

IMnI 30th Annual Conference

Tokyo, June 1st-3rd 2004

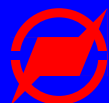
Japanese environmental protection regulations and the related measures taken by us

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Tokushima Plant

Nippon Denko Co.,Ltd.



Introduction

- **Around 1960**

Pollution problems such as smoke, soot & dust, waste water, and industry waste became serious.

1955 Itai-Itai Disease

1956 Minamata Disease

1961 Yotsukaichi Asthma

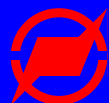
- **Around 1970**

Laws related to the environmental protection established.

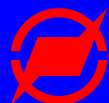
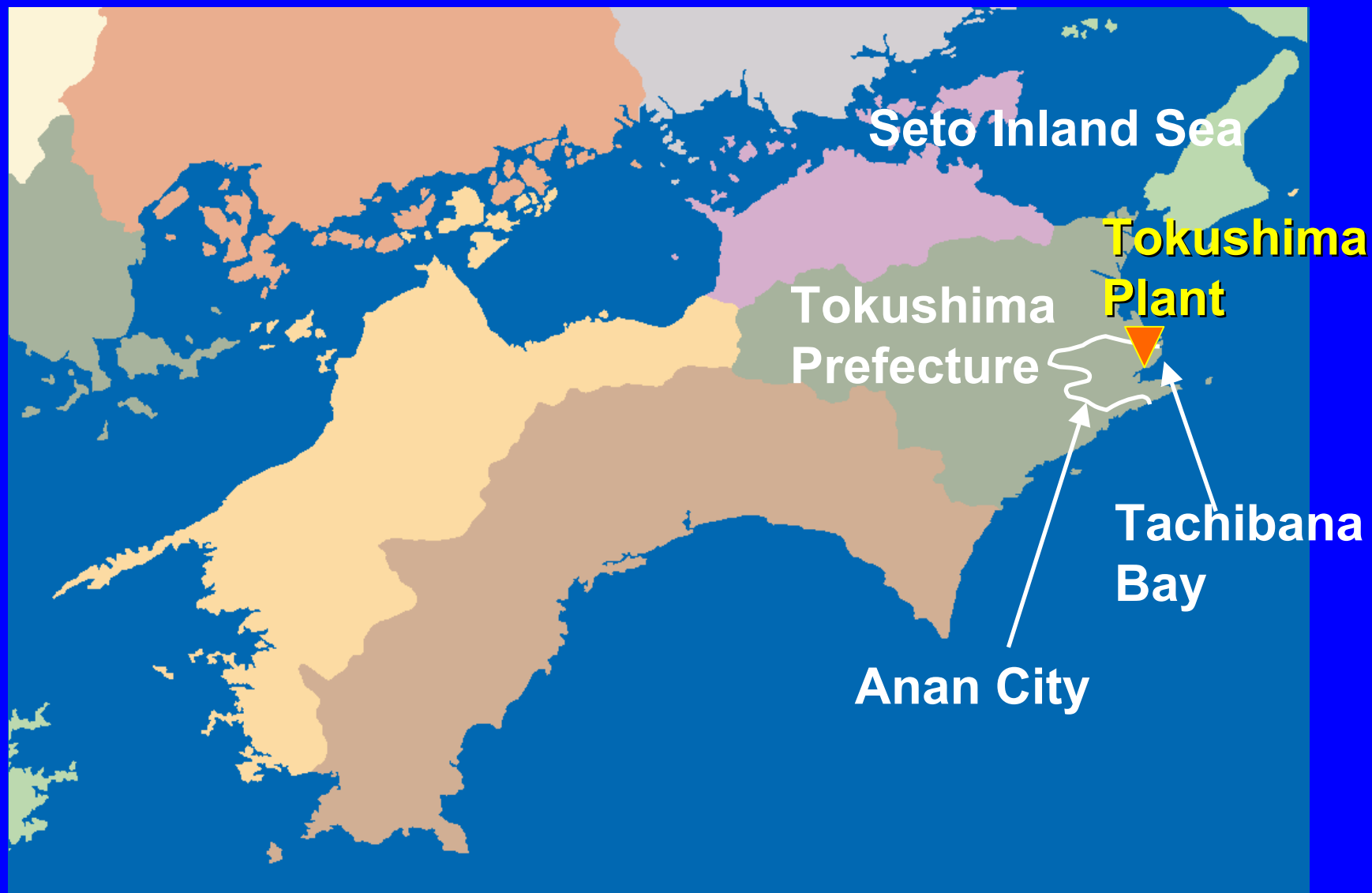
1967 Basic Law for Environmental Pollution

