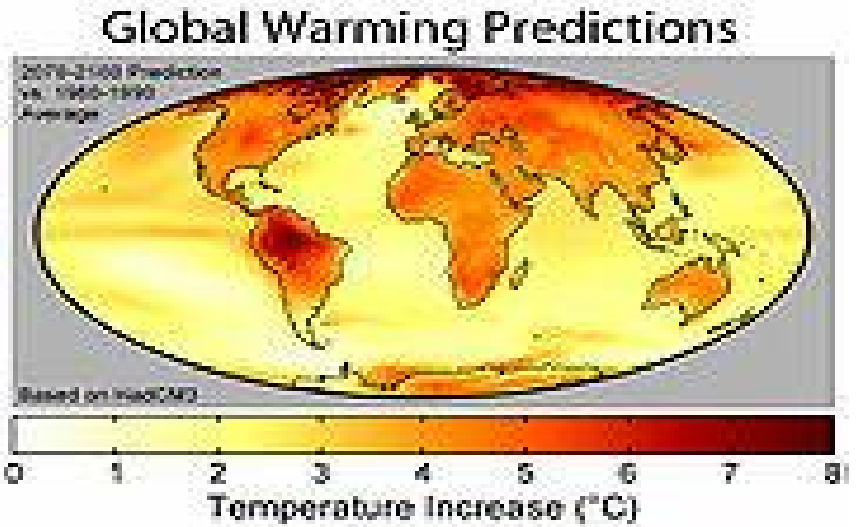
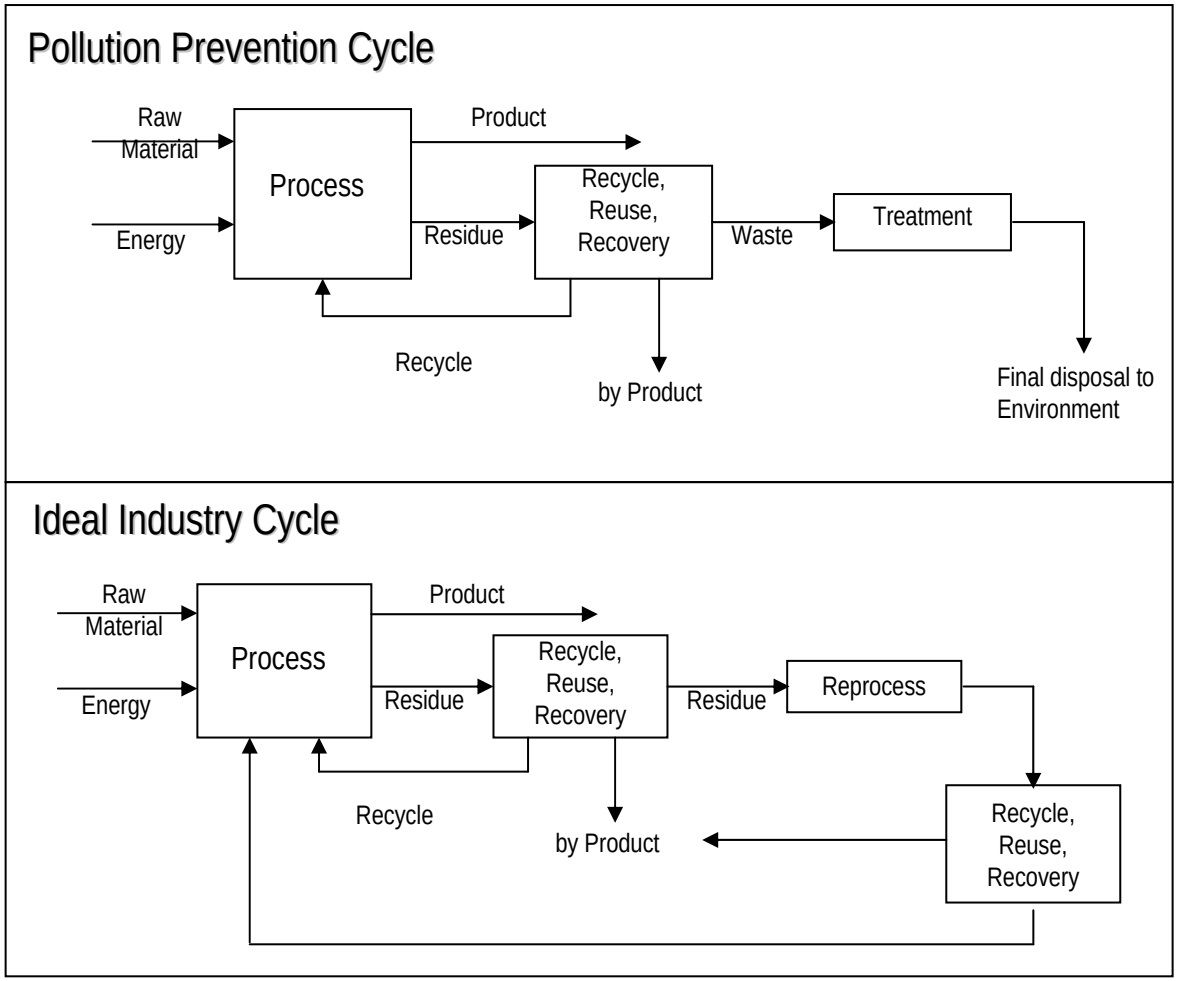
We target our 3R Program contributes to Environment Sustainability through Economic Concept emphasizing to fullfill our reasonable need and ;
Ecology Concept emphasizing on Ecosystem Balance - Environment Conservation

