OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

21243

Distr.
LIMITED

ID/WG.541/5(SPEC.)
9 October 1995

United Nations Industrial Development Organization

ORIGINAL: ENGLISH

First Global Consultation on Environmental Management/
Cleaner Technologies in the Metallurgical Industry
Vienna, Austria, 16-18 October 1995

*REPORT ON LEGAL FRAMEWORKS OF ENVIRONMENTAL STANDARDS OF SEAISI MEMBER COUNTRIES**

prepared by

the Committee on Environmental Affairs of SEAISI

*The views expressed in this paper are those of the authors and do not necessarily reflect the views of the Secretariat of the United Nations Industrial Development Organization (UNIDO). Mention of firm names and commercial products does not imply the endorsement of UNIDO. This document has not been edited.

V.95-58214

Report on Legal Frameworks of Environmental Standards of SEAISI Member Countries

Environmental standards (taken from questionnaires given to SEAISI contact persons and selected member companies in each country) of all member countries were collected before the first meeting of the commitee (Annex 1).

The collected data was summarized in the form of a table and presented at the 2nd meeting (Annex 2).

In addition to the data on legal standards, the frameworks of environmental regulation of several member countries have been submitted.
To date, legal frameworks of 8 countries, Japan, Indonesia, Malaysia, Singapore, Philippines, Taiwan, Australia and Korea have been collected.

The main structure of most legal frameworks collected here consists of :

- declaration of environmental policy
- construction and organization of administration
- power and functions of administration
- duties and responsibilities of businesses, individuals, communities and governments
- rights and duties of citizens
- emission standards for hazardous substances and toxic waste related to living environments and human health
- solid waste disposal and noise control guidelines
- prohibited acts and penalties
- principle of pollution prevention and polluter accountability
- principle of report, registration, permission and remediation
- marine pollution control
- radiation protection
- investigation duties on environmental pollution of government
- governmental duties on dissemination of knowledge and information on environmental preservation
- promotion of environmental science and technology
- installation and management of pollution prevention facilities
- duties of preparation of statements of environmental impact
- mediation of disputes and relief of damage

There is no country in which the legal framework integrates the idea of sustainable development as a means to keep the balance between the environment and the economy.
Environmental regulation must state that the activities of business, individuals, communities and government must be consistent with the philosophy of sustainable development.

Most of the legal frameworks studied here do not clear the following items:

- local emission standards to meet the international level
- governmental parties must clearly define their responsibilities for protection and demolition of the ecological system
- definition of responsibility for non-point source pollution
- legal system for pursuing the source of pollution
- import/export ban regulation for environmentally harmful articles

The following new concepts and strategies may be integrated in future frameworks of environmental legislation to attain sustainable development.

- adoption of the philosophy of zero discharge for the control of toxic substances
- adoption of clean production technology for preventing pollution prior its generation
- long term monitoring of effluents and discharges
- virtual elimination of non-conventional toxic substances
- adoption of limits on emission parameters based on the BAT(Best Available Technology)
- need for risk assessment
- adoption of total loading control of pollutants
- legal system for environmental auditing

