Responsible Care

The UBE Group

Responsible Care Report 2003

Working for the Environment, Safety and Health

Responsible Care Report 2003

UBE INDUSTRIES,LTD.

Contents

About this report:

◆ Period: April 1, 2002 to March 31, 2003 (Includes some fiscal 2003 activities and plans for the future.)

◆ Coverage: Ube Industries, Ltd. (“UBE”) and 12 main subsidiaries
Four chemical plants (Chiba, Sakai, Ube, Nishioki) and three cement plants (Ube, Isa, Kanda)
Ube Film, Ltd., Meiwa Kasei Industries, Ltd., Ube Ammonia Industry, Ltd., Ube Agri-Materials, Ltd.,
Ems-Ube Ltd., Kemira-Ube, Ltd., UMG ABS, Ltd.(Ube factory), Ube Material Industries, Ltd., Ube Board Co., Ltd.,
Ube Machinery Co., Ltd., Ube Steel Co., Ltd., U-Mold Co., Ltd.
These 12 main subsidiaries and Ube Industries, Ltd., are referred to as “the UBE Group.”

◆ This report covers only domestic activities of the UBE Group.

◆ The data of UBE in this Report generally cover the results of the last five years (1998 – 2002) and plans for fiscal 2003.
Along with growth of relevant subjects, the data on the UBE Group companies has been placed since fiscal 1999.

Foreword

This report focuses on the UBE Group’s commitment to the environment, safety and health in fiscal 2002.

Ten years have now passed since the issue of global warming began to be debated at the earth summits that sprang from the United Nations Conference on Environment and Development (UNCED). Over that time, efforts have been made to achieve the worldwide sustainable development concept represented by the Kyoto Protocol and the Johannesburg Declaration.

In Japan, social awareness of environmental issues has steadily grown with the disclosure of data from individual facilities based on the Soil Pollution Prevention Law and the Chemical Substance Promotion Law (informally known as “the PRTR (Pollutant Release and Transfer Register) Law.”

As a member of Japanese society, the UBE Group is committed to contributing to society and achieving environmental preservation, safety and heath through its business activities. We promote ongoing Responsible Care activities with the aim of providing customers and consumers with safe products, including the safe distribution of those products, positively protecting local living environments as well as the global environment, and ensuring and promoting the safety and health of staff.

In particular, through the “environmentally oriented business practices” advocated in the New 21・UBE Plan, UBE’s mid-term business plan launched in fiscal 2001, the Group is facing up to the problem of global warming through the effective utilization of resources and energy conservation, reducing substances covered under the PRTR Law that negatively impact the environment, and building systems to cover matters such as the safe control of chemicals. In addition to the successes we have already achieved with these efforts, we are also making ongoing efforts to meet future goals.

We wish to sincerely apologize for the considerable disruption caused to large numbers of people, including local citizens and the authorities, as a result of effluent spillage from the Isa Cement Factory occurred in December last year. We can report that we have thoroughly reviewed our management and education systems so that such an incident will not occur again.

Today, with increasing transparency demanded in regard to companies’ environment and safety information, we hope you will understand more about our activities in the areas of the environment, safety and health through this report. We welcome your comments and views so that we can further improve and enhance our Responsible Care activities.

September 2003

Kazumasa Tsunemi,
President and Group CEO
Ube Industries, Ltd.

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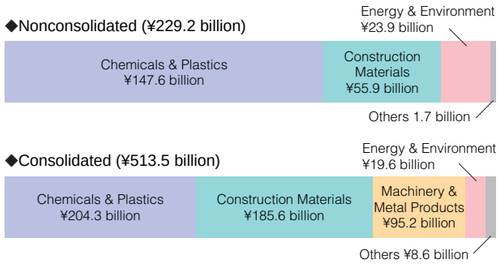
Company Profile (as of March 31, 2003)

The history of the UBE Group starts from the Okinoyama Coal Mine, established to develop the coalfields at Ube, Yamaguchi Prefecture. With its commitment to “co-existence and co-prosperity” with the local community, the Company used the limited coal industry as a starting point to create industries that would give rise to unlimited value, developing a succession of new businesses needed by the times to bring long-lasting prosperity. Unremitting self reform, a desire to progress through original technologies, and the ideal of sharing — these are the UBE Group’s core idendity that have permeated its long history. These values relate to how we can live in harmony with the community, the world and our planet. Cherishing these ideals, the UBE Group continues globally on its tireless path into the future.

