

3 Efforts Relating to Local Environmental Issues

The J-POWER Group understands that the basis for harmony with local communities is to ensure the safety and preserve the living environment of the residents by taking measures to minimize the environmental impact of our operations.

Close-up Preserving Biodiversity

In all its business activities, the J-POWER Group considers their impact on biodiversity and strives for harmonious coexistence with the natural environment.

When building a new power station or other facility, we carry out environmental impact assessments and adopt appropriate environmental safeguards with the views of local residents in mind. In addition, we carefully monitor outcomes as we pursue environmental policies oriented to harmonious coexistence with nature.

ACTION Steps to Preserve Biodiversity

In all our business operations, the J-POWER Group strives to accommodate and protect wildlife with the preservation of biodiversity in mind.

Northern Japanese Macaque

The Ohma Main Transmission Line will extend 61 km through Aomori Prefecture, from the Ohma Nuclear Power Station (Ohmamachi), currently under construction in Shimokita-gun, to Tohoku Electric Power Company's Higashidori Nuclear Power Station (Higashidori Village). During construction of the new line, it was found that the area bordering the route was a rich natural environment populated by a variety of rare species of flora and fauna, including the northern Japanese macaque, a protected species. For this reason we are proceeding very carefully with construction, taking adequate account of the impact on the surrounding environment.

Since 1997 we have gathered expert opinion on the macaques, sponsoring a study of the macaques' activity around the construction site using radio transmitters, and we have incorporated the information into conservation measures designed to minimize the impact of construction on the macaques' habitat.

In addition to Japanese macaques, the area around the planned route is known to be home to a number of rare bird species, including the northern goshawk and the mountain hawk-eagle. As with the Japanese macaques, we have sought expert advice and have adopted conservation measures to minimize our impact on these rare bird species.

We also require all staff involved in the project, including construction personnel, to keep with them at all times a conservation handbook containing photographs of the rare plant



Northern Japanese Macaques (photo taken December 3, 2003)

and animal species in the area, so that transplanting and other appropriate steps can be taken if these species are discovered near the site.

Japanese Golden Eagle, Okutadami-Otori Area

The area around Okutadami Dam and Otori Dam (Fukushima Prefecture, Niigata Prefecture) is home to the Japanese golden eagle, ranked as "endangered IB" in the Environment Ministry's Red Data Book. The J-POWER Group is helping protect the eagles by avoiding outdoor work on these dams during the eagle's nesting season. If work needs to be carried out in the vicinity, we determine the status of nesting activity, seek the advice of local ornithological experts, and take precautions to reduce vehicle traffic and noise level so as to minimize the impact on nesting activity.



Young Japanese golden eagle (photo taken July 18, 2000)

Blakiston's Fish-owl, Tokachi District

The Tokachi district of Hokkaido is home to Blakiston's fish-owl, classified as "endangered IA" in the Japanese Environment Ministry's Red Data Book (critically endangered in Hokkaido). The J-POWER Group is taking care to minimize any impact on the owl population, as by scheduling work in the area for times other than the nesting season.



Blakiston's fish-owl (photo: Kushiro Zoo)



Like the beech and Japanese oak forest near Tagokura Dam, much of the wooded land owned by J-POWER is relatively pristine forest. We are committed to maintaining these forests to protect their precious ecosystem.



Tagokura Dam (Fukushima Prefecture)

ACTION → **Harmony with the Aquatic Environment**

In all of its business operations, the J-POWER Group is mindful of the aquatic environment that supports the local ecosystem.

Water Quality of Dam Reservoirs

Typhoons and torrential rains can cause mud to flow into rivers, and dam reservoirs have an inherent tendency to retain this muddy water. When this happens, water released from the dam for power generation purposes can prolong the river turbidity. In the J-POWER Group, we monitor the water quality of our dam reservoirs by installing turbidimeters and performing water quality analyses on water samples. We also monitor changes in turbidity during periods of heavy runoff so that we can take appropriate countermeasures, as by using dam discharges to pass turbid water through quickly or installing surface-water intake systems that permit intake of the relatively clear water at the surface. In areas where turbidity is severe, we are taking preventive measures by working with national and prefectural governments in their forest management and afforestation programs.

