

# Plant Environmental Control (Environmental Risk Countermeasures)

Fujitsu is undertaking a variety of measures to protect the environment in and around its plants. As well as purifying soil and ground water, the company is working to prevent the emission of global warming gases and of dioxins from waste incineration. (In 1999, there were no environmental accidents.)

## Soil and ground water purification

Based on the results of surveys conducted in fiscal 1998 to determine the status of chlorine compound levels (specifically, trichloroethylene, methylene chloride, etc.) in soil and ground water in and around company plants, Fujitsu is continuing its purifying efforts. All factories in the Fujitsu Group fall within recognized contamination limits. However, to accelerate such efforts at 3 sites, the company is investing in purification equipment and increasing the number of wells used in connection with these clean-up programs. In addition, as a preventative measure, the company has begun drilling fresh observation wells. Moreover, Fujitsu's internal rules mandate that a full evaluation of soil or ground water contamination be made prior to the acquisition of any land to ensure that it is unpolluted.

## Dioxin emission prevention measures

Committees to oversee the implementation of countermeasures to prevent dioxin emissions were formed in May 1998 at all plants that had incinerators at that time. As a result of the committees' investigations, it was found that 2 plants did not need to be regulated. Nevertheless these 2 plants shut down their incinerators in March, 1999. The 3 plants which were to be regulated shut down their incinerators in January, 2000. Ten of Fujitsu's manufacturing affiliates abolished their incinerators in August, 2000.

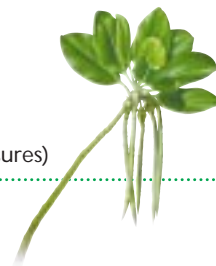
- Oyama Plant ..... Stopped in November 1998
- Tatebayashi Systems Center Stopped in November 1998
- Kanuma Plant ..... Stopped in March 1999
- Akashi Plant ..... Stopped in August 1999
- Numazu Plant ..... Stopped in January 2000



Purification equipment (Kawasaki Plant)



Abolished incinerator (Numazu Plant)



### Measures against environmental endocrine disruptors

Since fiscal 1997, Fujitsu has been measuring, and reducing the use at its factories of all of the 67 chemical substances designated by the Environment Agency of Japan as having potentially harmful effects on human endocrine systems. During fiscal 1999, the company used 140.7 kg of such substances, 38% less than in fiscal 1998. The number of substances in use was also reduced from 6 to 3. Through an internal registration system, Fujitsu will continue to work to restrict and reduce the use of new chemicals.

**Results**

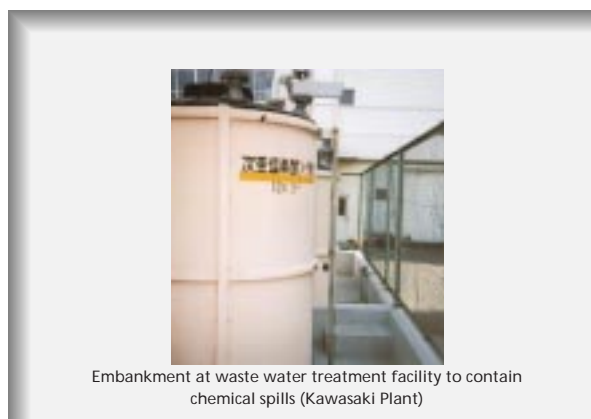
Name of substance	Amount used	Principal uses
Nonyl phenol	135	Degreasing agent
Bisphenol A	3.61	Raw material for resins
Di-n-butyl phthalate	2.10	Plasticizer; reagent

(kg)

\* Substances whose use has been entirely eliminated:  
 Styrene dimer; styrene trimer  
 Diethyl phthalate  
 Di-2-ethylhexyl phthalate

### Environmental risk countermeasures: chemical spills

To prevent acids, alkalis or solvents leaking into the environment from waste water treatment facility storage tanks in the event of earthquakes or accidents, Fujitsu and its affiliates have constructed concrete embankments and other barriers at manufacturing and R&D sites. The company also maintains and repairs such facilities on a regular basis.



### Elimination of use of ozone-depleting substances

Fujitsu has completely eliminated the use of ozone-depleting substances in its manufacturing operations. In addition, measures have been taken to ensure that any CFC coolants used in air conditioning or refrigeration equipment do not leak into the atmosphere. Whenever such kinds of equipment are renovated, the opportunity is taken to replace coolants with non-CFC alternatives.

