

4 Maintaining Harmony with the Local Environment

Kyushu Electric Power actively takes measures to protect the environment of local communities. Initiatives such as environmental impact assessments* prior to the construction of its power stations, environmental conservation during power facility operation and proper management are taken, as well as measures for maintaining harmony with the local environment.

1 Environmental (impact) assessment*

In accordance with the Environmental Impact Assessment Law*, Kyushu Electric Power conducts a survey on the natural (sea, land and air) and social environment prior to the construction of power stations. The environmental impact likely to be caused by such construction is then estimated and evaluated in advance, and appropriate measures are taken to protect the environment in the vicinity of power stations.

- Kyushu Electric Power started environmental assessments* and geological and meteorological research and observations in October 2003 in order to consider the planned expansion of the Sendai Nuclear Power Station based on the results.



Research on insects and small animals

2 Prevention of air, water and noise pollution

In operating its power stations and other facilities, Kyushu Electric Power conforms not only to laws and regulations, but also to environmental conservation agreements*, concluded with related local governments with regard to air, water and noise pollution as well as vibration.

Measures against air pollution*

Using the best technology in the world, Kyushu Electric Power takes measures to address smoke* emission from its thermal power stations.

- Kyushu Electric Power's fiscal 2003 emissions intensity* (emissions per kWh thermal electric power production) was 0.16 g/kWh for sulfur oxide* (SOx*) and 0.18 g/kWh for nitrogen oxide (NOx*), which represent a substantial decrease from fiscal 2002 in both SOx* and NOx*. This is mainly due to the fact that old-type coal-fired thermal power stations with high emissions intensity* generated less amount of electricity.

◇SOx* reduction measures

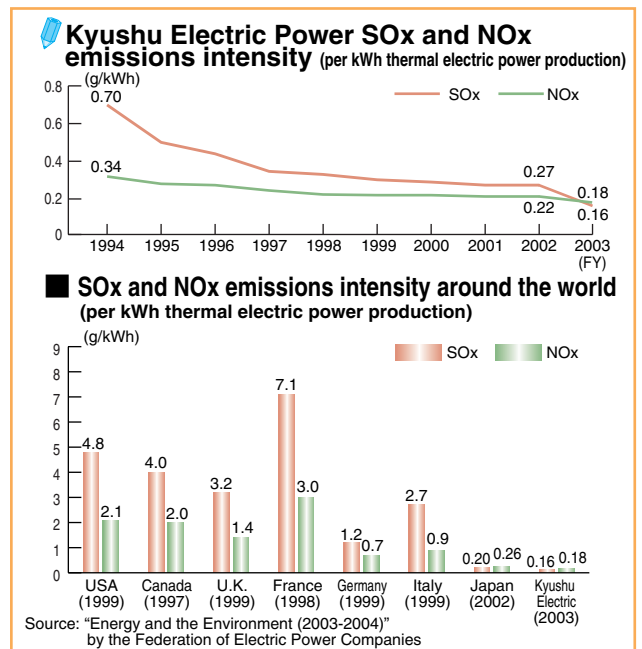
- Use of heavy and crude oil with a low sulfur content
- Promotion of the use of liquefied natural gas* (LNG*) that does not contain sulfur
- Installation of desulfurization facilities* that remove SOx* from exhaust gas
- Adoption of the in-furnace desulfurization method, which removes SOx* within the boiler*

◇NOx* reduction measures

- Combustion method improvement including boilers
- Adoption of the two-stage combustion method*
- Adoption of the exhaust gas recirculation combustion method*
- Adoption of low NOx* burners
- Installation of denitration facilities* that remove NOx* from exhaust gas

◇Particulate* reduction measures

- Promotion of LNG* use that does not generate particulate*
- Installation of high efficiency precipitators* that remove particulate* from exhaust gas