River Maintenance Discharge

Downstream from power station dams, river flow falls off between the dam and the generator outlet. To preserve a healthy river flow, we carry out river maintenance discharges in consultation with the Ministry of Land, Infrastructure and Transport and other relevant agencies.



River maintenance flow discharge (Itoshiro Dam, Fukui Prefecture)

Restoration of Wetlands

Plans connected with the Okutadami-Otori Hydro Power Expansion Project called for rock generated during excavation to be used as landfill on the left bank downstream of the Okutadami Dam. Because the area hosted a mountain ecosystem that depends on a wetland environment, a plan was devised to conserve the wetland ecosystem while proceeding with the landfill by creating a new wetland to take the place of the old. Meticulous attention was paid, such as by transplanting the flora carefully and allowing the old and new wetlands to exist together for as long as possible to allow dragonflies and other wildlife to migrate naturally. In fiscal 2005, these efforts were recognized and awarded the Japan Society of Civil Engineers Environment Award.

Since then, we have confirmed the continuing presence of rare dragonfly species in the area, including a newly created pond just downstream from the new wetland. In fiscal 2007, we carried out our first scientific survey to track changes in the flora and fauna since the restoration, and we are using the findings to draw up a maintenance plan for the period through 2013 to further enhance the efficacy of our conservation efforts.



