February 2,1996
Mitsubishi Chemical Corporation

Environmental control regulations in Japan

1 Basic law and individual laws

Basic law for environment (revise " Basic law for environment pollution control", 1993)

(Laws concerning to the application for industries)

- ① **Air pollution control law**
  - ①' Electric power industry law
- ② **Water pollution control law**
  - ②' Law concerning special measures for conservation of "Seto inland sea"
  - ②" Law concerning special measures for conservation of Lake water quality
  - ②"' Law concerning to the prevention of marine pollution & marine disaster
- ③ **Noise regulation law**
- ④ **Vibration reguration law**
- ⑤ **Offensive odor control law**
- ⑥ **Waste disposal and public cleaning law**
- ⑦ **Another laws**
  - ⑦' Factory location regulation law
  - ⑦" Industrial relocation promotion law
  - ⑦"' Pollution-related health damage compensation law
  - ⑦"" Law concerning the improvement of pollution prevent system in specified factories

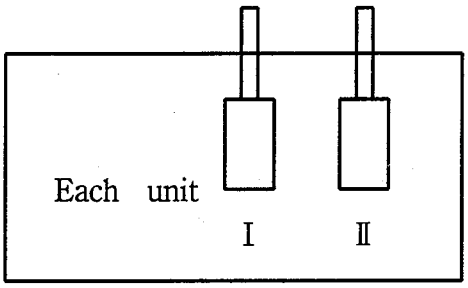
(1) Air Pollution control law

Regulation system

NAAQs (SO_2, NO_2, SPM, CO, Photochemical oxidants)

	(Long term targets)	(Short term targets)
SO_2:	Daily average of hourly values ≦ 0.04 ppm	／ Hourly value ≦ 0.1 ppm
NO_2:	Daily average of hourly values ≦ 0.04～0.06 ppm	
CO :	Daily average of hourly values ≦ 10 ppm	／ Hourly value ≦ 8 ppm
SPM:	Daily average of hourly values ≦ 0.10 mg/m^3	／ Hourly value ≦ 0.20 mg/m^3
Ph.O:	Hourly values ≦ 0.06 ppm	

A Emission concentration limit values (at each emission stack) [1)]
B Total emission amount limit values of SO_x,No_x
(only for specified facilities at some regions) [2)]



(Individual facility)

[1)] **A Items concerting to the emission concentration limit value**

- **SO_x*,NO_x,Dust,**
- Harmful Substances **(Cd & its compounds, Pb & its compounds, & Cl_2,HCl,F_2,HF,SiF,Asbestus)**

* **SO_x : " K value control "**
: applied to calculate the sulfer oxides volume by knowing the stack height (3.0～17.5 :16 rank)

Q (Nm^3/h) = $\mathbf{K \times He^2 \times 10^{-3}}$ (He : effective stack height)

* **SO_x : Regulation on fuel content of S for specific urban area**
(sulfer content : 0.5～1.2%)

[2)] **B Items concerning to the total emission amount limit value**
(SO_x: for some industrialized area : 24 areas)
(NO_x:for some urban area : 3 areas)

Q (Nm^3/h) = aW^b (W: fuel consumptions at each facility : kl/h)
(coefficients a: 1~5, b : 0.8~0.9)

A Detailed Items concerning to the emission concentration limit value of effluent gas (describe only about the case of new plant installation)

① **Dust**

Equipments	Effluent gas volume (Nm^3/h)	Regulation value (g/Nm^3)	Oxigen concentration * correction of effluent gas
1 Boiler			
(fuel:only gas)	≧ 40,000	0.03	5
	< 40,000	0.05	5
(fuel:only oil	≧200,000	0.04	4
or oil+gas)	40,000~200,000	0.05	4
	10,000~ 40,000	0.15	4
	< 10,000	0.15	4
(fuel:only coal)	≧200,000	0.05	6
	40,000~200,000	0.10	6
	< 40,000	0.15	6
(fuel:the other)	≧ 40,000	0.15	6
	< 40,000	0.20	6
2 Gas generation furnace	———	0.03	7
7 Petrochemical	≧ 40,000	0.05	6
furnace	< 40,000	0.20	6
10 Reaction furnace	≧ 40,000	0.08	6
	> 40,000	0.10	6
13 Waste Incinerator			
(continuous)	≧ 40,000	0.08	12
	> 40,000	0.15	12
(the other)	———	0.25	12