COLUMN NO.4 Tsukabaru Dam registered as a Tangible Cultural Property

In March 2004, Tsukabaru Dam (Saigo Village and Morotsuka Village, Miyazaki Prefecture) was added to the list of Japan's Registered Tangible Cultural Properties (Buildings). The system for Japan's Registered Tangible Cultural Properties (Buildings) was established in 1997 to protect cultural properties (buildings) which are not designated as national or municipal cultural properties but would require special attention to preserve and utilize them for their values. The system encourages property owners to apply voluntary care and protection to their cultural properties designated as a Registered Tangible Cultural Property. Tsukabaru Dam, 87 meters high, was the highest gravity type dam in Japan when it was built in 1938, and also the first dam constructed using mechanical technology. Patterned bridge railing situated at the top of the dam and turrets at both ends bring up the image of the Great Wall of China and a medieval castle in Europe, respectively; and therefore, the dam has received high acclaim and recognition in terms of its design. In 2001, the dam was nominated for Early-Modern Civil Engineering Heritage in Japan by the Japan Society of Civil Engineering. We, Kyushu Electric Power will maintain Tsukabaru Dam as a tourism resource and educational tool in cooperation with local governments.



Tsukabaru Dam

Water quality control

- Wastewater from premises including equipment and facilities is processed using special wastewater treatment systems at all of the company's thermal and nuclear power stations. The treated wastewater is discharged after confirming its quality.
- Quality analysis is conducted regularly for water in reservoirs at hydroelectric power stations. The water quality is maintained by measures such as the treatment of freshwater red tide* with ultraviolet rays, selective water intake* when water is turbid, and ensuring the health of neighboring forests.

Measures against noise and vibration

- Kyushu Electric Power addresses noise and vibration problems by adopting low-noise, low-vibration equipment, installing mufflers and soundproofing walls, and by installing noise-producing equipment indoors.

3 Environmental protection management

Kyushu Electric Power's power stations are strictly managed to ensure environmental protection by means of environmental monitoring and chemical substance control.

Environmental monitoring*

- Continuous monitoring using environment supervisory instruments
- Video camera monitoring
- Patrol monitoring
- Regular measurement and analysis
- Reporting environmental data to the authorities
- The company strictly manages the environment surrounding its power stations in cooperation with relevant municipalities and neighboring businesses.

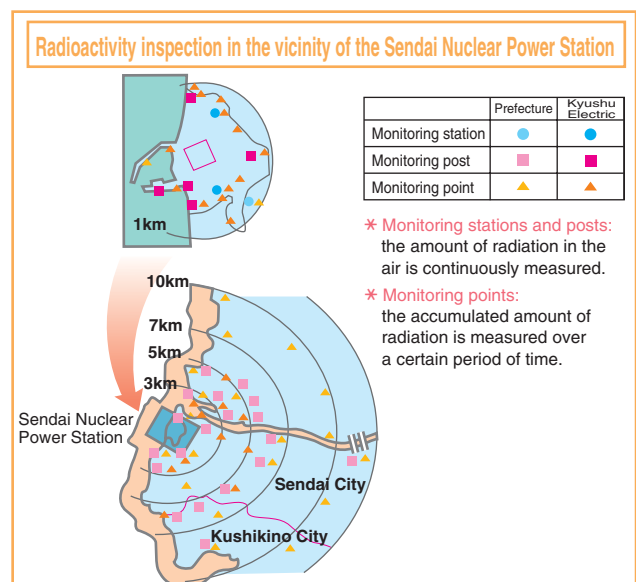
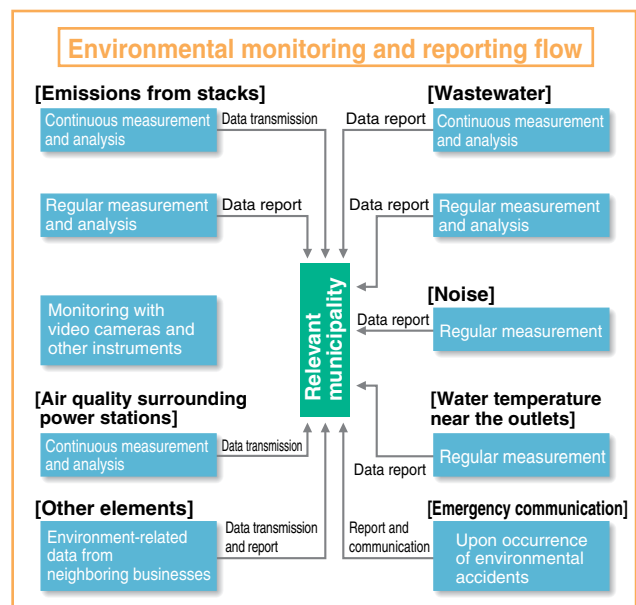
◇ Environmental monitoring for radioactivity* surrounding nuclear power stations

The amount of radiation* in the air near power stations and samples of seawater and agricultural and marine products is measured. Similar measurements are also performed in the prefectures where nuclear power stations are located.

