





# Responsible Care Report 2006

Our Commitment to the Environment, Safety and Health



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### Summary of Business

Capital:

Company Outline Established: February 16, 1918

Headquarters: Shibuya Konno Bldg. 3-1, Shibuya 3-chome, Shibuya-ku, Tokyo 150-8383, Japan

**Production and Research Sites:** 

Tokuyama Factory, Kashima Factory, Tsukuba **Research Laboratory** 

JPY 29,975 million (as of March 31, 2006)









### Number of Employees



### Business Segments and Main Products (including group companies)

Segment	Main Products
Chemicals	Caustic soda, soda ash, calcium chloride, sodium silicate, vinyl chloride monomer, polyvinyl chloride resin, propylene oxide, isopropyl alcohol, methylene chloride, biaxial-oriented polypropylene films, coextrusion multilayer film, cast polypropylene films, microporous films
Specialty products	Polycrystalline silicon, amorphous precipitated silica, fumed silica, aluminum nitride, dental materials, pharmaceutical, agricultural chemical bulks and intermediates, plastic lens materials, ion-exchange membranes, methylene chloride for washing metal, solvent for semiconductor base materials, environment-related items, medical diagnosis systems, gas sensitive semiconductors
Cement, Building materials, and Others	Ordinary Portland cement, high early strength Portland cement, blast furnace slag cement, ready-mixed concrete, plastic window sashes, cement type stabilizer, waste treatment

### **Editorial Notes**

The Responsible Care Report 2006 was prepared with the aim of bringing Tokuyama's activities on the society, environment, safety and health in fiscal 2005 to the attention of all concerned, including shareholders, investors, trading partners, employees and their families, people living near its sites and the public in general. This report carries messages from our employees and we have also made efforts this year to make the report easier to read. The Responsible Care Report 2006 is prepared based on the Environmental Reporting Guidelines (Fiscal 2003 Edition; Ministry of the Environment). The Responsible Care Report 2006 is also available on our Web site. http://www.tokuyama.co.jp

### Scope of Report

All performance data is for fiscal 2005 (from April 2005 to March 2006). Activities are for fiscal 2005 in general, with some for fiscal 2006. Period: Companies: Tokuyama Corp. For certain performance data, a total of eleven main production subsidiaries (see page 29) is also indicated. Region: Activities in Japan

### **Message from the President**



We are contributing to the "Creation of an Environmentally Friendly Country" through the development of eco-friendly products and environmental technologies. We promote CSR activities with the aim of creating a sustainable society for the benefit of future generations.

Economic and social activities in the 20th century, characterized by mass production and mass consumption, have greatly benefited human beings. On the other hand, they have also brought about environmental problems, such as global warming and concerns about the depletion of natural resources. Reflecting on this situation, we must be determined to make the 21st century the "Century of the Environment," in which we pay full respect to the value of the global environment and make efforts to ensure our harmonious coexistence with it. The chemical industry has made available a variety of chemical products to society and contributed to enhancing the wealth of our life. At the same time, as a chemical company, we are well aware of the indispensable necessity of giving due consideration to the environment and human health to ensure that they are not harmed by chemical products.

By acting on the principle of responsible care that is followed globally by chemical industries, Tokuyama joined Japan Responsible Care Council when it was founded in 1995. Since then, we have been conducting voluntary activities for a decade to protect people's health and the environment and to maintain safety for the whole life cycle of chemical products from manufacturing, logistics, use, to final consumption and disposal.

We have positioned environmental management as one of the core strategies and included a theme of "environment and energy" as one of the important growth strategies in our medium-term business plan. Environmental management is a business philosophy that places a priority on the environment. We aim at enhancing corporate values and achieving a sustainable society by transforming all our business activities into environmentally friendly ones. In particular, we have concentrated our energy on recycling waste and by-products by utilizing our ability to manufacture chemical products and cement. In fiscal 2005, we received waste and by-products in the amount of 1.90 million tons from the outside to manufacture cement. We are proud of the fact that the Tokuyama Group is contributing to the "creation of an environmentally friendly country" through the development of various eco-friendly products and environmental technologies.

In the new three-year business plan starting from fiscal 2005, we introduced the concept of corporate social responsibility (CSR) to ensure the sustainability credentials of our company. Based on this concept, we will enhance a framework to promote environmental management, process safety, compliance and energy saving to help prevent global warming and so forth. In other words, we aim at developing excellent "human resources" through the enhanced framework and the promotion of the above-mentioned activities.

Today, it is required to achieve a society in which each person can truly feel happiness to pass on to future generations. We are required to simultaneously improve environmental, economic and social elements to create a sustainable society. Tokuyama, as a chemical enterprise with excellent technologies, aims at becoming a "company consistently relied on by society and customers "by contributing to the improvement of these elements.

Following on from last year, our report on our environmental and social activities has been enriched. We sincerely hope that you will be able to gain a deeper understanding of our activities and give us your opinions and comments.

July 20, 2006

Shigeaki Nakahara President

S. Nakahara

## **Basic Philosophy of Responsible Care**

To contribute to the creation of a sustainable society and fulfill our company's social responsibilities, we have established a basic policy and action objectives. We are promoting "Environmental Management," which emphasizes the environment in all of our business activities. We are voluntarily and actively promoting responsible care activities on a company-wide basis.

### **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 and manufacturing, to distribution, use, final consumption and disposal.

Our social mission is to aggressively tackle and solve environmental issues in particular, which, in turn, will lead to sustainable corporate and social development. Based on this recognition, we are promoting "Environmental Management," a management policy that emphasizes the environment, in all of our business activities, including development, manufacturing and sales.





**Responsible Care: Responsible Care (RC)** is a self-management activity by a company that either manufactures or handles chemical substances, to implement and improve measures for protecting the "Environment, Safety and Health" of society and staff throughout the chemical substance handling process—from inception in the research and development through manufacture, distribution and use, to final consumption and disposal. These activities also includes public disclosure of company performance and social dialogue.

Born in Canada in 1985, Responsible Care has spread to 52 countries. The Japan Responsible Care Council (JRCC) was established in 1995 within the Japan Chemical Industry Association and has 103 companies registered as of April 2006.

## **Material Flow Balance in Our Production Activities**

Most of the raw materials and energy we use are for producing our main products, including cement, chemical products and polycrystalline silicon. Most of the energy needed for producing these products is supplied from our private power plant. We are making efforts to reduce environmental impacts by accurately assessing and managing the input and output of our manufacturing operations.



(Products of Tokuyama Group companies are included.)

## **Results and Evaluation of Fiscal 2005 Activities**

On a company-wide basis, we are promoting Responsible Care (RC) activities in the categories of environmental preservation, process safety, occupational health and safety, chemical product safety, trusting relationships with local communities and others. We have already achieved our environmental goal for the period up to fiscal 2005: "reduction of unit energy consumption by 15% from the level of fiscal 1990"; and also achieved the environmental goal for a period up to fiscal 2010: "reduction of unit energy consumption by 17.5% from the level of fiscal 1990."

We have established priority themes for each of the categories of RC activities and promoted activities on a company-wide basis. To improve RC activities on a continual basis, we have established a new three-year plan commencing with fiscal 2005 and are appropriately implementing environmental, quality and occupational health and safety management systems.

In fiscal 2005, we further improved unit energy consumption by promoting our energy saving efforts. The waste utilization rate slightly decreased from the level of the previous fiscal year because some waste was used for landfills. Despite this, the waste utilization rate remained at a high level of 93.9%.

We have significantly reduced the emission of PRTR substances and hazardous air pollutants by implementing effective emission reduction measures.

We will continue to make efforts to reduce the emission of SOx and COD that have increased slightly.

In the category of occupational health and safety, Tokuyama Factory, our main production site, has achieved the Category III zero-accident record.

### Fiscal 2005 RC Activities—Priority Issues and Performance

Segment	Priority Issues	Performance	Related pages
Management	Review by Senior Management	RC Administration Committee     Safety and Environmental Audit	P.7 P.8
Environmental preservation • Environmental load reduction • Energy conservation • Waste recycling	<ul> <li>Reduction in environmental burdens (air, water quality, etc.)</li> <li>Reduction in the emission of PRTR substances and hazardous air pollutants</li> <li>Decrease in unit energy consumption</li> <li>Promotion of zero-emission activities</li> <li>Promotion of green purchase</li> </ul>	<ul> <li>Reduction of the emission of NOx, soot, dust, etc.</li> <li>Reduction of the emission of 1,2-dichloroethane (EDC), etc.</li> <li>Promotion of energy conservation</li> <li>Utilization of waste as raw materials and fuel for producing cement</li> <li>Green Procurement of office supplies and lighting equipment</li> <li>Faithful implementation of the Environmental Management System</li> </ul>	P.13-14 P.13-14 P.12 P.9-10 P.8 P.7
Process safety	<ul> <li>No accident</li> <li>Promotion of risk management</li> <li>Promotion of safety self-management</li> </ul>	<ul> <li>Acquisition of the certificate of authorized high pressure gas inspector</li> <li>Safety education and training for logistics companies and audit</li> </ul>	P.23 P.22
Occupational health and safety	No disaster	Achievement of Category III zero-accident record	P.23
Chemical product safety	Ensured product safety	<ul> <li>Product assessment, labeling inspection</li> <li>Improvement of MSDS, investigation of potentially poisonous and deleterious substances</li> <li>Participation in the HPV program</li> </ul>	P.21–22
Trusting relationships with local communities and society at large	<ul> <li>Participation in community activities</li> <li>Harmonious coexistence with local communities and society at large</li> </ul>	<ul> <li>Participation in community's volunteer activities</li> <li>Dialogue meetings on RC activities with local communities (on a regional basis, or on a factory basis)</li> <li>Factory tours for stake holders</li> </ul>	P.25–26
Promotion of RC program to group companies	Dissemination of RC activities	<ul> <li>Safety and environmental inspection</li> <li>Acquisition of ISO certification</li> <li>Sharing of RC-related information</li> </ul>	P.29-30

### Performance of Environmental Preservation Measures in Fiscal 2005 (Tokuyama Factory)

Segment	Items		Base fiscal year	FY 2005 target	FY 2005 performance	Evaluation	FY 2007 target
	Air	Soot and Dust	2004	10% reduction	5% reduction	$\triangle$	11% reduction
	Water	COD	2004	±0%	8% increase	×	±0%
Reduction of		Ν	2004	±0%	1% increase	$\bigtriangleup$	±0%
environmental		Р	2004	±0%	48% decrease	0	±0%
impacts	PRTR	PRTR	2004	25% reduction	13% reduction	$\bigtriangleup$	29% reduction
		Hazardous air pollutants (vinyl chloride monomer (VCM), EDC)	2004	40% reduction	19% reduction	$\bigtriangleup$	46% reduction
Global environment conservation Energy conservation		Unit energy consumption index	1990	15% improvement	18.1% improvement	0	17.5% improvement (FY 2010)
Reduced waste	Recycling	Waste material effective utilization rate	—	94.4% or more	94.0%	$\triangle$	94.7% or more
materials	Zero-emission	Zero emission rate	-	99.8% or more	99.8%	0	99.9% or more

\* Evaluation (○: achieved, △: almost achieved, ×: unsatisfactory)

## **Environmental Accounting**

From fiscal 2000, we have adopted an Environmental Accounting System with the aim of assessing and analyzing the investment and expenditure needed for environmental conservation activities and their economic benefits and utilizing the data for more efficient environmental management. In fiscal 2005, the investment increased by about 800 million yen over the previous year's level due to the expansion of facilities to convert waste plastics into fuel, etc. Expenses and economic benefits remained almost unchanged from the previous year's level.

### Environmental Conservation Costs

About 30% of environmental investment is used for pollution prevention and about 70% for conservation of the global environment. In fiscal 2005, environmental investment was mainly made for the renewal of electric precipitators at our power generation plant, the adoption of new coolers for cement plants and the expansion of facilities to convert waste plastics into fuel.