1968~ Laws related to environmental protection

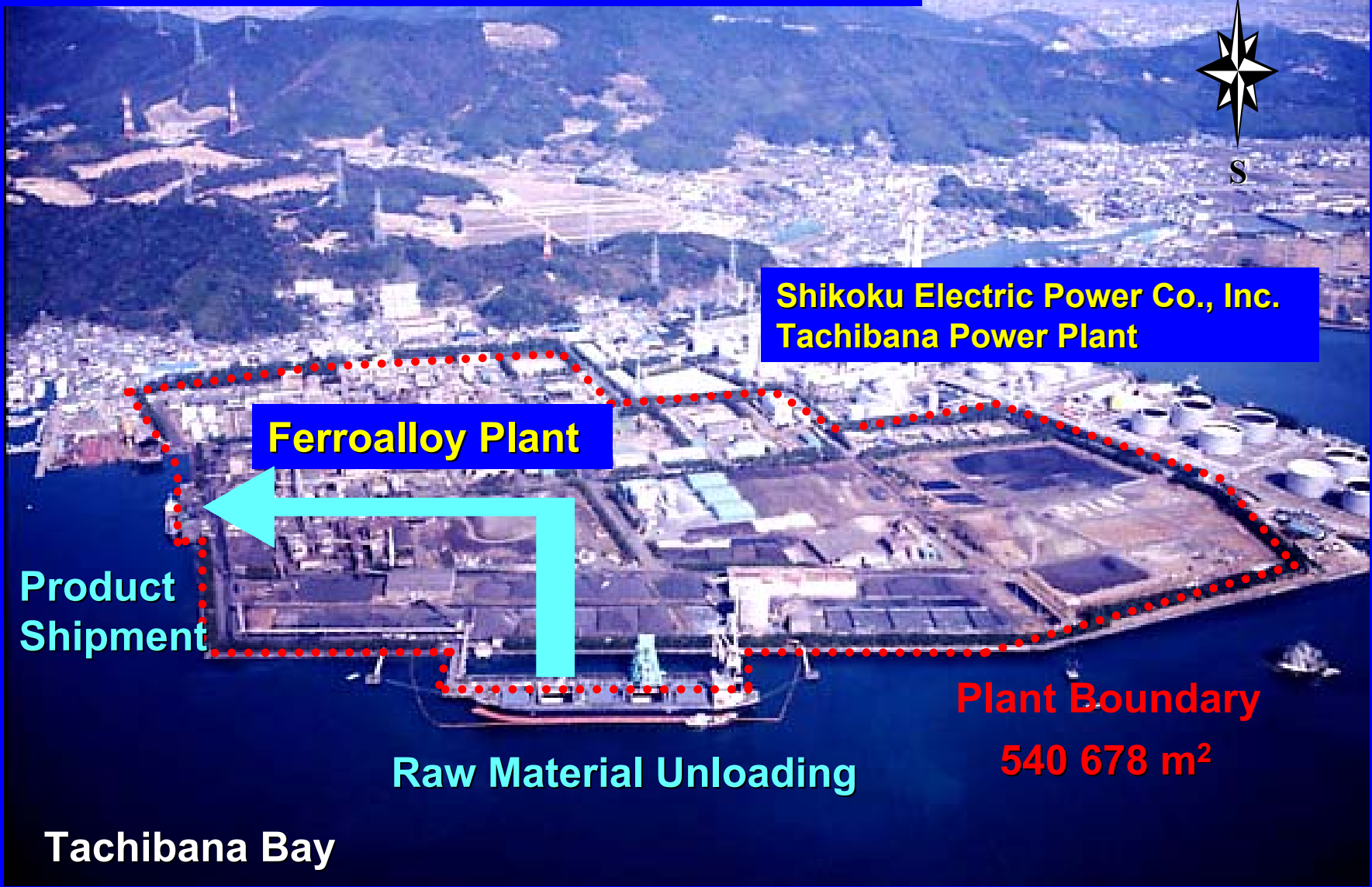
1971 Environment Agency



Location of Tokushima Plant



Panorama of Tokushima Plant



Shikoku Electric Power Co., Inc.
Tachibana Power Plant

Ferroalloy Plant

Product
Shipment

Raw Material Unloading

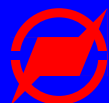
Plant Boundary
540 678 m²

Tachibana Bay



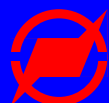
Outline of Japanese Environmental Pollution Control Regulations

Regulation	Proclamation	Principal Controlled Substances
Air Pollution Control Law	1968	SO _x , Soot & Dust, NO _x , ..
Water Pollution Control Law	1970	PH, SS, COD, BOD, ..
Waste Disposal and Public Cleaning Law	1970	Cd, Pb, Hg, ..
Offensive Odor Control Law	1971	NH ₃ , H ₂ S, CH ₃ S, ..
PRTR System MSDS System	1999	Number of Specified Chemical Substances First-Class : 354 Second-Class : 81



Emission Standards at Tokushima Plant

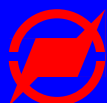
Controlled Substances	Facility	Air Pollution Control Law	Pollution Control Agreement
SOx	Sintering Furnace	22.5 m ³ /h	Total Amount Control 20 m³/h
	No.1 Furnace	21.3 m ³ /h	
	No.2 Furnace	21.3 m ³ /h	
Soot & Dust	Sintering Furnace	0.20 g/m³	0.2 g/m³
	No.1 Furnace	0.15 g/m³	—
	No.2 Furnace	0.15 g/m³	—
NOx	Sintering Furnace	270 ppm	—



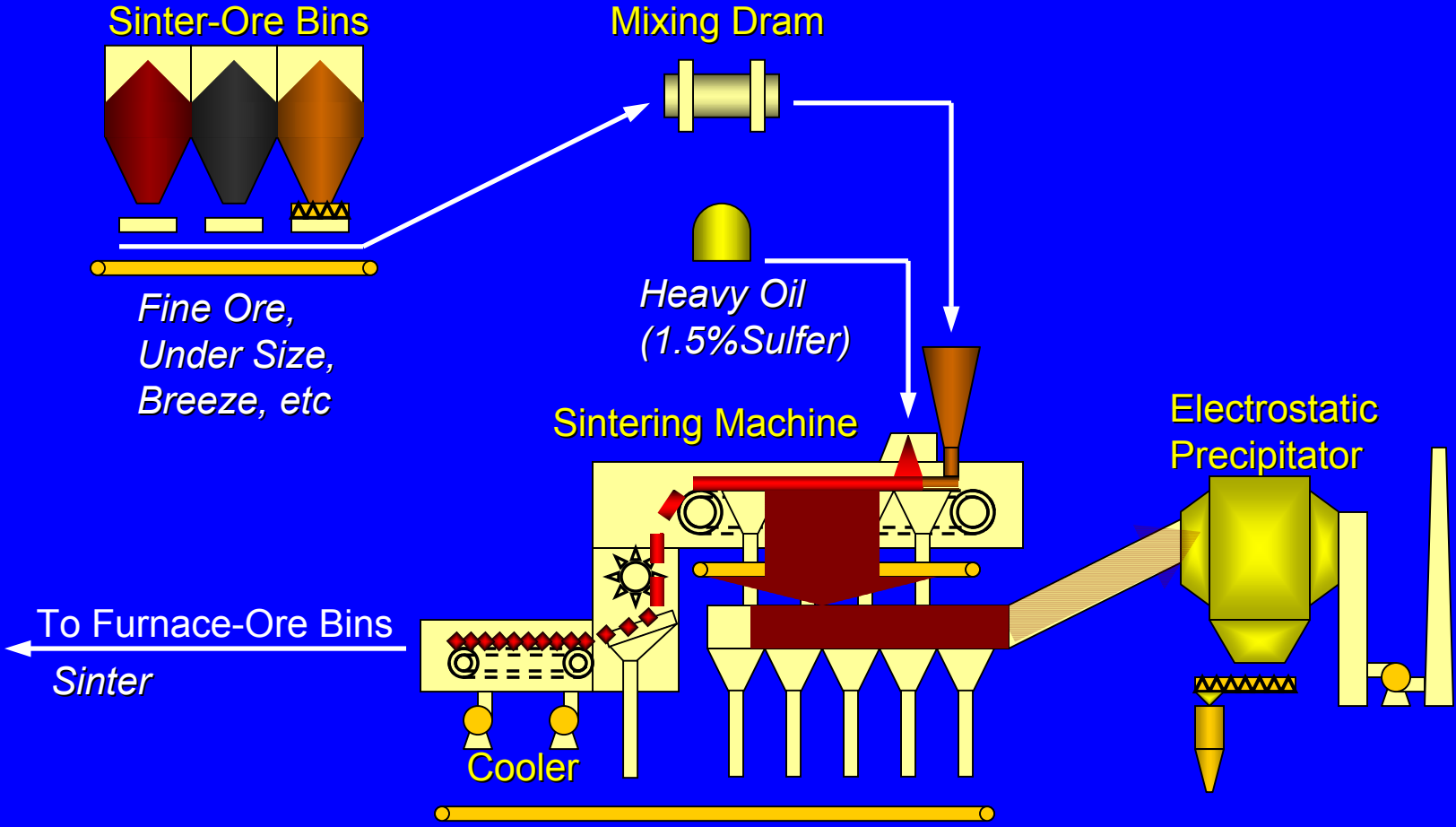
Effluent Standard at Tokushima Plant

One Day Max. Permissible Amount (One Day Ave. Permissible Amount) mg/l

Controlled Substances	Water Pollution Control Law	Local Pollution Control Rules of Tokushima Prefecture
PH	5.0-9.0	—
COD	160 (120)	25 (15)
BOD	160 (120)	25 (15)
SS	200 (150)	60 (50)
Fe	10	—
S-Mn	10	Pollution Control agreement : 5
Zn	5	—