② **Harmful substances**

Substance	Regulation value (mg/Nm^3)	Substance	Regulation value (mg/Nm^3)
Cadmium	1.0	**F_2,HF, SiF**	10
Cl_2	30	**Pb**	10
HCl	80		

③ **NO_x** (describe only about furnace, incinerator)

Equipments	Effluent gas volume (Nm^3/h)	Regulation value (ppm)	Oxigen concentration * correction of effluent gas
Gas generation furnace	———	150	7
Reaction furnace	———	150	7
Waste Incinerator (continuous)		450	12

(2) Water Pollution control law

Regulation system

① Environmental Quality standards concerning to protect the human health

Cadmium	:0.01 mg/l	**Dichloro-methane**	:0.02 mg/l
Total CN	:0.01 mg/l	**Tetrachloro-methane**	:0.002 mg/l
Total mercury	:Non detected	**1,2-dichloro-ethane**	:0.004 mg/l
Alkyl mercury	:Non detected	**1,1-dichloro-ethylene**	:0.02 mg/l
Lead	:0.01 mg/l	**1,1,1-trichloro-ethane**	:1 mg/l
Chromium^{+6}	:0.05 mg/l	**cis-1,2-dichloro-ethylene**	:0.04 mg/l
Arsenic	:0.01 mg/l	**1,1,2-trichloro-ethane**	:0.006 mg/l
PCB	:Non detected	**Tri-chloro-ethylene**	:0.03 mg/l
		Tetra-chloro-ethlene	:0.01 mg/l
		1,3-dichloro-propene	:0.01 mg/l
		Benzene	:0.01 mg/l
		Selenium	:0.01 mg/l

② Environmental quality standards concerning to preserve the living environment

Sea: (cancel the case of river, lake)

Category	purpose of utilization	**pH**	**COD_{Mn}**	**DO**	**N-hexane -extracts**
A	Fishery (type 1)	7.8	2 mg/l	7.5 mg/l	Non detected
	Water supply	-8.3			
	Bathing				
	Natural eivironment conservation				
B	Fishery (type 2)	7.8	3 mg/l	5 mg/l	Non detected
	Industrial water	-8.3			
C	Environmental conservation	7.0 -8.3	8 mg/l	2 mg/l	————

②' Environmental quality standards concerning to prevent the eutrophication

(only apply to the specified closed sea area)

Sea: (cancel the case of river, lake)

Category	purpose of utilization	**Total nitrogen**	**Total phosphorous**
I	Environmental conservation	0.2 mg/l	0.02 mg/l
II	Fishery (type 1) Bathing	0.3 mg/l	0.03 mg/l
III	Fishery (type 2)	0.6 mg/l	0.05 mg/l
IV	Fishery (type 3) Industrial Water Conservation of the living environment	1 mg/l	0.09 mg/l

④ **Emission concentration limit value** (apply to each effluent water outlet of facilities)

(a) **Regulation values regarding to protect the human health**

Items	regulation value (mg/l)	Items	regulation value (mg/l)
Cadmium	0.1	**Total CN**	1
Organic phosphate	1	**Lead & its compounds**	0.1
Chromium^{+6}	0.5	**Arsenic & its compounds**	0.1
Total mercury	0.005	**Alkyl mercury**	Non detected
PCB	0.003	**Tri-chloro-ethylene**	0.3
Tetra-chloro-ethylene	0.1	**Tetrachloro-methane**	0.02
Dichloro-methane	0.2	**1,2-dichloro-ethane**	0.04
1,1,1-tri-chloro-ethane	3.0	**1,1,2-tri-chloro-ethane**	0.06
1,1-dichloro-ethylene	0.2	**cis-1,2-dichloro-ethylene**	0.4
1,3-dichloro-propene	0.02	**Benzene**	0.1
Selenium	0.1		

1) According to the circumstance, each local Government can set another more strict values instead of these upper values.