**Results**

Ozone-depleting substance	Date of elimination
Cleaning freons (CFC-113, CFC-115)	End of 1992
Carbon tetrachloride	End of 1992
1,1,1-trichloroethane	End of October 1994
Substitute freons (HCFCs)	End of March 1999

### Greenhouse gas emission prevention

The Japanese semiconductor industry has established a voluntary code of conduct to cut emissions of greenhouse gases such as perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF<sub>6</sub>). At a meeting convened in April 1999, the global semiconductor industry also agreed to common emission reduction targets. Fujitsu's efforts in this area are being spearheaded by the Electronic Devices Division, which has formulated a plan to ensure that internal emission countermeasures meet the national and international targets. Specific measures include the following:

- Use of substitutes for liquid PFCs
- Application of emissions-reduction technologies to new production lines
- Survey/measurement of emission levels
- Support for R&D programs of substitutive technologies, collection and reuse technologies

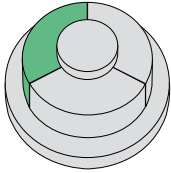
All of Fujitsu's activities in terms of surveying and collecting data on the amounts of such emissions by the Electronic Devices Division are reported to the Electronic Industries Association of Japan. The company continues to work to achieve its internal emission plan.

### Promotion of paperless operations

To conserve forests and reduce the amount of waste paper produced, Fujitsu is promoting the internal use of networks, and double-sided printing. During fiscal 1999, the company reduced its paper usage by the equivalent of around 40 million sheets of A4 paper.

**Results** (Fujitsu Group)

Sheets (A4 equivalents, estimated)/millions	
1998	900
1999	860
Reduction	40



# Protecting Water Sources

Fujitsu factories use substantial volumes of water in a number of manufacturing processes—for example, during the cleaning of coatings, or for cooling purposes. The company works to ensure that this water is used as efficiently as possible, both in manufacturing processes and afterwards. The volume of water used at Fujitsu's 15 plants (and offices) during fiscal 1999 totaled approximately 18.3 million cubic meters. At the Kawasaki Plant, purified water is used to supply a garden pond that supports a variety of wildlife, including fish and ducks. Other water usage examples are given below.



Kawasaki Plant

## Water usage examples

### Oyama Plant



At the Oyama Plant, through circulating water used to cool communications equipment in heat-shock vats (used to test reliability by exposure to alternate high and low temperatures) via cooling towers, the amount of underground water used was reduced by 111,829 m<sup>3</sup> per year.

### Nasu Plant



At the Nasu Plant, the addition of cooling-water recirculation equipment to high-temperature quality inspection machines resulted in an annual reduction in water usage of 6,000 m<sup>3</sup>.

### Aizuwakamatsu Plant



At the Aizuwakamatsu Plant, the waste water from the vacuum pumps used in manufacturing equipment had previously been allowed to drain away because it was acidic. By neutralizing this water with ammonia, it became possible to recycle it, resulting in an annual reduction in water usage of 89,289 m<sup>3</sup>.

### Suzaka Plant



At the Suzaka Plant, water used to clean the coatings applied during the manufacture of electronic devices is purified with ion-exchange resins and then recycled. As a result, of the 189,747 m<sup>3</sup> of cleaning water used, only 3,249 m<sup>3</sup> (1.7%) had to be introduced fresh—producing a total reduction of 186,498 m<sup>3</sup>.

# Plant Environmental Countermeasures: Air/Water/Noise/Vibration Pollution

For air, water, noise and vibration in factories and offices, Fujitsu implements in-house limits stricter than laws and regulations, and prevents pollution by regular measurement, maintenance and management of environmental protection equipment. Fujitsu took remedial measures at plants and offices which exceeded in-house limits.