### **Economic Benefits**

Economic benefits are evaluated based only on actual revenue figures, where any projected benefits are excluded, in areas of energy conservation, sales of relevant materials and reutilization of waste materials, which helps minimize processing for disposal and reduce consumption of raw materials and fuel. In fiscal 2005, economic benefits in the amount of about 1.3 billion yen were generated. This amount remains almost unchanged from the previous year's level.

### Trends of Accumulated Environmental Investments (cumulative since FY 1990)



### Environmental Conservation Costs

Classification		Major Expenditure Items	Amount Invested (JPY million)	Total Expenditure (JPY million)
	Pollution prevention	Renewal of electric precipitators and bag filters, conversion of the exhaust gas treatment tower, and improvement of drain ditches	698	3,343
Factory site costs	Global environment conservation	Adoption of new model cement coolers and installation of energy saving equipment	1,876	885
	Resource recycling	Efficient use of resources	3	965
Upstream/downstream costs			0	0
Costs of management activities		Installation of environmental analyzer	12	286
Research and deve	elopment costs	Development of waste treatment technology	0	99
Costs of social activities		Tree-planting at factories and preparation of the Responsible Care Report	2	49
Costs of environmental damage		Levies and management of disused mines	0	180
Total			2,591	5,807

### Economic Benefits

Item	Material Benefits (1,000 tons)	Economic Benefits (JPY million)	Remarks
Benefits from energy conservation	-	125	Benefits from lower electricity and steam consumptions
Revenues from salable materials	96	219	Revenues from selling metal scraps, waste oils, waste acids and alkalis
Benefits from lower waste materials processing costs	222	569	Processing costs reduced by reutilization of waste materials
Benefits from lower raw material and fuel consumption realized by waste reutilization	225	414	
Total		1,327	

\* Costs were compiled according to "Environmental Accounting Guideline-2002" of the Ministry of the Environment.

## **RC Promotion and Management Systems Operation**

We have a company-wide system to conduct RC activities that are defined in the "RC Action Objectives." Pursuant to the respective management systems and based on the "Plan, Do, Check, Action" (PDCA) cycle, we are making continuous improvements. In fiscal 2005, Tokuyama Factory established a new Safety Management System.

## **RC Promotion System**

Our RC Administration Committee, which draws up the highest-level policies on our RC activities, is chaired by the President and comprises board members. The committee discusses and approves company-wide RC policies and other environment, safety and quality-related measures. Under this committee are various subordinate organizations: the Environmental Measures Committee, the Safety Measures Committee, the Products Safety and **Quality Assurance Committee and the Product Assessment** Committee. These subordinate organizations are responsible for discussing specific action plans and assessing product safety. Each subcommittee is chaired by a director responsible for company-wide issues concerning the environment, safety, or quality. Heads of related company departments are appointed as subcommittee members.

### Evaluation and Management System for RC Activities

We have made a three-year plan starting from fiscal 2005. To achieve the goals of this three-year plan, we set yearly policies and related goals, based on which, each department prepares a specific implementation plan. The activities undertaken are assessed at the fiscal year end and the results reflected in plans for the following year.



### **Operation of Management Systems**

### **ISO 14001 Environmental Management System**

Tokuvama and Kashima Factories have already acquired ISO 14001 certification, an international standard for Environmental Management Systems.

In line with company-wide environmental policy, each factory sets itself an environmental policy and the specific goals to be achieved in areas covering lowering environmental loads, energy conservation, reducing waste material disposal and promoting resource recycling.

At the company headquarters, branch offices and research laboratories, activities are under way based on their respective policies and goals in the areas of energy conservation, reducing waste material disposal and resource recycling.

ISO 14001: ISO 14001 is one of the major international standards developed by the International Organization for Standardization (ISO) and provides the requirements for Environmental Management Systems, ISO 14001 certification is awarded to an organization that, based on the environmental management system implemented according to a systematized process, operates its business in an environment-oriented manner and achieves continual improvements through corrective actions, as necessary

### ISO 9001 Quality Management System

We have also acquired an ISO 9001 certification (Quality Management System) for our main products. All departments of our company, including sales and development departments, have implemented this system since fiscal 2002.

ISO 9001: ISO 9001 is one of the major international standards developed by the International Organization for Standardization (ISO) and provides the requirements for Quality Management Systems. It enables a company to establish dependable quality management systems within its organizations and thereby further address customer satisfaction



## Evaluation and Management System for

### **Health and Safety Management System**

Based on the "JCIA—New Occupational Health and Safety Guidelines" of the Japan Chemical Industry Association, we have implemented a Safety and Health Management System within our respective factories and commenced operation of these in fiscal 2003. In fiscal 2005, Tokuyama Factory expanded this system into a Safety Management System, including various safety-related activities.

Health and Safety Management System: In the area of occupational health and safety, this system requires the company to list dangerous/hazardous tasks, make risk assessments and provide appropriate measures to be adopted for such tasks in the order of the highest risk first, thereby lowering the overall risk level. Performance is continually and systematically improved as the above activity proceeds in a cycle of "Planning—Action—Assessment—Corrective Action." The "JCIA—New Occupational Health and Safety Guidelines" are prepared for chemical companies, based on the relevant guidelines issued by the Ministry of Health, Labor and Welfare, as well as International Standard OHSAS 18001.

### Assessment Systems

With the necessary assessment systems in place, we are working towards lowering environment- and safety-related risk levels.

The Safety and Environmental Assessment Subcommittee and the Product Assessment Committee are at work making strict assessments on environmental, safety and product safety management performance.

### Safety and Environmental Assessment

Before any facility is newly installed, expanded or refurbished, we require a safety and environmental assessment to be carried out. The assessment is designed to check the design safety of equipment, the safety of the materials being handled, compliance with laws and regulations and impacts on the environment. This helps us in our effort to make our facilities safe and easy to operate, easy to maintain and accident-free. The assessments apply to three stages: Basic Plan Assessment, Design Assessment and Pre-Operational Assessment. Through such stages, assessments are made to ensure that facilities are of safe and environment-oriented design, built to the design requirements and ready for operation.

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

To ensure product safety, our Product Assessment process is in effect at each stage, from research and development through to shipment of our products. This risk assessment covers a variety of aspects including safety of the chemical substances involved, environmental impacts, human health effects, compliance with laws and regulations, etc. Our Labeling Assessment helps us ensure that the labels that we carry on our products contain no defects in their instructions and/or warnings and that they contain sufficient and easyto-understand information.

### Auditing System

Our Auditing System is in place to verify that activities undertaken at each factory are in line with company-wide policies.

### Safety and Environmental Auditing

We conduct this type of auditing on a yearly basis to verify the appropriateness of our accident/disaster prevention measures and management activities for environmental conservation. The auditing team is headed by the director chairing the Environmental and Safety Measures Committee and conducts auditing for all factories and offices, authorized inspection organizations under the High Pressure Gas Safety Law, logistics departments and the Health Management Center. A report is compiled based on the auditing results and distributed to all departments concerned. The results are also presented to the President. Safety and environmental audit (Tokuyama Factory, February 6, 2006)



### Internal Auditing

Our internal auditing is carried out periodically in accordance with ISO 9001, ISO 14001 and Safety and Health Management System procedures. Progress status of the planned actions and the systems operational status are audited and areas of nonconformity identified for corrective actions.



Internal auditing in accordance with ISO 14001 (Kashima Factory, October 20, 2005)

### **Third Party Auditing**

Even after acquisition of the ISO 9001 and ISO 14001 certifications, to ensure continuous improvement we are regularly audited by certification and registration bodies.



ISO 9001 certification renewal inspection (January 27, 2006)

### **Promotion of Green Procurement**

We have included the promotion of Green Procurement in our basic procurement policy. We are actively promoting a Green Procurement campaign in purchasing copy paper, office supplies and lighting equipment.

### Education and Training

Employee education and training on the Responsible Care activities are provided on a hierarchical group basis.

For environmental management, safety management, occupational health and safety and quality management, "On-the-Job-Training" is provided so that employees can learn through actual management activities.

## **Recycling Outside Waste**

Our cement plant actively accepts and effectively recycles a large quantity of inside and outside waste and by-products as heat energy or as raw materials for cement. These waste-reduction activities greatly contribute to the prevention of global warming through the conservation of natural resources and a reduction in CO<sub>2</sub> emissions and to the creation of a recycling-oriented society.

## Efficient Use of Resources and Energy

Our cement plant, which commenced operations in 1938, was designed to be capable of effectively utilizing the byproducts from our own soda ash plant and coal cinders from our own power plant as part of the raw materials for cement. Today we also accept and recycle a large quantity of waste and by-products from outside.

Most waste and by-products contain the same elements as those contained in limestone, clay, silica, etc. that are used as raw materials for cement. Therefore, they can be used as raw materials for producing cement. Flammable waste can be used as an alternative fuel instead of coal. The internal temperatures of the cement kiln\* reach as high as 1000–1800°C, high enough to allow complete combustion of any flammable materials. Another feature is that the ash remaining after combustion is still used as a constituents of cement, thereby leaving no residues such as incineration ash. Another feature is that the ash remaining after combustion can be used as a constituent of cement, thereby leaving no residue-unlike ordinary incinerators.

Thus, elements of waste are effectively recycled as heat energy or as raw materials for cement. Therefore, the effective utilization of waste and by-products at the cement plant greatly contribute to the creation of a recycle-oriented society through a reduction in consumption of exhaustible resources, help to reduce global warming due to a decrease in  $CO_2$  emissions and contribute to the extension of service life of final disposal sites in Japan.

The waste materials and by-products reutilized in our cement plant in fiscal 2005 amounted to 2,210,000 tons, including 310,000 tons of waste from inside our company. Of this, 2,140,000 tons were used as the raw material substitutes (Material Recycling) and the remaining 70,000 tons were used as fuel substitutes (Thermal Recycling). Unit consumption of waste/by-products per ton of cement increased by 3.4% from 406 kg in fiscal 2004 to 420 kg.

Flow Diagram of the Waste and By-products Recycling Process in Cement Manufacturing (Figures represent those of fiscal 2005)



\* A cement kiln is a rotating furnace used to sinter the raw materials in the cement plant.

### Recycling a Variety of Waste Materials

### **Waste Plastics**

We began thermal recycling of waste plastics at the cement kiln in 1999 and have expanded recycling capacity year by year. In December 2005, the No. 4 unit at the waste plastic crushing facility started operation and annual recycling capacity increased to 125,000 tons. In fiscal 2005, a total of 59,000 tons of waste plastics were recycled.

No. 4 unit at the waste plastic crushing facility



### **Coal Ash/Sludge**

We accepted a total of 1,020,000 tons of coal ash from thermal power plants, sewage sludge from municipal sewerage systems and waste soils from construction sites and used them as the clay substitute in fiscal 2005.

### Dehydrated Cakes of Municipal Waste Incineration Ash

Yamaguchi Eco-Tech Co. (a joint venture company recycling of municipal garbage incineration ash generated in Yamaguchi prefecture. The incineration ash originating from municipal garbage and industrial waste is processed for dioxin removal and water wash desalting and then used as raw materials for cement. In fiscal 2005, we accepted 19,000

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have much to do." Yoshinori Mizumoto Manager, Resource Recycling Business Group, Cement Business Division

"We pursue recycling without

any secondary waste. This is a

worthwhile job, although we still

VOICE

Waste recycling at the cement plant without generating secondary waste is eco-friendly recycling without causing further environmental impact. Constituents and properties of waste vary from lot to lot and it sometimes contains foreign materials. Therefore, it is important to check the constituents of waste before accepting it and maintain its conditions after accepting it in order to maintain the quality of cement. The increased demand for waste plastics as an alternative fuel due to the high cost of fossil fuels, as well as their export to China because of their high value, make it increasingly difficult to collect waste plastics. Under these conditions, we are actively engaged in waste plastic recycling in an effort to contribute to the realization of a recycleoriented society.

tons of dehydrated cakes of municipal waste incineration ash from Yamaguchi Eco-Tech and used them as raw materials for cement.