Annex 1

COUNTRY	ADDRESS	
	ADDRESS 1	ADDRESS 2
INDONESIA	DR. SUHENDRO NOTOWIDJOJO BUDIDHARMA JAKARTA, P.T. Wisma Argo Manunggal 9th Fl., Jl. Jend. Gatot Subroto Kav. 22, Jakarta 12930 Indonesia	KRAKATAU STEEL, P.T. Wisma Baja Jl. Gatot Subroto Kav. 54, Jakarta Selatan Indonesia
MALAYSIA	DATO'SOONG SIEW HOONG MALAYSIAN IRON & STEEL FEDERATION 6th floor, Wisma MCIS (Secondary Tower Block), Jalan Barat 46200 Petaling Jaya, Selangor D.E. Malaysia	MALAYAWATA STEEL BERHAD P.O. Box 60 12700 Butterworth Penang Malaysia
PHILIPPINES	MR. ROLANDO JAURIGUE PHILIPPINES STEEL COATING CORP. Philsteel Tower 140 Amorsolo St., Legaspi Village Makti, Metro Manila 1227 Philippines	
SINGAPORE	MR. ANG CHEOK SAI NATSTEEL LTD. 22 Tanjong Kling Road Jurong Town 2262 Singapore	NATSTEEL LTD. 22 Tanjong Kling Road Jurong Town 2262 Singapore
AUSTRALIA	MR. EARLE J.S. HO TUNG HO ENTERPRISE CORP. 6th floor, Chang An East Road Section 1 Taipei 10404 Taiwan	CHINA STEEL CORPORATION Lin Hai Industrial District P.O. Box 47 - 29 Hsio Kang Kaohsiung 81233 Taiwan
THAILAND	MR. VISITH NOIPHAN MINISTRY OF INDUSTRY Department of Mineral Resource Rama VI Rd., Phayathai Bangkok 10400 Thailand	SIAM IRON AND STEEL CO., LTD., THE 1 Siam Cement Rd., Bangsue Bangkok 10800 Thailand
AUSTRALIA	MR. HUGH TREWARTHA 45, Banggalay Avenue Frankston Victoria 3199 Australia	BROKEN HILL PROPRIETARY CO. LTD., THE BHP House 140 William Street Melbourne Victoria 3000 Australia
JAPAN	MR. SCAHIO HATORI c/o NKK Corporation 1-2-2 Marunouchi Chiyoda-ku Tokyo 100 Japan	KAWASAKI STEEL COPORATION Hibiya Kokusai Bldg 2-3 Uchi-Saiwaicho, 2-Chome Chiyoda-ku, Tokyo 100 Japan

Annex 2

1. Legal Framework

- Environmental related acts in Korea

Acts	Principal Contents	Establi-shment	Relation to Iron & Steel Work	Remarks
Basic Environmental Policy Act	· Environmetal preservation planning · Legislative and financial activities · Preservation of natural environment · Environmetal impact assessment · Mediation of dispute	'90.8.1	0	highest position law
Environmental Pollution Demage Dispute Adjustment Act	· Committee for environmental pollution demage dispute adjustment · Negotiation of dispute	'90.8.1	0	
Atmospheric Environment Preservation Act	· Emission regulation of air pollutants from industry, living environment and automobiles · Air pollution control business	'90.8.1.	0	
Water Environment Preservation Act	· Effluent regulation of wastewater · Final wastewater treatment plant · Water quality preservation of public water-way and specific lakes and marshes · Water pollution control business	'90.8.1	0	
Noise & Vibration Regulation Act	· Regulation for noise and vibration from industrial plant, construction, traffic, living activities and airplane	'90.8.1	0	

Acts	Principal Contents	Establi-shment	Relation to iron & Steel Work	Remarks
Noxious Chemical Substance Act	· Toxicity test of chemical substances · Registration of hazardous material business · Management of hazardous material	'90.8.1	0	
Waste Control Act	· Regulation of waste treatment · Waste generation restraint and recycling · Guidance and supervision of waste treatment business	'86.12.31 '91.3.8 amendment	0	
Synthetic Resin Waste Disposal Business Act	· Korea Resource Recovery Corp. · Expenditure charging	'79.12.28 '91.3.8 amendment	X	
Act Regulating to Treatment of Sewage, Excreta and Livestock Wastewater	· Regulation on treatment of sewage, excreta, and livestock wastewater · Permission of excreta related business	'91.3.8	△	
Marine Poliution Control Act	· Regulation of oil and waste from ship and marine facility · Activity for marine poliution preservation	'77.12.31 '91.3.8 amendment	0	
Act of Control on the Production, etc. of Specified Substance for the Protection of Ozone Layer	· Regulation on manufacture and use of specified substances	'91.1.14	X	
Special Measure Act Relating to Purnishment of Environmental Offence	· Purnishment regulation on actitivities which cause hazardous effects on human health	'91.5.31	△	

2. Basic Criteria of Environmental Regulations

- In case of water pollution, the basic scientific criteria of the regulation limit can be helpful for the comparison of the data

- In case of air pollution, the reguiation method is based on facility, region and fuel. In some countries, it is not specified.

Pollutant	Indivisual Facility is Regulated	Regulated in Regional Basis	Regulated in Regional Basis	Not Specified
SOx	Korea Singapore Malaysia Thailand Australia	Japan	Taiwan	Indonesia Philippines
NOx	Korea Japan Singapore Malaysia Thailand		Japan Taiwan	Taiwan[1)] Indonesia Australia Philippines
Dust	Korea Japan Malaysia Thailand Australia		Japan Thailand	Taiwan[2)] Singapore Indonesia

1) Taiwan differently regulates NOx in exist and new facilities.
2) Taiwan regulates dust in the basis of facility capacity.

