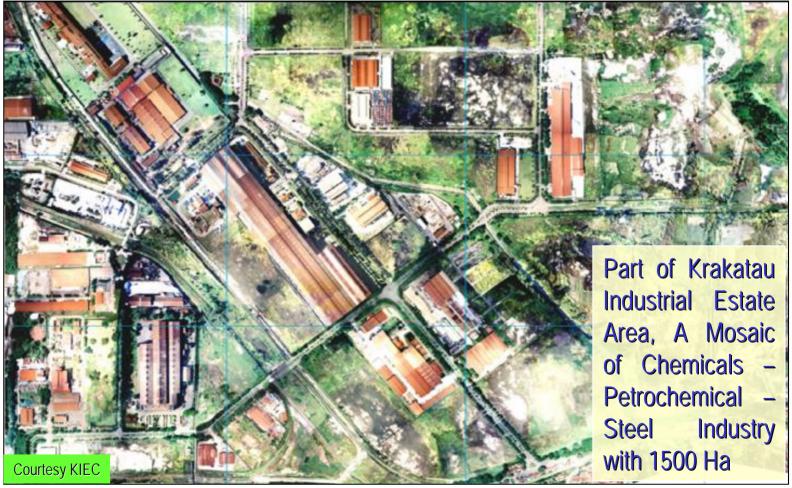


Utilization Industry Hazardous Waste





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

Upstream PetroChemical AMC//CMA **Distribution in Indonesia** AMC Chemical Manufacturer's Association Luzon THAILAND Da Nang LAOS Indonesia PHILIPPINES BURMA VIETNAM International boundary Manila Baneko National capital CAMBODIA Sea Railroad Philippine Nha Trang Andamar Sama Road hnon Sea Sea Penh Gulf 200 400 Kilometers He Chi Minh City of Palawar C'N' Thailand Nearo 200 400 Miles SPRATLY irinac Nakhon Si Mercator Projection **ISLANDS** Thammarat Sulu Sea South NICOBAR Koror Aindana Phuket (INDIA) Kudat Zamboang Davad Kota Baharu Sandakan Banda Aceh SUM Georg Bandar Seri Begawan Town PALAU BRUNEL PULAU-PULAU Methanol 330 MALAYSIA ANATUNA PACIFIC 660 BESAR Methano Kuala Lumpur MALAYSIA Medan Amonia 1160 Pulau 🥿 OCEAN KEPULAUAN Simeulue ANAMBAS Bost neo Rantauprapat Manado Dumai SINGAPORE Sanokulirano Halmahera Pulau ngapore Ternate. ekanbaru Nias Equator Kalimantan Kotamobagu Equator Gorontal Molucca Sea Propylene -50 12 Sintan Samarinda, PP 45 elukbatano Padano Biak Sorong Sumatra Balikoapa KEPULAUAN Pulau Jambi Beliny SULA Sarmi Pulau Siberut Kolonodale Bangka Kendawangan ·Palangkaraya Palembang Vanimo C Javapura Billiton Toboali 150 Banjarmasin Kendari Krakatau Steel Plants 2.5 mio t/v Propylene Ambon Benzene Timika. New Guine PP 225 GNEMEN SUNDA ISLANDS Tanjungkarang-500 p-Xiylene Telukbetung PAPU 120 o-Xiylene 350 Jakassar Coal Fire Power Plant 5000 MW Toluene 100 Jakarta NEW KEPULAUAN Light Naphtha 692 2 ARU GUINE Cirebon Kerosene 300 Bardun Sunda ABS Diesel 140 15 Jav KEPULAUAN 52 Acrilyc Acid 60 PET Sumbawa TANIMBAR abuhanbai 20 Acrylic Esters 100 PET Film Benzene 123 Merauk EAST Tutuala Dai Dent Arafura Sea Alcyl Benzenes 180 POLYOL 26 o-Xylene 270 Flores TIMOR DOP/DBP/DIDP/C EAST TIMOR 36 Waingapu EB 360 380 PP Timor PET Resin 63 EPS,PS EDC 625 260 DOP 70 Kupanor Propylene Sumba Torres PVC 120 EG 216 PS 104 istmas Island SB Latex 38 2-FHA 100 1440 (USTRALIA) FPS 18 PTA PVC 48 NDA ISLANDS Timor Sea Phthalic Anhydride 130 PVC 452 Ethoxilate 30 Maleic Anhydride 14 Maleic Anbhydride 2 Ashmore and Darwi Ethvl A crilate 70 Pyrolysis das 160 Cartier Islands (AUSTRALIA) S SAN AU Ethylene 580 20 OCEAN LIA ANHDPE 150 SBR 100 Gulf of SBR Latex Heavy Aixylates 48 30 Carpentaria LLDPE/HDPE 340 650 SN