- Founded: June 1897
- Consolidated: March 1942
- Capital: ¥43.5 billion
- Employees: 3,420 (nonconsolidated)
  10,829 (consolidated)
- Nonconsolidated / Consolidated sales:



- Business Areas

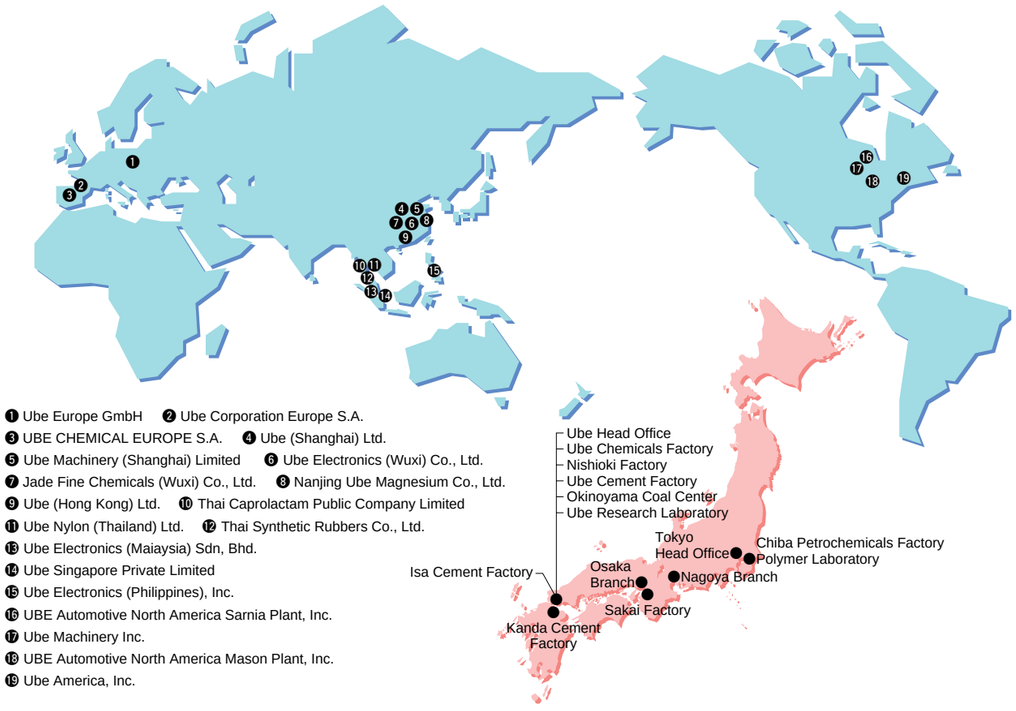
Chemicals & Plastics:
Manufacture and sale of fine chemicals, pharmaceuticals, caprolactam, nylon, industrial chemicals, specialty products, polyolefins, synthetic rubber and fertilizers

Construction Materials:
Manufacture and sale of cement, solidification agents, civil engineering and foundation materials, building materials and magnesium

Machinery & Metal Products:
Manufacture and sale of die-casting machines, injection-molding machines, extrusion presses, crushing machines, cranes, conveyors, bridges, steel structures and aluminum wheels.