- Kyushu Electric Power reports the measurement results to the related prefectural authorities. The authorities in turn review and evaluate the reports under the guidance and advice of academic experts and publicize the findings in PR magazines.
- The radiation dosage for people living near power stations is less than 0.001 mSv* per year. This is much lower than the statutory dosage limit of 1 mSv* per year and also lower than the annual 0.05 mSv* target set by the Nuclear Safety Commission.

Measures against land pollution

- Kyushu Electric Power strictly abides by the laws and regulations on land pollution to avoid discharge and leakage of toxic substances into the ground. The company conducts voluntary surveys on soil contamination for sites sold or purchased by the company, to avoid the risks of land pollution.
- Based on survey results released by the government, Kyushu Electric Power conducted a groundwater contamination survey in possibly contaminated areas in the vicinity of the company-owned land. The findings revealed that the groundwater was free from contamination attributable to Kyushu Electric Power.



Radioactive waste* management

Radioactive waste* includes low-level radioactive waste* generated from nuclear power stations and high-level radioactive waste* resulting from spent fuel reprocessing. Both require different management and disposal methods.

◇ Management of low-level radioactive waste*

- Radioactive waste in gas or liquefied form is discharged into the air or sea after being treated, measured for radioactivity, and confirmed as safe. The influence of such discharge on our power stations' surrounding environment is within the range of natural radiation.

🔍 Discharge status of radioactive gaseous and liquid waste

(Unit: Bq)

		Targeted value	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	
Gaseous waste	Noble gases	Genkai NPS	2.2×10^{15}	3.1×10^{11}	2.9×10^{10}	1.1×10^{10}	8.8×10^9	1.2×10^{10}	9.9×10^9
		Sendai NPS	1.6×10^{15}	3.7×10^{10}	6.7×10^{10}	3.1×10^{10}	1.5×10^{10}	1.6×10^{10}	3.1×10^{10}
	Iodine	Genkai NPS	5.9×10^{10}	3.9×10^6	N.D.	N.D.	N.D.	N.D.	N.D.
		Sendai NPS	6.2×10^{10}	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Liquid waste (excl. tritium)	Genkai NPS	1.4×10^{11}	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	
	Sendai NPS	7.4×10^{10}	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	

*NPS: Nuclear Power Station

*1: Bq (becquerel) shows the concentration of radioactivity.

*2: N.D. stands for the values less than detectable critical concentration.

- Concentrated treated wastewater is solidified with asphalt and sealed inside metal drums.
- Solid waste is first bulk-reduced by incineration and/or compression and sealed inside drums. These drums are first stored stringently in the solid waste storage located within the power station site. The drums are then transferred to the Low-level Radioactive Waste Disposal Center* of Japan Nuclear Fuel Limited* in Rokkasho-mura Village, Aomori Prefecture. They are buried and kept there until the waste ceases to have

an effect on the living environment.