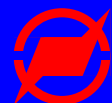
Sintering Process



Electrostatic Precipitator for Sintering Furnace

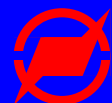
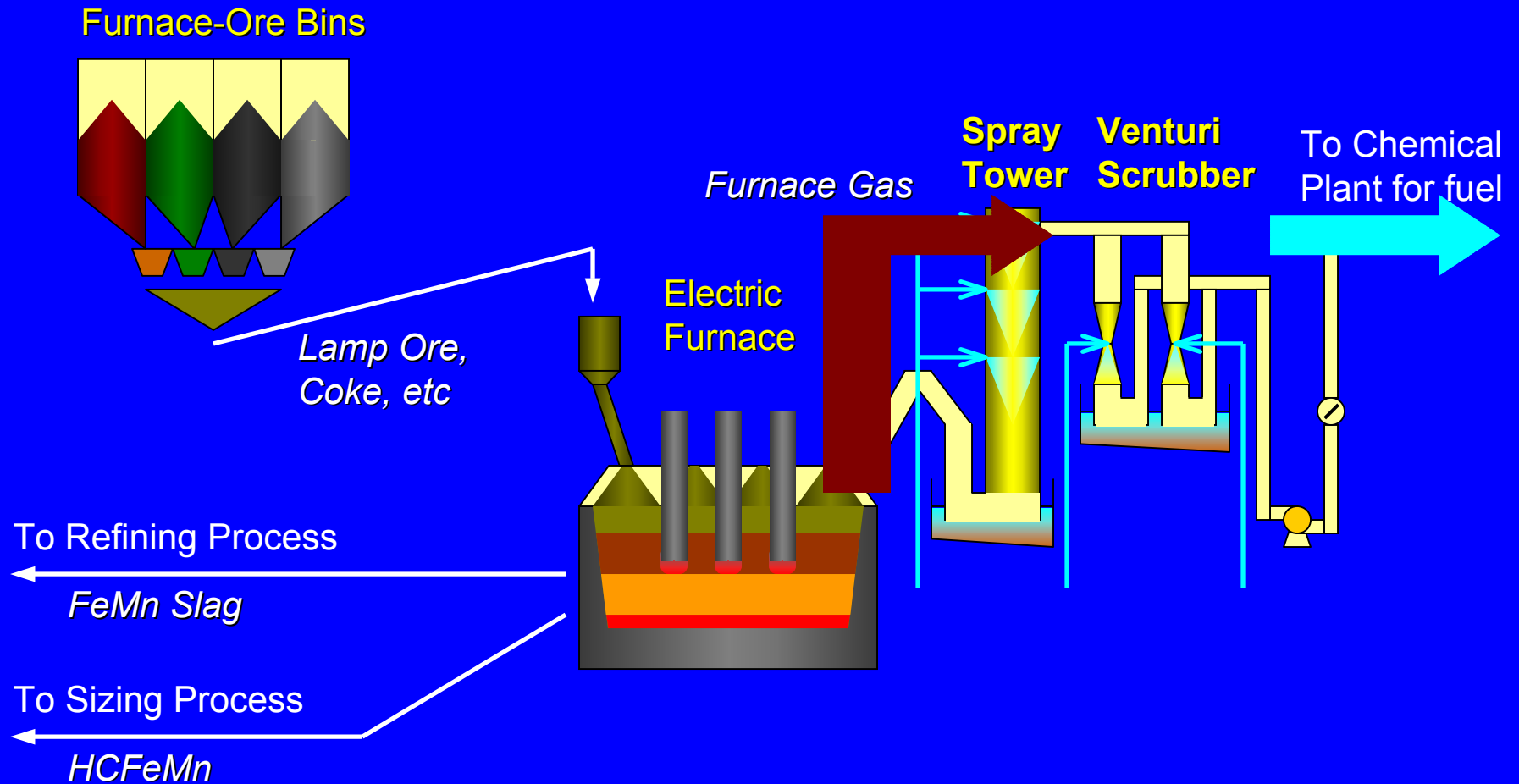


830 m³/min



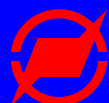
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Smelting Process