Pond created in area adjacent to new wetland

COLUMN

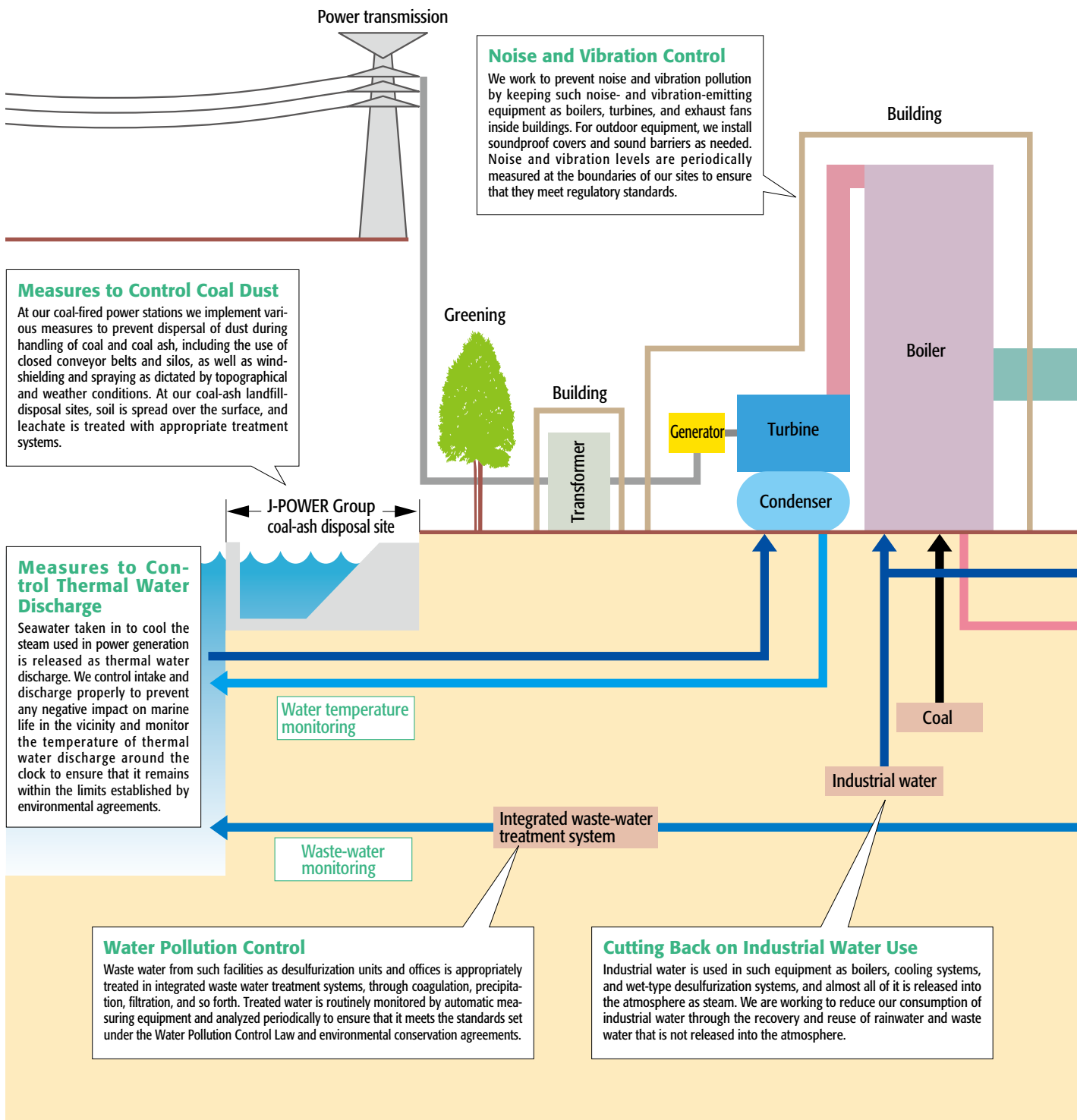
Control of Reservoir Sediment

Each year large quantities of earth flow into dam reservoirs from upstream, and a portion of it builds up as sediment at the bottom of the reservoir. This can cause the level of the river bottom to rise, raising the risk of flooding when rains or melting snow cause the river level to rise upstream. To prevent this, we control sediment by dredging and removing it or transporting it to another part of the reservoir.

Reduction of Environmental Load

In the J-POWER Group we use the latest environmental technology and know-how to prevent air and water pollution, noise, and vibration from our thermal and hydroelectric power facilities, so as to minimize the impact of our activities on air quality, water quality, and other aspects of the local environment.

Environmental Measures at Coal-Fired Power Stations



Air Pollution Control

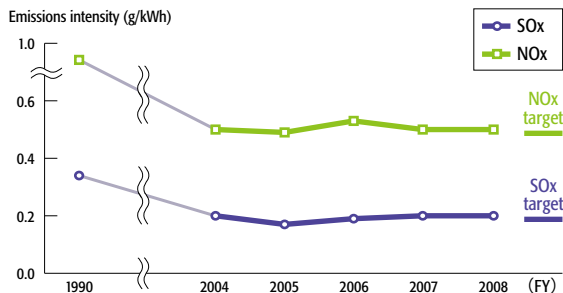
Combustion of coal and other fuels can generate sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust. To reduce these emissions we have improved our combustion methods and installed such flue-gas treatment equipment as desulfurization and denitrification systems and electrostatic precipitators. Although the performance of equipment varies with its date of installation, at each facility we have installed the newest technology available at the time to remove pollutants with maximum efficiency. This equipment operates automatically with the aid of monitoring devices that continuously measure the content of flue gas. In addition, human operators monitor the equipment 24 hours a day to ensure a swift response in the event of any malfunction.

Flue-gas Emissions, FY 2008

Substance	Equipment efficiency (removal efficiency)	Emissions	Emissions intensity
SOx	69%–99%	10,600 tons	0.20 g/kWh
NOx	70%–91%	26,700 tons	0.50 g/kWh
Soot and dust	99% (as designed)	800 tons	0.02 g/kWh

Notes:
 1. Emissions intensity: Emissions per unit of electricity generated at thermal power stations.
 2. Emissions of soot and dust are calculated on the basis of measurements taken monthly.

J-POWER Group SOx and NOx Emissions Intensity



Note: Figures for 1990–2004 are for J-POWER only.

Odor Control

Ammonia is used in such equipment as our flue-gas denitrification systems, and we are careful to prevent its leakage from equipment for handling it and facilities for receiving and storing it through routine inspections and other measures. Odor levels are periodically measured at the boundaries of our sites to confirm that they meet regulatory standards.

