



Tokuyama Corporation  
**Environmental Report**  
A Statement of Our Commitment  
to the Environment and Safety and Health  
Responsible Care **2003**

## Message from the President

# We desire to earn the trust and loyalty of customers and society at large by dedicating ourselves to the shaping of a sustainable society.

The economic system of the 20th century, marked by mass-production and mass-consumption, has brought within reach of mankind an unprecedented level of prosperity. Yet for all the benefits we have enjoyed, many environmental problems have been occurred on a global scale, such as global warming and the depletion of the world's natural resources. At the dawn of the 21st century, we are driven to reflect and to take decisive action to make the "transition to a sustainable system of production and consumption." While we, as a chemical manufacturer, have contributed much to the improvement of living standards and welfare through supplying a wide range of chemical products, we also recognize the imperative need to ensure that our corporate activities and our products do not lead to environmental problems and jeopardization of human health.

Based on this recognition, we have committed ourselves in the spirit of Responsible Care designed to protect the environment and ensure human safety and health in all aspects and at all stages of our products throughout their life-cycle from development through production, distribution, use and end-user consumption to disposal.

One of the priority areas of our strategy has been defined in our medium-term management plan as "Environment and Energy." This underscores our determination to embrace environmental management as a core element of our management strategies. "Environmental Management" is a management approach that addresses environmental considerations as important concerns. In this sense, it is our mission to integrate environmental protection into all our activities, from research and development through the production process to the sale of our products, and thereby enhance the value of our company and contribute to the realization of a sustainable society.

The key feature of our operational structure is our manufacturing activities in both chemical products and cement. In all our production activities, we have always maintained a resolute commitment to recycling of by-products and waste. In 2000, we launched the Resource Recycling and Environmental Business Department. The importance we attach to the environment as a business proposition can be gauged by the way we accepted as much as 1.34 million tons of



external industrial by-products and waste for use in our cement plant in 2002. These activities have produced a "trickle-down" effect that has helped us build a solid awareness at all levels of our organization of the principles of "environmental management." Hereafter, we will strengthen our various resource-recycling and environmental business activities in a commitment to the shaping of a sustainable society and in our ambition to win the trust and loyalty of all our customers and of society at large.

With the 21st century being hailed as "the century of the environment," we are determined to play our role and measure up to our responsibility as a manufacturing company in creating a dynamic and sustainable order of society.

Shigeaki Nakahara  
President  
August 1, 2003

A handwritten signature in black ink that reads "S. Nakahara". The signature is written in a cursive, flowing style.

# We define our basic policy and action objectives in a company-wide commitment to the promotion of environmental management.

## Basic Policy

As a member of the Japan Responsible Care Council, Tokuyama Corporation carries out Responsible Care activities that protect the environment and preserve safety and health throughout the entire chemical substance life cycle from development to manufacturing, distribution, use, final consumption and disposal. Our social mission is to aggressively tackle and solve environmental issues in particular, which will, in turn, drive sustainable corporate development. Based on this recognition, we are promoting environmental management, which is a management policy that emphasizes the environment, in all of our business activities, including development, manufacturing and sales.

## Action Objectives

- 1 To promote environmental protection.
  - To employ the environmental management system in accordance with ISO14001 and reduce environmental impacts.
- 2 To faithfully observe laws and regulations.
  - To faithfully observe international rules, domestic laws and regulations, and industry standards.
  - To thoroughly practice internal export control rules.
- 3 To promote energy conservation and curb global warming.
  - To achieve the lowest unit energy consumption in the industry for all of our products.
- 4 To promote resource recycling and work toward reduction and proper management of waste materials.
  - To promote material recycling and thermal recycling of resources.
  - To promote office paper reduction.
- 5 To promote safety, disaster prevention, and occupational health and safety.
  - To aim for zero accidents and disasters on the basis of the principle of self-management in safety and responsibility.
  - To ensure a comfortable work environment and preserve safety and health.
- 6 To ensure strict product safety standards.
  - To provide products that have little impact on the environment and can be used safely.
  - To provide appropriate information on how to use products properly, precautions, etc.
- 7 To deepen our trusting relationship with society.
  - To disclose information regarding our activities in the areas of the environment, safety and health.
  - To actively carry out dialogue with local communities.

## Activity Goal

- Achieving a 15% reduction in the 1990 unit energy consumption by 2005.
- Achieving a 92% improvement in the effective waste utilization rate by 2005.

**Responsible Care (RC)** Responsible Care (RC) is a self-management activity to implement and improve measures concerning the environment and safety and health. It is an activity of a corporation producing or handling chemical substances that pledges in its management policy to protect the environment and to ensure safety and health throughout the entire chemical substance life cycle, from development, manufacturing, distribution, use and final consumption to disposal on the basis of the principle of self-determination and self-responsibility.

# The results of our efforts to reduce environmental impact have fueled our ambitions to work toward yet more demanding targets.

The targets set for environmental impact reduction and the results achieved in 2002 are summarized below.

We determined our environmental impact reduction targets for each of our business and production locations and acted upon them accordingly. Moreover, we promoted company-wide activities such as energy saving, waste sorting and recovery, and green procurement\* at our Head Office and Branch Offices.

### Our Commitment to the Environment

#### [ Promoting Responsible Care ]

As a member of the Japan Responsible Care Council, we recognize and accept our roles and responsibilities for the promotion of Responsible Care.

The Japan Responsible Care Council has introduced and initiated a verification system in an attempt to give greater substance to the RC activities of its corporate members and ensure a fuller measure of transparency in their actions for the surrounding community. We intend to accept this verification system to improve our RC activities.

#### [ Promoting the Introduction of a Management System ]

We are making progress towards achieving standardization of our activities. In this context we have embraced a company-wide commitment to the introduction and expansion of the ISO9001 and ISO14001 systems as well as the safety and health management system. We also recommend member companies of the Tokuyama Group and our affiliated companies to introduce these systems.

#### [ Contributing to the Realization of a Recycling-oriented Society ]

Cement-making is the core area of our business activities and we devote our efforts to the achievement of recycling and reuse in this area as our contribution toward the fostering of a recycling-oriented society.

#### [ Environmental Perspective throughout the Life-cycle of our Products ]

We accept a full commitment to environmental care in all our production activities, including the reduction of the environmental impacts of our products in the manufacturing process, the recycling of wastes, and energy conservation and saving.

### Production Activities and Material Flow

Most of the fuels and energy we use are consumed in the production of cement, chemical products, and polycrystalline silicon. Moreover, the entire energy supply for our production facilities comes from in-

house power generation.

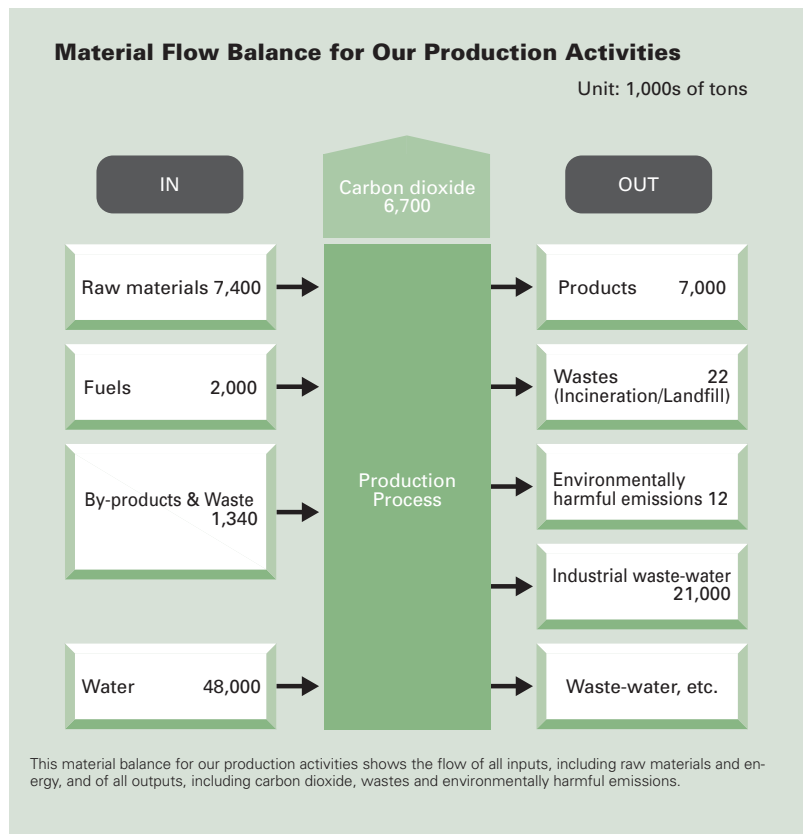
Our material flow balance shows the consumption levels of all primary inputs such as raw materials, fuels, water consumed for the production of our main products and for power generation on the one hand, and all emission levels generated in the process of our production activities, including carbon dioxide, wastewater and other emissions with an environmental impact on the other.

### Our Environmental Activities in 2002: the Facts and their Appraisal

- We have been successful in achieving a significant reduction in the emission of environmentally harmful substances such as SOx and NOx, recovering and recycling solids from our effluents, recovering waste heat and making progress in the thermal recycling of waste plastics.
- We have made substantial progress in reducing NOx emissions with the start of full-scale operation of a new gas denitrification system (de-NOx) at our cement plant.

#### \*Green Procurement

The purchase decisions regarding products and services are governed not only by the considerations of price, quality, convenience and design but also by the preference for goods and services with the least possible environmental impact.