Industry Related Scope

	Numbe	r of Factor	ries/Industry	Capacity		
Main Product	Indonesia Banten Cile		Cilegon-Serang	Production 2006	Product Value +/-	
				Mio Ton	Bio USD	
Pulp - Paper						
PULP Industry	14	1	n.a.	6.7	(Export)	
Paper Industry	79	2	n.a.	10.3	4 (Export)	
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

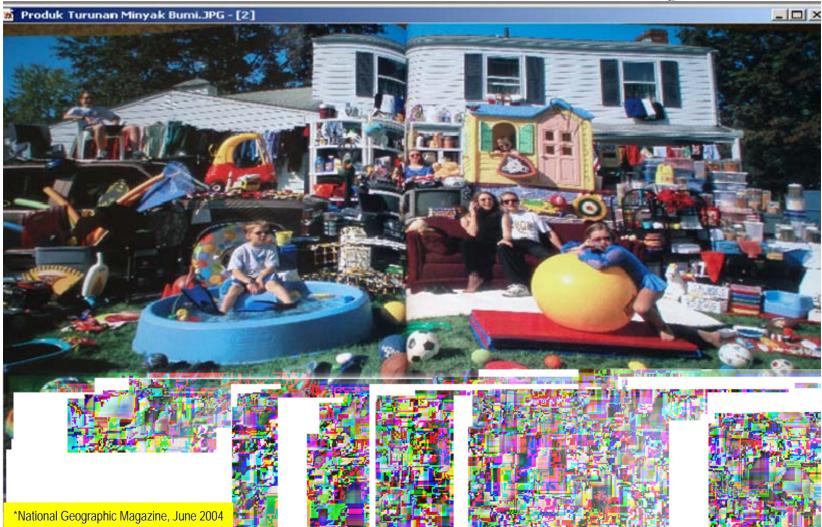
Indonesian BPS

Various Data Internet

Fertilizer Industry - Kompas 21.12.2007



Petrochemical Products ease our Modern Life *



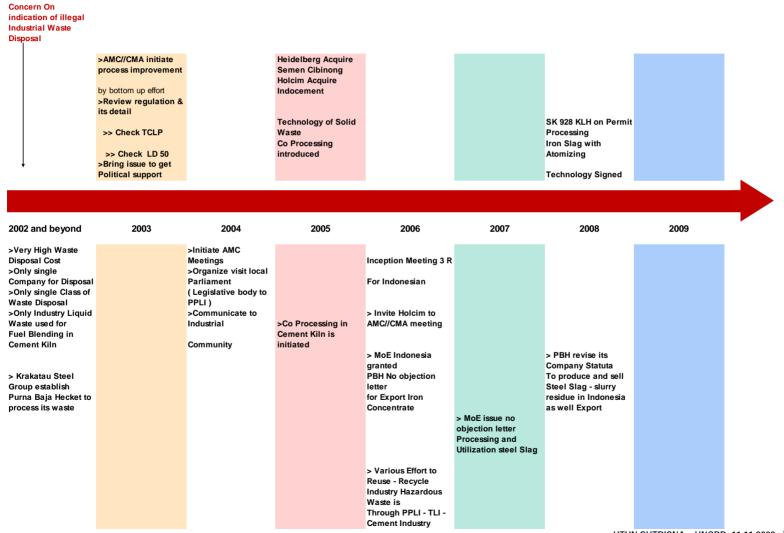


	Capacity Produc	ing Ethylene (as p	oer 2006)	Consumption
Country	Capacity As per World		Ranks	Plastic (2005)
	Million Ton/Year	Procentage (%)		Kg per kapita
INDONESIA	0.53	0.4	34	9.5
Japan	7.60	6.3	2	82
United States of America	28.74	23.9	1	169
China	7.27	6	3	29
India	3.53	2.9	10	3
South Korea	6.01	5	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



3 R Implementation from bottom Up View







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 F 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.
- We 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.