Energy & Environment:
Purchase, sale, storage, transportation, and distribution of imported steaming coal, electrical power generation (for internal use and wholesale distribution), and environmental recycling operations and the sale of related equipment

- Domestic and Overseas Bases



❶ Ube Europe GmbH ❷ Ube Corporation Europe S.A.
❸ UBE CHEMICAL EUROPE S.A. ❹ Ube (Shanghai) Ltd.
❺ Ube Machinery (Shanghai) Limited ❻ Ube Electronics (Wuxi) Co., Ltd.
❼ Jade Fine Chemicals (Wuxi) Co., Ltd. ❽ Nanjing Ube Magnesium Co., Ltd.
❾ Ube (Hong Kong) Ltd. ❿ Thai Caprolactam Public Company Limited
⓫ Ube Nylon (Thailand) Ltd. ⓬ Thai Synthetic Rubbers Co., Ltd.
⓭ Ube Electronics (Maiaysia) Sdn, Bhd.
⓮ Ube Singapore Private Limited
⓯ Ube Electronics (Philippines), Inc.
⓰ UBE Automotive North America Sarnia Plant, Inc.
⓱ Ube Machinery Inc.
⓲ UBE Automotive North America Mason Plant, Inc.
⓳ Ube America, Inc.

Responsible Care

In support of the ideal of Responsible Care (RC), in 1992 UBE set out its Environmental and Safety Principles, which stipulate its basic stance on environmental, safety and health issues. We carry out RC activities in all our business areas, including Construction Materials, Machinery and Metal Products, and Energy and Environment as well as Chemicals and Plastics.

In addition, in 1998 we formed a set of Personal Action Guidelines and sought to further beef up our compliance system in an effort to increase the trust and support we enjoy from the community at large. Our Personal Action Guidelines are standards governing the proper behavior of the staff and officers of the Group in the performance of their everyday duties.

◆ Environmental and Safety Principles

As members of society, corporations must be fully conscious of their own responsibilities regarding their contributions to society, environmental preservation and the maintenance of health and safety in performing their corporate activities. As the core company in managing the consolidated UBE Group, UBE shall purse the following vision in order to perform its leadership role, and shall work to improve the quality of the environment and safety among all of its group companies.

Safety Management	Ensuring safety shall be the priority in all areas and activities under UBE’s commitment to respect human life.
Environmental Preservation	As a responsible corporate citizen, UBE shall act positively to protect and improve both community and regional conditions and to work for the preservation of the global environment.
Product Safety	The UBE Group shall pursue its corporate responsibility in providing its customers and the public with safe and reliable products.
Health Management	UBE recognizes that maintaining and promoting the health of its employees is the basis of corporate and social vitality.

Kazumasa Tsunemi,
President and Group CEO
Ube Industries, Ltd.

Instituted April 1,1992. Revised April 1996, July 1999, and April 2003.

◆ Our Personal Action Guidelines

Chapter 1: Corporate Mission and Creation of Value
Chapter 2: The Law and the Corporation
Chapter 3: Social Trust and Rating
Chapter 4: Impartiality and Sincerity
Chapter 5: Safety and the Environment
Chapter 6: Human Rights and the Workplace
Chapter 7: Information Disclosure and the Regional Community
Chapter 8: International Society and the Corporation
Chapter 9: Conclusion: Establishing Corporate Ethics

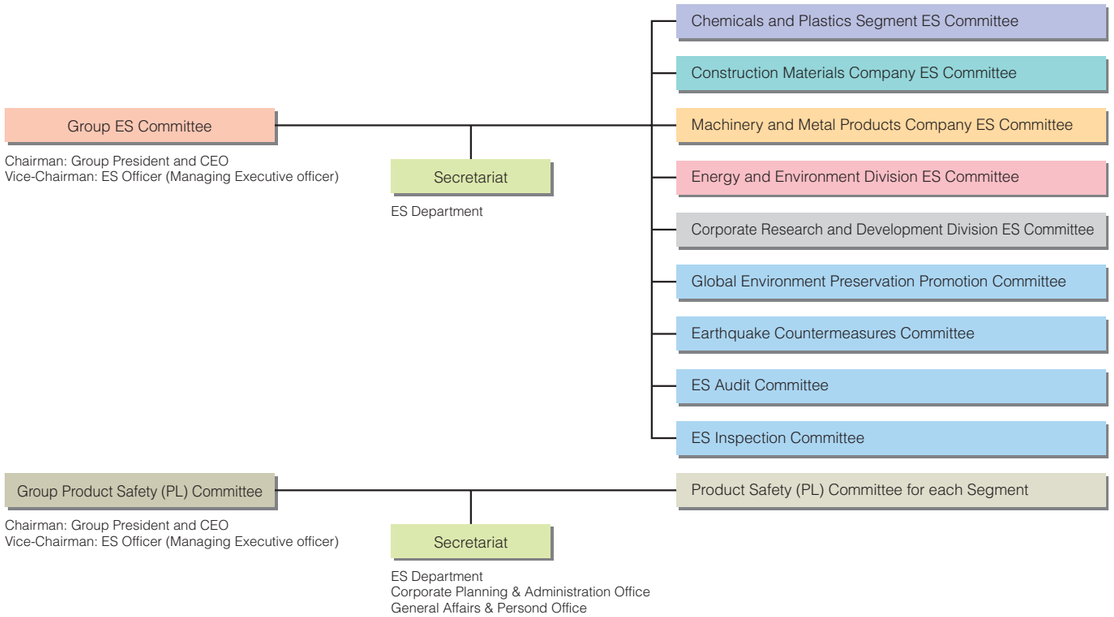
◆ What Is Responsible Care?