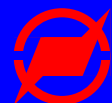
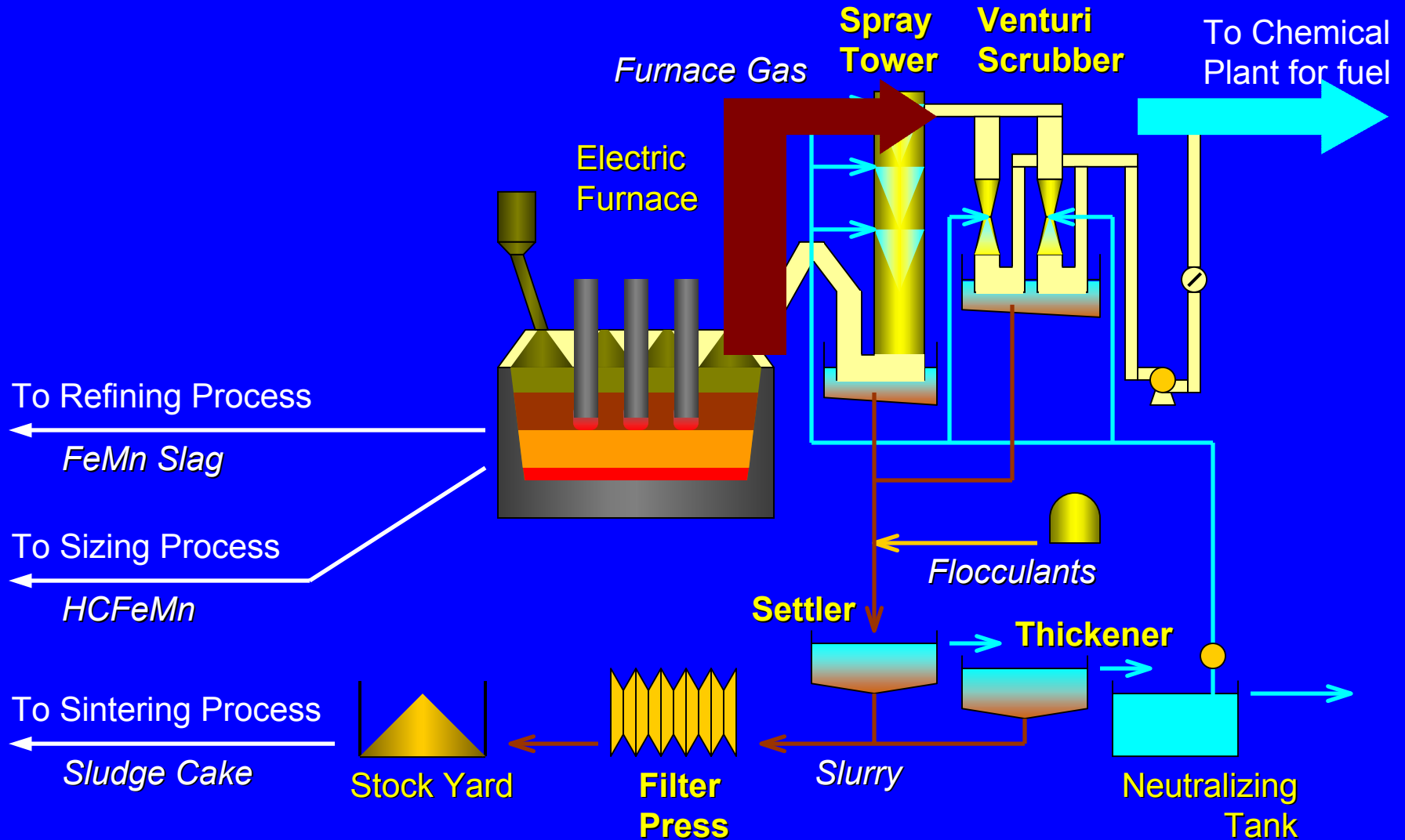


Soot & Dust Emitting Facilities

Facility (Capacity)	Pollution Control Equipment (Capacity)	Controlled Substances	Results of Treatment	Standard Value
Sintering Furnace (350 t/d)	Electrostatic Precipitator (830 m ³ /min)	SOx	6.5 m ³ /h	Total Amount 20 m ³ /h
		Soot & Dust	0.1 g/m ³	0.2 g/m ³
		NOx	82 ppm	270 ppm
No.1 Furnace (36.4 MVA)	Treated by Wet type dust collector	SOx	Treated gas is used for fuel of the kiln in chemical plant.	Total Amount 20 m ³ /h
Soot & Dust		0.2 g/m ³		
No.2 Furnace (40.5 MVA)		SOx		Total Amount 20 m ³ /h
Soot & Dust		0.2 g/m ³		



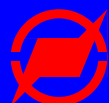
Gas Treatment & Water Treatment



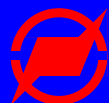
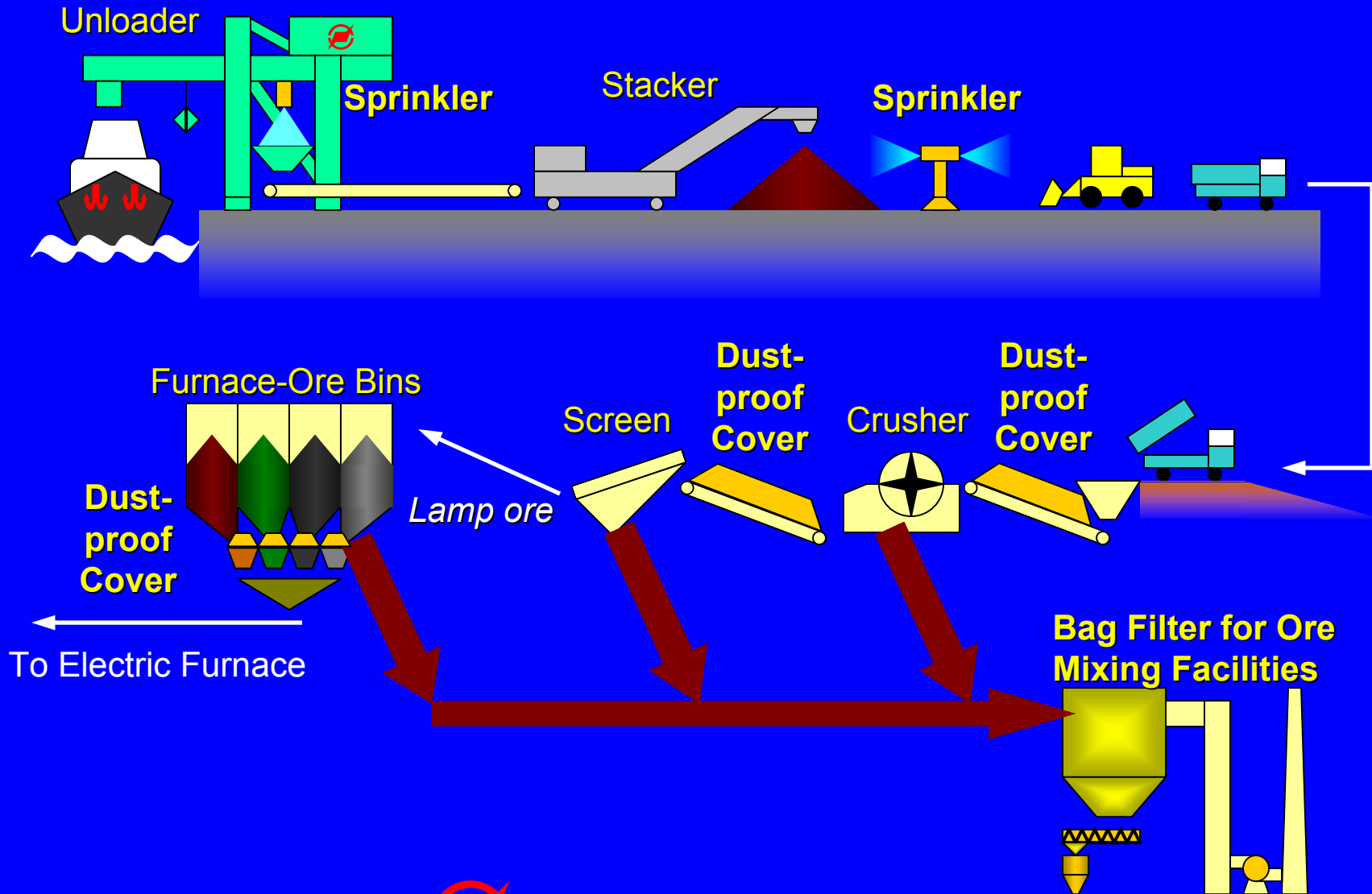
Facilities Related to Water Treatment