Industrial Hazardous Waste Tests

PT (PERSERC) SUPERINTENDING COMPANY OF INDOMESIA COMPANY, COMPANY, STRATTON, NY SHAPPA LAN

No.:0129623

Page No. 2 of 2

PT. (PERSERC) SUPERINTENDING COMPANY OF INDONESIA INTERNAL SURVICES STRATEGIC BURNESS LANT

No. 9148805

Page No. 2 of 3

ACUTE TOXICITY TEST LD₃₀ SUMMARY

Client	£	
Lefe	mint	
	Ord	
Feet 1		

Test Initiation

: 36/000040/09/05 ACUTE TOXICITY TEST LD. Outober, 2005

: PT. CLARIANT INDONESIA (CILEGON PLANT)

SAMPLE	
Identification	
Amount Received	
Date Callected	
Date received	
Solubility in Water	
Douge from	
Total Dosage	

CONTROL Medium :04

15.99.00

Not Soloble/suspension Suspension 10 (ten) dosage and 1 (one) control : Aquibidest

FILTER CAKE 1.60

September 16, 2005

6.08

TEST SPECIES INFORMATION

Organiam	Mus muonillus
Scratter	BPLPP - Boger *
Collect. Date Tatah	Outober, 2005
Age.	1.0-1.5 months
Conditioned on Laboratory	10 (km) days
Means of weight	15.67 grum

TEST CONDITION	
Temporature	24-28°C
Hanidity	: 60.0-25.0 %
Noise	7 60.0 - 70.0 dB
No. Organismicage	10

Toxicity Test Result (Calculated by Probit Analysis) : 11,641.26 mg/kg BW Base on Acute Textelly test LD₂₀ this sample has LD₂₀ values above 50.00 mg/kg Body Weight refer to Government Regulation of Indonesia No. 74/2001 is practically non-taxie