3. Comparison of Standards of Each Countries

3.1. Water Pollution

(1) Basic items : COD BOD, SS, TDS, pH, temperature, n-hexane, color, coliform

Thailand, Australia : regulate only BOD instead of COD
- TDS : is regulated only in Singapore and Indonesia
- Color : in Korea and Singapore
- Coliform : in Korea, Japan and Australia
- Taiwan, Korea : pre-notified the standards (to '98 and '96)

(2) Anions and/or its compounds

- Australia : on the whole, has ten times stricter regulation than other countries
- Cl^-, SO_4^{2-}, S^{2-} : don't regulate these items in most countires
  --> if these pollutants are in wastewater, then it is impossible to recycle wastewater because these pollutants are very corrosive
- NH_3, NO_2^-, NO_3^{2-}, PO_4^{3-} : are regulated only in Japan, Taiwan, Indonesia and Australia
  --> will be regulated in the region that nutrification may be occurred
- CN : in all countries

(3) Metals (Cations)

- Regulations of Thailand and Australia are stricter than other countries
  - 2-10 times
  - Pb and Mn : 20-200 times stricter in Australia
- Ba, Be, Ca, Mg : only in Singapore

(4) Toxic organic pollutants

- Organic phosphorus : only in Korea, Japan and Taiwan
- TCE(trichloroethylene), PCE(perchloroethylene)
  - only in Korea, Japan and Malaysia
  - will be regulated in other countries soon
  - may be discharged from rolling process of iron & steel works (cleaning agent)

3.2. Air Pollution

(1) Gaseous pollutants

- NH_3 : much more strictly regulated in Thailand and Indonesia than Korea and Philippines
- CS_2, formaldehyde : more strictly regulated in Korea than Philippines
- HCN, Br, bezene, phenol : only in Korea and Japan
  HCl, Cl_2 : most strictly regulated in Korea

(2) Particulates

- In metals, Cr, Ni and Zn are regulated in a few countries while Cd and Pb are regulated in all countries
- Fugitive dust : only in Korea and Taiwan
- Smoke : 1° in Taiwan, Malaysia and Australia
  2° in Korea, Singapore and Thailand
  not regulted in Japan, Indonesia and Philippines

* We have to prepare for CO_2 regulation.
  CO_2 primary sources in iron & steel works
  - coke plant
  - blast furnace
  - power plant

1. Water Pollution

Pollutants (unit)	EMISSION STANDARD							
	Korea	Japan	Taiwan	Singapore	Malaysia	Thailand	Indonesia	Australia
COD (mg/L)	100	100*(160)**	200	100	100		300	
BOD (")	100	100 (160)	100	50	50	20 - 60	150	20
SS (")	100	100 (160)	100	50	100	30(DR***=1/8-1/150) 60(DR=1/151-1/300) 100(DR=1/301-1/500)		
TDS (")				2000			400	
pH	5.8 - 8.6	5.8 - 8.6	6.0 - 9.0	6.0 - 9.0	5.5 - 9.0	5.0 - 9.0	6.0-9.0	6.5 - 8.5
Temperature(℃)	40	40	35	45	40	40	40	
n-Hexane Extract (mg/L)				10 (grease & oil)		5 (grease & oil)		
· Mineral oil	5	5	10		10			
· Others	30	30	30					
Phenol (")	5	5	5	0.2	1.0	1.0	1	0.001
Cyanide (")	1	1	1	0.1	0.10	0.2		0.05
Fluoride (")	15	15	15				3	1.5
Chloride (")				600				250
Free Chlorine (")				1	2.0		2	