- Our efforts in waste recycling in 2002 focused on increasing the rate of waste utilization and on substantially reducing the amount of waste disposed of as landfill.
- Our efforts toward the thermal recycling of waste enabled us to improve unit energy consumption. With effect from 2003, a more rigorous commitment will be undertaken to save energy and reduce waste on a project basis.
- As regards COD (Chemical Oxygen Demand),

PRTR (Pollutant Release and Transfer Register), dust and harmful atmospheric pollutants, there was variously a slight increase in emission levels due to production increase or a leveling off .

- We have made the necessary adjustments to meet the Soil Contamination Countermeasures Law, the PRTR Act and other new regulatory systems.
- We properly adjusted the air-conditioning systems and lighting of our offices in order to save electricity and as an integral part of our Green Procurement policy we promoted the use of recycled paper.

### Our FY 2002 RC Activities - Main Issues and Areas of Effort

Activity	Priority Issue	Details
Management	• Review by top management	• RC Administration Committee • Safety/environmental inspection
Environmental protection • Reducing environmental impact • Energy conservation • Recycling	• Reducing environmental impact (NOx, SOx, etc.) • Reducing emission levels of PRTR and harmful atmospheric pollutants • Improvement in unit energy consumption • Improvement in waste utilization rate • Promoting Green Procurement • Effective response to environmental regulations	• Reducing emission levels of NOx, SOx, etc. • Thermal recycling of waste plastics • Material recycling of wastes • Energy saving and resource-recycling in our offices • Green Procurement of paper and office materials
Safety and accident prevention	• Accident-free operation • Safety of distribution/transport	• Safety/environmental assessment • Acquiring safety approval for pressurized gases on a voluntary basis
Labor safety and health	• Zero-accident rate	• Introduction of a labor safety and health management system
Product safety	• Ensuring product safety	• Product assessment • Establishing an MSDS system • Establishing a yellow card system • HPV program
Social communication with local communities	• Participating in local/regional activities	• Participating in local voluntary activities • Dialogue with local communities
Promoting RC in order to encourage other group members to engage in RC	• Diffusion of RC	• Safety and environmental inspection • Promoting moves for the acquisition of ISO certification

### FY 2002 Environmental Management Activities

Activity	Details		Unit	Target	FY2001	FY2002	Difference against pre-activity year
Pollution prevention	Atmosphere	SOx	tons/year	-	2,260	2,010	-250
		NOx	tons/year	-	10,800	10,400	-400
		Dust	tons/year	-	179	235	+56
	Water quality	COD	tons/year	-	128	134	+6
Measures against global warming	Energy conservation	Reduction in unit energy consumption index (as compared with 1990)	%	-15 (2005)	-11	-12	-1
Reduction of wastes	Recycling	Rate of effective waste utilization	%	92 (2005)	91	94	+3
PRTR	PRTR	-	tons/year	-	88	90	+2
	Harmful atmospheric pollutants	-	tons/year	-	53	53	0

# Environmental accounting plays an important role in achieving effective environmental investment.

Since 2000, we have kept environmental accounting\* in order to permit a precise assessment and analysis of environmental investment and costs, and attain more effective investment for environmental protection in the future.

## Environmental Costs

The environmental costs and economic benefits were accounted for by environmental accounting. Our investments in pollution prevention and resource recycling accounted for about 90% of our total environmental investments. The rest of the investment costs went for plant development and environmental monitoring/measuring equipment.

Our main items of environmental investment spending in 2002 were environmental protection measures for

the coal-fired boilers in our power plant and general wastewater treatment plant. Investment funds were also allocated to the renewal of the electrostatic precipitators for the cement plant and to the modification of the waste incinerator.

The economic benefits earned were calculated from the cost savings in terms of reduced treatment costs and reduced primary fuel costs due to the reuse of wastes, and the costs benefits in terms of energy savings and profits made on the sale of saleable wastes. The profits gained from the economic effect of increased waste recovery and reuse in 2002 were improved by roughly 500 million yen to the previous year.

## \*Environmental Accounting

A clear recognition of the costs incurred in the environmental protection measures undertaken in our business activities and of the benefits achieved as a result helps us make a quantitative assessment that is then made public.

## FY2002 Environmental Protection Costs

Type of Environmental Protection Costs		Main Measures Undertaken	Investment Amount (Unit: Million yen)	Total Costs (Unit: Million yen)
On-site Costs	Pollution prevention	Installation of effluent treatment plant, flue gas treatment plant, and dust collectors (ESPs)	564	3,418
	Measures against global warming	Energy conservation	0	15
	Material Recycling	Modification of waste incinerator, installation of a general effluent treatment plant, organic flue gas combustion plant	381	1,040
Upstream/downstream costs	-	-	0	-
Costs of management activities	-	Installation of analyzers and meters for environmental measuring equipment	28	245
Research and development costs	-	Development of facilities related to environmental protection	73	268
Costs of community activities	-	Factory greening	17	36
Costs of environmental damage	-	Levies, disused mine area administration	0	217
<b>Total</b>			<b>1,063</b>	<b>5,239</b>

\* Data compiled in accordance with the Ministry of the Environment Guidelines for Introducing Environmental Accounting Systems.

\* The data cover all manufacturing plants of the company.

## Economic Benefits

Item	Material Benefits (Unit: 1,000s of tons)	Economic Benefits (Unit: Millions of yen)	Remarks
Reduction due to energy saving	-	262	Benefits arising from electricity and steam savings
Sale of saleable materials	160	173	Profits arising from the sale of saleable wastes such as metal scrap, waste oils, waste acids and waste alkalis.
Reduction in waste treatment costs	182	467	Saved waste treatment costs as a result of waste reuse
Reduction in material/fuel consumption due to waste recycling	185	345	Saved primary fuel costs as a result of waste reuse
<b>Total</b>		<b>1,247</b>	

# We have created a system in the company for planning, execution, evaluation and auditing to promote environmental measures quickly and effectively.

The RC Administration Committee and the Environmental Measures Committee evaluate the progress and results achieved in the implementation of our medium-term (three-year) environmental plan. We also operate an inspection and assessment system to check that management activities are carried out properly.

are selected by the respective committee or subcommittee chairman from the related Administration Departments.

In order to ensure the safety of equipment and environmental protection, a Safety and Environment Assessment Subcommittee is appointed. Its task is to inspect the safety of newly installed or modified equipment and its influence on the environment.

### \*ISO 14001

This international standard was established by the International Standards Organization (ISO) for Environmental Management Systems. It is not the type of standard that prescribes the mere adherence to certain standard values that have been decided, as is the case with pollution regulation measures. The company determines the policies and targets for reducing environmental impacts, and the accreditation body certifies the results achieved as a result of establishing the environmental management system.

### Support System for Responsible Care (RC)

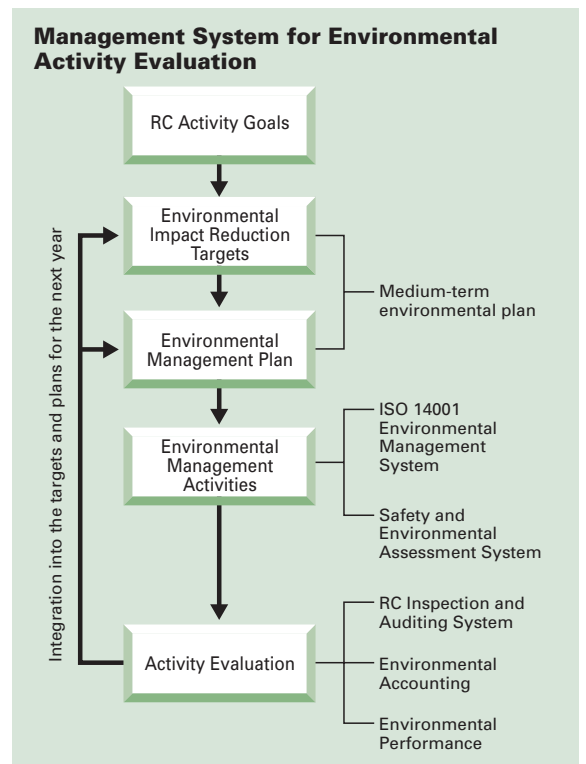
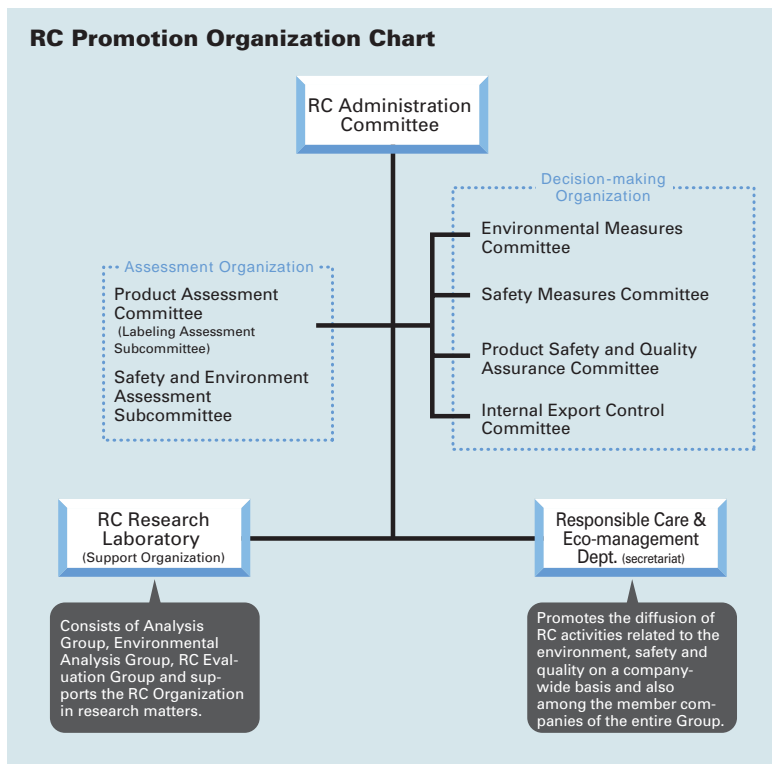
The supreme decision-making organization on issues related to the company's general RC activities is the RC Administration Committee. Chaired by the President of Tokuyama Corporation, its sessions are held in the presence of the members of the company's top-management. This RC Administration Committee discusses and approves company-wide policies and measures on safety, environmental protection, and quality. The sub-organizations of this Committee are the Safety Measures Committee, the Environmental Measures Committee, the Product Safety and Quality Assurance Committee, and the Product Assessment Committee. These organizations examine the specific programs for safety management, environmental management, and Product safety. One of the Directors is appointed to preside over each committee and subcommittee and take charge of environmental, safety and quality management. The committee and subcommittee members