Responsible Care (RC) is a set of voluntary initiative based on the principles of autonomous decision-making and self-responsibility. Under RC, corporations that manufacture and/or handle chemical substances are working voluntarily to preserve health, safety and environment in every process, from the development of chemicals through their manufacture, distribution, use and final consumption and disposal. This includes maintaining ongoing dialogues and discussions with the public by openly disclosing the results of these efforts.

Responsible Care

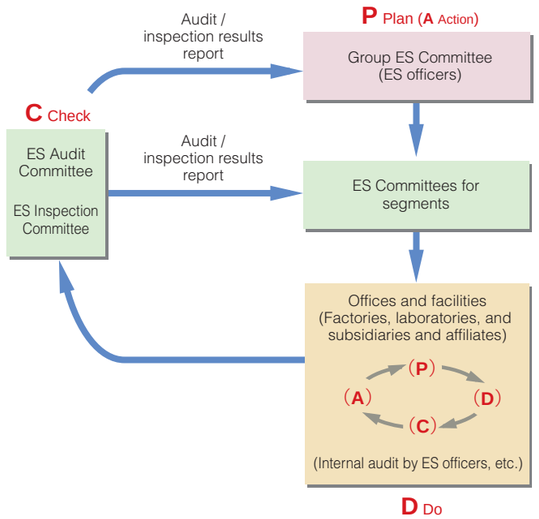
Environment and Safety Management System

The UBE Group established the Group Environment and Safety Committee, consisting of Group Management Committee members and chaired by the president (also the Group CEO), as the highest decision-making entity in the area of safety management, environmental preservation and health management as set out in our Environmental and Safety Principles. This Committee decides Group policy as well as implememtation plans relating to the environment, safety and health.
Under the Group Environment and Safety Committee, individual Environment and Safety Committees were set up for each of our five business segments as shown below, and each committee deals with environment and safety measures that relate to the business operations of each segment in accordance with the policies and plans determined by the Group Environment and Safety Committee. In addition, four further separate committees were set up to examine, report on, and review specific activity plans. From fiscal 2002, the Group Product Liability Committee has been determining and reviewing policy relating to product safety.



◆ Responsible Care Management System

In an effort to continually improve its performance in regard to the environment, safety, and health, the UBE Group promotes a management system based on the PDCA (Plan, Do, Check, Action) cycle.
Specifically, the Environment and Safety Committee for each segment formulate concrete plans that reflect the plans determined by the Group Environment and Safety Committee, and each office or facility implements measures based on these plans.
Moreover, all offices, facilities, and group companies are subject to annual environment and safety audits and inspections. On the basis of these, corrective measures may be required to be implemented where applicable, and results are reported to the Group Environment and Safety Committee and to the ES committee for each segment.