### Waste and By-Products Generated from Inside Our Company and Accepted from the Outside

### Sludge

Construction sludge, water works sludge, sewage sludge, paper sludge, fuel sludge, industrial wastewater sludge

### Waste Soils

### Construction waste soilsd

Waste Incineration Ash We recycle incineration ash generated from municipal waste incineration facilities in Yamaguchi prefecture after the ash is pre-treated by Yamaguchi Eco-Tech.

### **Coal Ash**

Coal ash generated from thermal power plants, including our private power generation plant

### Waste Liquid

Film developer and waste alkal

### Slag

Blast furnace slag, converter slag, steel-making slag, neutralization slag

### Waste Plastics (Excluding Vinyl Chloride)

We have developed the technology to inject quantities of crushed waste plastics into the front portion of the cement kiln. We have expanded our capacity to accept, crush and incinerate such waste each year in response to increased requirements.

### Heavy Fuel Oil Ash Heavy fuel oil ash generated from thermal power plants, etc.

### Waste Tires

Acceptance of chipped waste tires

### Animal Sludge Meat-and-bone meal

Wood Chips

### Waste Liquid



film developer



### Volume of Material Recycling



### Volume of Thermal Recycling



## **Reducing and Recycling Waste Materials**

We are making an effort to reduce waste generation and recycle waste with an aim of achieving zero emissions (zero emissions: aim of reducing the quantity of the waste from factories etc. that is sent to landfills to zero). In fiscal 2005, the zero emission rate remained at 99.8%.

### Waste Management

Waste materials generated from our facilities amounted to 350,000 tons in fiscal 2005. We have actively promoted the recycling of waste materials generated both inside and outside our company, such as the reutilization of waste materials as raw materials and fuel for producing cement at Tokuyama Factory. Since some waste materials were used



### VOICE



### Our slogan is: "They are refuse, if mixed—but they are resources, when sorted."

Hiromasa Yamakado Assistant Manager, Environmental Control Section, Environmental & Safety Department, Tokuyama Factory

Tokuyama Factory has established its own waste sorting and collection system to promote the reduction of landfill waste. Thanks to this system, we have significantly reduced the quantity of landfill waste to about one-third of the level before the introduction of the system. We believe it is our mission to maintain and upgrade this system to meet the needs of the times. We will continue efforts with the aim of achieving genuine zero emissions under the slogan, "They are refuse, if mixed—but they are resources, when sorted." for landfills, the quantity of waste materials used as raw materials for cement was reduced. As a result, effective utilization rate of waste materials remained at 93.9%, which is slightly lower than the figure for the previous year.

Our efforts in the field of minimizing landfill waste and maximizing recycling of such waste allowed us to achieve a 99.8% "zero-emission" rate for landfill waste.

In fiscal 2004, Tokuyama Factory acquired certification of "Yamaguchi Prefecture Eco Factory," as an appreciation of their efforts. Under the "Eco Factory Certification System," Yamaguchi prefectural government grants a certification to those factories that are actively involved in the reduction and recycling of industrial waste generated. The system intends to contribute to the formation of a recycle-oriented society.

Management and Disposal of PCB Waste Both Tokuyama and its group companies properly store transformers, capacitors, etc. containing PCBs,<sup>\*</sup> in accordance with the requirements of the "Special Measures Law for the Proper Treatment of Polychlorinated Biphenyl Waste." In fiscal 2005, we placed an advance order for PCB disposal with Japan Environmental Safety Corporation by utilizing its early registration system. We continue to appropriately dispose of all PCB-containing waste.



### Effective Utilization Rate for Waste and Disposal to Landfill



\* PCB is an abbreviation for Polychlorinated Biphenyl. This is a chlorinated organic compound and produces dioxins when burnt at low temperatures. It is chemically stable, heatresistant, chemical-resistant and provides excellent electrical characteristics such as high insulation performance. It had many applications in electrical equipment, such as utility transformers, capacitors, etc., until 1972 when its production and use were banned due to the fact that it is harmful to humans. The law requires that transformers, capacitors and the like, that are already in the market be brought to safe storage at appropriate business units.

## **Prevention of Global Warming**

Tokuyama Factory had established a goal of improving unit energy consumption by 17.5% by fiscal 2010 from the level of 1990 and has been promoting energy saving activities. Tokuyama Factory achieved this goal as early as fiscal 2005. Recognizing that it is a company that has a social responsibility to reduce greenhouse gas emissions to help prevent global warming, we continue improving unit energy consumption to the greatest possible extent.

## Promotion of Energy Saving Efforts

We place a priority on contributing to the prevention of global warming and are promoting energy saving activities to reduce CO<sub>2</sub> emissions.

Tokuyama Factory, which accounts for more than 99% of total energy consumption of our company, has established a midterm target to improve unit energy consumption by 17.5% by fiscal 2010 as compared with fiscal 1990 and is promoting energy saving activities. Tokuyama Factory has already achieved this target in fiscal 2005. Tokuyama Factory's target for fiscal 2010 is far more challenging than the overall target of Japan Chemical Industry Association (improvement in unit energy consumption by 10% by fiscal 2010 as compared with fiscal 1990).

In fiscal 2005, Tokuyama Factory could improve unit energy consumption by 18.1%, which is larger than the figure achieved in fiscal 2004, as compared with fiscal 1990. This performance is attributable to equipment improvements and higher capacity equipment replacements in the private power generation plant, chemical product manufacturing process, etc. Tokuyama Factory is continuing its efforts for further improvement in unit energy consumption.

### Contribution to Global Warming Prevention Measures of Consumer and Transportation Sectors

Both Tokuyama and its group companies have contributed to a reduction in  $CO_2$  emissions in the consumer and transportation sectors, in which  $CO_2$  emissions have significantly increased, through the sales of products, including silica for energy saving tires. Furthermore, we are developing technologies for the prevention of global warming, including those for polycrystalline silicon for solar cells and electrolyte membrane for fuel cells.

### VOICE



### Our task is to reduce CO<sub>2</sub> emissions, even if production increases

Masataka Imada Manager, Factory Administration Department, Tokuyama Factory

In fiscal 2005, production at the Tokuyama Factory totaled approximately 16 million tons in cement equivalent, representing more than a 70% increase over fiscal 1990. Since we have an output increase plan, production in fiscal 2010 is expected to increase by more than 100% over fiscal 1990. Accordingly, energy consumption will increase. However, energy consumption in fiscal 2005 increased by only about 40% over fiscal 1990 thanks to the energy saving and waste recycling efforts of our departments. Energy consumption in fiscal 2010 is expected to increase by only about 70% over fiscal 1990. We intend to further diversify our efforts to contribute to the prevention of global warming.

### Efforts at Our Offices

We participate in the "Cool Biz" campaign that started as a national movement in the summer of 2005. In addition to conventional energy saving activities at our offices, we encouraged our employees to work in light clothing and the temperature of air-conditioned rooms was strictly maintained at 28°C. Thanks to these efforts, Tokyo head office could reduce power consumption in four months from June to September 2005 by 15% from the level of the corresponding period of the previous fiscal year.







\* Figures of group companies are included in and after fiscal 2001. As for Tokuyama Plant of Sun Tox Co., Ltd., their actual figures have been included in the Tokuyama data until fiscal 2004 and included in the group company data since fiscal 2005.

### Unit Energy Consumption Index (Tokuyama Factory)



## **Reduction of Air and Water Pollutants**

We have long taken various measures to reduce air and water pollutants. For pollutants specified in the PRTR Law and the Air Pollution Control Law, in particular, the emission of these pollutants has been gradually reduced due to our active efforts.

### SOx Emissions

SOx<sup>\*</sup> (sulfur oxides) are emitted from facilities such as boilers, sintering furnaces, drying furnaces, etc., where heavy fuel oil or coal is combusted. In our case, most SOx emissions are from power plant boilers. To reduce SOx emissions, we have installed flue gas desulfurization equipment in each boiler system.

In fiscal 2005, SOx emissions increased as the operating rate of our power plant increased.

### SOx Emissions



### VOICE



"Operational mistakes are eliminated by developing ideas and checking operations thoroughly. We aim at maintaining zero discharge of hot media."

### Hiroyasu Morikawa Assistant Manager, Advanced Materials Manufacturing Department, Kashima Factory

When producing chemical products under the batch processing system, we adjust temperatures by sending either a hot medium or a coolant to the outer casing of the reaction vessel. Since this changeover is made manually, we must avoid operating mistakes. Therefore, we make it a rule to make "finger pointing and calling" when any changeover is made and to check things out after the changeover has been effected. In addition, we use not only chemical symbols but also "kanji" (Chinese characters) to indicate the fluids inside the pipes so that we can visually confirm the fluid with ease. In fiscal 2005, we achieved zero discharge of hot media into the environment by erroneous operations. From now on, we will promote a reduction in environmental impacts by developing ideas and continuing zero discharge.

### NOx Emissions

NOx<sup>\*</sup> (nitrogen oxides) are also emitted from facilities such as boilers, sintering furnaces, drying furnaces, etc., where heavy fuel oil or coal is combusted. Most NOx emissions from our facilities are from power plant boilers and cement sintering furnaces. We have already installed denitration equipment and low NOx burners in these boilers and sintering furnaces.

In fiscal 2005, NOx emissions slightly decreased due to the enhancement of denitration, despite the high operating rate of the facilities.

### NOx Emissions



Soot and Dust Emissions

Soot and dust<sup>\*</sup> are emitted in the combustion process of fuel and other materials in the power plant boilers and cement sintering furnaces. We have installed high performance dust collectors to reduce soot and dust emissions.

In fiscal 2005, soot and dust emissions decreased as the dust collectors worked effectively due to periodic inspections.

### Soot and Dust Emissions



\* SOx refer to sulfur oxides, which are produced primarily by the combustion of fossil fuels such as coal and oil. They are known to cause respiratory disorders and to be a causative agent of acid rain.

3 Tokuyama Corporation \* NOx

\* NOx refer to nitrogen oxides, which are included in the exhaust gases from automobiles and factories. They are a contributor to photochemical smog and acid rain \* Soot and dust refer to fine particles of soot and dust contained in the emissions from smoke stacks.

### Factory Wastewater

Tokuyama Factory releases some 20 million tons of factory wastewater each year into public waters. We have a stringent monitoring system to keep the hydrogen-ion concentration (pH) and suspended solids within their respective limits.

The wastewater from our Kashima Factory is treated at the terminal treatment facilities.

### 25.0 (Million tons) 214 21.2 21 1 19.8 20.0 18.8 15.0 14.3 10.0 5.0 0 01 02 03 04 05 (Fiscal year)

### Factory Wastewater Release

### Release of COD, Nitrogen and Phosphorus

We have a system in place to prevent water pollution. Activated sludge process equipment is in operation downstream of the process where organic constituents are involved, to reduce COD<sup>\*</sup> (Chemical Oxygen Demand).

We began to measure the release of nitrogen and phosphorus in fiscal 2004 because these substances are subject to the total amount controlled under the Water Pollution Control Law in that year. The release of these substances is well below control levels.

## 200 (Tons) 180 150 128 134 135 100 50 50 128 134 135

COD Release

0

### Release of Nitrogen and Phosphorus

	(kg/day)		
Item	Legal regulation value	2004 Fiscal year	2005 Fiscal year
Nitrogen	5,280	260	260
Phosphorus	270	21	11

02

03

04

### Hazardous Air Pollutants Release

Of the twelve substances left to corporate self-management under the Air Pollution Control Law, four substances, including chloroethylene (vinyl chloride), are produced by our company. We have set ourselves a voluntary program to achieve the necessary reductions.

### Hazardous Air Pollutants Release



### Release of Substances Regulated by the PRTR Law

We compile reports on all PRTR substances and file them as necessary in accordance with the PRTR<sup>\*</sup> Law, while at the same time, we pursue reductions in releasing such substances. In fiscal 2005, we had 27 substances that we were required to report on.

In fiscal 2005, the total release of these substances decreased to 60 tons as we implemented measures to decrease the release of 1,2-dichloroethene (EDC) and environmental equipment worked effectively.