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





Industry Green Production Cycle



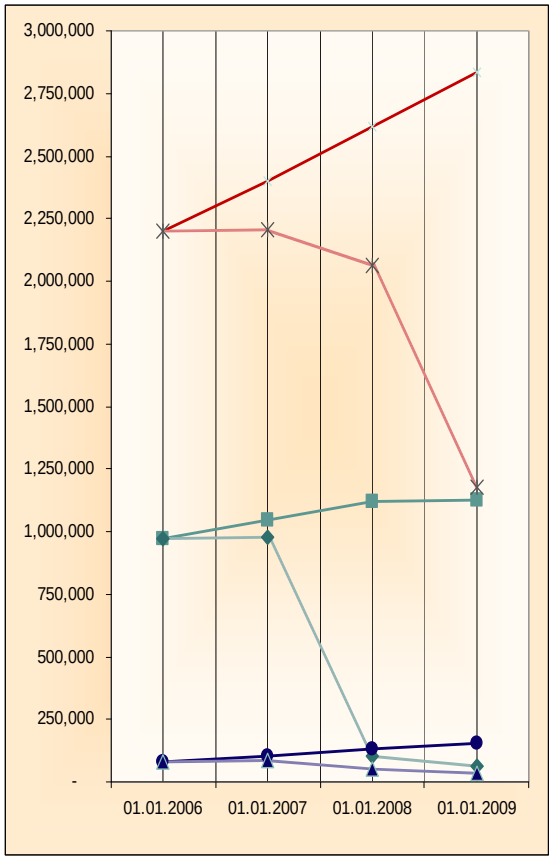
Courtesy Prof.Tjandra Setiadi PhD

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	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	1. Fly – Bottom Ash, with average 600 000 Ton stock in Site, manage through Co Processing	+/- 1600
Integrated Steel Plants	1. Steel Sludge 2. Steel Slag 3. EAF Dust	+/- 1000

Stock Balance HW in Integrated Steel Industry

		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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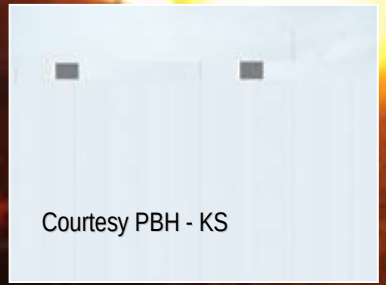
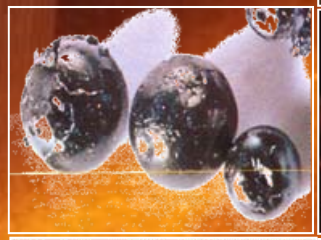
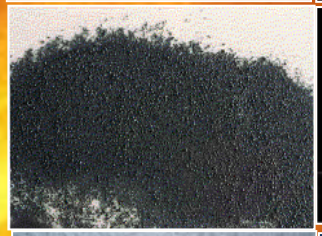
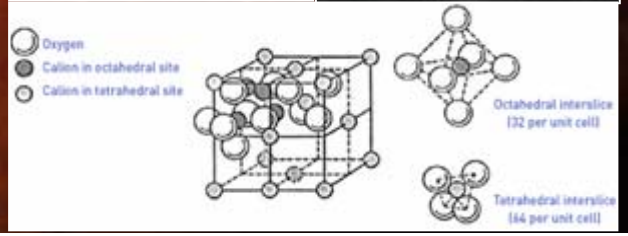
STEEL SLAG Processing