Sucufinde Labora KEMAL MUSTAFA

Chat .	Peteret	Control	Test Streams	Seading -	Brand State of The	Mp.35ell Post Resident
	Darryant i				1	
11-464.0	Acaste	ingh.	× 6.60	. A.M.	3.8	10,000,000,000,000
82-488.8	Deal and	egt.	- 9.44	8.10	1480.0	UR EXA, 1997 Ave. YORK
11-4011	Suma	raf.	4.21	8,008	100.0	THE ROOM DOLL IN
12-4088	Children	. aut.	- 0.807	8.004	1.6	UR SPA 994 846 7130
D-4011	Chevral and	ing/L	4 9.09	8.87	3.0	10 8214 379-848-7280
0.4011	Commi	and a	1.540	1.62	25.9	138 E255 MW 8-66-7231
10-401 [†]	Pres Carella	engili.	+8.81	8.49	31.8	130 2354, 200 2
0.4014	Panish	ral.	6.55	8.61	176.8	41/0-0" 21."
D-401P	Gent	earl.	- A00	6.45		131 8294 8791 848-7420
12-411	Marrier	185	0.004	8.001	8.3	01254.056.856.846.7470
11-4011	Nimals + Marine	- Farl-	HLI	8.11	1000.0	4100-0422-8-7 8888-9812-9
3-404	New	ter.	4.6.01	1.01	146.4	4080-040,18*
0.4011	Delogias	100	- 9.007	8,867	1.6	10132A.2014-0-1241
2-4544	Mine .	igh.	4800	6.83	.5.0	US RIFA SHE AND THE
21-4012	Zim	ter.	< 0.888	8.018		EXERCISE STRUCTURE PRAVIL
	Terment (and the second second	Contract of the second s
0.4011	Author + Distriction	1981	+1.81	1,011	6.67	ALL REAL REAL PORT OF THE REAL PORT
12-4064	Baunes .	100	-12,808	8,816	4.1	UR KIPA MW-B # - REBE
D-4097	Carlos Totacities in	1985	× 9.001	8.063.4	6.1	170 ETCA 40W-8-40-2400
D 4008	Chivrine	ing'L	+ 6,800,	6,891	0.49	125 EFA 3FW 8-46-8690
0.4087	Chevileante	1965	48.85	0.85	188	CREATE A REPORT OF THE PERSON
2-4018	-Chiuradiana	- April -	+6.888	1.000	4.0	UB EAA STREAM-DEDI
10-40(3)	a Dreed	1983	~ 6.8M	6.816	346.4	SIE KINA WAYMAN ADAD
3D-406-4	m-Orenti	mg1.	+0.800	0.001	100.0	UR BRA WWY AND ADAR
D 404.1	g-Created	ingri.	+ 6.800	6.800	186-9	CB EEA WWW-BHD
2484	Total Creek	185	-140	185	2014	Caledation
0.4018	2,4-0	ough.	10.005	6.000	.19.3	08 825 A 1994 - # 42-85 38
0.4009	1.4 Doll and manual	mel.	1248	ELEMENT.	7.8	OR RAA STATISTICS
0-4081	3.2 Dotte providence	nert.	10.494	NAME.	- M	UR BAR SHOWS THE
314081	1.1 Digit available at	reri-	4.0.800	0.68	8.7	UN SERA WAR-ADM
2-4011	1.4 Distinguistance	1985	-0.89	0.000		THE REAL MENT & MUSIC
114063	Forkin	mgil.	+8.885	11.041	9.84	CREPA STATEMENTER
35-4961	Righeith er + 3, Tgretick.	196	10,000	1.00	3.808	STEREA STACKAGE
D-40016	French with states	mg1.	+0.400	1.651	8.0	US KEA WAY GAL SUBT
314021	Departition of prefiction	mert	4.0.848	6.862	6.7	UR ETA EN HAL-NEW
21-1022	Element of an instituted	1003	-128	100		55 EFA 254 940-2626
0.4036	Lipping.	ingri.		1.251	8.0	CE EFA XIN DAL BER
0.4011	Matcarditor	mg1.	+0.48	0.041	18.2	12 EAL 25 (AAL 804)
21.4023	Maket 18pl Autors	mpt),	10,810	8.812	380.8	UREPANN/AAL-NON
D-4014	Molto Pentina	ingl.	= 0.681	6.061	8.7	212274,2294,840-9080
EL ATOPT	All Boldparcheles	. Suger	+ 6.899	6.68	4.8	THE YEA UNLAW, MY
31-4014	Historia di Anta		-1546	11.041	1.8	18.271.271-046.302
21-4000	Fodulli-riphosi	mgT.	-3.823	0.041	180-8	TR EPA STATISAL-BOH
D-4044	Epider	mel.	+3.881	1441	1.8	18 EPA 39/846-308
D-4041	. Paretti m	- 121	+0.05	0.001	M	CH EFA STRUGAL-RORE
D 4942	P.3H	ag'L	< 9.041	0.081	8.3	US XPA 274 840-808
214942	Tetrachtie or by ent	1983.	+3.481	5.091	6.7	TR.RPA, KNV BAD DOR
E 4044	Totaghese	sql.	-1.06	8.040	6.2	10 EFA 276 844 8088
TI 4041	Trial provide son	mg/L.	-1.8.801	8.061	8.8	18 874 276 840 1998
21-4048	Tribel encellage	- rach	-0.001	0.081	31.0	33.27.4.379.846.208
21.4500	5.4.3 Thirld scophonal	1984	+ 8.085	8.083	0010	TH FEA WILLIAM MADE
D.4578	Add. Thillie sphered	185	+3.001	8.061	18	13,574,579,844,8748
21-46011	1,4,0-19 (Bilted)	eg1.	- 8,085	8.088	1 14	TR.EPA. 274 846-8040

Memberd Methods, 30" 2.455-0.1918, APRIA AMWA WED ** Department are so fooded if built value of parameter in Moder regions the respinement (her-scenario Regulation No.181879 (a. No.871989) of a Loss from the detection limit indicated