🔍 Solid radioactive waste storage status

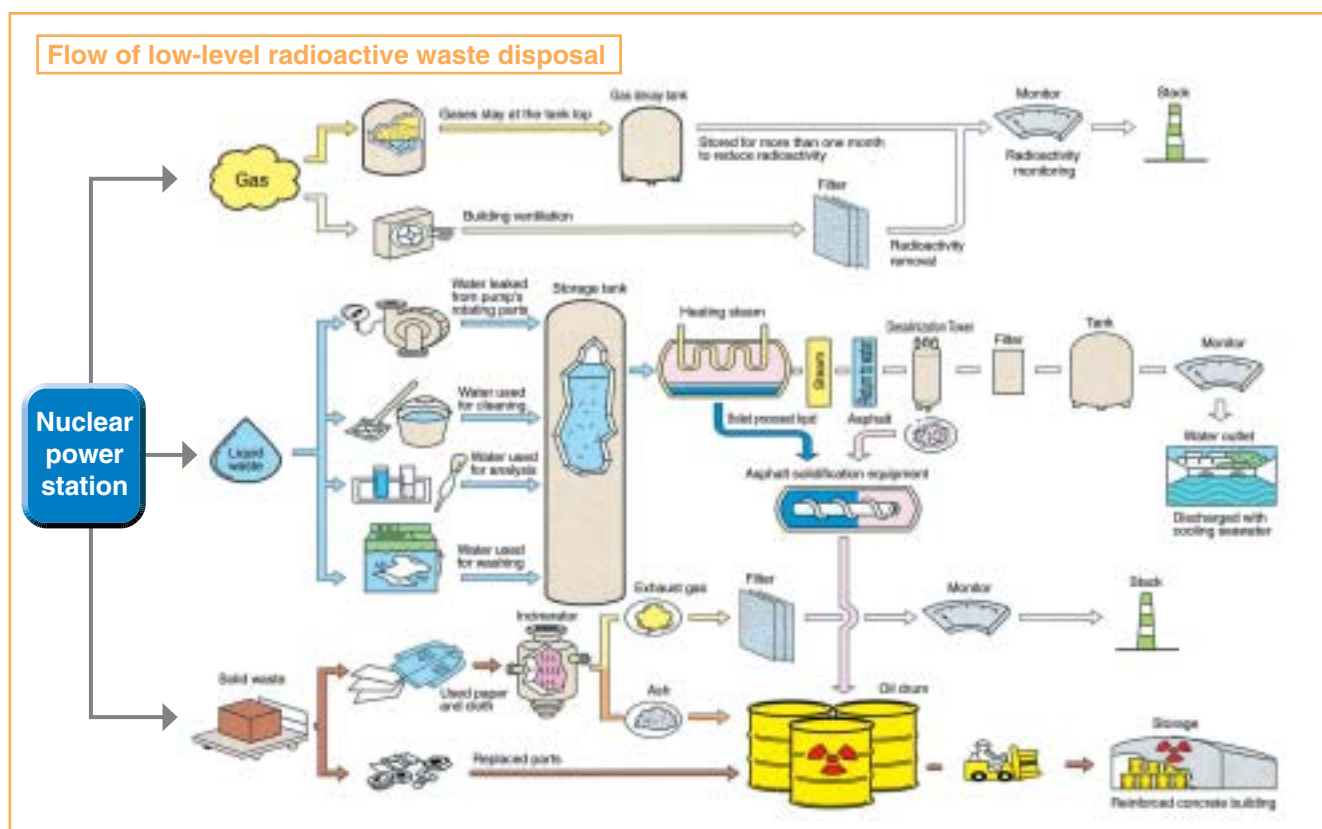
(Unit: a 200-liter drum)

	Waste stored in power station sites	Waste transferred*
Genkai NPS	20,480 (19,934)	6,536 (6,536)
Sendai NPS	11,173 (10,150)	—
Total	31,653 (30,084)	6,536 (6,536)

*NPS: Nuclear Power Station

*Figures are the cumulative totals as of the end of FY2003, and figures in parentheses are totals as of the end of FY2002.

Amount transferred to the Low-level Radioactive Waste Disposal Center



Chemical substance control

Most chemical substances handled by Kyushu Electric Power are for use at thermal or nuclear power stations and are properly managed at each site in full accordance with related laws and regulations.

PRTR* investigation results (FY2003)*1

Index No	Chemical substance	Applications	Unit	Amount handled	Amount released into environment				Amount transferred*2	FY2002 records (reference)		
					Air	Water	Soil	Landfill		Amount handled	Amount released	Amount transferred
30	Bisphenol A type epoxy resin*	Coating material for equipment	kg	1,100	22	0	0	0	0	—	—	—
40	Ethylbenzene*	Coating material for equipment	kg	3,800	3,800	0	0	0	0	—	—	—
63	Xylene*	Coating material for equipment	kg	16,000	16,000	0	0	0	0	5,600	5,600	0
179	Dioxins*	Waste incinerator	mg-TEQ*3	—	49	0	0	0	2.1	—	54	34
227	Toluene*	Coating material for equipment	kg	2,800	2,800	0	0	0	0	—	—	—
253	Hydrazine*	Feed water processing agent	kg	29,000	1.5	0	0	0	0	30,000	1.5	0
304	Boron and boron compounds*	Reactivity control in nuclear reactors	kg	3,200	0	0	0	0	0	2,200	0	0
353	Tris phosphate (dimethyl phenyl)*	Turbine control	kg	7,600	0	0	0	0	7,600	7,100	0	7,800

1: Calculated for one ton or more of Type I Monitoring Chemical Substances, or 0.5 tons or more of Type I Monitoring/Designated Chemical Substances* handled by operational sites annually (Effective digit: 2). All dioxins are calculated regardless of the amount.