## Kawasaki Plant (Location: Kawasaki, Kanagawa)

### Results of waste water measurement

ND: Not detected Units: ppm (mg/ℓ)

Item		Regulatory limit (max.)			Fiscal 1999 actual	
		National limit #1	Local govt. limit	In-house limit		
Plant waste water	Toxic substances	Effluent load (m <sup>3</sup> /day)			158	
		Cadmium	0.1	0.1	0.05	ND (<0.01)
		Total cyanide	1	1	0.5	ND (<0.01)
		Organic phosphorus	1	0.2	—	*2
		Lead	0.1	0.1	0.05	0.078 (*3)
		Hexavalent chromium	0.5	0.5	0.1	ND (<0.01)
		Arsenic	0.1	0.1	0.05	0.002
		Total mercury	0.005	0.05		
		Organic mercury	ND	ND		
		PCB	0.003	0.003	—	*2
		Selenium	0.1	0.1		
		Benzene	0.1	0.1	0.01	ND (<0.001)
		Trichloroethylene	0.3	0.3	0.03	ND (<0.001)
		Tetrachloroethylene	0.1	0.1	0.01	ND (<0.0015)
		1,1,1-trichloroethane	3	3	0.3	ND (<0.001)
		Carbon tetrachloride	0.02	0.02	0.01	ND (<0.0015)
		Dichloromethane	0.2	0.2	0.01	ND (<0.001)
		1,2-dichloroethane	0.04	0.04	0.01	ND (<0.0015)
	1,1,2-trichloroethane	0.06	0.06	0.01	ND (<0.0015)	
	1,1-dichloroethylene	0.2	0.2	0.02	ND (<0.0005)	
	cis-1,2-dichloroethylene	0.4	0.4	0.04	ND (<0.0005)	
	General items	Hydrogen ion concentration (pH)	5.7-8.7	5.7-8.7	6.0-8.5	6.84-7.56
		BOD (biochemical oxygen demand)	300	300	80	12.18
		Iodine consumption	—	220	80	23.68
		SS (suspended solids)	300	300	50	27.8
		n-hexane (mineral)	5	5	—	
		n-hexane (animal/plant)	30	30	—	*2
		Phenols	5	0.5	0.4	ND (<0.01)
		Copper	3	3	1	0.33
		Zinc	5	3	1	0.62
		Soluble iron	10	10	2	4.75 (*4)
		Soluble manganese	10	1	0.8	0.15
Total chromium		2	2	0.5	ND (<0.06)	
Fluorine		15	15	10	2.58	
Nitrogen		150	150	60	19.98	
Phosphorus	20	20	8	2.16		
Nickel	—	1	0.8	0.17		

Note: Values for effluent are average daily values; pH values express ranges, defined numerically.

\*1: National standard is based on Sewage Water Law. \*2: Excluded from measurement due to unused amounts of specific pharmaceuticals.

\*3: The in-house limit for lead was exceeded in only one measurement; however the limit was not exceeded in any of the other regular measurements.

\*4: The in-house limit for soluble iron was exceeded due to an inability to remove the iron from wastewater; however, the process was improved, and the limit was not exceeded in any of the other regular measurements.

### Results of air quality measurement

Item		Regulatory limit (max.)			Fiscal 1999 actual
		National limit	Local govt. limit	In-house limit #5	
Facility name Boiler No. 1	Nitrogen oxides (NOx) [ppm]	150	0.33g/10 <sup>3</sup> kcal	100	30
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	2.3	0.34g/10 <sup>3</sup> kcal	—	*6
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.15	0.05g/10 <sup>3</sup> kcal	0.01	0.001
Facility name Boiler No. 2	Nitrogen oxides (NOx) [ppm]	150	0.33g/10 <sup>3</sup> kcal	100	49.9
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	3.0	0.34g/10 <sup>3</sup> kcal	—	*6
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.15	0.05g/10 <sup>3</sup> kcal	0.01	0.001
Facility name Boiler No. 3	Nitrogen oxides (NOx) [ppm]	150	0.33g/10 <sup>3</sup> kcal	100	87.6
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	6.5	0.34g/10 <sup>3</sup> kcal	—	*6
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.15	0.05g/10 <sup>3</sup> kcal	0.01	0.001
Facility name Boiler No. 4	Nitrogen oxides (NOx) [ppm]	150	0.33g/10 <sup>3</sup> kcal	100	46.7
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	9.4	0.34g/10 <sup>3</sup> kcal	—	*6
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.05	0.05g/10 <sup>3</sup> kcal	0.01	0.001
Facility name Boiler No. 5	Nitrogen oxides (NOx) [ppm]	150	0.33g/10 <sup>3</sup> kcal	100	67.7
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	0.5	0.34g/10 <sup>3</sup> kcal	—	*6
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.05	0.05g/10 <sup>3</sup> kcal	0.01	0.001

\*5: In-house limits were calculated from local government limits.