### Release of Substances Regulated by the PRTR Law

Waste incinerator, waste oil incinerators and part of the vinyl chloride monomer (VCM) production facilities are regulated by the Special Measures Law for Countermeasures against Dioxins.

The measured concentrations of dioxin in emission gas and wastewater are well below control levels.

\* COD is the abbreviation for Chemical Oxygen Demand. It shows the amount of oxygen required to oxidize organic matter in the water and indicates the level of water contamination.

\* PRTR Pollutant Releases and Transfer Register, is a system for the compilation and publication of data concerning harmful chemical substances with respect to their sources, the amount of their environmental emissions and the amount released from factory in waste materials.

157

05 (Fiscal year)

## Development of Environmentally Friendly Products and Environmental Technologies

The development of environmentally friendly products and recycling technology constitutes one of the important elements needed for creating a recycling-oriented society. In fiscal 2005, Tokuyama and its group companies promoted various activities, including the development of "hydrocarbon-based electrolyte membranes" for fuel cells and material recycling of liquid developer waste.

### Development of "Hydrocarbon-Based Electrolyte Membranes" for Fuel Cells\* Broad Lineup of Products, Including an Anion Type

Direct methanol fuel cells (DMFCs)\* are expected to become the next generation power source for portable terminals, including cell phones and laptop PCs, replacing lithium ion batteries. In fiscal 2004, we developed low cost, high performance hydrocarbon-based electrolyte membranes\* for DMFCs. In fiscal 2005, we established a system to introduce products of various types to meet the needs of users, such as high-output type and highly concentrated methanol fuel type, in the DMFC market that is expected to emerge in 2007. Furthermore, we developed anion-type hydrocarbonbased electrolyte membranes as a world first and began to supply samples. As is the case with hydrocarbon-based electrolyte membranes for DMFCs, anion-type hydrocarbonbased electrolyte membranes can be produced at low cost and power generation efficiency of these two types is the same. The above-mentioned products are intended mainly for the portable terminal fuel cell market. We are now promoting a study on hydrocarbon-based electrolyte membranes for fuel cells for cars and houses.



Anion-type hydrocarbon-based electrolyte membranes for fuel cells

### VOICE



### "Aiming at commercial use of more environmentally friendly fuel cells"

Takeo Kawahara Assistant Manager, Fine Chemical Sales Department, Advanced Materials Business Division

In the fuel cell market, technological innovation is rapid. For example, anion-type hydrocarbon-based electrolyte membranes have been said to be impractical as fuel cells because their power output was too low in the past. At present, however, the anion type is said to be next generation membranes for fuel cells following the DMFC and the performance of the anion type has recently been significantly improved. If the anion type is commercially used, it can use bio-ethanol as fuel. The market will expand further as low-cost metals, such as iron and nickel, can be used as an electrolytic catalyst. We are making an effort towards our dream of "realizing an environmentally friendly society."

### Polycrystalline Silicon for Solar Cells Contribution to Energy Saving through Solar Cells

The amount of solar energy that the earth receives in an hour is said to be equivalent to the amount of energy consumed by human beings in a year. If solar energy could be used effectively through solar cells, a huge amount of other energy may be saved. Therefore, facilities to manufacture photovoltaic generation systems are now being vigorously constructed in many parts of the world.

As one of the leading companies manufacturing polycrystalline silicon for solar cells, we place a priority on technology to manufacture polycrystalline silicon for solar cells at a lower cost. In fiscal 2005, we constructed a verification plant (with a production capacity of 200 tons/year) using the VLD method to manufacture polycrystalline silicon for solar cells at a higher speed and more efficiently than the conventional method. Then, we started a study on full-scale commercial production. We are determined to promote energy saving through the diffusion of solar cells.



Verification plant to manufacture polycrystalline silicon for solar cells

### Ion Exchange Membranes (ASTOM Corporation) Prevention of Environmental Pollution through Clean Technology

ASTOM Corporation, a Tokuyama Group company, contributes to the solution of environmental problems with its separation technology based on ion exchange membranes, "NEOSEPTA," and high performance dialyzer, "ACILYZER." Ion exchange membranes enable selective permeation of positive and negative ions dissociated in solutions. Traditionally, ion exchange membranes have been used for salt production, food, fresh water generation, pharmaceuticals and the treatment of various waste liquids. Recently, ion exchange membranes have been used to separate and collect acid and alkaline in waste liquids, treat leachate at waste disposal facilities and eliminate nitrate nitrogen from groundwater as part of efforts to prevent the environmental pollution. Thus, ion exchange membranes as clean technology are attracting the attention of the international community. As a bio-refinery technology that contributes to the creation of a recycle-oriented society, ion exchange membranes will be utilized for separating and

\* Fuel cell: A chemical battery to generate electricity via a chemical reaction between hydrogen inside the fuel cell and oxygen in the air in contrast with electrolysis of water.

DMFC: Direct methanol fuel cell that converts fuel methanol into hydrogen using a catalytic electrode in the fuel cell.
Electrolyte membrane: Membrane to selectively conductions.

refining organic acid used for biodegradable plastics and cleaning animal waste to make manure.



High performance dialyzer "ACILYZER"

### "Shanon" Plastic Window Sashes (Shanon Co., Ltd.) High-Performance Windows Contribute to Household Energy Conservation

Shanon Corporation, one of our group companies, manufactures and sells "Shanon" plastic window sashes, which provide an excellent airtight quality, heat and sound insulation and prevent moisture condensation.

To help prevent global warming, all companies and citizens are being required to reduce greenhouse gas emissions. Although reductions are being steadily achieved in the industrial sectors, household emissions are on the rise and need to be addressed through more effective measures. In this connection, plastic window sashes are receiving attention due to their ability to conserve energy. A simulation run by the "Plastic Window Sash Promotional Committee" indicates a significant improvement in insulation efficiency, or some 40% reduction in CO2 emissions, can be achieved per house if single-glazed aluminum window sashes were all replaced with double-glazed plastic window sashes fitted with a low emission glass. The government of Japan actively encourages the diffusion of double-glazed plastic window sashes. Shanon's plastic window sashes are a promising energy saving measure that will contribute to the prevention of global warming in the future.



"Shanon" —environmentally friendly doubleglazed plastic window sashes

### Closed System for Liquid Developers Goes into Operation Material Recycling of Used Liquid Developers

Tokuyama and Sharp Corporation completed a process to develop a "material-recycling technology for used liquid developers at liquid crystal plants." In April 2005, the commercial operation of this closed system for liquid developers (collection, recovery and reuse) commenced, involving Sharp Corporation's Mie plant (in Taki-gun, Mie Prefecture) and our own dedicated plant. Our dedicated plant could speedily begin operations on a commercial basis and continued operations satisfactorily. This is because practical problems were resolved from various viewpoints by conducting practical tests at the pilot plant over a period of about three years and countermeasures appropriately taken.

From now on, we will make our utmost efforts to further improve this technology and reduce costs so that the closed system may be utilized not only by liquid crystal manufacturers but also by other users of liquid developers without anxiety. We will continue efforts to develop technologies to manufacture and dispose liquid developers that generate less environmental impacts throughout the supply chain (manufacture of liquid developers).



### Closed System for Liquid Developers at Sharp Corporation's Mie Plant

### Chelating Agent "PURIFEED" (Tokuyama Siltech Co., Ltd.) Supplemental raw material with insignificant environmental impacts for detergents

Tokuyama Siltech Co., Ltd., our group company, manufactures and sells crystalline layered sodium silicate "PURIFEED." This product is a mineral manufactured from silica sands and alkaline. In many cases, these products with chelate and alkaline properties are used as supplemental raw materials for detergents (for both home and industrial usage).

Traditionally, phosphoric acid and organic materials have been used as chelating agents. These chelating agents caused problems such as the eutrophication of lakes and marshes and residues in the environment due to low biodegradability. On the other hand, "PURIFEED" is made only of oxygen, silicon and sodium, which exist in quantities in nature. Therefore, it causes almost no adverse effects on the natural environment. "PURIFEED" ultimately returns to sand and salts after use. Therefore, this product is now attracting the attention of many sectors as a supplemental raw material for detergents with less environmental impact.



Chelating Agent "PURIFEED" (Electron microscope photograph: x 40,000 magnification)

## **Reliable Company**

Our basic management policy places a priority on compliance as part of corporate social responsibility (CSR). In fiscal 2005, we implemented a Compliance Promotion Program, which contains company-wide education, awareness building activities, etc., with the aim of establishing a more effective compliance system. In addition, we are now working to establish an Internal Control System.

### Improvement of the Compliance System

### **Basic Concept**

The newly enacted Company Law obligates all companies to establish an internal control system. Therefore, we are now working to establish our own Internal Control System. We understand that compliance is one of the core parts of the Internal Control System and also believe that compliance is essential for a company to fully perform its CSR.

### **Promotion of Compliance**

In July 2003, we revised the "Tokuyama Code of Behavior." In March 2004, we established the "Tokuyama Behavioral Guidelines" and distributed copies to all employees. All employees are required to carry a copy of the "Tokuyama Behavioral Guidelines," which containing "Tokuyama's Five Conscience Clauses."

### **Compliance Promotion System**

The Compliance Committee, headed by the President, determines the basic concept, company-wide policies and systems/organizations concerning compliance. Its



### **Establishment of the Compliance Promotion Program**

The Compliance Committee established a Compliance Promotion Program for fiscal 2005 and determined that its secretariat should conduct the following activities on a priority basis:

- 1) Enhancement of awareness of compliance
- Assistance to group companies in establishing their own compliance systems

### Implementation of Compliance Promotion Program

**[Fiscal 2005]** As part of education and awareness building activities, we organized explanatory meetings on the Law for Prohibition of Private Monopoly and Maintenance of Fair Trade and the newly enacted Company Law. We investigated the current conditions of compliance systems of our group companies and assisted them in establishing more effective compliance systems.

[Fiscal 2006] We will implement the PDCA cycle<sup>\*</sup> for compliance activities.



] 7 Tokuyama Corporation

PDCA cycle: This is a management cycle to continuously improve compliance activities by implementing the process of Plan (establishment of a basic plan of activities), Do (implementation of the plan and follow-up and monitoring of activities), Check (review of the plan of activities based on the results of monitoring etc.) and Action (establishment of a new plan of activities).

### Protection of Information Security

### **Company-Wide Efforts**

Committee

Chairperson

We are actively promoting the introduction of IT with an aim of reforming business operations of all group companies. In the meantime, we fully understand that the importance of information security will increase as employees are increasingly dependent on information and networking systems as a result of the diffusion of IT. Therefore, we have enhanced efforts to ensure that we can utilize "information" as an important asset while protecting it in a proper manner.

In 2001, top management declared that measures to protect information security should be implemented with the participation of all employees. As a result, the "Information Security Committee," which establishes and implements overall and particular measures, was formed. The "Information Security Committee" has established the "Information Security Policy" containing overall security measures with an aim of actively utilizing information assets held by our company (information and the information system) while protecting their security. It has also finalized the basic policy of information security for Tokuyama group companies and promotes an educational campaign.

Organization of the Information Security





## compliance activities instead of passive ones."

Shoji lida Officer in charge of the Compliance Committee and Managing Director

Compliance is not only a matter of morals or attitude. I believe compliance management is identical to risk management. Compliance is essential for the Tokuyama Group to achieve sustainable growth in a stable manner by avoiding the risks of violating laws, regulations, or corporate ethics and by preventing corporate scandals. A company must perform its self-cleaning function by assessing current risks at an early stage, evaluating the degrees of risk and taking countermeasures rapidly and appropriately. For this purpose, we are committed to maintaining and improving our "open corporate culture" in which employees can exchange opinions frankly and openly.

"We pursue proactive

Each department of Tokuyama implements particular activities in accordance with the common rules contained in the Information Security Policy that was established in March 2002. Each group company has established various regulations in view of the Information Security Policy. Thus, Tokuyama and its group companies are making efforts to enhance information security.

### Personal Information Protection Management System

In recognition that the protection of personal information is one of the most important aspects of CSR, we have established a Personal Information Protection Management System.