*2: Amount transferred as waste *3: Since the toxicity of dioxins differs according to types, values are expressed in toxicity equivalent quantity (TEQ)* in 2, 3, 7, 8-T4CDD.

N.B. 1: Since FY2002, under the Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances* and Promoting Improvements in Their Management (full enforcement in Apr. 2001), enterprises are required to report to the government the quantity and management of specified chemical substances that are emitted and transferred for the record and management.

N.B. 2: Under the PRTR (Pollutant Release and Transfer Register) system, operators keep track of the amount of each chemical substance subject to PRTR that is released during operational activities and of the amount transferred as waste. These results are then reported. This system serves to promote voluntary management efforts by operators together with society as a whole, fostering countermeasures against the environmental risks imposed by such chemical substances.

◇Dioxins*

Kyushu Electric Power is reducing the use of waste incinerators, which are believed to contribute to dioxins* emission. As for the boilers installed at thermal power stations, only small amount of dioxins* are emitted because fuel contains little chlorine, and high combustion temperatures are secured by an appropriate management system to help process them effectively.

- The company discontinued the use of 39 incinerators in fiscal 2002, and one waste incinerator in fiscal 2003, leaving seven waste incinerators in operation as of the end of fiscal 2003.
- Currently, six of the above seven incinerators are not being used. The remaining incinerator's emission levels meet all standards stipulated by the Law Concerning Special Measures against Dioxins, enforced in January 2000.

◇PCB (polychlorinated biphenyl)*

- Equipment utilizing PCB* (1,512 high-voltage transformers, capacitors and others) is kept in special storage areas at Kyushu Electric Power under strict surveillance.
- Kyushu Electric Power plans to treat the equipment and render it harmless by 2016, the deadline set by the Law Concerning Special Measures against PCB* Waste, effective as of July 2001.
- The national investigation committee has been discussing the causes for and the basic policies for countermeasures concerning a minute amount of PCB* that enters equipment (equipment with a trace of PCB*). Since the causes and the equipment with a trace of PCB* have not been specified yet, the company conducts PCB examinations as a preventative measure to detect the presence of PCB* when handling insulation oil such as equipment dismantlement. The dismantled equipment detected with a trace of PCB* is kept in designated storage areas under strict control.

5 Harmony with the surrounding environment

When designing facilities, Kyushu Electric Power places a high priority on the natural environment and urban landscapes of its surrounding areas and implements environmentally friendly measures such as tree planting in addition to environment protection activities.

- Kyushu Electric Power has been promoting the underground power distribution system that enables safe and pedestrian-friendly pavement, the revitalizing of local communities and urban landscape protection. The company has been implementing systematic installation of such a distribution system, based on the "Underground Distribution System Installation Plan" (FY1986 - 1998) and the "New Underground Distribution System Installation Plan" (FY1999 - 2003) with the cooperation of road administrators, related local authorities and distribution line administrators since fiscal 1986. Through these efforts, underground distribution lines having a total length of 497 km have been installed mostly along main roads in urban areas of the company's service area.

In the future, Kyushu Electric Power will continue its efforts to expand the underground distribution system to other roads based on the "Pole-free Power Distribution Promotion Plan" (FY2004 - 2008) to harmonize with the surrounding environment.

Underground distribution system installation status

	Underground Distribution System Installation Plan			New Underground Distribution System Installation Plan		Total
	1st period (1986-1990)	2nd period (1991-1994)	3rd period (1995-1998)	4th period (1999-2003)		
Underground distribution line installed (km)	97	73	117	210	497	

■ Landscape before/after the system installation (Fukuoka City)



Before



After