One Day Max. Permissible Amount (One Day Ave. Permissible Amount)

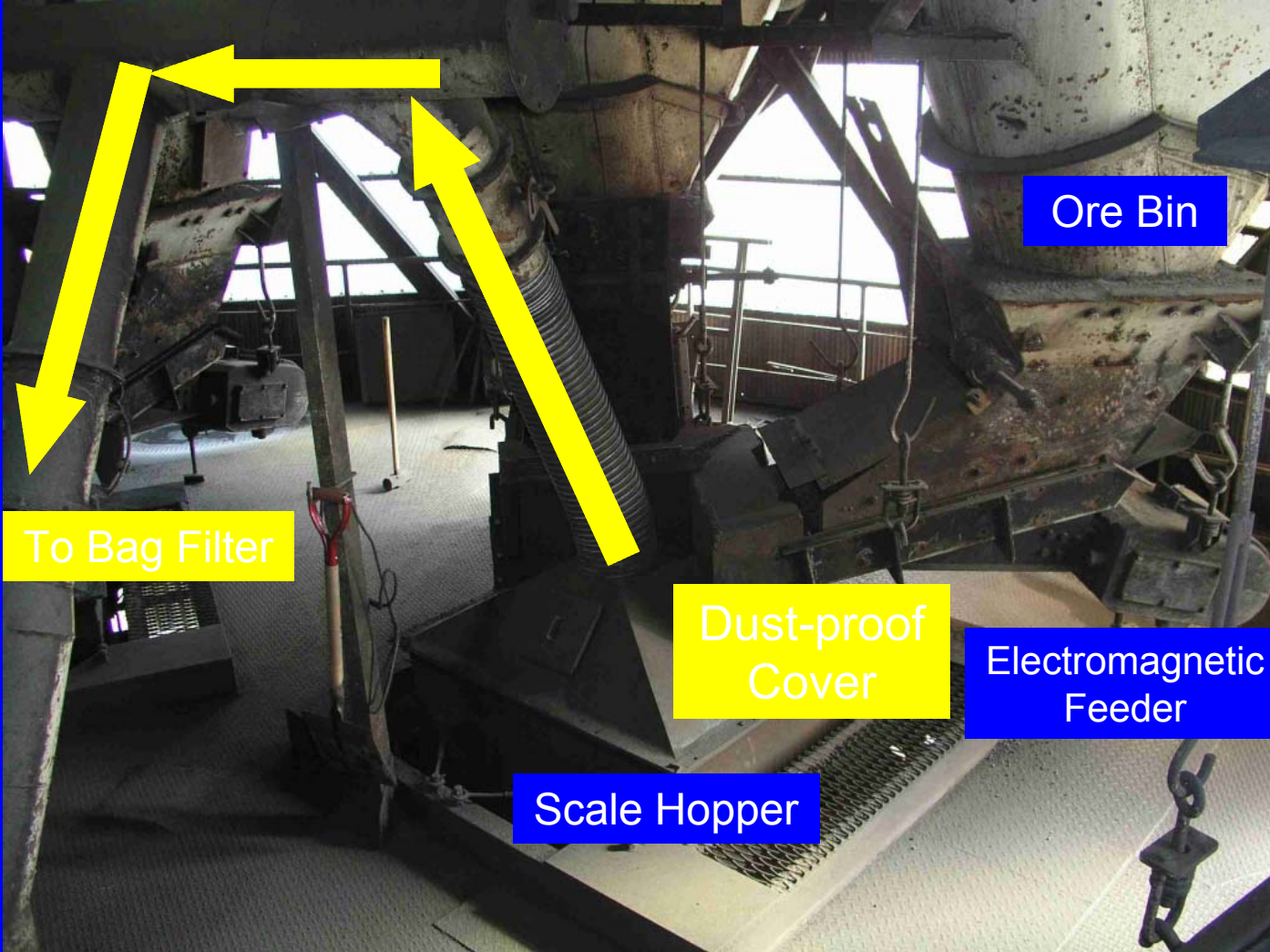
Facility	Pollution Control Equipment	Capacity	Controlled Substances	Discharge Concentration mg/l	Standard Value mg/l
Wet type dust collectors	Spray Tower, Venturi Scrubber	Treated Gas Volume 1EF:10000 m ³ /h 2EF:12000 m ³ /h	COD	9 (7)	
			SS	200 (100)	
			S-Mn	4 (2)	
Water treatment facilities	Settler	Treated Effluent 8000 t/d	COD	3 (2)	25 (15)
	Thickener		SS	8 (2)	60 (50)
	Filter Press	Cake Production 15 dry-t/d	S-Mn	0.7 (0.1)	5



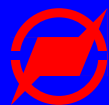
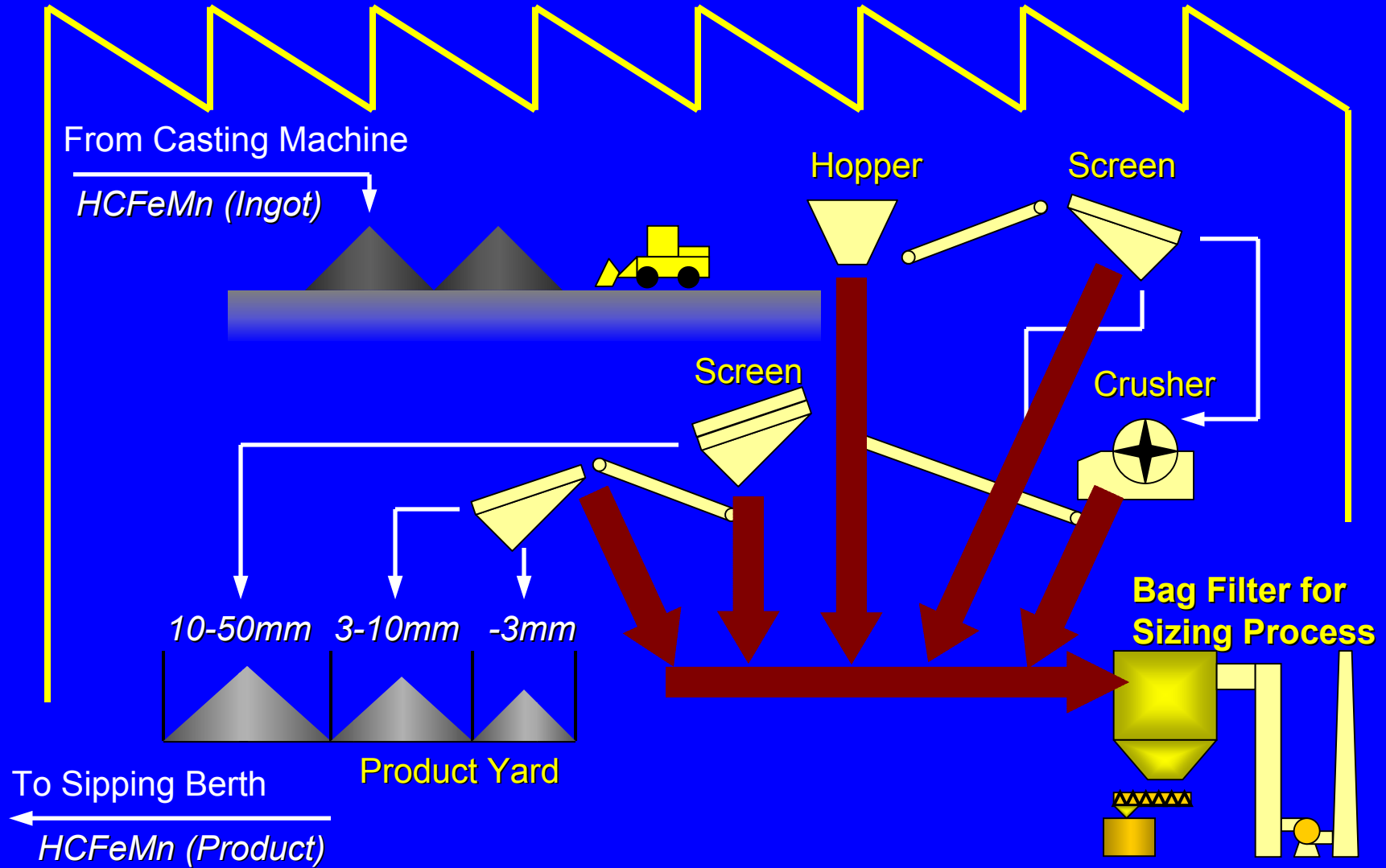
Ore Mixing Process