\*6: Sulfur oxides are excluded from measurement because their value is calculated based upon usage of kerosene and municipal gas.

### Results of noise and vibration measurement

Units: dB

Item		Regulatory limit (max.)			Fiscal 1999 actual
		National limit	Local govt. limit	In-house limit	
Noise	Daytime	*7	62.5	60	53.1
	Morning/evening		57.5	57.5	49.3
	Night		50	49.5	48.9
Vibration	Day		70	50	41.1
	Night		60	50	38.1

\*7: Law provides that regulatory limit should be provided by mayor.

## Nasu Plant (Location: Otahara, Tochigi)

## Results of waste water measurement

ND: Not detected Units: ppm (mg/ℓ)

Item		Regulatory limit (max.)			Fiscal 1999 actual	
		National limit	Local govt. limit	In-house limit		
Plant waste water	Toxic substances	Effluent load (m <sup>3</sup> /day)			125	
		Cadmium	0.1	0.1	0.01	ND (<0.005)
		Total cyanide	1	1	0.01	ND (<0.01)
		Organic phosphorus	1	1	—	*1
		Lead	0.1	0.1	0.01	ND (<0.005)
		Hexavalent chromium	0.5	0.1	0.01	ND (<0.01)
		Arsenic	0.1	0.1	0.05	ND (<0.005)
		Total mercury	0.005	0.005	ND	ND (<0.005)
		Organic mercury	ND	ND	ND	ND (<0.0005)
		PCB	0.003	0.003	ND	ND (<0.0005)
		Selenium	0.1	0.1	0.01	ND (<0.002)
		Benzene	0.1	0.1	0.01	ND (<0.01)
		Trichloroethylene	0.3	0.3	0.01	ND (<0.01)
		Tetrachloroethylene	0.1	0.1	0.01	ND (<0.01)
		1,1,1-trichloroethane	3	3	0.03	ND (<0.01)
		Carbon tetrachloride	0.02	0.02	0.002	ND (<0.001)
		Dichloromethane	0.2	0.2	0.02	ND (<0.01)
		1,2-dichloroethane	0.04	0.04	0.004	ND (<0.001)
		1,1,2-trichloroethane	0.06	0.06	0.006	ND (<0.001)
		1,1-dichloroethylene	0.2	0.2	0.02	ND (<0.02)
	cis-1,2-dichloroethylene	0.4	0.4	0.02	ND (<0.04)	
	General items	Hydrogen ion concentration (pH)	5.8-8.6	5.8-8.6	6.0-8.0	6.9-7.4
		BOD (biochemical oxygen demand)	160	25	8	3.8
		COD (chemical oxygen demand)	160	25	20	8.9
		SS (suspended solids)	200	50	10	ND (<1.0)
		n-hexane (mineral)	5	5	1	ND (<0.5)
		n-hexane (animal/plant)	30	10	1	ND (<0.5)
		Phenols	5	1	0.1	ND (<0.01)
		Copper	3	3	0.1	0.09
		Zinc	5	5	0.3	0.046
		Soluble iron	10	3	0.5	0.067
		Soluble manganese	10	3	0.5	ND (<0.05)
Total chromium		2	2	0.2	ND (<0.05)	
Fluorine	15	8	1	0.77		
Nitrogen	120	20	20	5.4		
Phosphorus	16	2	8	2.6		

Note: Values for effluent are average daily values; pH values express ranges, defined numerically.  
 \*1: Excluded from measurement due to unused amounts of specific pharmaceuticals.

## Results of air quality measurement

Item		Regulatory limit (max.)			Fiscal 1999 actual
		National limit	Local govt. limit	In-house limit	
Facility name	Nitrogen oxides (NOx) [ppm]	150	150	120	62
Boiler No. 1	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	2.2	2.2	1.76	ND (<0.0001)
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.1	0.1	0.02	0.001

## Results of noise and vibration measurement

Units: dB

Item		Regulatory limit (max.)			Fiscal 1999 actual
		National limit	Local govt. limit	In-house limit	
Noise	Daytime	*2	75	65	50
	Morning/evening		70	65	57
	Night		60	55	50
Vibration	Day		70	55	<30
	Night		65	50	<30

\*2: Limit set by prefectural governor, in accordance with legislation.