(b) **Regulation values regarding to preserve the living environment**

Items	Regulation value (unit)		Items	Regulation value (unit)	
pH	———	5.8~8.6	**BOD**	(mg/l)	120
COD_{Mn}	(mg/l)	160	**S S**	(mg/l)	150
N-hexane -extracts	(mg/l)	5	**Fhenols**	(mg/l)	5
Cupper	(mg/l)	3	**Zinc**		
soluble Fe	(mg/l)	10	**Soluble Mn**	(mg/l)	5
Chromium^{+6}	(mg/l)	2	**F_2**	(mg/l)	10
Total nitrogen*	(mg/l)	60	**Total phosphorous***	(mg/l)	8

1) According to the circumstance, each local Government can set another more strict values instead of these upper values. (* adopt only to the closed sea)

⑤ **Total emission amount limit value for each factory at specified closed sea**
(only apply to COD_{Mn})

$$L = \Sigma (C_i \cdot Q_i) \times 10^{-3}$$

L : Total amount regulation value (kg/day)
C_i : Set value of COD for specified of (i) industry (mg/l)
Q_i : Volume of specific effuluent waste water at (i) industry (m^3/day)

(3) Noise regulation law

Regulation system

① Environmantal Quality standards according to the purpose of land use

	Daytime	Morning & Evening	Midnigit
AA (Area necessary to be silent :cf: hospital)	45 phone	40 phone	35 phone
A (Area mainly used for living)	50 phone	45 phone	40 phone
B (Area used for commerce, industry)	60 phone	55 phone	50 phone

* These standards are not applied to the exclusive industrialized area.
* The sets of these standards are executed by local governments.

* Daytime 7:00~20:00, Morning 5:00~7:00
Evening 20:00~22:00 Midnight 22:00~5:00

② Regulation limit values (at the boundary limit of plant site)

· To keep the later limit values ,alweys.

Land use	Daytime	Morning & Evening	Midnigit
Ⅰ (Area necessary to be silent :cf: hospital)	45~50	40~45	40~45 phone
Ⅱ (Area mainly used for living)	50~60	45~50	40~50 phone
Ⅲ (Area used for living, commerce, industry)	60~65	55~65	50~55 phone
Ⅳ (Area mainly used for industry)	65~70	60~70	55~65 phone

(4) Vibration regulation law

① No environmental quality standards

② Regulation limit values (same as Noise regulation law)

(5) Offensive oder control law

① No environmental quality standards

② Regulation limit values

A **Values for the effuluent gas** (Emission concentration regulation : **Cm** ppm)
Chemical substances : 23

B **Total amount emission values for effuluent gas**

Chemical substances : 14

$q=0.108\times He^2\times Cm$

q : Total amount emission volume(Nm^3/h)
He : Effective stack height (m)
Cm : Emission concentration regulation (ppm)

C **Values for the effuluent waste water outlet** (emission concentration limits)