Dust-proof Cover Equipped with Electric Furnace Scale Hopper



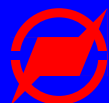
Sizing Process of Products



Bag Filter for Sizing Process of No.2 Electric Furnace



1600 m³/min

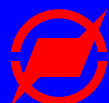


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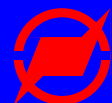
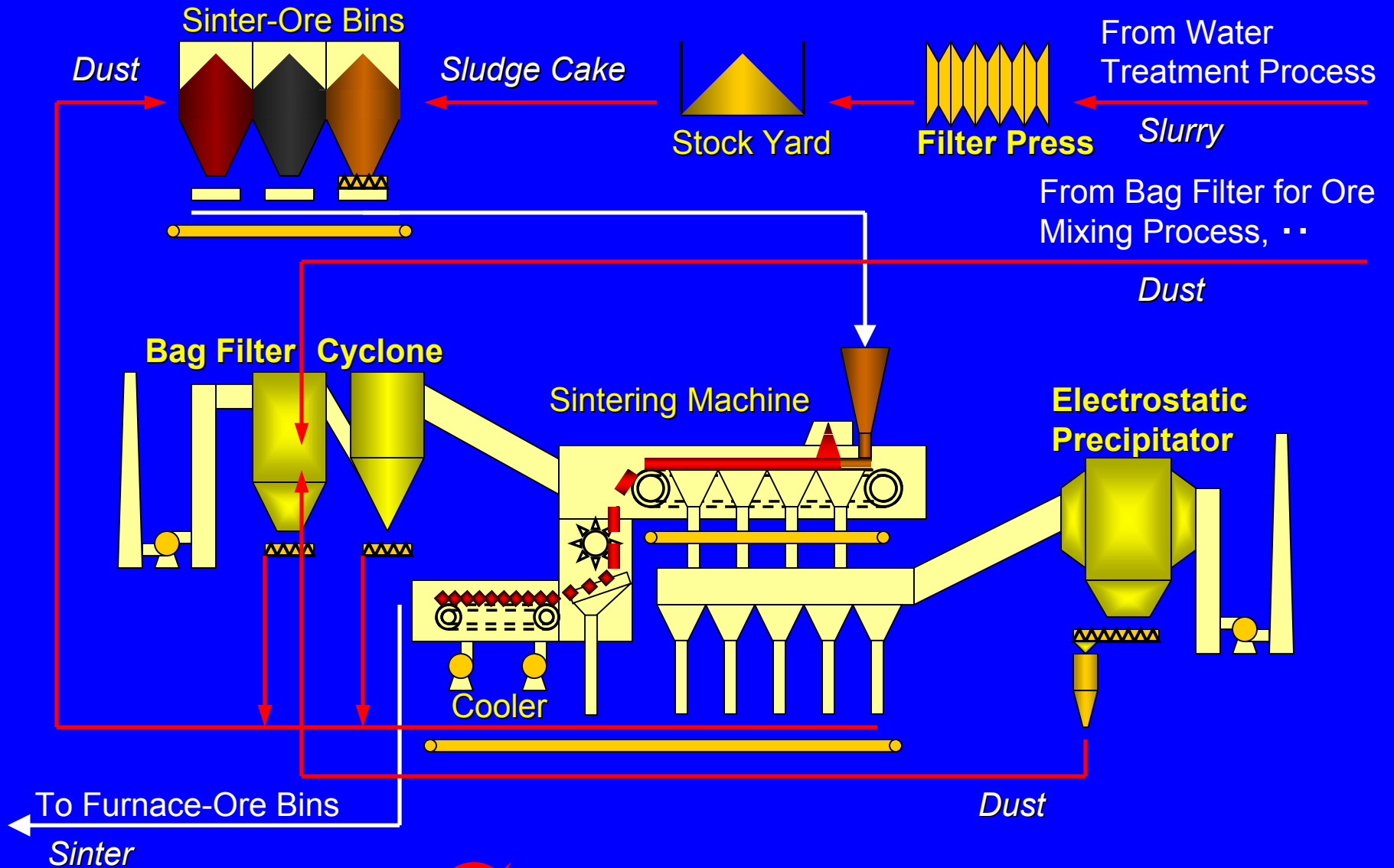
Dust-Emitting Facilities

Facility	Treating Substances (Capacity)	Principal Dust Emitting Equipment	Pollution Control Equipment	
			Equipment	Capacity
Ore Yard	Fine Ore Lump Ore (140000 t)	Ore Yard	Sprinkler	—
Sintering Furnace	Fine Ore Breeze (620 m ³)	Scale Hopper Crusher Hot Screen	Dust-proof Cover Bag Filter	700 m ³ /min
Ore Mixing Facilities of Furnaces	Mn Ore Coke (600 m ³ /furnace)	Scale Hopper Crusher Screen	Dust-proof Cover Bag Filter Bag Filter	550 m ³ /min 680 m ³ /min
Sizing Process of Products	HCFeMn (20000 t)	Crusher Screen	Bag Filter Bag Filter	3500 m ³ /min 1600 m ³ /min

In addition to above, dust-proof cover is equipped with a belt conveyer at each facility.