### Management System for Environmental Activities and their Evaluation

In the process of achieving the medium-term environmental plan, a system is in place under which policies and targets are defined each year and specific action programs are established on the basis of these policies and targets for each division. The activity results are evaluated at the end of each year and integrated into the plan for the next year.

### ISO 14001 Environmental Management System

The Tokuyama and Kashima Factories have both acquired ISO 14001\* certification for their Environmental Management Systems. In accordance with the company-wide environmental policy directions, environmental policies and targets are determined for each factory.



### **ISO 9001 Quality Management System**

We have acquired ISO 9001\* Quality Management System certification for our main products. In 2002, we made the transition to ISO9001:2000 Standard and established our company-wide quality management system. The quality management system is effective throughout the company, including the sales and development departments, and will continue further to enhance customer satisfaction.

### **Inspection System**

We have established a comprehensive range of assessment or inspection systems in an effort to reduce environmental and safety risks.

We have established the Safety and Environment Assessment Subcommittee and the Product Assessment Committee as the organizations in charge of assessment and inspection. Their role is to carry our rigorous checks on the way in which environmental management, safety management and product safety management are implemented.

#### **[ Safety and Environmental Inspection ]**

Safety can only be achieved when the work operations and the equipment with which the work is done are safe. Whenever new production equipment is installed or existing equipment extended or modified, the practice is to conduct safety and environmental inspections beforehand. The objective of these safety and environmental inspections is to investigate the safety of equipment design, the safety of the materials handled, the existence of an appropriate response to errors, and compliance with the legal regulations in order to ensure that all equipment is safe and easy to operate, maintenance-friendly and free from accidents. Prior to the installation of equipment and before any equipment is finished and commissioned we make sure that it has been designed and built for safety and environmental compatibility. At a further stage, we check that the startup preparations have been completed in the most thorough manner.

#### **[ Product Safety and Labeling Inspection ]**

To verify the safety of our products, product safety inspections are carried out employing a comprehensive range of criteria and at all stages from research and development and design phases to the marketing of our products. Risk assessments are made in these inspection procedures from a variety of viewpoints, including the safety of chemical products, their effect on the environment, the effect on human health and their compliance with the relevant legal regulations.

### **Inspection and Auditing System**

A system for inspecting and auditing has been established to check whether all factories are implementing appropriate activities in accordance with company-wide policies.

#### **[ Safety and Environmental Inspection ]**

Safety and Environmental Inspections are carried out to check that appropriate safety and environmental action is implemented in the Production Department and the related Administration Departments. Any defective area that is discovered in the inspection process is identified and instructions for improvement are given.



Safety and Environment Inspection

#### **[ Internal and External Auditing ]**

Internal auditing is carried out on a regular basis in accordance with the ISO14001 Environmental Management System and the ISO9001 Quality Management System. Internal audits are carried out to check that activities are implemented in accordance with the plans and to pinpoint any defective areas for improvement.

#### **[ Third-Party Inspection ]**

We are subject to inspection by the Registration Body that carries out investigation of our ISO14001 Environmental Management System and the ISO9001 Quality Management System.

### **Promotion of Green Procurement**

We have established Green Procurement standards and are actively engaged in green procurement for copying-paper and stationery.

### **Instruction and Training**

Our employees receive instruction on RC in the group instruction courses held for the various grades of employees.

In the areas of the environment, safety and health and quality control, practical instruction and training are provided as part of the respective management activities.

### **\*ISO 9001**

This international standard for quality management and quality assurance was established by the International Standards Organization (ISO). The objective of this standard is to obtain customer satisfaction by establishing a reliable quality system within the corporate organization.



# We are committed to recycling waste and by-products not only from our own plants but also from outside.

**\*Cement Kiln**

Cement kilns are used for sintering the materials in the cement plant.

**\*Material Recycling**

Material recycling involves the reuse of waste and by-products as materials. Our cement plant uses slag, coal ash, sludge and incineration ash generated both internally and externally.

**\*Thermal Recycling**

Thermal recycling involves the reuse of waste as a heat source. Our cement plant accepts in-house and external waste plastics, waste tires and other waste and uses them as fuel.

Our cement plant reuses a large quantity and variety of waste and by-products of both internal and external origin.

Much of the waste and by-products contains the same components as the raw materials used for cement such as limestone, clay, and silica. They can, therefore, be used as raw materials for cement.

Cement kilns\* are operated at extremely high temperatures in the range of 1000 - 1800°C. Under these conditions, all combustible components are completely combusted. The ash residues remaining in the kiln after combustion are used as a raw material for cement.

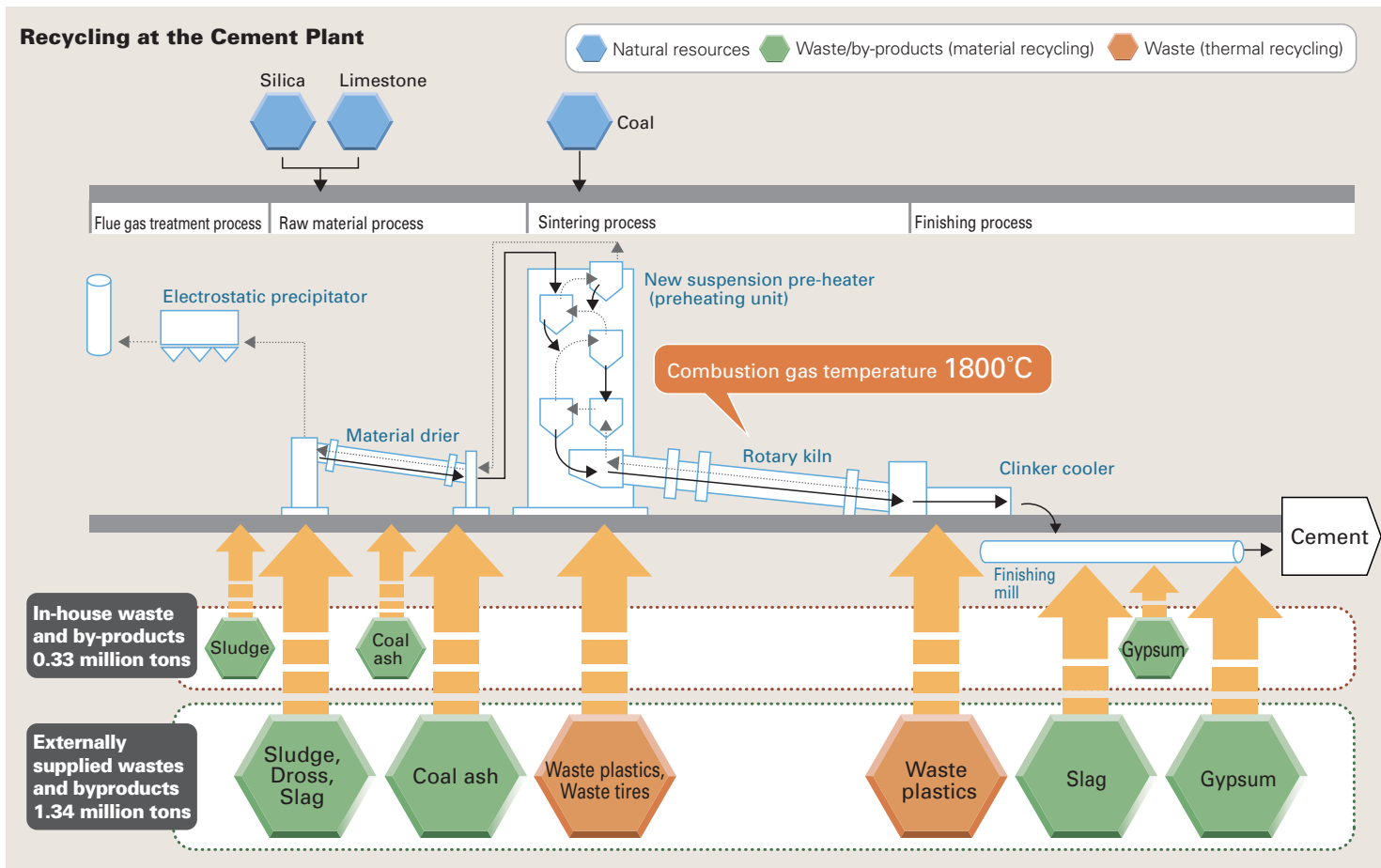
The waste components are thermally recycled to make use of their heat energy and materially recycled for effective reuse as raw materials. In this manner, the cement plant can make a substantial contribution to achieving the recycling-oriented society of the future.