Stack

Flue-gas monitoring

Greening

We supply our sites with greenery by planting trees and shrubs, primarily evergreens.

Greening

Power station boundary

Noise/vibration monitoring
 Odor monitoring
 Dust monitoring

Electrostatic precipitator
 Flue-gas desulfurization system
 Flue-gas denitrification system

Coal ash

Gypsum

Waste recycling (p. 61)

Measures to Prevent Soil Pollution

From fiscal 2004 through 2006, we conducted studies at all J-POWER Group domestic sites and determined that they were free of soil or groundwater contamination. We will continue working diligently to prevent soil and groundwater pollution.

COLUMN

Dry-type Flue-gas Desulfurization-Denitrification System (Regenerative Activated Coke Technology: ReACT)

The ReACT dry-type desulfurization and denitrification system continuously regenerates and recycles activated coke, removing such pollutants as SOx, NOx, and soot and dust from flue gas. Another key feature is that it uses almost no water. J-POWER has been using this system at two of its large-scale commercial plants, the Takehara Thermal Power Station No. 2 unit and the Isogo Thermal Power Station new No. 1 unit. In addition, J-POWER Group company J-POWER EnTech, Inc., which specializes in ReACT engineering, has been supplying ReACT systems for power stations, steel mills, and other industrial facilities in Japan and abroad, including J-POWER's Isogo Thermal Power Station new No. 2 unit (began operating in fiscal 2009). By using this technology in our own power stations and making it available to other companies and industries as well, the J-POWER Group is helping reduce the environmental load across a broad economic spectrum (see also p. 78).



Dry-type desulfurization system at Isogo Thermal Power Station new No. 2 unit (Yokohama)

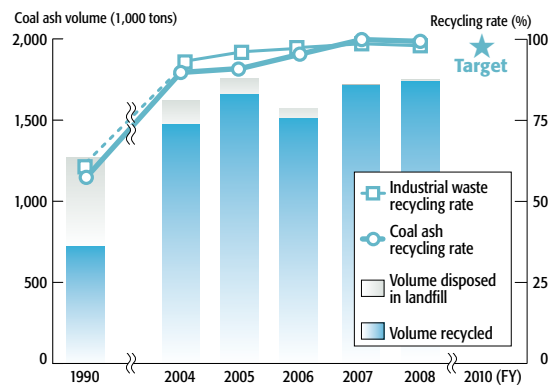
Establishing a Sound Material-Cycle Society

To help establish a sound material-cycle society, the J-POWER Group is working hard to reduce the waste we generate and to properly treat and recycle the waste we do produce. We are also pursuing business undertakings that build on these practices.

Recycling and Reduction of Waste

In fiscal 2008, the J-POWER Group generated 2.14 million tons of industrial waste, while recycling or reusing resources totaling 2.10 million tons, or 98 percent. In the J-POWER Group, we intend to promote more extensive recycling of coal ash and reduction of industrial waste generated from the maintenance and operation of power stations to “achieve a recycling rate of 97 percent within the J-POWER Group as a whole by the end of fiscal 2010, with the goal of zero emissions¹ of industrial waste” (see p. 43).

Industrial Waste and Coal Ash Recycling Rates

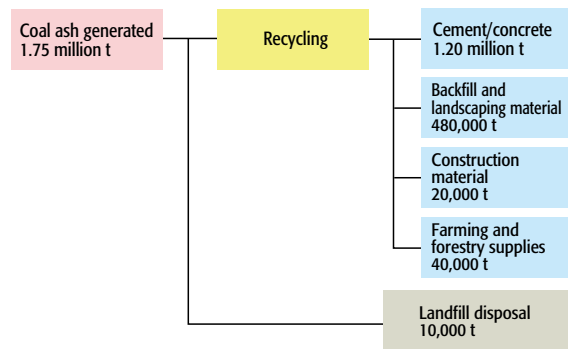


Note: The figure for FY 1990 represents J-POWER's recycling rate for coal ash only; figures for FY 2002–FY 2003 are the rate for all industrial waste produced by J-POWER; FY 2004–FY 2008 and target figures represent the recycling rate for all industrial waste generated by all companies of the J-POWER Group.