13.99.40-

DRA LELYATININGER NPT: 81.34,06475

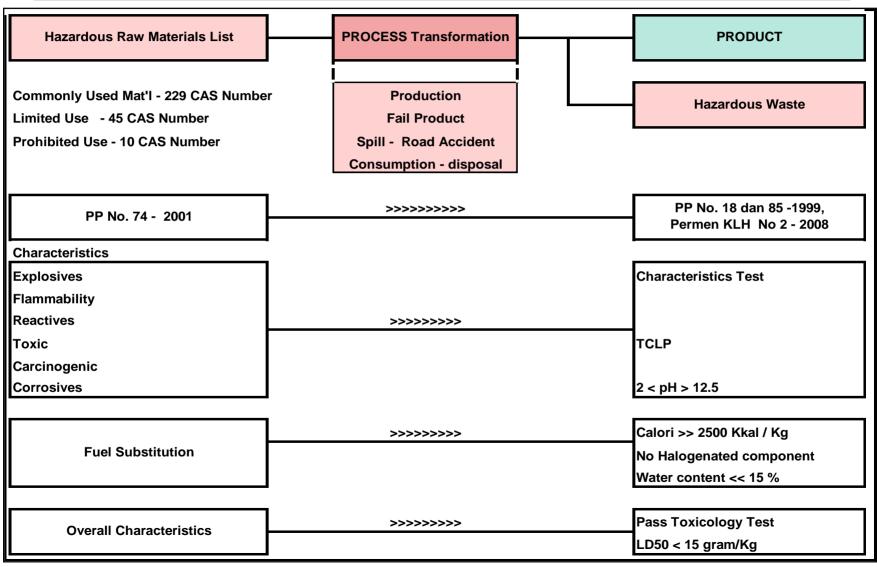
Socillado Laboratory,

while other has been provided and this restrictioners is record adapted in the Databasi General Condition of the Internet/Conditional PEDDATECH (or PEDDETECH result CEC) (FVR) The company's feelby is Indext under the types of Article 19 downed Testagnee of the peddatech down not exchanged the leaves and actives, that says carry at that Ayris and confuences the basis and the forward of these SCI JUM-03

adus siter has seen excepted and the settleakings) is instant action to the Stendard Second Constitute of the Artigitual Legendresia, Reconstruction OF INDEXISTAN ADDRESS (FP). The surgery's booky is index work that some of while 15 meret takance of the performance there not exclusion for balance for patient from exercising of their sight and all for anying that belows of the the Common of Sales ALC: 1 1844 1911



Material Transformation





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					
РСВ	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

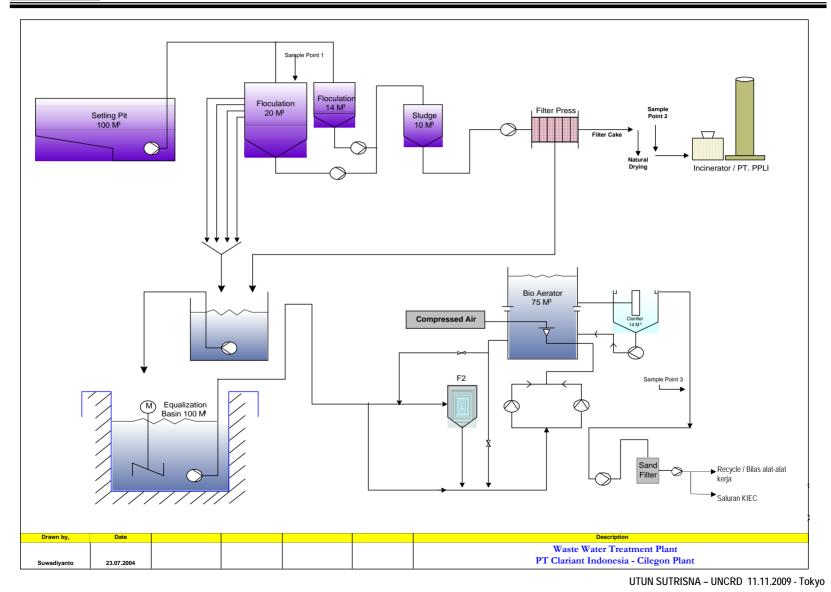
(PP 18/1999, PP 85/1999), soon may need to be reviewed with adaptation of UN-GHS

- Exhibits characteristics such as being explosive, ignitable, reactive, toxic, by Toxicity Leaching Characteristics Procedure (TLCP, Infectious, Corrosive, and/or toxicity by Lethal Doses-50 (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.