**Accepting waste and by-products at the cement factory**

Since our debut in the cement sector in 1938, we have adhered to the practice of accepting various industrial waste of internal and external origin for use as raw materials or for use of its heat content as fuels for our cement kilns. This has made a significant contribution to achieving a recycling-oriented society in the sense that it allows the effective use of the world's limited resources.

In 2002, as much as 1.67 million tons of waste and by-products was reused at our cement plant. This includes a total of 1.61 million tons used as alternative raw materials (material recycling\*) and 55,000 tons used as alternative fuels (thermal recycling\*).

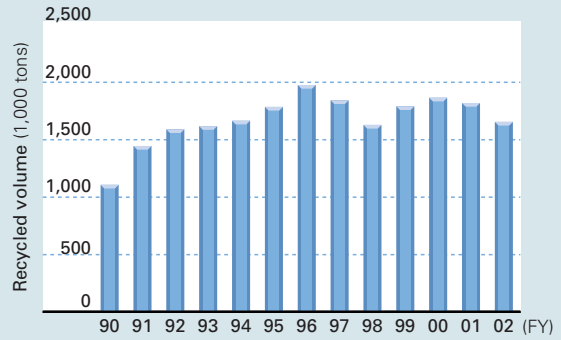
In 2002, the amount of waste and by-products accepted by our cement plant for reuse from outside the company accounted for 1.34 million tons.



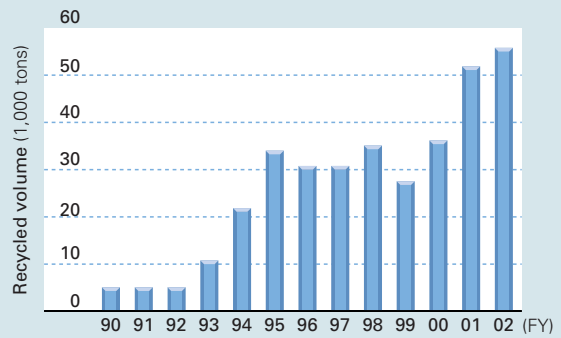
**Accepting a Wide Range of Waste**

- **Waste Plastics**  
We have a plant that crushes waste to convert it to fuel for thermal recycling in our cement kilns. In 2002, we recycled 38,000 tons of waste plastics in this manner.
- **Waste Tires**  
Our plant receives cut waste tires and feeds them into the cement kilns. In 2002, we recycled 4,000 tons of waste tires.
- **Coal Ash/Sludge, etc.**  
The coal combustion residues (coal ash) from coal-fired power stations and the sludge from municipal sewage systems are used as an alternative to clay. In 2002, a total of 650,000 tons were recycled. The sewage sludge receiving plant has been extended from its previous 30,000 tons/year to its present 85,000 tons throughput capacity per year. The ash and sludge receiving system was arranged to cover a wide area.

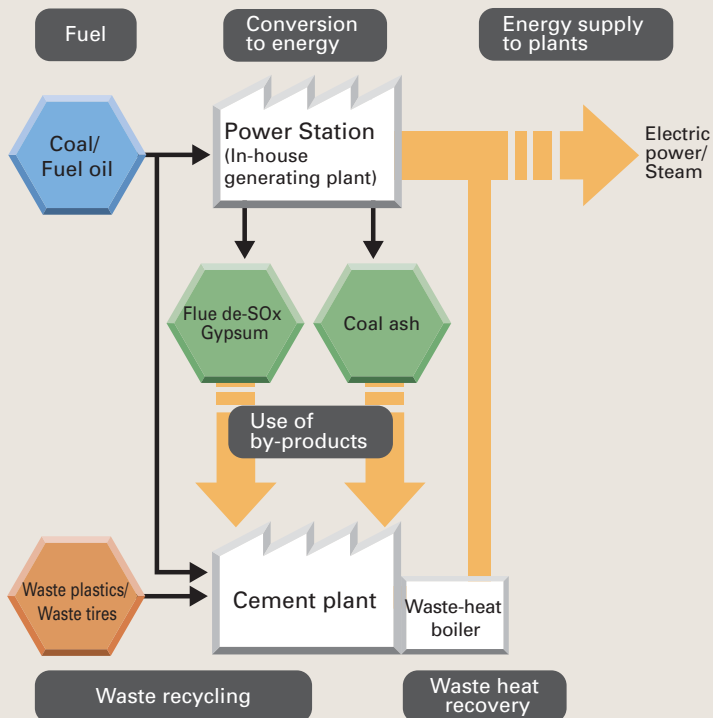
**Changes in Material Recycling Volumes at Cement Plant**



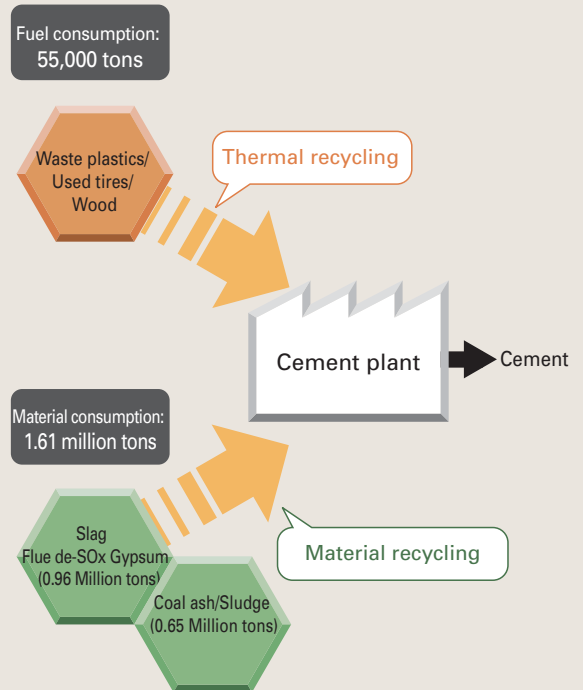
**Changes in Thermal Recycling Volumes at Cement Plant**



**Resource and Energy Recycling System**



**Recycling of waste and by-products for cement production**



# Supplying environmentally-oriented products and technology is our way of contributing to the realization of a recycling-oriented society.

Our corporate activities focus on the development of environmentally-oriented products, on product recycling technology and on waste recycling techniques. This ongoing commitment to environmental technology gives us the strength to make a significant contribution to the shaping of a recycling-oriented society.

### Use of TOKUSIL for low-energy tires

The precipitated silica TOKUSIL has conventionally been used for a variety of applications including fillers and reinforcement agents for rubbers, newspaper filler material, and absorbent carriers. In recent years it has attracted much attention by reason of its favorable properties in reduction of rolling resistance between the tire and the road surface. The use of silica in tires thus leads to a significant improvement in fuel consumption. Apart from energy saving, the silica-added tire also improves vehicle running stability on wet roads.

Based on our proprietary technology, we have developed our TOKUSIL USR with improved dispersion properties when the silica is filled into tires. Thanks to the use of this highly dispersed silica, we have been able to achieve a further 20% improvement in rolling resistance. This is equivalent to a more than 5% improvement in fuel consumption.

We have taken our silica development work a step further with our TOKUSIL USG product which is environmentally-friendly with less dust generation.



Precipitated silica TOKUSIL

### Development of Developer Solution Recycling Technology

We manufacture and sell the developer solution SD Series which is used in the lithography processes for semiconductors and liquid crystal panels. Amidst the growing awareness of the need for environmental protection in recent years and the resulting tightening of the regulations concerning the prevention of water pollution and effective resource utilization, manufacturers have a statutory duty to recycle developer solution waste. This has led to an intense effort to commercialize recycling.



Developer Solution SD-1

We have also commenced the recovery and recycling of waste from high-purity chemicals used in the electronics industry with products such as TOKUSOH IPA SE.

With the benefit of our unique distillation technology, we have in particular developed commercial equipment for recycling solvents. These are designed to recover and recycle used solvents such as resist strippers.

### Development of Fuel Conversion Technology Using Waste Plastics for Cement-Making

We have long worked on the development of technology permitting the use of waste plastics for cement-making. The use of waste plastics is showing a year-on-year increase. The present plastic waste/fuel conversion plant has been boosted from a throughput capacity of 45,000 tons/year to almost double that, i. e., 85,000 tons/year. The fuel conversion system for waste plastics developed during the period has been recog-



The Head of the Industrial Science and Technology Policy and Environment Bureau Prize

nized as state-of-the-art and as being of great practical value. As a token of this acknowledgment, it was awarded the Head of the Industrial Science and Technology Policy and Environment Bureau Prize, a Distinction bestowed on Advanced Resource Recycling Technology and Systems by the Ministry of Economy, Trade and Industry (METI) in 2002.

#### [ Use of meat and bone meal in cement kiln ]

In connection with the outbreak of mad-cow disease (BSE), about 2,000 tons of meat and bone meal have been incinerated in a year. This has done much to reduce the vast stocks of meat and bone meal in Japan's Chugoku region. The treatment of meat and bone meal in cement kilns is a safe way owing to utilization of the ash residue after incineration as a cement component.