We have nominated a Personal Information Protection Promotion Director who works as the superintendent in charge of personal information protection management. We have also established the Personal Information Protection Promotion Committee, its Secretariat and an Inquiry Desk. A Personal Information Management Leader is nominated for each department. These leaders promote effective management and utilization of personal information and implement educational activities for the members of their departments.

### Improvement of the Crisis Management System

If a grave crisis threatening the survival of our company should take place, an Emergency Headquarters headed by the President will be immediately established. The Emergency Headquarters will conduct crisis management operations across the company with the objective of restoring normal business operations as soon as possible. The particulars of our Crisis Management Promotion System are specified in the "Crisis Management Regulations." These regulations provide standards, guidelines, etc. for properly responding to individual crises, including "security environment crises," "product-related crises," and "human life crises in foreign countries."

Since the risk of a large-scale earthquake, such as an earthquake in the capital, a Nankai/Tonankai earthquake, or a Tokai earthquake, (regional earthquakes) has increased recently, the importance of establishing an emergency contact system is widely recognized. In fiscal 2005, we introduced various emergency communication tools and studied the means to enhance cooperation between business establishments. In fiscal 2006, we will build up our company-wide crisis management system to make crisis management operations even more reliable.

### VOICE

## **Relationship with Employees**

Tokuyama and its group companies are making efforts to improve the work environment so that all employees may exhibit their abilities and engage in their work with satisfaction. In fiscal 2005, we established an action plan based on the Law for Measures to Support the Development of the Next Generation and promoted the reemployment of retired persons and the employment of persons with disabilities.

### Personnel Management System to Maintain and Develop Dynamism

### Introduction of Annual Salary Scheme for Managerial **Employees**

Our Personnel Management System is based on the principle of capability development and attaches importance to the development and utilization of human resources. The system is a kind of ability-based grade system that has been adopted by many enterprises. We review the Personnel Management System from time to time in order to meet the needs of the times, while making the best use of principles of this worthy system.

In fiscal 2005, we introduced an annual salary scheme for managerial employees. This scheme is intended to reform managers' attitudes toward management and business performances, to activate the organization and to improve corporate financial performance. With the annual salary scheme, we have abolished seniority and personal factors and seek to pay compensation to managers depending on their duties, roles and achievements based on the principle of "work-and-you-will-be-rewarded."

### **Commendation scheme**

We have expanded our commendation scheme. At present, we have three main types of commendation as follows:

- 1) President's award: This award is given to persons who have contributed to the identification, development and expansion of new businesses.
- 2) Invention award: This award (including compensation) established in 2001, is given to persons who have obtained patent rights earning a significant amount of profit.
- 3) Division award: This award was established in 2001 to commend persons who have made outstanding contributions to their division and through which the division could achieve its annual targets.

In accordance with the Commendation and Disciplinary Regulations, we commend our employees who obtained patent rights or who made proposals for improvement, as well as those who received external awards, as the case may be.

### **Diversified Work Styles**

### **Employment of Physically-Challenged Individuals**

The employment rates of physically-challenged individuals at our company in fiscal years 2003 and 2004 were 1.39% and 1.59%, respectively, regrettably falling short of the legal employment rate of 1.8%. In fiscal 2005, this rate improved to 1.80%. We will continue to make efforts to provide physicallychallenged individuals with employment opportunities.

### Approach to the Law for Measures to Support the **Development of the Next Generation**

Against the background of an increasingly aging society with fewer children, the Law for Measures to Support the Development of the Next Generation was enacted to help create an environment where the number of children may increase and all children grow up in good health. As a response to the declining birthrate, we have established an "Action Plan" for the three fiscal years from 2005 to 2007 as follows.

### Action Plan under the Law for Measures to Support the Development of the Next Generation

1. The progress of childcare leave during the plan period should be as follows:

For male employees: At least one employee takes childcare leave For female employees: Average childcare leave taking rate is 70% or more

- 2. With the aim of introducing a more effective maternal support scheme in the future, we will study potential ideas, including "short-time work" and "reemployment."
- 3. We will improve the childcare leave scheme.
- 4. We will implement measures to encourage employees to take longer annual paid leave in a planned manner.

At present, we are making efforts to achieve these four targets across the company. We aim at acquiring certification\* by actively implementing the Action Plan.

### of Physically-Challenged Individuals 1.80 1.80 (%) 1.68 1.59 .48 1.5 1 39 1 0.5 0 00 01 02 04 05 (Fiscal year)

Trend of Employment Rates

### Number of Female Employees Who Took **Childcare Leave** 20



19 Tokuyama Corporation Certification: If a company implementing measures to support the development of the next generation based on its action plan achieves the targets specified in the action plan and satisfies of the following conditions: establishment of "childcare leave scheme, short-time work scheme and the like" for employees with childen aged three or older who have not reached school age; and one or more male employees have taken childcare leave during a plan period and childcare leave taking rate of female employees has reached 70% or more, the company will be qualified to receive certification from the Ministry of Health, Labour and Welfare under Article 13 of the Law for Measures to Support the Developme of the Next Generation.

### **Measures for Elder Employees**

To respond to the gradual postponement of the pensionable age for welfare benefits for the elderly and to help transfer the skills of retiring baby boomers to younger generations, we created a reemployment scheme for retired employees in fiscal 2001, ahead of many other companies in our industry. Although this scheme was temporarily suspended due to poor financial performance, we restarted it in fiscal 2005. In fiscal 2005, 35 of 50 retiring persons desired to be reemployed and 23 persons were reemployed in various positions.

### Introduction of Cafeteria Plan

Head office and branches are less well-equipped with welfare facilities than Tokuyama Factory. To meet the various needs of employees at these offices, therefore, we introduced a selective welfare system in fiscal 2001. In the autumn of 2005, we applied this selective welfare system to all employees, including those of Tokuyama Factory.

We are providing employees at our head office and branches with "cafeteria points." Each employee is given a certain number of points (each point has a certain denomination value) during each year. Cafeteria points can be used for travel, leisure activities and childcare/nursing services.

To encourage self-development and health management, a cafeteria point is allotted a higher denomination if used for self-development or health management activities.

At first, this cafeteria plan was utilized only by a small number of employees as it had not been widely publicized. Now, however, cafeteria points are being utilized not only for leisure activities but also for self-development.

### Promotion of Total Health Promotion Plan (THP)

### **Health Promotion under THP**

In accordance with the "Guidelines of the Total Health Promotion Plan (THP)" established by Ministry of Health, Labour and Welfare, we established the THP Committee to carry out various health promotion activities. We also established three expert panels: a Mental Health Panel, a Lifestyle Panel and an Education and Publicity Panel. Mental health workshops are organized for managerial employees. Employees may also utilize the helpline services of a specialized institution.

The Lifestyle Panel dispatches its health management staff to workplaces to run a "mini health class." This mini health class is run when employees gather for a safety meeting, etc. At this class, health management staff talk on essential points of health promotion for about twenty minutes. The theme covers, for example, "soft drinks" or "alcohol," changing on a six-monthly basis. This mini health class started in October 2005 and has been attended by a total of 157 employees at 13 workplaces (as of the end of March 2006.)

The Education and Publicity Panel issues a health magazine entitled "Dou?" and conducts educational and awareness building activities.

### **Promotion of Internal Recreational Activities**

We are promoting recreational activities for better communications and health with the aim of creating a "cheerful and lively workplace." The objective of these recreational activities is to encourage communication among employees, which tends to be insufficient in the IT environment and to help create a stress-free and vibrant workplace. Employees in charge of recreational activities mainly plan and conduct these activities at factories, divisions, branches and offices.



### "I aim at improving the lifestyles of employees by running "mini health class.""

VOICE

**Aya Shiigi** Public Health Nurse, Health Care Center

I introduce essential points of health promotion to employees so that they can better manage their health in their daily lives. These "mini health classes" are opened at each workplace and therefore attendants can be relaxed and conversations are animated. Although the allocated time is short, I make an effort to talk on familiar and concrete themes in communicating with attendants. I hope my mini health classes will be a good opportunity for employees to review their lifestyles and thereby contribute to their health promotion.

"Soft Volleyball" game at Tokuyama Factory (January 2006)





At the "mini health class," explanations are made on familiar themes, such as the "quantity of sugar in juices."

The health magazine titled "Dou?" issued by the THP Committee introduces recreational activities held at various workplaces.



## **Relationship with Customers**

We adopt customer-focused quality assurance based on the ISO 9001 quality management system. We are implementing strict quality management for all product-related processes, carrying out comprehensive safety management of chemicals and making every effort to conserve the environment and secure people's safety and health.

### **Quality Assurance**

We aim at being a much more customer-focused company that is continuously relied on by our customers. Therefore, we place a top priority on the provision of quality products and services that can offer satisfaction and a sense of security to our customers.

Our company, including branches, sales departments and R&D divisions, implements quality management and quality assurance activities in accordance with the ISO 9001 quality management system. By including branches and sales departments in the system, we can rapidly and properly respond to requests and complaints from our customers. Each division publicizes information on requests and complaints in their portal of our "groupware" intranet, so that division members may share the same information.

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Chemical Division portal site (in Japanese only)

### **Comprehensive Safety Management of Chemicals**

## Data Acquisition and Analysis on the Safety of Chemical Substances

We assess the safety of chemical substances by acquiring and analyzing safety-related data. Such data is used in preparing safety information for our products, waste materials, etc.

In fiscal 2005, we assessed the hazards related with all chemical substances handled internally, including products, raw materials and waste, reviewed handling methods and provided a variety of information.

### **Risk Assessment and Management of Chemicals**

We are conducting activities to prevent environmental pollution by monitoring the concentration of chemicals in effluents and gas emissions.

In addition, we simulate concentration distribution for chemicals and analyze their detailed behaviors. Risks are characterized based on a combination of concentration data and safety data and the characterized results are reflected in



### VOICE

"We are checking on the safety of chemicals in cooperation with persons in charge of responsible care (RC) of other companies."

### Norikazu Hattori

Senior Research Chemist, RC Research Laboratory

I had very valuable experience by participating in the HPV (High Production Volume) chemicals program. Under this program, representatives from seven companies handling TMAH (tetramethylammonium hydroxide) and its related products gathered to check the safety of the chemical. All of these representatives were in charge of RC. In these HPV activities, each company brought its safety data, shared the cost of conducting toxicity tests and mutually verified respective safety assessment documents. In the work related to the safety of chemicals, there should be no barriers between different companies. I really felt that HPV work cannot be done by a single company alone. enhancing our equipment safety measures and handling procedures and in educating workers involved in handling products and waste. These efforts eventually help us improve our product safety and provide accurate information to our customers.



### **Participation in HPV Program**

The HPV Program (High Production Volume Chemicals Program) is an international program to conduct safety assessment of chemicals that are manufactured in no less than two countries with a volume of 1,000 tons or more and OECD (Organization for Economic Co-operation and Development) lists as priority chemicals (about 1,000 chemicals). We actively participate in the HPV Program in regards to 17 chemical substances and conduct safety assessments of them.

As a leader of the international consortium for calcium chloride HPV, we participated in an international conference held in 2002. At present, we are promoting activities as a leader of the international consortium for TMAH (tetramethylammonium hydroxide) HPV, which is used as a liquid developer in the photolithography process for semiconductors and liquid crystal panels. In fiscal 2005, we prepared an HPV Assessment Report, had the document reviewed by the government authorities and submitted it to the OECD's secretariat. In April 2006, we attended the international conference (SIAM22) held in France where our HPV Assessment Report was accepted.

### Assessment of Products and Labeling

We appropriately assess the safety of both the chemicals and equipment units that we manufacture, in stages from research and development through commercialization. We made 51 assessments of this kind in fiscal 2005.

We also carry out labeling assessments for our catalogues, MSDSs,<sup>\*</sup> and other technical documents. The appropriateness and legality of representations on labeling and packaging of products, prototypes and sample products are assessed and inappropriate representations are corrected.