* Data submitted by Kawasaki Steel

** Data submitted by the Japan Iron and Steel Federation

Pollutants (unit)	EMISSION STANDARD							
	Korea	Japan	T. iwan	Singapore	Malaysia	Thailand	Indonesia	Australia
Sulfate (mg/L)				500				250
Sulfide (")				0.2(as sulfur)	0.5		0.1	
Organic P (")	1	1						
PCB (")	0.003	0.003						
Color (degree)	300			7 Lovlbond				
Colifonn (No./mL)	3000	3000						2
Total Cr (mg/L)	2	2		1		2.0	2	
Cr^{+3} (")					1.0			
Cr^{+6} (")	0.5	0.5			0.05	0.5	0.5	0.05
Fe (")	10	10		20	5.0		10	0.3
Cu (")	3	3		0.1	1.0	1.0	3	1.0
Cd (")	0.1	0.1		0.1	0.02	0.03	0.1	0.01
Hg (")	0.005	0.005		0.05	0.05	0.005	0.005	0.001
As (")	0.5	0.5		1	0.1	0.25	0.5	0.05
Pb (")	1	1		0.1	0.1	0.2	1	0.05
Mn (")	10	10		5	1.0	5	5	0.05

Pollutants (unit)	EMISSION STANDARD							
	Korea	Japan	Taiwan	Singarpore	Malaysia	Thailand	Indonesia	Australia
Ni (mg/L)				1	1.0		0.5	
Sn (")				0.5	1.0		3	
Zn (")				1	1.0			5.0
Ba (")				5			3	1.0
Be (")				0.5				
Ca (")				200				
Mg (")				200				
B (")				5	4.0			1.0
Metals in Total (")				1				
NH_3 (")							5	0.5
NO_3 (")							30	10
NO_2 (")							3	10
PO_4 (")				5				
Trichloroethylene(")	0.3(after '93.1)				0.3			
Tetrachloro-ethylene (")	0.1(")				0.1			
Detergents (")				15				

2. Air Pollution

2.1. Gaseous Pollutants

Pollutants	EMISSION STANDARD							
	Korea		Japan		Taiwan		Singapore	
	STD (ppm)	Facilities	STD (ppm)	Facilities	STD (ppm)	Facilities	STD (g/Nm3)	Facilities
Sulfur Oxide (as SO_2)	1200(4) 650 300(7) 300(12) 800	power plant blast furnace coke plant others	K*= 3.0-17.5 1.17-2.34	defined by regions new facilities	750 (6)	1.5% S in fuel	3.0 (as SO3) 0.1	sulfuric acid plants others
Nitrogen Oxide (as NO_2)	250(4) 200	power plant others	60-150 (5) 200-350 (6) 130-180 (4) 100(15) 220(15) 170(7) 100-180(11) 250(15) 230(16)	boiler(gas)** " (coal)** " (liquid)** blast furnace, basic oxygen converter, open furnace sinter plant coke oven heating furnace** lime cucination furnace drying furnace	300 (6) 400 (6) 500 (6)	boiler(gas) " (liquid) " (solid)	2.0 1.0	nitric acid plant others
Ammonia	200	all						
Carbon Disulfide	30	all						
Form-aldehyde	20	all						

*$q = K \times 10^3 \times He^2$, q =allowable limit of SOx (Nm3/h), He=effective stack height (m) :different according to regions

Pollutants	EMISSION STANDARD							
	Malaysia		Thailand		Indonesia		Australia	
	STD (g/Nm3)	Facilities	STD (ppm)	Facilities	STD (g/Nm3)	Facilities	STD (mg/Nm3)	Facilities
Sulfur Oxide (as SO_2)	3.5 (as SO3) 0.2	sulfuric acid plants others	500 400 700	sulfuric acid plants others in Bangkok others in other area	0.25	all	100 (as SO3)	all
Nitrogen Oxide (as NO_2)	equiv. of 1.7 g/Nm3 of SO3	all	487 974	combustion source nitric acid production and others	4.6	all	2500	all
Ammonia			25	gas plant				
Carbon Disulfide								
Form-aldehyde								

Pollutants	EMISSION STANDARD							
	Korea		Japan		Taiwan		Singapore	
	STD (ppm)	Facilities	STD (mg/Nm3)	Facilities	STD (ppm)	Facilities	STD (g/Nm3)	Facilities
Hydrogen Sulfide	10 15	desulfurizer others			100	all	5 ppm	all
Hydrogen Cyanide	10	all						
Fluoride Compound	5	all	1.0-20	all	20	all	0.1	process with fluorine, hydrofluoric acid or inorganic fluorine
Bromide Compound	5	all						
Benzene Compound	50	all						
Phenol Compound	10	all						
Hydrogen Chloride	10 80 10	acid treatment incinerator others	700 80	waste incinerator others	80	all	0.2	all
Chlorine			30	all			0.1	all
Mercury Compound	5	all					0.01	all
Arsenic Compound	3	all					0.02	all