#### **Use of Polycrystalline Silicon for Solar Batteries**

The solar light energy pouring down on earth in just one hour is as much energy as the whole of mankind can use in a year. Harnessing this energy in a solar battery helps us save fossil fuels. Power output from solar batteries amounted to 512MW worldwide in 2002, and 460MW or so of this comes from solar batteries made from silicon. Power generated from solar batteries is a clean energy, without emissions. Efforts are underway in all countries to introduce solar power batteries. To expand their use, however, it is essential to develop more advanced production technology capable of manufacturing the polycrystalline silicon used for solar batteries more cheaply.

We are one of the world's few manufacturers of high-purity polycrystalline silicon and supply our product to single-crystal manufacturers to be used for the IC chips in electronic parts. We have also begun to develop a product designed for solar battery applications.

#### **The SHANON HOUSE - A product with the ambition of being a zero-energy home for the next hundred years**

Shunan System Sangyo Co., Ltd., a member company of the Tokuyama Group, is proud to present its SHANON HOUSE, a dwelling with high thermal insulation and highly-sealed properties.

At present, about 20% of all industrial waste in the whole of Japan is construction waste, including house demolition rubble. Assuming that Japanese houses continue to be rebuilt every 30 years, it is clear that environmental impact due to construction waste will increase relentlessly. This environmental impact can only be lessened by developing longer-life housing.

The SHANON HOUSE is designed with consideration to a long-life durability of as much as hundred years and dwelling comfort cool in summer and warm in winter.

Because of the high thermal insulation properties of hard urethane, the problem of dew condensation causing wood rot, the enemy of any home, is eliminated. A construction method is used in which wall structure makes the framework of house stronger. This has helped raise seismic resistance and wind resistance 2.5 times compared to houses built by conventional construction systems.

The high thermal insulation of the plastic sash SHANON window and the urethane panel (FP panel) form an ideal combination to achieve a homestead with thermal insulation of world top class level. Because of the outstanding thermal insulation, the SHANON HOUSE can save energy consumption for heating and cooling by up to about one third compared to an ordinary house.

The SHANON HOUSE has the ambition of being a protector of the global environment with its long-life durability and energy-saving friendliness.



SHANON HOUSE

# We have a range of solutions to reduce environmental impact.

**\*PRTR**

Pollutant Release Transfer Register

The PRTR system keeps a record of data on harmful pollutants and serves to disclose the details to the public. The data give the particulars concerning the sources from which pollutants arise, to what extent they are released into the atmosphere and in what quantities they are contained in waste and transferred to other outside locations.

**\*SOx**

SOx, short for sulfur oxides, are generated in large amounts in the combustion of fossil fuels such as coal and petroleum. They are deleterious to human health, causing mainly respiratory organ diseases. They are also responsible for acid rain.

**\*NOx**

NOx, short for nitrogen oxides, are contained in the exhaust gases of automobiles and factories. They are responsible for photochemical smog and acid rain.

**\*Dust**

Dust consists of fine particles such as soot contained in the smoke released from factory flue stacks.

From a very early stage, we have made it our business to quantify the environmental impact of the emissions and waste sent into the atmosphere and into water mainly from our power plants and cement plant and to take positive action to reduce them. In recent years, we have also embraced an active commitment toward the reduction of the chemical substances requiring registration in the Pollutant Release and Transfer Register (PRTR\*) as well as dioxins.

**Changes in SOx Emission Levels**

SOx\* (sulfur oxides) are released from heavy oil or coal burning plant installations such as boilers, cement kilns, and dryers. All power generating boilers are provided with flue desulfurizing (de-SOx) systems in an effort to reduce their emissions. The de-SOx process leads to the formation of gypsum which in turn is used as a raw material for cement.

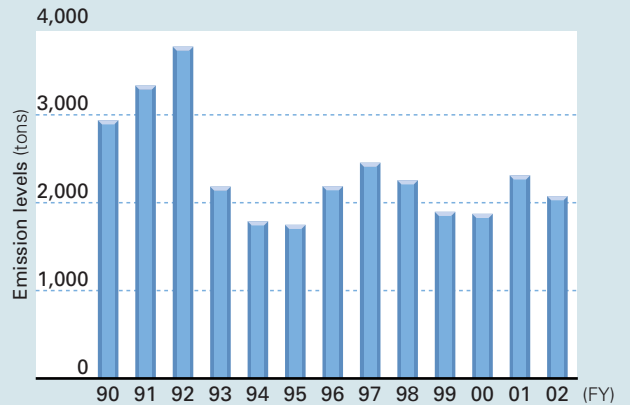
**Changes in NOx Emission Levels**

NOx\* (nitrogen oxides) are released from heavy oil or coal burning plant installations such as boilers, cement kilns, and dryers. De-NOx systems and low-NOx burners are used in all types of combustion systems, including the boilers of power stations or the kilns of a cement plant. We have operated de-NOx systems in cement kilns since 2002.

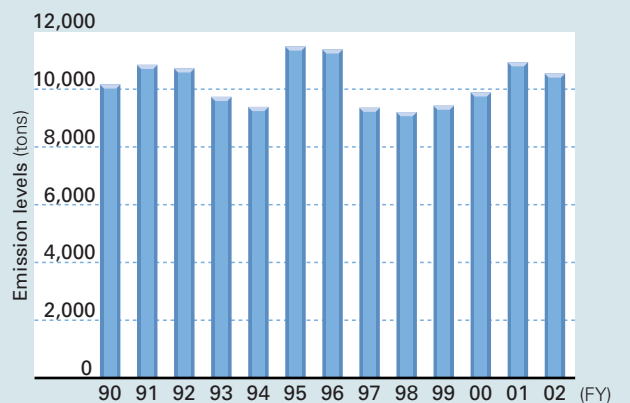
**Changes in Dust Emission Levels**

Dust\* is generated in the combustion of fuels in power generating boilers and cement kilns. These plant units are provided with high-efficiency electrostatic dust precipitators in an effort to reduce dust emissions.

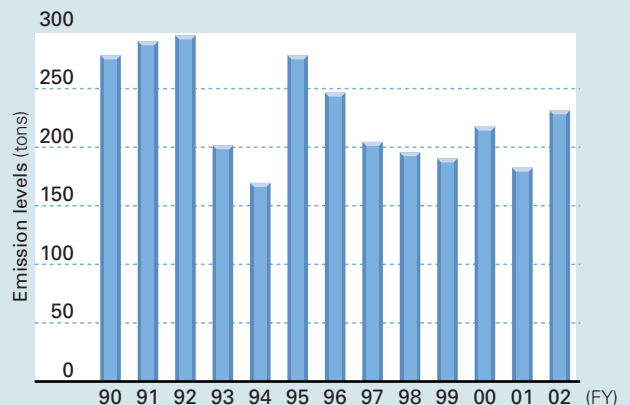
**SOx Emission Levels**



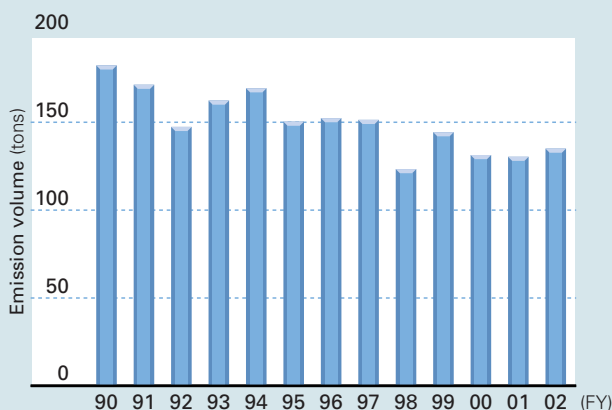
**NOx Emission Levels**



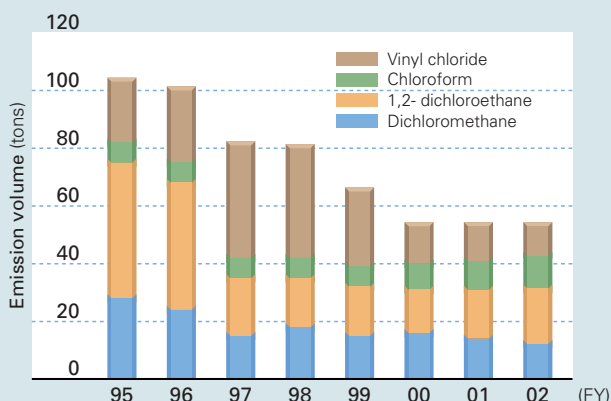
**Dust Emission Levels**



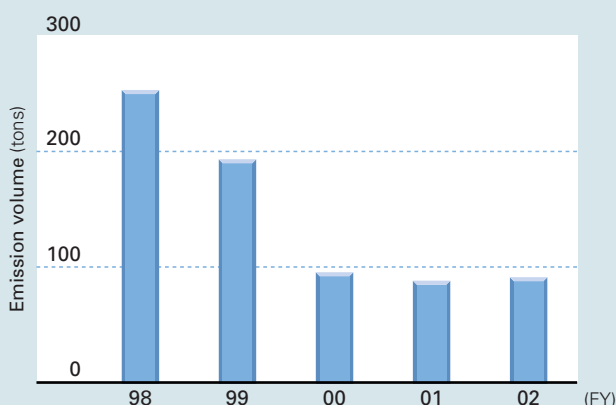
### COD Emission Levels



### Emission of Harmful Atmospheric Pollutants



### Emission of Chemical Substances Registered for PRTR



### Changes in COD Emissions

Every effort is being made to prevent water contamination due to industrial effluents. Effluents containing organic substances are treated in activated sludge treatment facilities to reduce their chemical oxygen demand (COD\*).