In fiscal 2005, we conducted about 230 labeling assessments.

### Provision of Information on Our Chemical Products

We provide MSDSs for all our products and prototypes to our customers and distribution agents.

MSDSs are prepared for about 400 types of products. Of these, MSDSs for 32 types of products that are transported in large quantities and heavily used by our customers are publicized on our company's Web site.

We also have each driver carry a "Yellow Card"\*\* that is

prepared with emergency instructions for use if an incident occurs during transportation. MSDSs and "Yellow Cards" on our products and waste materials are also posted on our intranet Web site so that this type of safety-related information can be shared.

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	ALTER CONTRACTOR
The MS are put (in Jap	SDSs of our major products blicized on our Web site. anese only)

### Assessment Flow Diagram for Ensuring Safety and Environmental Preservation

Assessment stages	Product assessment	Safety and Environmental assessment	Labeling assessment
Research commenced	Development group leaders (Primary assessment)		
Development commenced	R&D department heads (Secondary assessment)		Labeling Assessment Subcommittee (Prototypes)
Commercialization under study	Product assessment committee (Tertiary assessment)	Safety and Environment Assessment Subcommittee (Basic Plan)	Labeling Assessment Subcommittee (Products)
Product equipment being designed		Safety and Environment Assessment Subcommittee (Designing)	
Pre-marketing (pre-operation)		Safety and Environment Assessment Subcommittee (Pre-operation)	
Post-operation		Report on actual conditions (Environmental)	

### Safety Management of Waste Materials

Waste materials are handled in the same way as our products. We have prepared the necessary MSDSs for waste materials and distribute them to waste handling contractors and distribution agents to ensure safe handling and transportation of such waste materials. Also each driver is made to carry a "Yellow Card" prepared for the waste materials in case an incident occurs during transportation. We have so far prepared 68 MSDSs for waste materials.

### Promoting Safety and Environmental Management in the Distribution Process

### Providing Our Logistics Companies with Guidance and Education on Safety Management

We regularly hold local safety meetings with our nation-wide logistics companies whom we commission for transportation services. We conduct safety inspections for these logistics companies to help improve their management levels. Within the premises of our Tokuyama Factory, our safety specialists regularly make inspections of the loading terminal and visit the transporters in dock, providing safety guidance as necessary in cooperation with the logistics companies.

We also have a range of emergency measures in place. For example, each truck driver is required to carry a "Yellow Card" and appropriate emergency tools so that the driver can take suitable and speedy actions based on the emergency measures specified on the card if an incident occurs during land transportation. An emergency network and related organizations also form part of our emergency measures.

### **Distribution Risk Assessment**

Before hazardous materials are transported, we conduct risk assessments to verify the safety of the means of transportation and the trucking route and any emergency measures to be taken in the event of an accident. We also

conduct drills based on accident simulations.When a logistics facility is newly constructed or enlarged inside or outside our factory, facility safety assessments are always conducted.



### Crisis Management System

To deal with potential crises in logistics operations, we have established emergency respons prevention equipment and mate Drill assuming a truck accident (at Shunan district)

established emergency response criteria and disaster prevention equipment and materials are always ready for use.

In the Shunan and Kanto districts, we have established a mutual disaster assistance system with related logistics companies. This system has also been recently established in the Kansai district.

### Environmental Preservation Measures and Energy Conservation

We urge trucking companies to introduce vehicles adapted to exhaust regulations, fuel-efficient vehicles and eco-driving support devices (for example, digital tachographs and so forth).

Following the revision of the Law concerning the Rational Use of Energy (Energy Saving Law), we participated in the "Trial Project for Computation of Energy Needed by Cargo Owners, etc. to Comply with the Energy Saving Law," a governmental model project and reflected our opinions in operational guidelines.

### VOICE



"We make our best efforts to conduct education on the prevention of accidents and conduct drills to respond to emergency situations."

### Takayuki Sera

General Manager, Safety, Environment and Quality Assurance Office, Tokuyama Logistics Corporation.

To prevent a logistics accident or disaster, our 2006 Safety Management Plan attaches great importance to education and drills conducted by logistics companies. We inspect the contents of their training for truck drivers and their responses to potential accidents and thereby support their activities.

We conduct various kinds of drills just in case an accident or disaster occurs. Through field-oriented activities, we aim at improving logistics operations in accordance with ISO 9001 standards.

\* MSDS is the abbreviation for Material Safety Data Sheet. It is a document that contains information such as the name of the chemical material, appropriate safety and emergency measures required, etc., related to that material and is intended to ensure safe handling by providing information about any hazards related with the specific material.
\* The "Yellow Card" is the common name of a card prepared for emergency use, which explains to the truck driver, relevant persons, fire crews and police officers what to do in the event of a truck accident involving the chemicals being transported.

## Process Safety and Disaster Prevention/ Occupational Health and Safety

We place top priority on safe operations and promote process safety and disaster prevention activities to realize operations without accidents or disasters. In fiscal 2005, Tokuyama Factory achieved a Category III Zero-Accident record of 12.2 million hours. In cooperation with our contractors, we conduct safety education and training to ensure occupational health and safety and a comfortable working environment.

## Commitment to Safety and Disaster Prevention

**Comprehensive Disaster Prevention and Safety Activities** Tokuyama Factory-our main production site-is located in the vicinity of a residential area. Based on a determination to do our utmost to prevent any accidents, we are making every possible effort to secure safety through enhanced education and strict safety management in our operations. We also conduct various types of drills so that proper action can be rapidly taken in the event of an emergency. In the event of a large-scale accident, Tokuyama Factory has formed a Self-Defense Disaster Prevention Unit and conducts joint disaster prevention drills in collaboration with group companies, neighboring enterprises and related public authorities based on various simulated accident and disaster scenarios. These drills are open to and observed by, local residents so that they can better understand and rely on the safety activities of Tokuyama Factory.

We also steadily continue traditional activities, including safety patrols, hazard prediction activities, avoidance of dangerous carelessness, 5S activities and verbal safety checks (pointing at the item to be checked and voicing its name). Recently, we are actively "securing safety in advance" by identifying potential sources of danger and reducing and eliminating the risks involved.



Annual ceremony cum internal comprehensive disaster prevention drill (held on January 20, 2006)

### Self-Administered Safety Management

Tokuyama Factory has actively obtained certifications of "Certified Safety Inspector" and "Certified Completion Inspector" in accordance with the High-Pressure Gas Safety Law. In fiscal 2005, Tokuyama Factory renewed "Certified Safety Inspector" certification and newly acquired "Certified Completion Inspector" certification for its 12 facilities, including the VCM production plant. Tokuyama Factory is determined to comply with the conditions of these certifications and to improve safety management activities by conducting the "PDCA" cycle based on the principles of self-administered safety management and self-responsibility. We are committed to stable plant operations by promoting the self-administered safety management of our operational management division and by reinforcing the specialized maintenance skills of our facilities management division. In particular, the cement plant actively promotes TPM<sup>\*</sup> activities and received the TPM Superior Continuation Prize (first class) in fiscal 2005.



On-site inspections before receiving certification of "Certified Safety Inspector" and "Certified Completion Inspector" (June 15, 2005)

### Safety Audit

We conduct inspections for all of our facilities to identify the status of Process Safety and Disaster Prevention/ Occupational Health and Safety. If the audit identifies any incidents of nonconformance, these are pointed out and necessary guidance is given for corrective action. The results of audits are reported to the Safety Measures Committee and are reflected in the action policy for the following fiscal year.





Safety inspection at Kashima Factory (November 15, 2005)

### Achievement of Category III Zero-Accident hours Total of 12.2 million

In June 2005, Tokuyama Factory achieved the record of Ministry of Health, Labour and Welfare's Category III Zero-Accident hours total of 12.2 million. In the past, Tokuyama Factory achieved the record of Category I five times, but this is the first time since its start-up that it has achieved the record of Category III. This is the result of all employees' determined efforts to continue zero-accident operations. Now, Tokuyama Factory aims at achieving Zero-Accident hours total of 15 million.

Kashima Factory has continued zero-accident and zerodisaster operations for the past 20 years since its start-up. Tsukuba Research Laboratory has also continued zerodisaster operations for the past 16 years since its foundation.

In fiscal 2005, we invested 430 million yen on process safety, including a large water cannon truck for use in the event of a chemical accident.

\* TPM: Total Productive Maintenance is an abbreviation for Total Productive Maintenance. It is intended for achieving zero-losses with the participation of all employees, in pursuit of maximized production efficiencies, by implementing systems that prevent any losses due to accidents, defective products, equipment failures, etc.

## Commitment to Occupational Health and Safety

### **Expansion of the Safety Management System**

Each facility has been implementing an Occupational Health and Safety Management System since the establishment of this system in fiscal 2003. In fiscal 2005, Tokuyama Factory expanded this system into a full Safety Management System by including process safety and conducting risk assessment not only for work operations but also for processes and plant maintenance in a planned manner. In fiscal 2005, we invested 190 million ven in occupational health and safety activities

### Accident Severity Rates\*



### Rates of Lost Work Time Injuries\*



### **Our Situation in the Asbestos Problems**

### 1. Health Related Reports

Our company has never manufactured products containing asbestos in the past. It has not been reported so far that any of our employees, persons retired from our company or employees of contractors suffered health hazard from asbestos, or have qualified for workers' compensation for health hazards related with asbestos. Our Tokuyama, Kashima and Tsukuba facilities have not received any reports about health problems from any neighboring residents.

At our company, a small quantity of asbestos was used to repair a part of chemical manufacturing plants over a short period in the past. Therefore, we conducted medical checks for those persons who handled the asbestos (including active and retired employees). Fortunately, none of these persons have had asbestos-related health problems.

### 2. Handling of Items Containing Asbestos and Countermeasures

As is the case in many general manufacturing facilities, heat insulation and fireproof materials containing asbestos are used in our facilities. In the case of normal use, however, there is no concern that the asbestos may disperse into the air. In order not to have asbestos be dispersed into the air when structures

## "All of us are making efforts to 'secure safety in advance."

## Noriaki Saiki

Manager, Safety and Health Section, Environment & Safety Department, Tokuyama Factory

VOICE

"No accident" and "No disaster." These are the most important goals for all of us, including our group companies and contractors. They can only be achieved by acting and thinking together. At Tokuyama Factory, we improve safety with "Safety by visualization" and "Safety by Thinking" slogans, as well as "Secure safety in advance" by identifying risk factors in advance and eliminating them.

We are determined to continue "no-accident and no-disaster" operations through the concerted efforts of all persons concerned. We are making every effort in order that our factory can enjoy continued safety and can be relied on by local communities.

### Safety Education and Training in Close Coordination with Contractors

We are promoting activities to ensure "no-accident and nodisaster" operations in close coordination with contractors. such as safety meetings for information sharing attended by employees of Tokuyama and its contractors, management improvements through safety patrols, safety education and seminars for improvement of knowledge of various themes and drills for the improvement of skills.

### Maintaining a Comfortable Work Environment

Aiming to prevent health hazards and create pleasant working conditions, we continue to monitor the workplace environment where specified chemicals, organic solvents etc. are handled and continue to improve the work procedures and equipment involved. Thanks to these efforts, all worksites of Tokuyama Factory are rated as Control Category I.\* Tokuyama Factory has established its own voluntary standards to further improve safety activities.

containing asbestos are scrapped or renewed, the department in charge of facility management has established handling guidelines and also conducts specialized repair work, etc.

We are replacing asbestos-containing items with nonasbestos-containing ones in a planned manner. 3. Asbestos-Sprayed Buildings and Countermeasures In our company, we found a few exposed portions where asbestos was sprayed inside buildings that were built in the late 1960s and 1970s. Our environmental measurement data have revealed that these asbestos-sprayed materials are not immediately dangerous to life or health.

Although there is little concern about those asbestossprayed portions, we have decided to remove them to ensure a safer work environment. At present, removal work has been almost completed and will be fully completed in fiscal 2006.

With regard to these problems, we will take all appropriate measures to protect the health of our current and retired employees, employees of contractors and local residents.