Beneficial Use of Coal Ash and Gypsum

Almost all the coal ash generated by coal-fired power stations is recycled, either as construction material such as a clay substitute in cement and backfill and landscaping material or farming and forestry supplies such as fertilizers. All of the gypsum and sulfuric acid generated by our flue-gas desulfurization systems is recycled.

Breakdown of Coal-Ash Recycling



Examples of coal ash recycling



Park turf planted using “J-SAND” (clinker ash²)



Dam built with “J-POWDER” (fly ash³) as concrete admixture

COLUMN

EPO-COAL: Recycled Activated Coke Powder for Dioxin Removal

J-POWER's powdered dioxin remover EPO-COAL for waste incinerators is a commercial product made from activated coke powder discharged by the dry-type flue-gas denitrification unit at the Takehara Thermal Power Station No. 2 unit. In fiscal 2008, sales volume doubled from the previous year, reflecting the high marks EPO-COAL receives from users and equipment manufacturers for performance, quality, and stable pricing. Production of EPO-COAL using activated coke from Isogo Thermal Power Station new No. 1 unit began in April 2009, following installation of equipment to improve the quality of the activated coke generated by that facility's desulfurization system.

The purpose of the J-POWER Group's involvement in this business is not only to reduce waste and raise our recycling rate but also to contribute to the creation of a material-cycle society. We also regard it as integral to our efforts to stem

global warming, since recycling can reduce the CO₂ emissions that result from production of the activated coke commonly available on the market. As a member of a society that is striving for harmonious coexistence with the environment, we plan to pursue such operations actively.



Dry-type flue-gas treatment (activated coke pellets)

Thermal power station dry-type flue-gas treatment system (recycling)

Powdered by machine and chemical action



EPO-COAL (activated coke powder)

key word

¹ Zero emissions

An initiative advocated by United Nations University to build a system of waste recycling through inter-industry partnerships and reduce the amount of waste (final disposal volume) to a level approaching zero.

² Clinker ash

Sandlike substance formed when dissolved ash congeals and collected at the bottom of boilers. Used as soil and ground conditioner, backfill material, etc.

³ Fly ash

A granular ash created by the combustion of coal in boilers and collected in electrostatic precipitators. Used as concrete admixture.

● Beneficial Use of Driftwood

In the J-POWER Group, we recycle the driftwood that flows into the dam reservoirs at our hydroelectric power stations, using it to manufacture charcoal or extract pyrolygneous acid, or chipping it for use as building material, mulch, or ground cover.

Ground cover made from our chipped driftwood has been used in parks, as in the photo below, and on the restored Fuda Path (said to have been used by members of the heroic Shinsengumi band of samurai when they traveled to a village to teach swordsmanship), part of our project to develop a “community forest” around the site of the Nishi Tokyo Power Administration Office.

We are currently studying other ways of recycling driftwood, such as the use of chips as boiler fuel by local businesses.



Chips used as ground cover at Ikehara Dam Park (Nara Prefecture)

● Recycling of Construction By-products

We work with subcontractors and others to promote efficient use of by-products generated by new construction, expansion, and renovation of electric power facilities, as by recycling concrete scrap and cleared timber or making use of loose earth generated during construction within the grounds of the facility.

Reducing and Recycling Office Waste

All J-POWER Group offices are working to reduce non-industrial waste by such measures as sorting waste paper, bottles, cans, and plastics; using both sides of copier paper; and reusing envelopes.

In respect to our paper recycling rate, our employees are working harder than ever to help us reach our group-wide corporate target (see p. 43).

● Promoting Green Purchasing

To contribute to the development of a material-cycle society, we have adopted the J-POWER Group Green Purchasing Guidelines^{*4} to promote green purchasing throughout the J-POWER Group.

These guidelines apply not only to office supplies but to all products and services purchased by members of the J-POWER Group.

We are pursuing a wide-ranging policy that encourages environmental responsibility among our suppliers and subcontractors, as by stipulating specifications that must be built into construction and other contracts to ensure that subcontractors carry out the work in an environmentally friendly manner.