## Akashi Plant (Location: Akashi, Hyogo)

### Results of waste water measurement

ND: Not detected Units: ppm (mg/ℓ)

Item		Regulatory limit (max.)			Fiscal 1999 actual	
		National limit	Local govt. limit	In-house limit		
Plant waste water	Toxic substances	Effluent load (m <sup>3</sup> /day)			5,292	
		Cadmium	0.1	0.05	0.008	ND (<0.005)
		Total cyanide	1	0.7	0.08	ND (<0.02)
		Organic phosphorus	1	0.7	0.08	ND (<0.08)
		Lead	0.1	0.1	0.05	ND (<0.05)
		Hexavalent chromium	0.5	0.35	0.04	ND (<0.01)
		Arsenic	0.1	0.1	0.04	ND (<0.01)
		Total mercury	0.005	0.005	0.0005	ND (<0.0005)
		Organic mercury	ND	ND	ND	ND (<0.0005)
		PCB	0.003	0.003	0.0005	ND (<0.0005)
		Selenium	0.1	0.1	0.01	ND (<0.01)
		Benzene	0.1	0.1	0.01	ND (<0.001)
		Trichloroethylene	0.3	0.3	0.03	ND (<0.002)
		Tetrachloroethylene	0.1	0.1	0.01	ND (0.0005)
		1,1,1-trichloroethane	3	3	0.03	ND (<0.0005)
		Carbon tetrachloride	0.02	0.02	0.01	ND (<0.0005)
		Dichloromethane	0.2	0.2	0.02	ND (<0.002)
		1,2-dichloroethane	0.04	0.04	0.01	ND (<0.004)
		1,1,2-trichloroethane	0.06	0.06	0.01	ND (<0.006)
		1,1-dichloroethylene	0.2	0.2	0.02	ND (<0.002)
	cis-1,2-dichloroethylene	0.4	0.4	0.04	ND (<0.004)	
	General items	Hydrogen ion concentration (pH)	5.8-8.6	5.8-8.6	6.2-8.2	7.05-7.9
		BOD (biochemical oxygen demand)	35	35	12.0	10.9
		COD (chemical oxygen demand)	35	35	12.1	10.5
		SS (suspended solids)	50	50	11.2	10.2
		n-hexane (mineral)	5	1.5	0.8	0.15
		n-hexane (animal/plant)	30	15	12	0.56
		Phenols	1	1	0.5	ND (<0.1)
		Copper	3	3	1	0.46
		Zinc	5	5	1	0.11
		Soluble iron	10	10	2	0.68
		Soluble manganese	10	10	1	0.93
Total chromium		2	2	0.5	0.05	
Fluorine	15	15	10	0.85		
Nitrogen	120	120	40	10.7		
Phosphorus	16	16	1	0.23		

Note: Values for effluent are average daily values; pH values express ranges, defined numerically.

34

### Results of air quality measurement

Item		Regulatory limit (max.)			Fiscal 1999 actual
		National limit	Local govt. limit	In-house limit	
Facility name Boiler No. 2	Nitrogen oxides (NOx) [ppm]	150	20 ton/year (*1)	104	40.1
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	5.5	5.5	0.053	ND (<0.004)
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	0.3	0.04	0.0006
Facility name Boiler No. 10	Nitrogen oxides (NOx) [ppm]	130	20 ton/year (*1)	104	39.8
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	4.9	4.9	0.057	ND (<0.006)
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	0.3	0.12	0.0011
Facility name Boiler No. 17	Nitrogen oxides (NOx) [ppm]	150	20 ton/year (*1)	104	56.1
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	3.8	3.8	0.015	ND (<0.001)
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	0.3	0.04	0.0004
Multi-layer chimney boiler	Nitrogen oxides (NOx) [ppm]	150	20 ton/year (*1)	104	71.0
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	0.4	0.4	0.006	ND (<0.001)
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	0.3	0.04	0.0006

\*1: This value is fixed from the areawide total pollutant load control, and in-house standards are converted from it.

### Results of noise and vibration measurement

Units: dB

Item		Regulatory limit (max.)			Fiscal 1999 actual
		National limit	Local govt. limit	In-house limit	
Noise	Daytime	*2	65	63.5	61
	Morning/evening		60	58.5	53
	Night		50	49.8	49.6
Vibration	Day		65	62.5	45
	Night		60	57.5	45

\*2: Limit set by prefectural governor, in accordance with legislation.