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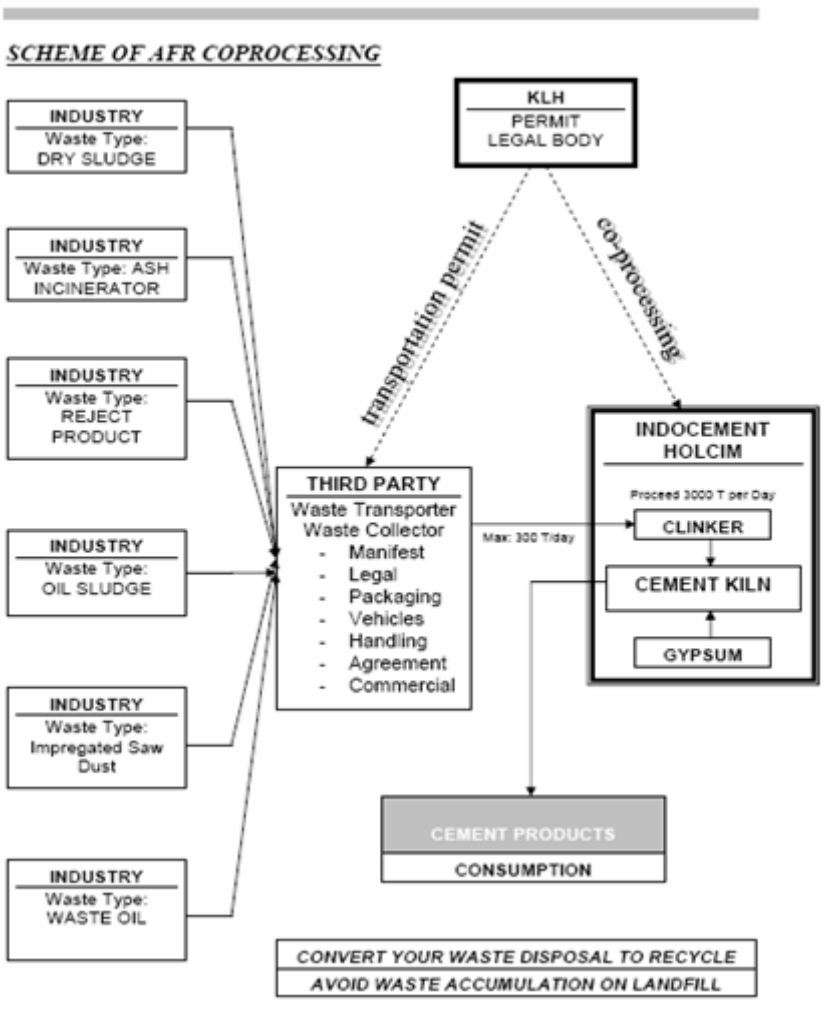
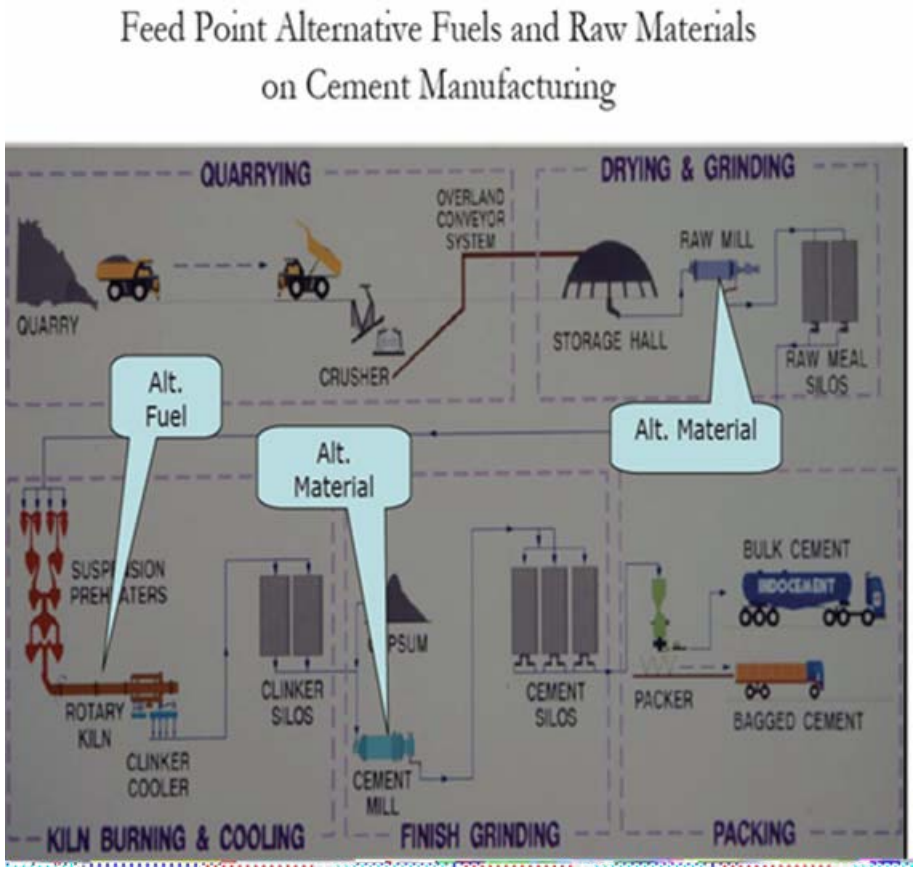
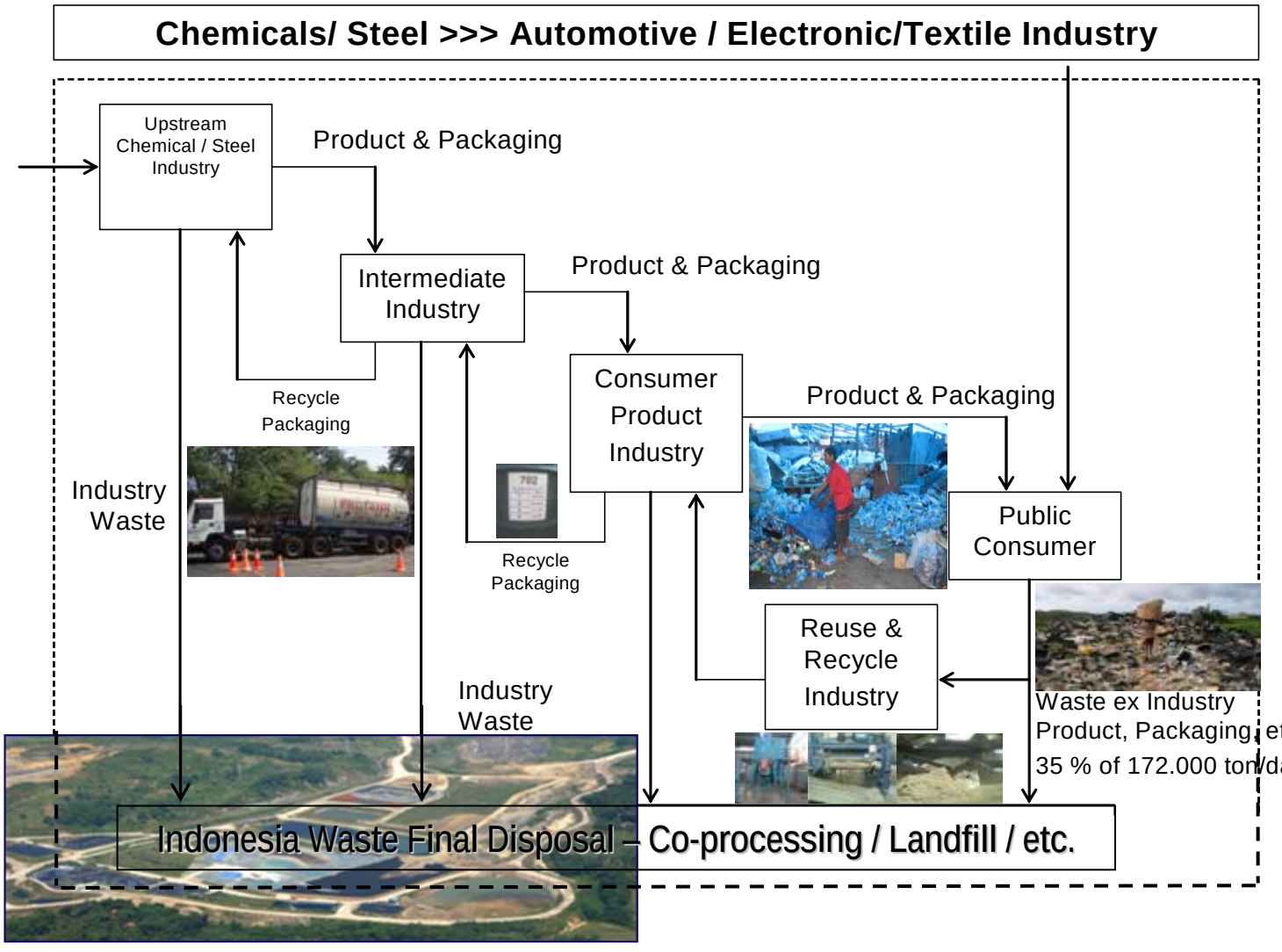
Co-Processing Schema





Industry – Waste Cycle Process



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

Courtesy of PPLI - DOWA


Thank You.ppt