In addition, we are taking our efforts a step further by establishing group-wide corporate targets (see p. 43) for the rate of green purchasing of office supplies (desk supplies) and the ratio of recycled copy paper to the total purchased, as well as the percentage of low-emission vehicles among Group company vehicles, to promote green purchasing on an ongoing basis.

PERSON

Hiromi Iwamatsu Management Group, JPEC Matsushima Company

We Take Sorting Seriously

The city of Saikai (Nagasaki Prefecture) is fastidious about sorted garbage collection, and we do our best to cooperate. Instead of waste baskets in the offices, we have waste stations on each floor with separate receptacles for burnable trash, paper, plastic, PET bottles, PET bottle caps, and so forth—close to 10 receptacles altogether. At times we may find ourselves wondering which

one to use, but that gives us an opportunity to think about why we need to sort.

We also take pains to purchase nothing but green supplies. Often the first handy-looking product I spot is missing the Eco-mark, so I search through the catalogue to find another product that is not only just as handy but also has the Eco-mark.



*4 J-POWER Group Green Purchasing Guidelines

web http://www.jpowers.co.jp/company_info/environment/kankyo04gl.html
(Japanese only)

Environmental and Recycling Programs

The J-POWER Group is involved in a variety of environmental and recycling programs pertaining to such matters as proper waste treatment, environmental conservation, and use of untapped energy sources.

● Demonstration Trials of Non-industrial Waste Carbonization

To promote the use of a promising untapped energy source, the J-POWER Group has been developing technology for production of carbonized fuel from non-industrial waste with biomass content. The current project, aimed at achieving a more efficient use of biomass energy, is being carried out in collaboration with the city of Saikai in Nagasaki Prefecture as a NEDO (New Energy and Industrial Technology Development Organization) Verification Test for Biomass and Other Untapped Energy. It involves demonstration testing at Matsushima Thermal Power Station to verify the feasibility of replacing a portion of the coal burned at coal-fired thermal power stations with carbonized fuel, as well as development of technology for producing the fuel. Viewed also as a means of reducing CO₂ emissions through the use of biomass fuel in coal-fired power stations, the operation has produced about 60 tons of carbonized fuel from 276 tons of non-industrial waste as of the end of fiscal 2008.



Test facilities for production of carbonized fuel from non-industrial waste (Matsushima Thermal Power Station, Nagasaki Prefecture)

● Omuta Recycle Power Station

Since December 2002 the J-POWER Group has been operating a high-efficiency waste-power station in Omuta, Fukuoka Prefecture, that uses refuse-derived fuel (RDF) made by shredding, drying, and pelletizing non-industrial waste.



Omuta Recycle Power Station (Fukuoka Prefecture)

● Narumi Waste Gasification Plant, Nagoya

The J-POWER Group is also participating in a project involving gasification power generation^{*1} using non-industrial waste. At the Narumi Waste Gasification Plant in Nagoya, waste is not only used to generate power but also reduced to molten slags and metals that can be recycled. The facility began operating in July 2009.



Narumi Waste Gasification Plant (Nagoya)

COLUMN

Dioxin Monitor

A valuable by-product of the J-POWER Group's development of technology for non-industrial-waste power generation is our proprietary flue-gas monitor, first developed seven years ago. Our initial model (coulometric titration method) is widely used to monitor dioxin emissions from incinerators and other systems.

We continued work on our monitoring technology, and today a new, high-performance model (plasma

method) is on the threshold of commercialization. This latest technology is designed to support the stable, long-term operation of waste power plants and other facilities by facilitating the monitoring and control of gas emissions, and we are hopeful that it will enhance the safety and peace of mind of local residents while contributing to the development of a material-cycling society.



Field testing of new flue-gas monitor

key word

*1 Gasification power generation

Power generation technology that uses high-temperature processing to melt down such waste matter as burnable refuse, combustion ash, and shredded solid waste into recyclable slag. The pyrolysis gas generated by the gasification-melting furnace is directed to a boiler for heat recovery and used to power an electric generator. The electric power thus generated is used to operate the facility, and surplus power is sold.