**Iwate Plant (Location: Kanegasaki, Isawa, Iwate)**
**Results of waste water measurement**

ND: Not detected Units: ppm (mg/ℓ)

Item		Regulatory limit (max.)			Fiscal 1999 actual	
		National limit	Local govt. limit	In-house limit		
Plant waste water	Toxic substances	Effluent load (m <sup>3</sup> /day)			10,525	
		Cadmium	0.1	0.1	0.01	ND (<0.01)
		Total cyanide	1	1	0.1	ND (<0.01)
		Organic phosphorus	1	1	ND	ND (<0.1)
		Lead	0.1	0.1	0.07	ND (<0.008)
		Hexavalent chromium	0.5	0.5	0.05	ND (<0.01)
		Arsenic	0.1	0.1	0.05	ND (<0.001)
		Total mercury	0.005	0.005		
		Organic mercury	ND	ND		
		PCB	0.003	0.003	—	*1
		Selenium	0.1	0.1		
		Benzene	0.1	0.1		
		Trichloroethylene	0.3	0.3	0.03	ND (<0.002)
		Tetrachloroethylene	0.1	0.1	0.01	ND (<0.0005)
		1,1,1-trichloroethane	3	3	0.3	ND (<0.0005)
		Carbon tetrachloride	0.02	0.02	0.002	ND (<0.0002)
		Dichloromethane	0.2	0.2		
		1,2-dichloroethane	0.04	0.04		
		1,1,2-trichloroethane	0.06	0.06	—	*1
		1,1-dichloroethylene	0.2	0.2		
	cis-1,2-dichloroethylene	0.4	0.4			
	General items	Hydrogen ion concentration (pH)	5.8-8.6	5.8-8.6	5.9-8.5	6.4-7.3
		BOD (biochemical oxygen demand)	160	160	25	9.3
		COD (chemical oxygen demand)	160	160	30	21
		SS (suspended solids)	200	200	30	2.4
		n-hexane (mineral)	5	5	—	*1
		n-hexane (animal/plant)	30	30	3	0.5
		Phenols	5	5	—	*1
		Copper	3	3	0.5	0.03
		Zinc	5	5	0.5	0.19
Soluble iron		10	10	1	0.98	
Soluble manganese	10	10	1	ND (<0.02)		
Total chromium	2	2	0.2	ND (<0.06)		
Fluorine	15	15	5	4		
Nitrogen	120	120	70	28.6		
Phosphorus	16	16	5	0.59		

 Note: Values for effluent are average daily values; pH values express ranges, defined numerically.  
 \*1: Excluded from measurement due to unused amounts of specific pharmaceuticals.

**Results of air quality measurement**

Item		Regulatory limit (max.)			Fiscal 1999 actual
		National limit	Local govt. limit	In-house limit	
Facility name Boiler No. 1	Nitrogen oxides (NOx) [ppm]	150	150	100	71
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	21.4	21.4	12.3	4.1
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.25	0.25	0.1	0.02
Co-generation system	Nitrogen oxides (NOx) [ppm]	70	70	67.5	66.1
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	3.94	3.94	2.25	1.0
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.05	0.05	0.045	0.014

**Results of noise and vibration measurement**

Units: dB

Item		Regulatory limit (max.)			Fiscal 1999 actual
		National limit	Local govt. limit	In-house limit	
Noise	Daytime	*2	70	60	55
	Morning/evening		70	55	53
	Night		65	55	53
Vibration	Day	*3		—	—
	Night			—	—

 \*2: Limit set by prefectural governor, in accordance with legislation.  
 \*3: Not regulated because location is an industrial area.

## Fujitsu Laboratories (Atsugi) (Location: Atsugi, Kanagawa)

### Results of waste water measurement

ND: Not detected Units: ppm (mg/ℓ)