#### \*COD

Chemical Oxygen Demand  
This is one indicator of the level of water contamination. It gives the amount of oxygen required to oxidize the organic substances in the water.

### Changes in Harmful Atmospheric Pollutant Emissions

Voluntary management activities are in place to reduce the emissions of harmful atmospheric pollutants.

We manufacture four of these chemicals: vinyl chloride, chloroform, 1,2-dichloroethane and dichloromethane. We have determined our own voluntary reduction targets for these substances to implement effective reduction programs.

### PRTR

We are committed to the rigorous execution of PRTR investigation and the reduction of chemical substances emission. In 2002, a total of 22 substances was subject to registration in PRTR. Their overall emission volume stands at 90 tons.

#### Emission Levels of Chemical Substances Subject to Registration in the PRTR

Name of specified chemical	Emission level (tons)
Ethylene glycol	3.6
Cresol	22
Vinyl chloride	10
Chloroform	8.8
1,2-dichloroethane	22
1,2-dichloropropane	4.8
Dichloromethane	11
Toluene	4.8

### Dioxin Prevention Measures

Waste incinerators and waste oil incinerators are subject to dioxin emission regulations and dioxin measuring and monitoring is required. We have modified our waste incinerator to ensure full compliance with the dioxin countermeasure law. A small waste incinerator was taken out of operation.

# Reducing the volume of waste is one solution and another solution is to reuse waste effectively to minimize the volume of waste requiring disposal as landfill.

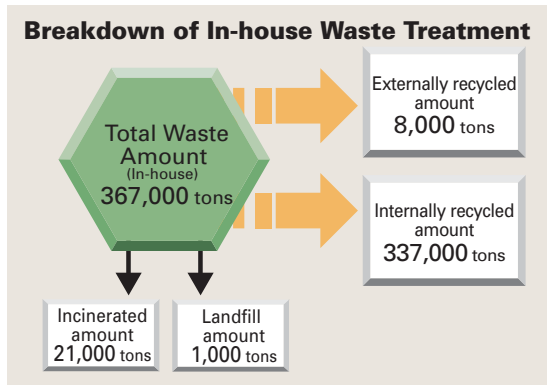
**\*PCB**

PCB, short for polychloride biphenyl, is a harmful organic compound with a structure resembling that of DDT. It is the causal agent responsible for the Kanemi Oil Disease accident. It releases dioxins on burning. Because of its superior heat and chemical resistance and its outstanding insulation properties it has been used for capacitor insulation. In 1972, its production was discontinued and manufacturers and factories were compelled to take back and store PCB-containing transformers and capacitors that had already been on the market.

We are firmly committed to the reuse of waste. In 2002, the waste utilization ratio was 94%. This is well above the 92% target we had set ourselves for 2005.

**Waste Management**

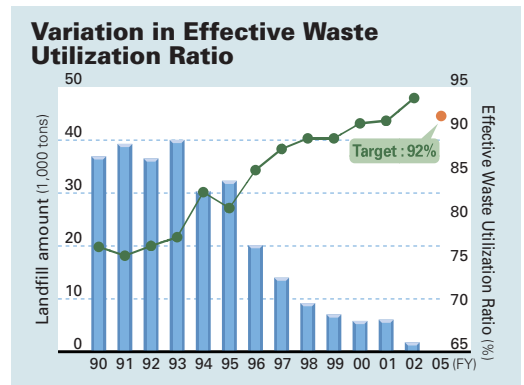
In 2002, our total in-house waste volume amounted to approximately 360,000 tons. Waste released from our factories was either reused or incinerated with the ash



residue being disposed of as landfill. Thanks to our aggressive endeavor in the reuse of waste as a fuel and raw materials for cement-making, our waste utilization ratio was as high as 94%.

**PCB Waste Management**

We and our member companies keep PCB\* transformers and high-voltage capacitors under appropriately managed storage conditions.



**topics**

## Our commitment to the prevention of global warming

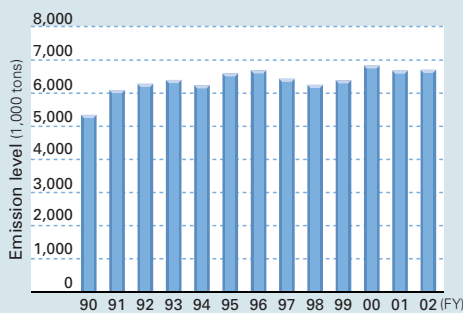
We consume energy on a massive scale in manufacturing caustic soda and cement. We accept our commitment to the prevention of global warming as an important issue and are making every effort to conserve and save energy.

Carbon dioxide (CO<sub>2</sub>), one of the greenhouse gases\*, is released mainly from our power plants and cement kilns. At our main factory, the Tokuyama Factory, the target is to reduce unit energy consumption by 15% as compared with the 1990 energy consumption by 2005. Our energy conservation drive was already successful in achieving a 12% reduction in unit energy consumption in 2002. Despite increased production output the carbon dioxide emission levels was kept steady thanks to our various energy conservation efforts. We have also replaced the specified chlorofluorocarbons (CFCs) used as refrigerants with alternative CFCs.

**\*Greenhouse Gases**

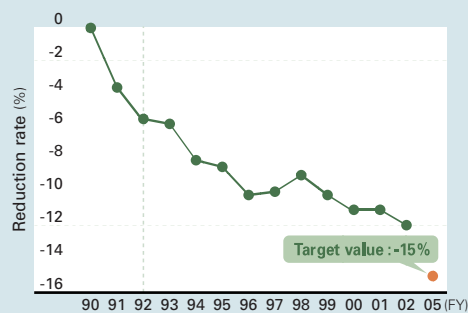
The Earth is kept cool by the release of heat into outer space in the form of infrared radiation. Greenhouse gases absorb infrared radiation and thus prevent the release of heat. Greenhouse gases include carbon dioxide, methane, nitrous oxide and CFCs. Among greenhouse gases, carbon dioxide is emitted in the largest amounts and therefore has the greatest impact on global warming.

**Variation in CO<sub>2</sub> Emission (Converted to CO<sub>2</sub>)**



With effect from this fiscal year we no longer quote carbon dioxide emissions by converting to the carbon equivalent but directly as carbon dioxide emissions.

**Variation in Unit Energy Consumption Index**



# We are totally dedicated to the safety of our factories and personnel and to the prevention of environmental accidents.

Without safety it is not possible to maintain steady production operation. For us, "Safety is the basis of all business activities, and ensuring safety is always the first step in our symbiosis with society." Founded on this basic attitude toward safety, we engage in our corporate activities with the determination to reach our zero-accident and zero-disaster goals.

### General Accident Prevention Activities

We have a comprehensive range of fire-fighting equipment and materials in readiness for all eventualities, including chemical fire engines, high-reach water-jet fire engines, ambulances and oil fences. We have also established self-defense fire brigades in our plant complexes and implement general, combined fire drills and exercises assuming the accidents that can occur.

### Safety Activities Toward Achieving our Zero-Accident Target

On the "look before you leap" principle, the fundamental policy for all activities enjoins all employees to heed safety first before acting. In this way we are resolute in working toward our zero-accident target. For this purpose we deploy a wide range of safety activities, including on-the-job safety meetings, safety patrols, danger prediction activities, the 5S activity\*, increasing the number of danger signs and labels, completeness-checking by voicing items by name while pointing at them, and safety instruction.

### Safety and Environmental Inspection

We carry out safety and environmental inspections for all our factories and business premises to ensure that our safety management activities are conducted in the appropriate manner. Whenever any defect or shortfall is discovered in the inspection procedures, a request for improvement is issued.



Safety and Environmental Inspection

### Safety and Health Management System

For each factory we have created a safety and health management system\*. These systems have been put into operation in 2003.

### Work Environment Management

We carry out measurements at workplaces using substances such as specific chemicals and organic solvents in an effort to create and maintain a comfortable workplace environment. In accordance with the results of these measurements, we make improvements in our work methods and equipment. In order to protect the health of our employees we have regular health check programs.

### Safety Instruction

We organize a variety of safety instruction programs such as in-house seminars, safety meetings, danger prediction training and training for new employees. These events are designed to raise the general level of safety awareness among our employees and cooperating firms.

### Acquisition of Voluntary Safety Certification

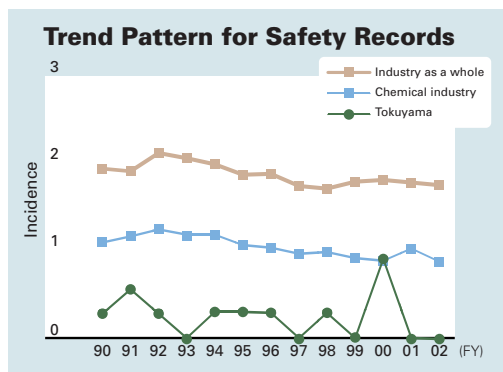
For equipment subject to the provisions of the Pressurized Gas Safety Act we have acquired safety approval on a voluntary basis. In addition to the polypropylene production plant for which we acquired safety approval in 2002, we have also obtained approval as Safety Approval Inspection service for IPA (isopropyl alcohol) production plants. We shall continue to make preparations for obtaining similar approval for other equipment.