Control Category I refers to a condition in which an atmospheric concentration of hazardous substances is below the control level in most part (over 95%) of the unit work area. There are three classes of Control Category: Category I, II and III, of which I is the in most part (over most desirable.

## Harmonious Coexistence with Communities and Society

We are enhancing communications with local residents in the vicinity of our facilities through RC dialogues, active participation in local environmental conservation activities and events and other social contributions. We always make efforts to rapidly provide all stakeholders with information in a transparent manner to maintain good communications and build trusting relationships with them.

### Communications with Communities and Society

### **Tokuyama Science Foundation**

This foundation was established in 1988 with the aim of creating a new field of science as part of the project for commemorating our company's 70th anniversary. Each year, the foundation grants subsidies to young researchers in the study of new materials and conducts various fostering projects, including "International Exchange Assistance," "International Symposium Assistance," and "Science and Technology Awareness Building Assistance." A total of 253 studies have been granted subsidies, with the total subsidies amounting to 490 million yen (as of March 2006.)

The foundation and the Chugoku/Shikoku Branch of the Chemical Society of Japan cosponsored the "Interesting and Exciting World of Chemistry–2005 Hiroshima Chemical Exhibition," held from August 19 to 21, 2005, in Hiroshima City. The purpose of this exhibition was to "raise children's interest in matters related to chemistry and science and technology and help them understand the importance of harmonization with the natural environment." Our company opened a booth with a theme of "Let's make '*karumera-yaki*!"" (crunchy candy)." In the experiment, children observed how '*karumera-yaki*? would rise due to the pyrolysis of baking soda, one of our products. The exhibition attracted 4,219 visitors in total, with more than 300 persons visiting our booth over the three days.



"2005 Hiroshima Chemical Exhibition" Children are enjoying making *"karumera-yaki."* (August 19, 2005)

### **Afforestation Activities in China**

In many parts of China, desertification is rapidly progressing. We have four group companies in China. Since desertification is a serious problem, we planted 13,000 seedlings in Houning, Hebei Province, which is situated 180 km north of Beijing, in April 2001, through the Nature Conservation Fund of the Nippon Keidanren. Since then, our local subsidiaries have participated in afforestation activities every year in an effort to help prevent desertification.

### **Donation of Previous Uniforms to Nepal**

We donated previous uniforms from our female employees to Nepalese children who are living in rather harsh conditions. When their previous uniforms were being replaced with new ones, some female employees made this donation proposal as a means of effectively utilizing limited resources. About

200 uniforms were delivered to Nepal through a volunteer group. The previous uniforms are used as winter clothes for Nepalese children living in mountainous areas.

> Nepalese junior high girls in uniform (in August 2005)



## Communications between Tokuyama Factory and Local Communities

• Every year, "RC dialogues with community" are organized with the aim of increasing community awareness of environmental conservation efforts made by companies in the Shunan district. In fiscal 2005 a number of presentations and plant tours were held.

Tokuyama Factory has also held its own "RC dialogues

with the community" since fiscal 2004. In fiscal 2005, 25 women from local communities (community associations) participated in our RC dialogues. At these meetings, opinions were exchanged under the theme of "Efforts for Environmental Conservation and Process Safety."



"RC dialogues with community people' held at Tokuyama Factory (August 22, 2005)

◆ Each year, we actively participate in forestry maintenance activities, called "Activities for Community-Forest-Water Interaction," organized to help preserve the forests in the community area. In fiscal 2005 (our 9th year), 127 people participated in this event, mowing grass, thinning out the woodland and trimming the branches of trees at Mt. linoyama in Shunan City.

• We aim at being a company open to society. Anyone

interested can make a factory tour by submitting an application in advance. In fiscal 2005, Tokuyama Factory became one of the tour sites for "Factory and Sightseeing Tours," which were organized by the "Chamber of Commerce and Industry" in Shunan district. Thanks to that, we had some 3,700 visitors, including about 130 school children, to our Tokuyama



Factory tour by employees' families (August 8, 2005)

activities (February 28, 2006)

Our two group companies participate in afforestation

Factory, taking a tour of the cement plant where waste recycling facilities are in operation.

 There were eight environmental complaints in fiscal 2005. five of which were considered attributable to our Tokuyama operations. We investigated the causes and implemented the necessary measures, including equipment repair.

### **Communications between Kashima Factory and Local** Communities

◆ We have designated May 30 as "Zero Refuse Day," and carry out coordinated cleaning work inside and outside Kashima Factory every year.

As a member of the Hasaki District Companies Network (Hasakiren), we undertook odor patrols and coordinated cleaning around the industrial complex.

There was a complaint from local residents to Hasakiren that offensive odors were experienced in the northeast district of the complex. Although we eventually found that we were not responsible for that incident, our Administration Section took the role of coordinating with the parties concerned.



### "A factory tour offers a good opportunity for interaction between Tokuvama and local residents."

VOICE

Yumiko Yamada General Affairs Department, Tokuyama Factory

In fiscal 2005, "Factory and Sightseeing Tours" were started. Participants in the events enjoyed our factory in the Shunan district. We have received many applications for our "Factory tours." Participants, ranging from school children to elders, have made the following comments: "I visited a real factory for the first time and was surprised at everything I saw"; and "I came to know for the first time that your company is producing the raw materials for the products I use." I will do my best to make our factory tour more interesting and help visitors to feel familiar with Tokuyama.

### **Environmental Communications**

### **Responsible Care Report and Web Site**

Every year since 1997, we have issued our "Responsible Care Report" (both Japanese and English editions) to communicate our stance on society, the environment and on safety and health issues and report on our activities during the previous year.

Our Web site includes pages with information on our efforts in making environmental and social contributions.



"Responsible Care Report 2005"



Our Web site introduces our environmental and social activities.

### **Exhibition at Environmental Events**

### SEMICON Japan 2005

From December 7 to 9, 2005, "SEMICON Japan 2005," an exhibition of semiconductor manufacturing equipment and materials, was held in Makuhari Messe. We exhibited our products at this exhibition. At the "Photovoltaic Generation Technology Symposium " which was set up as an annex to

the exhibition, we gave a presentation under the theme of "Current Conditions and Prospects for Silicon as a Raw Material for Solar Cells." The seminar room for the presentation was so full of attendants that many listened standing up.



Presentation by Tokuyama at SEMICON Japan 2005

### ♦ NEW EARTH 2005

The "Global Environment Technology Show & International Symposium (NEW EARTH 2005)" was held at INTEX OSAKA for four days from October 26, 2005. Tokuyama Siltech Co., Ltd., a

group company, exhibited "Prefeed," a multifunctional ingredient for detergents and "Ecolayer," a new heavy metal sequestrant. Many people visited the company booth. making inquiries and providing valuable opinions. Yamaguchi Iki-Iki Eco Fair



Tokuyama Siltech's booth at the NEW EARTH 2005

An environmental event titled the "Yamaguchi Iki-Iki Eco Fair" was organized by the Yamaguchi prefectural

government (from October 15 to 16, 2005.) We opened a booth under the theme of "Eco Life Tokuyama." We widely publicized to prefectural

residents that Tokuyama manufactures polycrystalline silicon as a raw material for solar cells with the aim of realizing an energy-saving society, thus helping to prevent global warming through the diffusion of solar cells.



FIGARO Engineering Inc., a group company, opened a booth at the EXPO 2005 Aichi Japan, held in Nagoya, jointly with U-Dome Co., Ltd. and Nagoya Sangyo University. FIGARO actively introduces gas sensors in the field of global environmental measuring. At the booth, the company

introduced technology for "solid-electrolyte CO2 sensors," which it has begun to sell ahead of competitors throughout the world.



at the Yamaguchi Iki-Iki Eco Fair

FIGARO's booth at the EXPO 2005 Aichi Japan

## **Tokuyama Factory**



Location: 1-1, Mikage-cho, Shunan City, Yamaguchi Prefecture Number of Employees: 1,566 Area of Factory: 1,650,000 m<sup>2</sup> (total area) (Tokuyama Plant, Nanyo



Main Products Cement, inorganic and organic chemical products, polycrystalline silicon, silica, vinyl chloride monomer, etc.

Executive Managing Director and Tokuyama Factory General Manager Hisami Tanimoto

Facing the Tokuyama bay, the Tokuyama Factory is conveniently located for sea transportation of raw materials and products. The cement plant contributes to recycling waste materials and byproducts. Electric power and steam are supplied from our own power generation plant.

Plant and Higashi Plant)

### Release and Transfer of PRTR Substances Sorted by Item (FY 2005)\* (in tons\*\* except dioxins, in mg-TEQ)

- <b>y</b> y					- ,	3,
Leg		Amount released			ed	A
Name of substance	substance number	To atmo- sphere	To public water systems	To soils	Subtotal	transferred
Cresol	67	0.0	22.9	0.0	22.9	0.0
Chloroethylene (Vinyl chloride)	77	11.8	0.0	0.0	11.8	0.0
1,2-dichloroethane	116	9.3	0.0	0.0	9.3	0.0
1,2-dichloropropane	135	3.8	0.0	0.0	3.8	187.4
Toluene	227	3.2	0.0	0.0	3.2	106.4
Chloromethane (Methyl chloride)	96	3.1	0.0	0.0	3.1	0.0
Dichloromethane (Methylene chloride)	145	1.7	0.0	0.0	1.7	0.9
Chloroform	95	0.7	0.0	0.0	0.7	0.0
1,2-epoxypropane (Propylene oxide)	56	0.6	0.0	0.0	0.6	2.3
Carbon tetrachloride	112	0.1	0.0	0.0	0.1	0.0
Benzene	299	0.0	0.0	0.0	0.0	0.0
2,2'-azobisisobutyronitrile	13	0.0	0.0	0.0	0.0	0.0
Ethylene glycol	43	0.0	0.0	0.0	0.0	0.2
Copper and its water-soluble salts (excluding complex salt)	207	0.0	0.0	0.0	0.0	1.9
Nickel compounds	232	0.0	0.0	0.0	0.0	0.0
Hydrazine	253	0.0	0.0	0.0	0.0	0.0
Hydrogen fluoride and its water soluble salt	283	0.0	0.0	0.0	0.0	0.0
Boron and its compounds	304	0.0	0.0	0.0	0.0	0.0
Dioxins	179	(75.1)	(64.5)	(0.0)	(139.6)	(0.0)
Total		34.3	22.9	0.0	57.2	299.1

 Scope of survey includes PRTR-law specified substances with an amount handled of more than 1 ton per year and dioxins.
 \*\* While the PRTR Law says the amount of release shall be given in kilograms to two

\*\* While the PRTR Law says the amount of release shall be given in kilograms to two significant figures, the amount in this report is given in tons, rounded to the nearest 1/10 ton (dioxins in mg-TEQ).





Certification of Ministry of Health, Labour and Welfare's Category III Zero-Accident record of 12.2 million hours presented (June 14, 2005)

## Volume of Finally Disposed Waste, Utilization Rates, etc.



## **Kashima Factory**



Location: 26 Sunayama, Kamisu City, Ibaraki Prefecture Number of Employees: 78

Area of Factory: 101,000 m<sup>2</sup>



Kashima Factory is located within the Hasaki Industrial Complex that forms a part of the Kashima Coastal Industrial Region. It comprises the plants of Tokuyama's three group companies. They are all engaged in manufacturing specialty chemical products that contribute to human health.