Dust Flow — Closed System —



Industrial Safety and Health Law

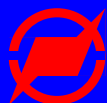
- Standard Control Concentration for Work Environment

Manganese and Its Compounds : 1 mg/m³

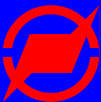
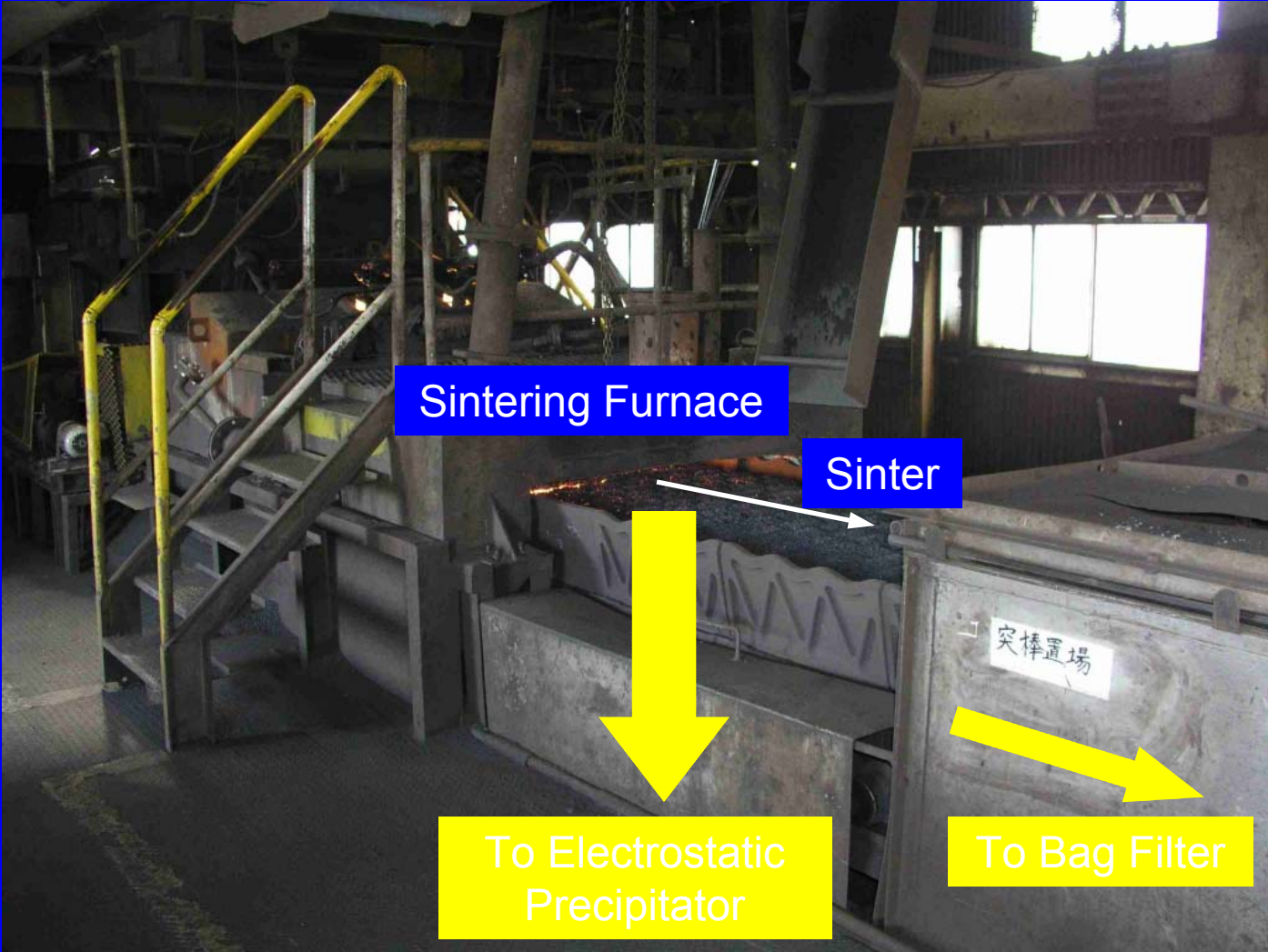
Mineral Dust : 2.9 mg/m³

- Implementation of work environment measurements and health checkup for plant workers