Item		Regulatory limit (max.)			Fiscal 1999 actual	
		National limit #1	Local govt. limit	In-house limit		
Plant waste water	Toxic substances	Effluent load (m <sup>3</sup> /day)			208	
		Cadmium	0.1	0.1	0.01	ND (<0.002)
		Total cyanide	1	1	0.5	ND (<0.01)
		Organic phosphorus	1	0.2	—	*2
		Lead	0.1	0.1	0.05	ND (<0.02)
		Hexavalent chromium	0.5	0.5	0.1	ND (<0.05)
		Arsenic	0.1	0.1	0.05	ND (<0.005)
		Total mercury	0.005	0.005	0.004	ND (<0.0005)
		Organic mercury	ND	ND	—	*2
		PCB	0.003	0.003	—	*2
		Selenium	0.1	0.1	0.01	ND (<0.002)
		Benzene	0.1	0.1	0.01	0.0002
		Trichloroethylene	0.3	0.3	0.03	ND (<0.0002)
		Tetrachloroethylene	0.1	0.1	0.01	ND (<0.0002)
		1,1,1-trichloroethane	3	3	0.3	ND (<0.0002)
		Carbon tetrachloride	0.02	0.02	0.01	ND (<0.0002)
		Dichloromethane	0.2	0.2	0.02	0.0011
		1,2-dichloroethane	0.04	0.04	0.01	ND (<0.0002)
		1,1,2-trichloroethane	0.06	0.06	—	*2
		1,1-dichloroethylene	0.2	0.2	0.02	ND (<0.0002)
		cis-1,2-dichloroethylene	0.4	0.4	0.04	0.0008
	General items	Hydrogen ion concentration (pH)	5.0-9.0	5.0-9.0	6.0-8.6	6.7-7.3
		BOD (biochemical oxygen demand)	<600	<600	80	10
		Iodine consumption	—	220	100	98.96
		SS (suspended solids)	<600	<600	50	14
		n-hexane (mineral)	5	5	5	ND (<2.5)
		n-hexane (animal/plant)	30	30	15	*2
		Phenols	5	0.5	0.4	0.029
		Copper	3	3	1	0.12
		Zinc	5	3	1	0.1
		Soluble iron	10	10	2	0.08
		Soluble manganese	10	1	0.8	0.15
		Total chromium	2	2	0.5	ND (<0.05)
Fluorine	15	15	10	6.3		
Nitrogen	—	—	60	22.57		
Phosphorus	—	—	8	0.12		
Nickel	—	1	0.8	0.05		

Note: Values for effluent are average daily values; pH values express ranges, defined numerically.

\*1: National standard is based on Sewage Water Law.

\*2: Excluded from measurement due to unused amounts of specific pharmaceuticals.

### Results of air quality measurement

Item		Regulatory limit (max.)			Fiscal 1999 actual
		National limit	Local govt. limit	In-house limit	
Facility name Boiler No. 1	Nitrogen oxides (NOx) [ppm]	180	150	144	96
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	23.9	0.8	0.8	ND (<0.017)
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	—	0.24	0.011
Facility name Boiler No. 2	Nitrogen oxides (NOx) [ppm]	180	150	144	89
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	23.9	0.8	0.8	ND (<0.022)
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	—	0.24	0.01
Heating/cooling unit RF-2	Nitrogen oxides (NOx) [ppm]	180	150	144	56
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	24.1	1.1	1.1	ND (<0.017)
Building No. 1	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	0.3	0.24	0.0056
	Nitrogen oxides (NOx) [ppm]	180	150	144	61
Heating/cooling unit RF-3	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	24.1	1.1	1.1	ND (<0.017)
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	0.3	0.24	0.0075
Heating/cooling unit RF-3	Nitrogen oxides (NOx) [ppm]	180	150	144	72
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	29.6	1.3	1.3	ND (<0.024)
Building No. 2	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	0.3	0.24	0.0064
	Nitrogen oxides (NOx) [ppm]	180	150	144	82
Heating/cooling unit RF-4	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	29.6	1.3	1.3	ND (<0.027)
	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	0.3	0.24	0.0048
Heating/cooling unit RF-5	Nitrogen oxides (NOx) [ppm]	180	150	144	71
	Sulfur oxides (SOx) [Nm <sup>3</sup> /h]	37.2	0.71	0.71	ND (<0.028)
Building No. 2	Soot/dust/particulates [g/Nm <sup>3</sup> ]	0.3	0.3	0.24	0.0047

### Results of noise and vibration measurement

Units: dB

Item		Regulatory limit (max.)			Fiscal 1999 actual
		National limit	Local govt. limit	In-house limit	
Noise	Daytime	*3	65	60	50
	Morning/evening		60	50	*4
	Night		50	50	48
Vibration	Day		65	55	47.2
	Night		60	55	47.2

\*3: Limit set by prefectural governor, in accordance with legislation.

\*4: Vibration measurements only taken for day and night.