	Criteria Hazardo	us Materials - Waste	INDONE	ESIAN GOVERNMENT R	REGULATION	
HAZARDOUS Raw			HAZARDOUS Raw	Materials Status	Hazardous	WASTES
Material - Waste	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<="" td=""><td>210C<t<600c< td=""><td></td><td></td></t<600c<></td></t<55>	210C <t<600c< td=""><td></td><td></td></t<600c<>		
		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	рН		pH<2 or pH > 12.5	pH<2 or pH > 12.5	
	Excemption	Caloric Value, Kcal/Kg				2500
	Excemption	Halogenated Component				None

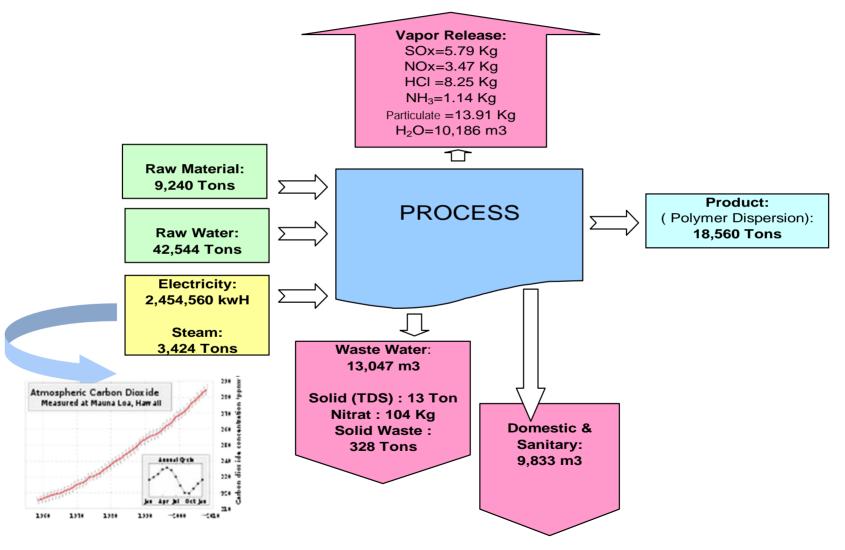






Typical WWT Process In Production Site							
	_	1st Step	2nd Step	3rd Step	Standard		
Typical Waste Parameters	Equalization	Physical Separation	Chemical Degradation	Clarifier dan	Effluent		
		Flocculation-Filtration	Of Waste	Filtration			
Average waste Characteristic							
within Outlet Process,	10 000 - 20 000	800 - 1 400					
COD in ppm			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		
рН	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%			

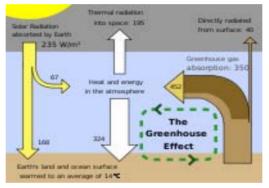






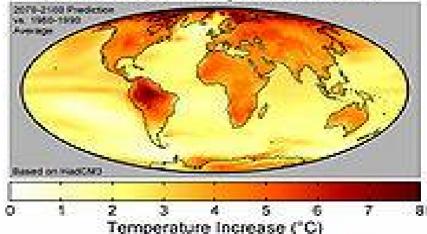
We target our 3R Program contributes to Environment Sustainability through Economic Concept emphasizing to fullfill our reasonable need and ; Ecology Concept emphasizing on Ecosystem Balance - Environment Conservation

- 🕹 <mark>S</mark>afe
- Universaly Accepted
- Stable
- Technology that benifits all
- Antipolution
- Improvement in Quality of Life
- Nontoxic
- Awareness
- Beautiful
- Indeginious Knowledge
- Least Cost Production
- lncome
- Total Quality
- Youth

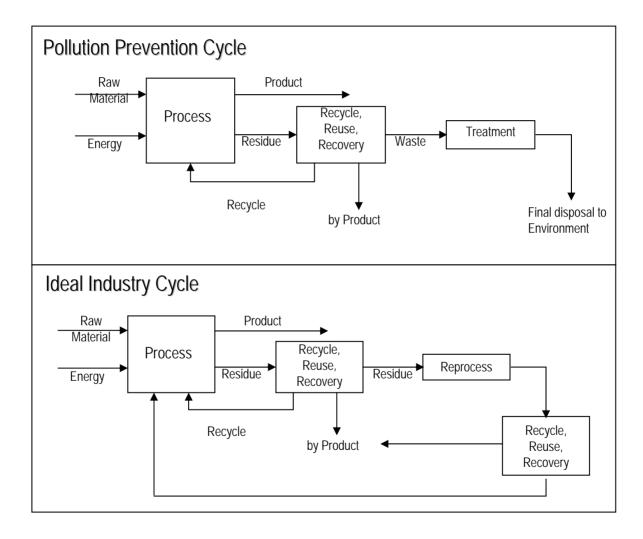




Global Warming Predictions









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	 Contaminated Packaging, Junk Chemical, Lamp, etc. to Land Fill or Recycle Disposal. 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	 Steel Sludge Steel Slag EAF Dust 	+/- 1000