Kashima Factory General Manager Osamu Iwamoto

### Tokuyama's Kashima Factory

Bulk pharmaceuticals (x-ray contrast agents, stomach and duodenal ulcer treatment drugs); optical materials (plastic lens monomers, light modulating materials, hard coat solutions); metal washing solutions

### Kashima Plant of Tokuyama Dental Corporation

Dental materials (restorative materials, adhesives, denture relining materials, impression materials, dental stone, implant materials)

### Kashima Works of A&T Corporation

Reagents for clinical analysis (electrolyte analysis reagents, glucose analysis reagents)

### ■ Release and Transfer of PRTR Substances Sorted by Item (FY 2005)\*

(Total of Three Companies)				(in tons)		
	Legally- specified substance number	Amount released				
Name of substance		To atmo- sphere	To public water systems	To soils	Subtotal	Amount transferred
Toluene	227	1.7	0.0	0.0	1.7	28.5
Dichloromethane (Methylene chloride)	145	1.2	0.0	0.0	1.2	5.4
Chloroform	95	0.4	0.0	0.0	0.4	1.5
Acetonitrile	12	0.0	0.0	0.0	0.0	4.3
Ethylene glycol	43	0.0	0.0	0.0	0.0	0.3
1,4-dioxane	113	0.0	0.0	0.0	0.0	0.1
N,N-dimethylformamide	172	0.0	0.0	0.0	0.0	14.2
2-vinylpyridine	256	0.0	0.0	0.0	0.0	0.2
Methacrylic acid	314	0.0	0.0	0.0	0.0	0.0
2,3-epoxypropyl methacrylate	316	0.0	0.0	0.0	0.0	0.0
Methyl methacrylate	320	0.0	0.0	0.0	0.0	0.0
$\alpha$ -methylstyrene	335	0.0	0.0	0.0	0.0	0.0
Total		3.3	0.0	0.0	3.3	54.5

Scope of survey includes PRTR-law specified substances with an amount handled of

 \*\* While the PRTR Law says the amount of release shall be given in kilograms to two significant figures, the amount in this report is given in tons, rounded to the nearest 1/10 ton

Hazardous air pollutants: The gross release of dichloromethane and chloroform remained the same as the previous year's level. Tokuyama Dental changed processing solutions from dichloromethane to aqueous solvent for a number of products. We will continue efforts to reduce the release of dichloromethane by changing processing solutions for other products. Volume of final disposal: In fiscal 2005, the volume of final disposal decreased to 15 tons (-48%) due to recycling of inorganic sludge and material recycling of metals. Environmental conservation: All employees of our factory participated in the "Stop Engine-Idling Campaign," promoted by the Ibaraki prefectural government to help conserve the environment.

Process safety: At the end of fiscal 2004, all operators participated in an experience-based seminar on valve operations. In fiscal 2005, the incidence of wrong valve operations was reduced to zero. Five operators participated in an experience-based seminar on burns from heat or chemicals to improve their capability to predict hazards and prevent errors in operations. In March 2006, we conducted a drill on the handling of fire extinguishers to improve employees' awareness of fire prevention.

Occupational health and safety: As a result of a work environment assessment, one workplace was rated as Control Category II. Therefore, we increased the number of ducts at during our periodic repairs in the second half of the year to regain the rating of Control Category I for the workplace.



Tree planting to celebrate the 20th anniversary of zero-accident operations (September 27, 2005)

### Release of Hazardous Air Pollutants (Total of Three Companies)



### Volume of Finally Disposed Waste, Utilization Rates, etc.



## **Environmental Activities of Group Companies**

We believe we should jointly address Responsible Care activities with our group companies. To provide support for their activities, we have exchanged a memorandum of agreement on RC management with respective group companies that are engaged in production activities at home and abroad

We assess overall RC activities by reviewing the RC activity data of group companies, such as their environmental impacts, safety management indicators, etc. and also by making safety and environmental inspections of a number of companies on a yearly basis.

We share information on relevant laws and regulations with our group companies and also help them acquire ISO 14001 and ISO 9001 certification. In fiscal 2005, ASTOM Corporation acquired ISO 9001 certification.



Safety and environmental inspections of group companies (Kuriyama Plant, Shanon Co., Ltd., October 27, 2005)



ASTOM Corporation acquires ISO 9001 certification

### ISO 9001 and ISO 14001 Acquisition Status for 11 **Group Companies**

Company name	ISO 9001	ISO 14001
Sun Tox Co., Ltd.		
Shanon Co., Ltd.		—
Tohoku Shanon Co., Ltd.		
A&T Corporation		
Figaro Engineering Inc.		
Tokuyama Dental Corporation		
Tokuyama Siltech Co., Ltd.		
Sun Arrow Chemical Co., Ltd.	—	
ASTOM Corporation		
Shin Dai-ichi Vinyl Corporation	—	
Tokuyama Polypropylene Co., Ltd.		

Certified Included as a group site

### Sun Tox Co., Ltd.

Established: February 14, 1992 Shareholders: Tokuyama Corporation (100%)

3075-18, Shimasu, Itako City, Ibaraki Prefecture, 311-2434 Kanto Plant



Plant manager: Hideki Tanaka Employees: 167

Area: 55.800 m

Kanto Plant is located in the Itako Industrial Park in Ibaraki Prefecture and manufactures a total quantity of 25,000 tons a year of biaxially oriented PP films and cast PP films. Kanto Plant has actively pursued energy saving from the standpoint of environmental conservation.

In fiscal 2005, we reduced heavy oil consumption by 38% as compared with the previous year by operating the cogeneration plant at full scale. In fiscal 2006, we aim at reducing heavy oil consumption by 50% as compared with fiscal 2004. We kicked off activities to acquire ISO 14001. We promote the PDCA cycle aiming at running our plant in harmony with society, together with implementing ISO 9001 and the Occupational Health and Safety Management System.

### Performance Data (FYs 2001-2005)

	Unit	2001	2002	2003	2004	2005
Power consumption	1,000 kWh	21,730	26,890	27,810	28,470	28,480
Heavy oil consumption	kl/year	1,280	1,480	1,460	1,470	910
SOx	tons/year	1.4	2.2	2.0	2.0	0.7
NOx	tons/year	2.5	2.8	3.3	3.3	0.9
Soot particles	tons/year	0.6	0.1	0.3	0.3	0.04
Industrial water consumption	tons/year	62	56	52	53	63
Waste generation	tons/year	300	100	27	90	22
Volume of external final disposal	tons/year	7	10	20	0	0
COD	tons/year	0.01	0.02	0.02	0.02	0.02

Head office: Annex to Tokuyama Bldg. 1-4-5, Nishi-Shimbashi, Minato-ku, Tokyo, 105-8429 **Business:** Manufacture and sales of biaxially oriented polypropylene films and cast polypropylene films (including multi-layer co-extruded films)

Tokuyama Plant 7-7, Harumi-cho, Shunan City, Yamaguchi Prefecture, 745-0024





Plant manager: Toshiyuki Yamaoka Employees: 145 Area: 24,100 m<sup>2</sup>

Tokuyama Plant is located within the Tokuyama Factory and manufactures about 23,000 tons a year of biaxially oriented PP film. The plant conducts coordinated RC activities with Tokuyama Factory and also maintains ISO 14001 for environmental conservation. In fiscal 2005, we made all-out efforts to "drastically reduce manufacturing losses" Thanks to these efforts, we achieved an 8% reduction in unit raw material consumption and a 5% decrease in unit energy consumption. For these achievements, we were presented with the President's Award for Tokuyama Group companies.

Regarding safety and health, we began to implement an occupational health and safety management system and promoted various activities laying stress on risk assessment. In fiscal 2006, we continued efforts under the slogan of "Feel joy in production; Be stringent with quality; and Adhere to safety," so that our plant can continue to be relied on by society and by our customers.

### Performance Data (FYs 2001-2005)

	Unit	2001	2002	2003	2004	2005
Power consumption	1,000 kWh	34,420	34,920	36,170	35,740	35,770
Consumption of 0.3 MPa steam	kl/year	2,500	2,450	3,080	2,610	2,930
Consumption of 2.1 MPa steam	tons/year	37,690	39,670	42,270	42,760	44,830
Waste generation	tons/year	670	270	100	80	160
Volume of external final disposal	tons/year	36	18	4	2	0

### Sun Arrow Chemical Co., Ltd.

### Established: February 1, 1999 Shareholders: Tokuyama Corporation (100%)

Head office: Kitahama-Chuo Bldg., 2-2-22, Kitahama, Chuo-ku, Osaka City, 541-0041 Business: Manufacture and sales of vinyl chloride compounds

# Tokuyama Plant 1-2, Harumicho, Shunan City, Yamaguchi Prefecture, 745-0024 Image: A state of the state of t



Plant manager: Shigefumi Kunihiro Employees: 25 Area: 3,280 m<sup>2</sup>

Our Tokuyama Plant is located within the Higashi Plant of the Tokuyama Factory and manufactures about 12,000 tons of vinyl chloride compounds a year.

Out of recognition that RC activities should be carried out regardless of the size of a company, our plant conducts its own RC activities harmonized with those of Tokuyama Factory.

In fiscal 2005, we established goals for reducing waste and 100% recycling of waste plastics. We achieved these goals by exhaustively sorting out such waste materials.

As for occupational health and safety, we uphold a stringent corporate policy of "Safety First," fully realizing the

### Performance Data (FYs 2001-2005)

	Units	2001	2002	2003	2004	2005
Power consumption	1,000 kWh	2,310	2,570	2,790	3,020	3,210
Consumption of 0.3 MPa steam	tons/ year	240	240	240	240	240
Industrial water consumption	1,000 tons/year	65	65	65	65	65
Volume of external final disposal	tons/ year	21.1	7.3	0	0	0

importance of preventing any kind of disaster. Therefore, we enthusiastically conduct activities in response to technological progress and the diversification of materials with assistance from Tokuyama Corporation and make continuing efforts to reduce or eliminate potential risks. We will plan a transition to the Occupational and Health and Safety Management System in fiscal 2006 and establish the system in fiscal 2007.

### Tokuyama RC Activities—Historical Overview

July 1991	Established Global Environmental Issues Committee	June	Kashima Factory won the Ibaraki Prefecture award in
March 1993	Established RC Administration Committee,		recognition of it being an "Earth-Friendly Company".
	Instituted voluntary plan for Total Management of	March 2003	Received the award of distinction in "Resource
	Environment, Safety and Quality		Recycling Technologies and Systems" from the
April 1994	Acquired ISO 9002 certification for High-Purity		Director-General of Industrial Science and
•	Isopropyl Alcohol		Technology Policy and Environment Bureau, Ministry
June	Improved product warranty systems, such as product		of Economy, Trade and Industry
	and labeling assessments	April	Updated certification to ISO 9001: 2000; company's
April 1995	Became a member of the Japan Responsible Care	•	sales sector was newly certified
	Council	December	Underwent the Responsible Care verification
May 1997	Acquired ISO 9001 certification for Cement		process. Tokuyama Factory achieved a Category II
-	Manufacturing		zero-accidents record (8.1 million hours for the
September	Issued RC Report (First edition)		chemical industry) as defined by the Ministry of
April 1998	Acquired ISO 9001 certification for Dental Materials		Health, Labor and Welfare.
	Manufacturing	October 2004	Figaro Engineering Inc. acquired an ISO 14001
December	Acquired ISO 9001 and 9002 certifications for		certification. Kashima Factory was granted the
	aluminum nitride and Functional Powders		Director-General of Labor Bureau of the Ibaraki
	Manufacturing; Tokuyama Factory was certified to		Prefectural Government Award.
	ISO 14001	February 2005	Tokuyama Factory was granted the Director-General
January 1999	Kashima Factory was certified to ISO 14001.		of the Agency of Natural Resources and Energy
June	Acquired ISO 9002 certification for Chemical		Award for Excellent Energy Management Plant
	Products, Polypropylene, Films, etc.		(Electricity Sector).
December	Set up Ecological Management Initiative Department.	March	Tokuyama Factory acquired a certification of the
	Acquired ISO 9002 certification for polycrystalline		Yamaguchi Prefecture Eco Factory.
	silicon, organic solutions, etc.	June	Tokuyama Factory achieved the Ministry of Health,
August 2000	Created Recycling and Environmental Business		Labour and Welfare's Category III Zero-Accident
	Department		record (chemical industry: 12.2 million hours).
April 2001	Established Yamaguchi Eco-Tech Corporation	September	ASTOM Corporation acquired ISO 9001 certification.
April 2002	Acquired ISO 9002 certification for vinyl chloride		
	monomer and polyvinyl chloride		

### Tokuyama Corp.

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