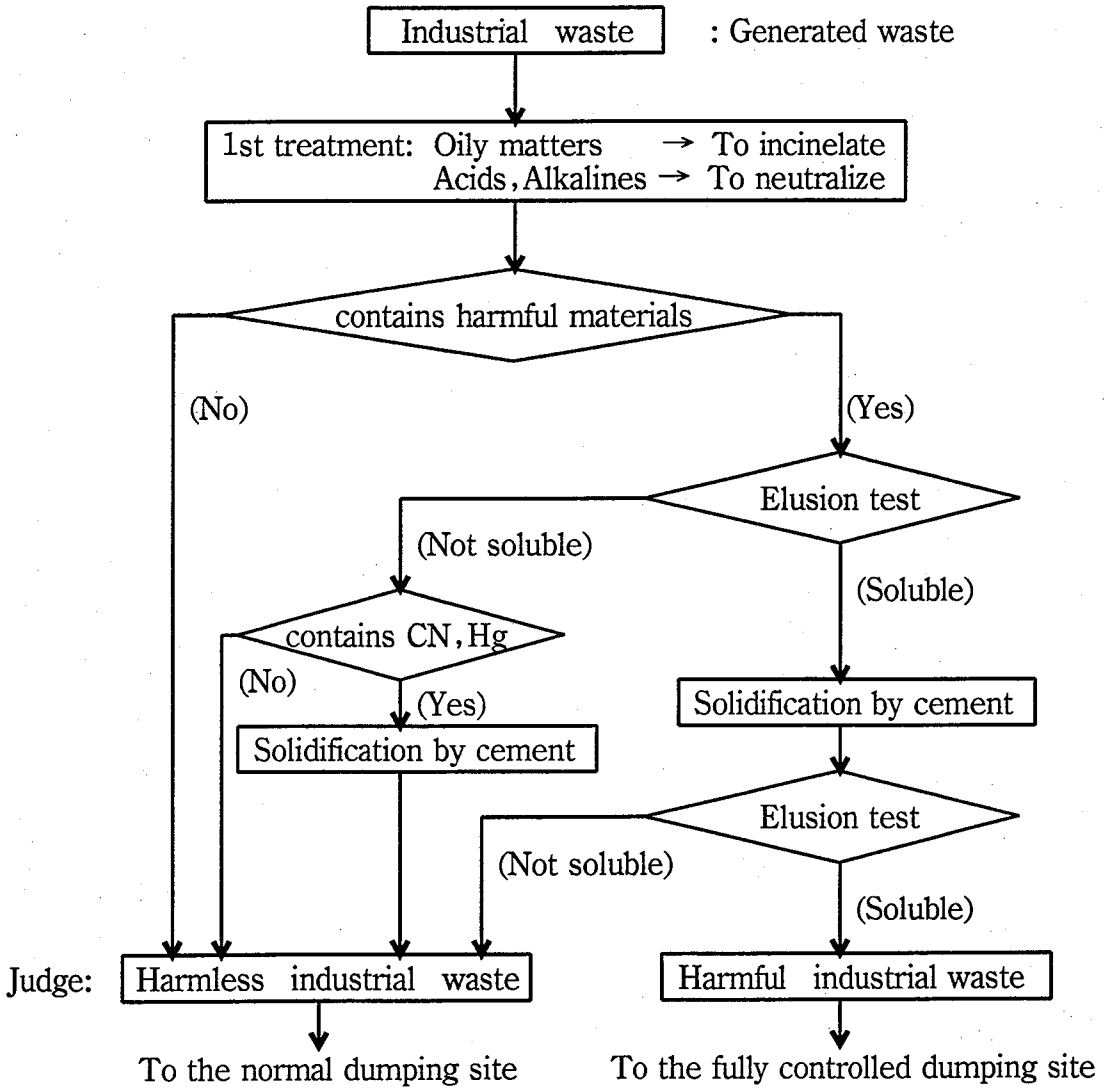
Chemical substances : 4

D **Regulation from the odor strength**

(Only apply to the unsuccessful case by those upper regurations)

(6) Waste disposal and public cleaning law

A **Procedures for dealing with the generated waste**



B **Procedures for testing the "Elusion test"**

① Add 10 parts of pure water to 1 part of waste sample.

② Shake the mixture for 30 minutes.

③ After filtrate the mixtue, the residual mother liquid is tested.
(Elusion test)

④ Analized materials are same as water emission concentration materials.
(See Page 5)
And the standards whether materials are soluble or not are same as those.