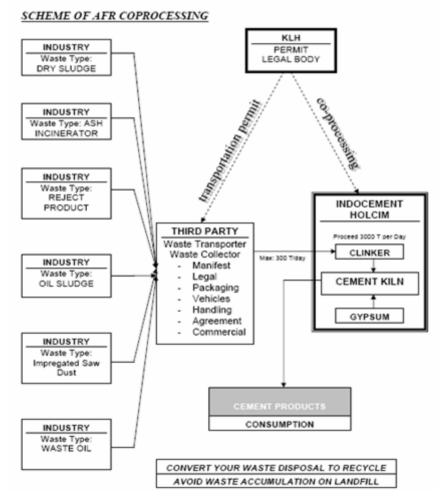
		01.01.2006	01.01.2007	01.01.2008	01.01.2009	
Iron	Stock without 3 R Management	970,000	1,043,000	1,118,000	1,124,000	3,000,000 2,750,000 -
Sludge	Stock with 3 R Management	970,000	977,526	101,558	64,287	2,500,000 - 2,250,000 - 2,000,000 -
	Stock without 3R Management	80,000	104,000	129,000	157,000	1,750,000 - 1,500,000 -
EAF Dust	Stock with 3 R Management	80,000	88,433	51,630	37,021	1,250,000
	Stock without 3 R Management	2,200,000	2,402,500	2,614,500	2,836,950	750,000 - 500,000 -
Steel Slag	Stock with 3R Management	2,200,000	2,207,526	2,062,061	1,178,875	250,000 - 01.01.2007 01.01.2008 01.01.2009



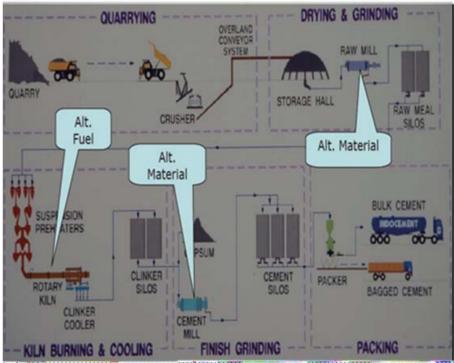




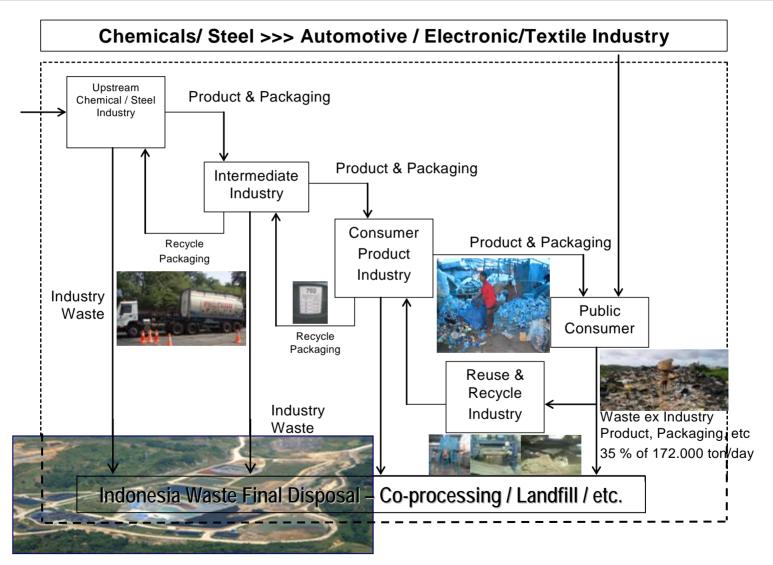
Co-Processing Schema



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