Management of Chemical Substances

Storage and management of chemical substances in the J-POWER Group is rigorous and in full compliance with the law. With regard to PCBs, we are following detoxification treatment procedures in conformance with Japan's regional waste treatment program.

PRTR (Pollutant Release and Transfer Register) Law

The PRTR system is a mechanism for reporting and disclosing the level of chemical emissions and the transfer of chemicals to the environment through waste materials. The legislation was enacted in 1999, and monitoring and reporting of the targeted substances began in 2001.

While the J-POWER Group uses chemical substances for painting and coating, treatment of intake water at thermal power stations, and other purposes, we have traditionally managed these substances carefully by monitoring and recording the quantities purchased and used. We are committed to reducing the use of such chemicals and to controlling and managing those we use appropriately, complying with all established procedures. With respect to dioxins, we are working hard to reduce emissions through proper management and oversight of facilities.

>>> PRTR Substance Release and Transfer Volumes (FY 2008)

Substance	Use	Volume handled	Volume released	Volume transferred as waste
63: Xylene	Coating for machinery	13.43 t/y	8,616 kg/y	64.38 kg/y
40: Ethylbenzene	Coating for machinery	1.03 t/y	1,032 kg/y	-
177: Styrene	Coating for machinery	1.01 t/y	1,006 kg/y	-
26: Asbestos	Insulation material	7.46 t/y	-	7,461 kg/y
179: Dioxins	Waste incinerators	-	0.0 mg-TEQ/y	3.1 mg-TEQ/y
304: Boron and its compounds	Fertilizer additive	14.49 t/y	0.3 kg/y	-

Notes:

1. Figures represent total release and transfer volumes for all business sites handling 1 ton or more per year of a Class 1 designated chemical substance or 0.5 ton or more per year of a Specific Class 1 designated chemical substance.

2. For dioxins, figures represent total emissions from waste incinerators.

Measures to Reduce Dioxins

The J-POWER Group operates incinerators (designated as "specified facilities" under the Act on Special Measures against Dioxins) at three business sites. At these specified facilities we follow appropriate maintenance and management procedures, such as sorting prior to treatment and combustion temperature control. In compliance with the above-mentioned act, the dioxin concentration in the flue gas of these facilities is measured at least once a year and reported to the local government, and in fiscal 2008, all of them met emissions standards.

Asbestos

The J-POWER Group has adopted an asbestos policy, under which we have conducted health checks and surveys of asbestos use in our equipment and buildings and undertaken appropriate countermeasures. According to the results of our surveys, there are no active or retired J-POWER Group employees who have been designated eligible for workers' compensation for health problems or death from asbestos, or who are in the process of applying for such compensation.

Where we have confirmed the presence of asbestos, we are systematically removing it and switching to alternatives while effectively managing the process to prevent dispersal of asbestos dust. Asbestos-containing material that has been removed is disposed of in a manner consistent with the Waste Management and Public Cleansing Act.

PCB Waste

● Management and Treatment of PCBs

PCBs have been widely used for insulating oil in transformers and other electric devices because of their excellent heat-resistance and insulation properties. Because of their toxicity, however, manufacture and import were outlawed in 1974, and all those in possession of such substances were required to observe stringent storage and management requirements. In July 2001, the Act on Special Measures against PCB Waste came into force, and proper treatment of waste containing PCBs became mandatory.

The J-POWER Group began treatment of these substances under the regional waste treatment program in February 2005, and as of March 2009 we had treated approximately 9 kl of insulating oil (containing high concentrations of PCBs). The J-POWER Group currently has approximately 130 kl of insulating oil (as of March 2009). This is stored and managed under stringent conditions in 31 warehouses and similar facilities that we have established nationwide.

● Trace PCB Contamination

Concerns have been raised by the detection of extremely low levels of PCBs in heavy electrical machinery that would not ordinarily contain PCBs. In the J-POWER Group, we are conducting analyses as needed, following stringent management procedures for machinery using insulating oil in which traces of PCBs have been detected, and submitting all paperwork required by the relevant laws and regulations. We will continue to respond to this issue in a conscientious and appropriate manner.