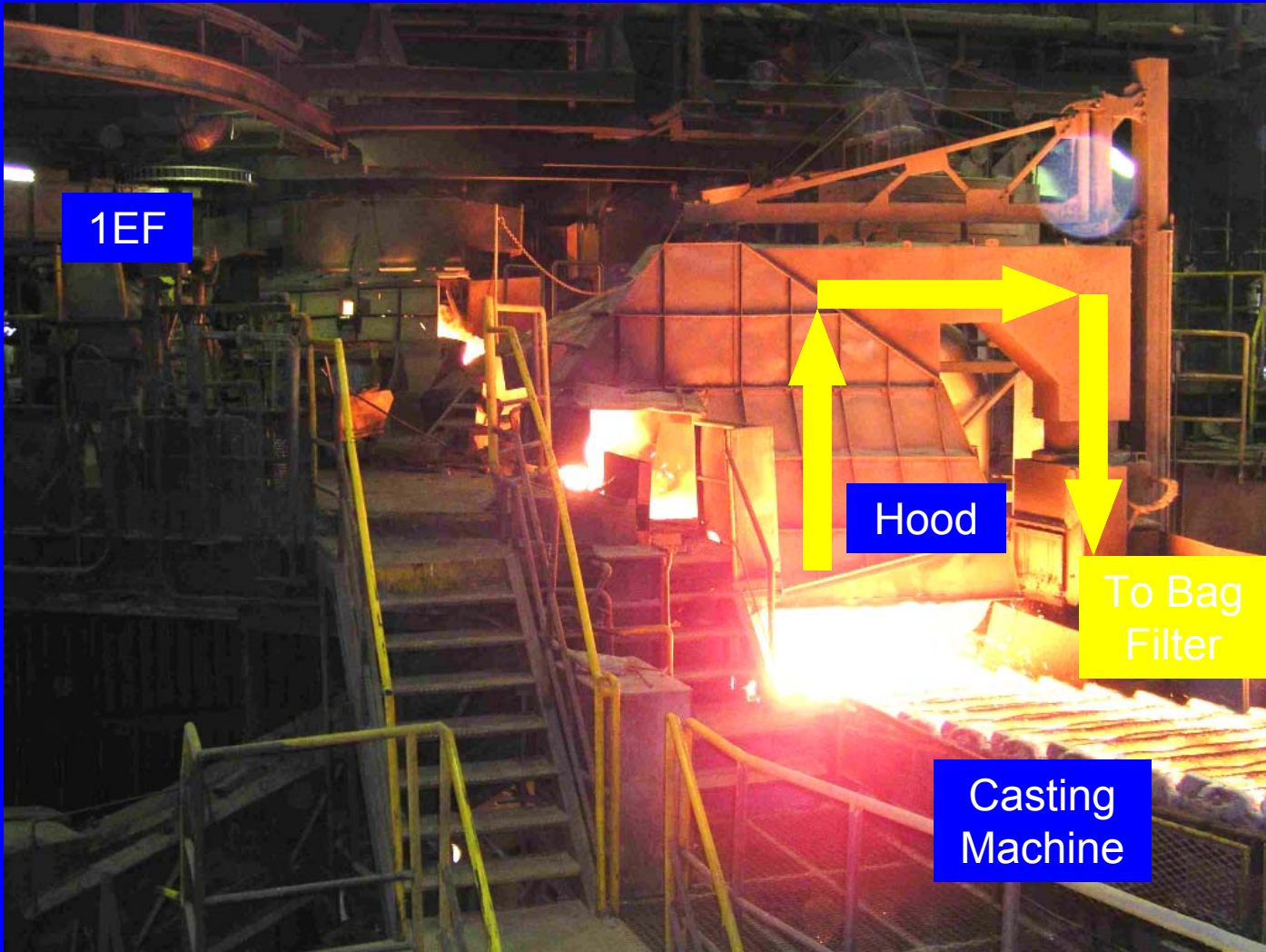
Every 6 Months



Sintering Plant Operation



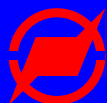
Metal Tapping of No.1 Furnace



Facilities for Work Environment

Results of the second half of 2003 mg/m³

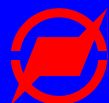
Working Place	Bag Filter for Pollution Control (Capacity)	Controlled Substances	Results of Treatment	Standard Value
Tapping Floor of No.1 Furnace	Metal Tapping Hole (1200 m ³ /min)	Mineral Dust	0.73	2.9
	Slag Tapping Hole (1200 m ³ /min)	Mn & Mn Compounds	0.44	1
Tapping Floor of No.2 Furnace	Metal Tapping Hole (1200 m ³ /min)	Mineral Dust	1.20	2.9
	Slag Tapping Hole (1200 m ³ /min)	Mn & Mn Compounds	0.66	1
Operating Floor of Sintering Furnace	Sintering Furnace (700 m ³ /min)	Mineral Dust	0.42	2.9
		Mn & Mn Compounds	0.75	1



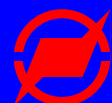
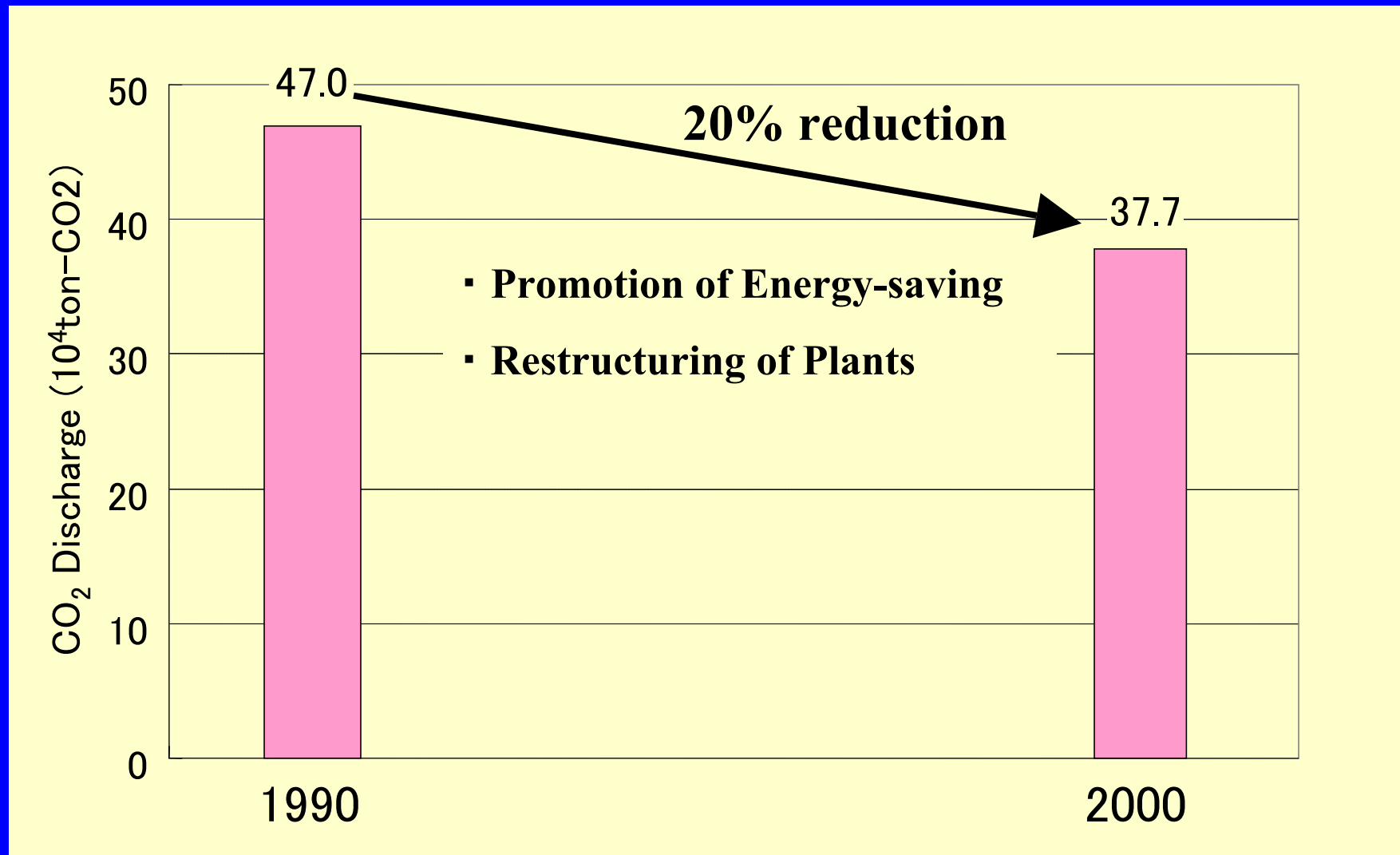
Human Health and Safety

- We publicize relevant information to the parties concerned through the MSDS (Material Safety Data Sheet).

- We strictly comply with the PRTR (Pollutant Release and Transfer Register) system.



Trend of CO₂ Discharge at Nippon Denko



Finally..

Increase awareness about environmental Issues

Reinforce regulations for environmental protection

Establish environmental quality standards

Supplement and reinforce discharge controls on
polluting substances

Create harmony between production and environment

Zero emissions!