Pollutants	EMISSION STANDARD							
	Malaysia		Thailand		Indonesia		Australia	
	STD (g/Nm3)	Facilities	STD (mg/Nm3)	Facilities	STD (g/Nm3)	Facilities	STD (mg/Nm3)	Facilities
Hydrogen Sulfide	5	all	100 ppm	all	5 ppm	all	5	all
Hydrogen Cyanide							100	all
Fluoride Compound					0.02	all		
Bromide Compound								
Benzene Compound								
Phenol Compound								
Hydrogen Chloride	0.4	all	200	all	0.5	all		
Chlorine					0.25	all		
Mercury Compound	0.01	all	0.1	all	0.01	all	3	all
Arsenic Compound	0.025	all	20	all	0.025	all	10	all

2.2. Particulates

Pollutants	EMISSION STANDARD							
	Korea		Japan		Taiwan		Singapore	
	STD (mg/Sm3)	Facilities	STD (mg/Nm3)	Facilities	STD (mg/Nm3)	Facilities	STD (mg/Nm3)	Facilities
Dust	150(4) 100(2) 30 70 200 100(11) 100(7) 120	power plant incinerator electric arc furnace blast furnace sintering furnace heating furnace coke plant others	50-100 (5) 50-300 (4) 100-300 (6) 150 50 100 100-200 (11) 300(15) 500(16) 100 150(7)	boiler(gas)* " (liquid)* " (solid)* sinter plant blast furnace basic oxygen converter heating furnace* lime calcination furnace drying furnace electric furnace coke oven	189-500 95-176 50-39	gas flowrate(Nm3.min)= 30 - 1000 1000-10000 10000--70000 and over	200 (12% CO2)	all
Cadmium Compound	1.0	all	1.0	all	1	all	10	all
Lead Compound	20 10	blast furnace others	10-30	all	10	all	20	all
Chromium Compound	1.0	all						
Copper Compound	10	all					20	all

*Different according to capacities

Pollutants	EMISSION STANDARD							
	Malaysia		Thailand		Indonesia		Australia	
	STD (mg/Nm3)	Facilities	STD (mg/Nm3)	Facilities	STD (mg/Nm3)	Facilities	STD (mg/Nm3)	Facilities
Dust	20 (6) 400	heating furnace others	300 (6) 500 (6) 400 (6) 400 (6) 400 500	boiler (heavy oil) boiler(coal) cement plant & calcium carbide plant steel manufacturing rock & gravel aggregate plant others	500	all	250 400 200 250	power plant incinerator and boilers electric furnace other
Cadmium Compound	15	all	1.0	all	15	all	3	all
Lead Compound	25	all	30	all	25	all	10	all
Chromium Compound								
Copper Compound	0.1	all	20	all				

(): Oxygen Content (%)

Pollutants	EMISSION STANDARD							
	Korea		Japan		Taiwan		Singapore	
	STD (mg/Sm3)	Facilities	STD (mg/Nm3)	Facilities	STD (mg/Nm3)	Facilities	STD (mg/Nm3)	Facilities
Nickel Compound	20	all						
Zinc Compound	30 10	electric arc furnace & incinerator others						
Antimony Compound								
Fugitive Dust	1.5	all			1			
Smoke* (degree)	2	all			1		2	all
Noise(dB)	70 65	day night	50-70 45-65 40-55	day morning & evening night	80 70	day night		

* smoke: Degree of Ringelmann Smoke Chart

Pollutants	EMISSION STANDARD							
	Malaysia		Thailand		Indonesia		Australia	
	STD (mg/Nm3)	Facilities	STD (mg/Nm3)	Facilities	STD (mg/Nm3)	Facilities	STD (mg/Nm3)	Facilities
Nickel Compound								
Zinc Compound	100	all			100	all		
Antimony Compound	25	all			25	all	10	all
Fugitive Dust								
Smoke (degree)	1	all	40%	boiler & furnace			2	all
Noise(dB)	85	all	80	all				