### Commitment toward TPM

In November 2002, we received the TPM\* Distinction Prize for our cement plant. We make the same commitment to TPM also at our other plants.

### Changes in Safety Activity Records

We take great pride in the fact that thanks to our effective safety activities we have achieved a level of safety that is well above the industry average.



### \*5S activity

The 5S activity is an activity for making the workplace neat and clean in order to prevent problems arising.

### \*Safety and Health Management System

Our Safety and Health Management System is based on organized activities for prevention of work accidents. This management system includes OHSAS 18001 and the Guidelines for Safety and Health Management Systems of the Ministry of Health, Labour and Welfare.

### \*TPM

TPM is short for Total Productive Maintenance. Its purpose is to achieve greater efficiency in production system maintenance. The way it works is to establish systems for preventing all kinds of losses with targets such as zero-accidents, zero-defects, and zero-breakdowns, and to achieve zero-loss with the efforts of all our employees.



# As part of our uncompromising commitment to safety, we collect product safety data and provide the information to our customers and suppliers.

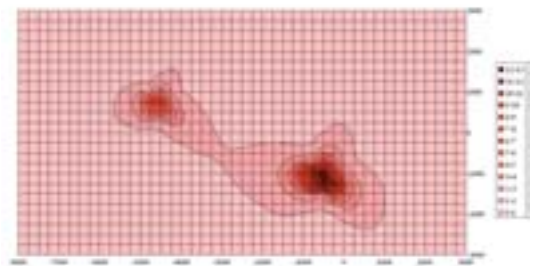
We are engaged in an ongoing process of collecting and compiling product safety data. Based on our product safety data we carry out safety and environmental assessment as well as product and labeling assessment. With a simulation method to determine the dispersal behavior of chemical emissions in the environment, we carry out surveys on the effects of chemicals on the surrounding environment. For hazardous and harmful products, we give instructions and explanations about their use to our customers and dealers.

### Risk Management for Chemicals

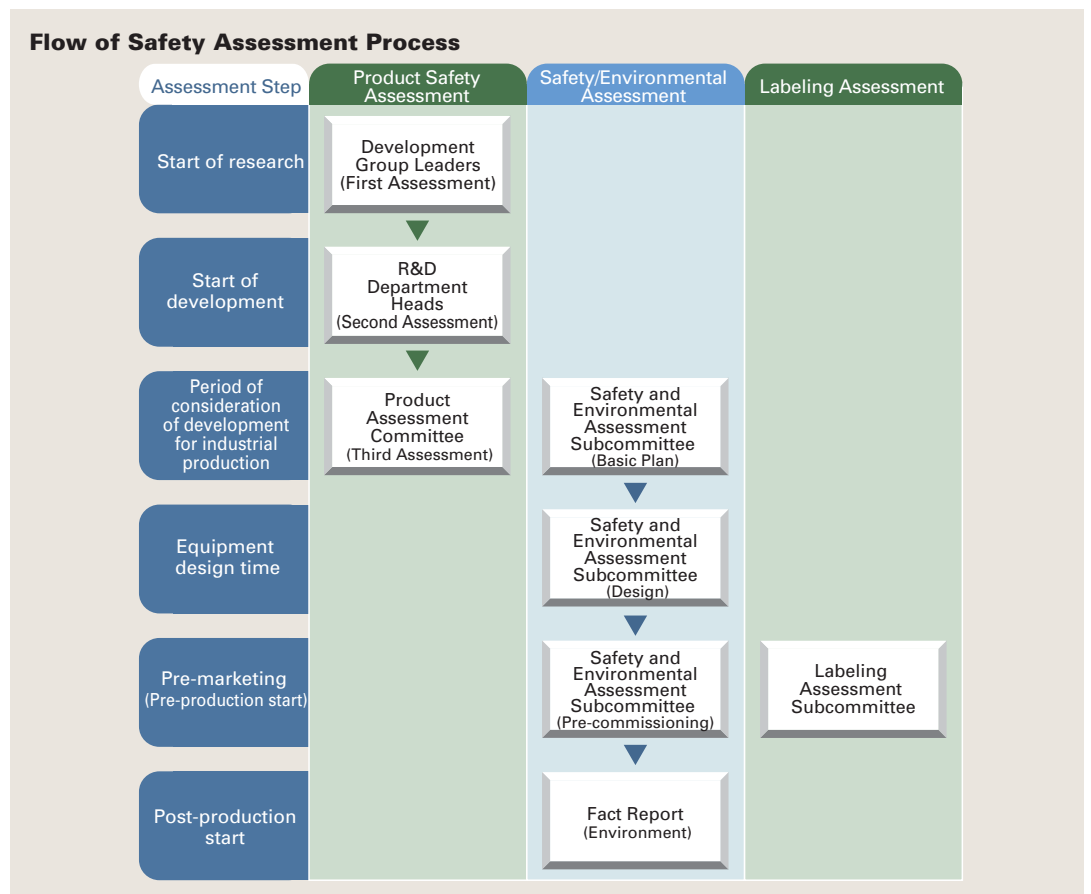
We collect safety data on chemicals to implement safety evaluations. The results of these studies are used for improving our safety measures in production plants and our operating procedures while handling these chemicals. We also provide safety instruction to all personnel handling hazardous chemicals. From the product liability perspective, we endeavour to provide

correct information to the consumers in an effort to enhance the safety of our products.

For new chemicals, we carry out initial tests in accordance with the Chemical Substance Control Law and pursuant to the Industrial Safety and Health Law in an effort to collect necessary test data. To assess the impact of our chemicals on the environment, we carry out simulations to determine the concentration distribution of chemicals that have been released.



Dispersion simulation



### **Product and Product Labeling Assessment**

For chemicals and equipment, we apply rigorous inspections to assess their safety at all stages from research and development through the design phase to the eventual marketing of the products. In 2002, we implemented 18 product inspections.

All catalogues, Material Safety Data Sheets (MSDS\*) and technical documentation are closely scrutinized in our labeling assessment to ensure that our descriptions are free from error. In 2002, we carried out 562 labeling assessments.

### **HPV Program**

We have marked out 18 of our products for entry in the HVP Program\*.

We became a leader of the calcium chloride HPV Program and formed an international consortium. In October 2002, we submitted an HVP safety assessment report for calcium chloride to the international conference held by the OECD\* in Boston, USA. The report was approved.

### **Waste Safety Management**

In order to ensure the safety of waste while it is handled and transported, we prepare MSDS for waste and distribute these data sheets to waste disposal services and transport companies. We are prepared with Yellow Cards\* for waste similar to those for our products so that appropriate measures can be taken to ensure the safety of waste in a traffic accident. All drivers are required to carry these cards with them when transporting waste.

### **Providing Material Safety Data Sheets (MSDS)**

Those who use, treat or distribute our products and/or waste are issued with Material Safety Data Sheets (MSDS) which give explicit instructions on the correct management of the substances at all stages of their life cycle from use to disposal.

We prepare as many as around 400 MSDS for products and 76 for waste. The product and waste MSDS and yellow cards are presented on our Intranet to ensure effective information-sharing on the safety of our products and waste. The MSDS forms for the 15 products that are transported in the largest quantities are presented on the company's home page so that they can be accessed at any time and anywhere in an emergency.

### **Promoting Safety in Distribution Logistics and Environmental Management**

#### **[ Instruction and Training of Members of the Distributive Trades on Safety Management ]**

We hold regular safety meetings with our distributors to provide all necessary information to ensure safety during the transportation of our products.

If a traffic accident occurred the Yellow Card would give full instructions about the emergency measures that should be taken to ensure a fast and appropriate response to the situation.

We have also created an emergency response organization and a communication system. An emergency action organization is in place to handle accidents and disasters.

#### **[ Risk Assessment in Distribution Logistics ]**

Regarding the transportation of hazardous products, we carry out risk assessments to make the necessary arrangements for facilities to be used in emergencies and to promote improvement of our customer's plants. For products with a high danger-risk, training sessions are conducted in simulated accident situations.



Distribution training

#### **[ Energy Saving in the Distribution Process ]**

Our transport logistics operation involves mainly maritime transport to our logistics centers and land transport from those to our customers. Maritime transport accounts for about 3/4th of our entire transport operations. In the case of land transport, we are taking effective measures to save energy in transit by the introduction of transit control devices.

#### **\*Material Safety Data Sheet (MSDS)**

Material Safety Data Sheets are used for entering all information relevant to the dangers and hazards of chemical products in order to ensure their safe handling. The details include the name of the chemical, safety precautions and measures required in an emergency.

#### **\*HPV Program**

High Production Volume (HPV) Programs are programs in which priority chemicals manufactured on a scale of 1,000 tons or more in 2 countries or more by the world's chemical companies or by the industry are assessed, with the assessment results to be reported by the end of 2004.

#### **\*OECD**

Organization for Economic Co-operation and Development  
This international organization fosters  
1) economic growth, 2) free trade and 3) support for developing countries through free exchange of opinions and information among the leading industrialized countries.

#### **\*Yellow Card**

The Yellow Card is an Emergency Instruction Card giving details of what the driver and/or his nearest agents and the police should do in an emergency so as to forestall accidents involving chemicals and high-pressure gases in transit.

# All of our factories have the same powerful commitment to the environment consistent with their local conditions.



Tokuyama Factory

## Tokuyama Factory

### Overview of the Tokuyama Factory

- Location: 1-1, Mikage-cho, Shunan-shi Yamaguchi Prefecture
- Site: Total land area: 1.48 million sq.m. The Tokuyama factory consists of the Tokuyama plant, Nanyo plant and Higashi plant. Located on Tokuyama Bay, the factory is ideally located for maritime product transport. The cement plant contributes to the recycling of waste and by-products. The factory has power plants and is self-sufficient in electricity and steam.
- Main products: cement, inorganic chemicals, organic chemicals, polycrystalline silicon, silica, PVC.

### Policies of the Tokuyama Factory

- On the basis of the company-wide policies on safety and the environment, the factory determines its own local policies. At each plant, plant targets and goals are determined and activities are launched to work toward the attainment of these targets.

### Commitment to Environmental Protection

- Together with the 6 companies including our member companies on the site, ISO14001 certification has been acquired and an environmental management system is in place.
- The de-NOx system installed in 2001 in the cement plant has been put into full-scale operation to reduce NOx emissions.
- Efforts were made to reduce the chemical substances registered in the PRTR. In 2002, there was only a slight increase despite an increase in production levels. Efforts to achieve further reduction will be made.
- The waste incinerator was modified to achieve a significant reduction in the concentration of dioxin in flue gas.
- Most of the internally generated waste was reused as raw material and fuel for cement. Incombustible waste was difficult to reuse, and so far has been disposed of as landfill. Since 2002, efforts have been made to reduce these types of incombustible waste and recycle the product scraps as a raw material for cement production. As a result, they were reduced significantly in 2002 as compared with 2001. To achieve further reduction a project has started with the ambitious goal of reducing waste to zero.

### Commitment to Labor Safety and Health

- To prevent work accidents, we have given our full support to the introduction of a safety and health management system. This has been fully initiated in 2003.
- Accident prevention forums are established to prevent construction work accidents and disasters and integrated activities with subcontracted companies are being promoted. We run safety patrols and organize safety meetings to foster information-sharing among all our employees and raise general safety awareness.
- To ensure safety, we are creating workplaces where "overlooking unsafe conditions and unsafe actions is not allowed". The safety principle we have in mind is one that squares with the wisdom of "Look before You Leap" - in other words, Think of Safety before You Do Anything. Another of our safety principles is "Visible Safety." In the interest of improving safety, we also engage in mutual attention-drawing exercises, increasing the number of danger

signs and labels, voicing items by name and pointing to them to ensure completeness, KYT\* and other danger prediction activities, the 5S activity to create approved model workplaces, fool-proofing activities, safety instruction and training, and safety and environmental inspections and assessments.

- In December 2002 we attained the Ministry of Health, Labor and Welfare's first-grade accident-free operation record (5.40 million hours with no accident).

### Commitment to Accident Prevention

- We have established self-defense fire brigade organizations at our complexes and carry out yearly combined accident prevention drills assuming all sorts of accidents and disasters. In 2002, we focused on rescuing victims of accident situations.



Accident Prevention Training

### Symbiosis with our Local Communities

- In the city of Shunan a Clean Network Promotion Project has been launched with activities designed to improve the city's environment. In 2002 our factory joined in this project and engaged in activities consisting of monthly cleaning activities around the factory compound.
- We actively took part in the Wood Volunteer Activities designed to protect the region's woods, planting young trees and trimming bushes.



Cleaning Activities around the Factory Compound



Wood Volunteers

- In connection with the implementation of PRTR we held an explanatory meeting in the city of Shunan on the topic of "Proper Handling of Chemical Substances". The purpose was to get a fuller mutual understanding with local community members of the way in which chemical companies are trying to adopt the PRTR system. This type of meeting was the first trial in Japan and attracted much attention from all quarters. The explanatory meeting did much to foster a better understanding among the public of what the PRTR system is all about.



Regional RC Explanatory Meeting

### \*KYT

KYT is an activity for predicting hidden dangers and taking action. Small circles gather to discuss the potential danger factors that are hidden in the workplace or in work situations and pinpoint the events that can trigger danger, to check danger points and determine priorities in implementation and taking action.

## Kashima Factory

### Overview of the Kashima Factory

- Location: 26 Sunayama, Hasaki-machi, Kashima, Ibaraki Prefecture
- Site: Land area: 100,000 sq.m.  
Located at Hasaki Industrial Park in Kashima Industrial Zone.  
Two member companies within the compound:  
Tokuyama Dental Corporation  
A&T Corporation
- Main products: bulk pharmaceuticals, optical materials, electronic materials and fine chemical products such as detergents (Tokuyama Corporation); dental materials (Tokuyama Dental Corporation); medical diagnostic drugs (A&T Corporation).

### Commitment to Environmental Protection

- The factory operates ISO14001 Environmental Management Systems in an effort to reduce environmental impact.
- The companies are committed to a reduction in emission levels of substances subject to registration in the PRTR and to a reduction in the amount of waste disposed of as landfill.
- In an effort to prevent soil pollution in the factory, annual studies on soil pollution are made by analyzing the water quality of an observation well. The results have demonstrated that no soil pollution has occurred.
- In 2002, the small-sized waste incinerator was taken out of operation as a measure against dioxin emissions.

### Symbiosis with our Local Communities

- The Kashima factory participates in local environmental protection activities. In 2002, the factory took part in the regional Kashima dialogue on Responsible Care and announced its RC activities.
- We attracted much acclaim for our positive commitment to the environment and were awarded the Ibaraki Prefecture distinction of being an "Earth-friendly Company."



"Earth-Friendly Company" Distinction Award Ceremony

### Commitment to Safety and Health

- The Factory stages a range of planned activities, including danger prediction drills, seminar and lecture events, acquisition of official qualifications and study sessions in which the Safety and Health Committee assumes a key role. The factory has had no accident or disaster in the whole 18 years of its existence.
- In 2002, the Safety and Health Management System was introduced and went into operation.
- In readiness for accidents and disasters, annual training including general disaster response drills, fire extinguisher training and water discharge training were carried out.



Kashima Factory

# We are determined to move forward toward the realization of a sustainable society.

## Commitment of our Member Companies towards the Environment

Based on the RC Administration Pact signed by us with member companies of the Tokuyama Group, efforts are made to diffuse RC activities by implementing safety and environmental inspection each year. Among group members, the number of those acquiring ISO9001 and ISO14001 certification is steadily growing.

Since 2002, RC activity data, including members' environmental load data and safety management indices, have been collected and statistically evaluated to obtain a fuller picture of the RC activities within the Tokuyama Group.

## Progress Status of our Member Companies in acquisition of ISO9001/ISO14001 Certification

Group Companies	ISO 9001	ISO 14001
Sun•Tox Co., Ltd.		
Shanon Co., Ltd.		-
Tohoku Shanon Co., Ltd.		-
Tokuyama Logistics Corporation		-
A&T Corporation		
Figaro Engineering Inc.		-
Tokuyama Dental Corporation		
Tokuyama Ready Mixed Concrete Co., Ltd.		-
Tokuyama Siltech Co., Ltd.		
Sun Arrow Chemical Co., Ltd.	-	
Taiwan Tokuyama Corporation		
Tokuyama Electronic Chemicals Pte. Ltd.		
Pornpat Chemicals Co., Ltd.		

= Certified      = Certified as a Tokuyama site

## Historical Overview of Tokuyama's RC Activities

7/1991	Global Environmental Issues Committee established
3/1993	RC Administration Committee established — Voluntary plan for overall management of environment, safety and quality established.
4/1994	ISO9002 certification acquired for high-purity isopropyl alcohol
6/1994	Arrangements for quality assurance system, including product safety and labeling assessment
12/1994	Internal Export Control Committee established
4/1995	Participation in Japan RC Council
2/1997	First edition of RC Report issued
5/1997	ISO9001 certification acquired for cement
4/1998	ISO9001 certification acquired for dental materials
12/1998	ISO9001 and ISO9002 certification acquired for aluminum nitride, precipitated silica, etc. — Tokuyama Factory acquired ISO14001 certification.
1/1999	Kashima Factory acquired ISO14001 certification.
6/1999	ISO9002 certification acquired for inorganic chemicals, polypropylene, film, etc.
12/1999	Ecological Management Initiative Dept. inaugurated. ISO9002 certification acquired for polycrystalline silicon, organic solvents, etc.
8/2000	Recycling and Environmental Business Dept. inaugurated
4/2001	Yamaguchi Eco-Tech. Co., Ltd. established
4/2002	Vinylchloride, polyvinylchloride - Acquisition of ISO9002 certification
6/2002	Kashima Factory awarded the "Earth-Friendly Company" Distinction by Ibaraki Prefecture
3/2003	Awarded the "Resource Recycling Technology System Award" by the Head of the Industrial Science and Technology Policy and Environment Bureau

Our homepage has a Questionnaire Website giving you an opportunity to voice your opinions concerning this report.

[http:// www.tokuyama.co.jp/care/enquette.html](http://www.tokuyama.co.jp/care/enquette.html)



For all inquiries, please do not hesitate to contact us at:

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Responsible Care (RC) is a self-management activity to implement and improve measures concerning the environment and safety and health.  
It is an activity of a corporation producing or handling chemical substances that pledges in its management policy to protect the environment and to ensure safety and health throughout the entire chemical substance life cycle, from development, manufacturing, distribution, use and final consumption to disposal on the basis of the principle of self-determination and self-responsibility.



This Environmental Reports uses paper made 100% from old paper.



The printing ink used for printing this Environmental Report uses soybean oil in and endeavor to reduce an environmental impact.