Environment and Safety

■History

	Organization & Environmental Activities (UBE)	Environment-Related Products and Technology	Domestic and World Trends
1949	○Ube System started		
1951	○Dust Countermeasures Section established in Ube City		
1971	●Environment Management Section established in each factory		●Environment Agency established
1973	●Environment Management Department established in head office (currently “ES Department”) ●Energy Savings Committee established		●Special Environment Preservation Law for Seto Inland Sea enacted
1992	●UBE ES Principles instituted		●UN Conference on the Environment and Development (Earth Summit) held
1993			●Basic Environment Law enacted
1994	●Environment-related business started ●ES audits started		●UN Framework Convention on Climate Change took effect
1995	●Joined Japan Responsible Care Council (JRCC), UBE’s Voluntary ES Plan formulated	●Demonstration plant for in-situ vitrification completed ●Demonstration plant for manufacture of RDF from waste plastics completed	●JRCC established ●Container and Packaging Recycling Law enacted
1996	●UBE’s ES Principles revised ●Environment and Engineering Division formed	●Sludge puffing demonstration plant completed	
1997	○Ube City awarded UNEP Global 500 Prize ●1st RC report issued ●Participated in 1st RC regional meetings in Chiba, Yamaguchi, and Sakai-Senboku	●SWM demonstration plant completed	●Third Convention on Climate Change (COP3) held
1998	●Resource Energy Measures Study Committee established ●Personal Action Guidelines instituted		●Law for Promotion Measures to Tackle Global Warming enacted
1999	●Isa Cement Factory received ISO-14001 certification. Subsequently, all plants awarded ISO-14001 certifications ●Participated in 2nd RC regional meeting in Chiba	●Handover of RDF manufacturing plant to Mine City ●EUP demonstration plant completed ●Test operation of press and roll packaging plant completed	●Chemical Substance Management Promotion Law (PRTR Law) enacted ●Law Concerning Special Measures Against Dioxins enacted ●Guidelines on Environmental Accounting announced
2000	●Environmental accounting introduced ●2010 Environment Preservation Project initiated ●Participated in 2nd RC regional meetings in Sakai-Senboku and Yamaguchi	●Commercial EUP operations begun	●Basic Law to Promote the Formation of a Recycling-Conscious Society enacted
2001	●Global Warming Prevention Promotion Committee formed ●Participated in 3rd RC community dialog in Chiba	●Completion of facilities to produce raw materials from refuse incineration ash at Yamaguchi EcoTech	
2002	●Participated in 3rd RC community dialog in Sakai-Senboku and Yamaguchi	●Demonstration plant to produce artificial sand from coal ash completed ●2nd EUP line expanded	●Kyoto Protocol ratified ●Soil Pollution Prevention Law enacted
2003	●Participated in 4th RC community dialog in Chiba ●Personal Action Guidelines revised		

Ube System: This is the common name for a system that was independently established by Ube city as a measure to prevent environmental pollution, whereby the public, academic specialists, administrative agencies and companies have cooperated in carrying out voluntary activities on the basis of information disclosure. While the Ube System already has a history of more than 50 years, new viewpoints are still being incorporated in addressing environmental and safety issues.

Outline of Responsible Care Activities

Conforming with "Guideline of Submission in the RC Implementation Report and Plan" of the Japan Responsible Care Council (JRCC).

Responsible Care code	FY2002 targets	FY2002 plans / policies	FY2002 Activities	Page
Common points	●RC mid-term targets: Build a sound culture of safety and hygiene. Practice environmentally oriented management	①Devise company wide education programs and continuously implement them.	①Based on a layered educational curriculum, implement broad-ranging environment and safety education targeting top executives to new employees.	21
		②Carry out emergency training at all factories.	②Implement emergency training at all factories.	21
			＊At the Isa Cement Factory, on December 6, 2002, waste effluent containing resins from another company spilled into a river. Papers pertaining to the case were sent to the Public Prosecutors Office because of a violation of prefectural bylaws.	23
Management system			●Compliance Committee set up and Personal Action Guidelines revised.	3
		①Implement ES audits.	①Audits implemented at 12 business offices of UBE and 4 Group companies.	4
		②Implement ES inspections and special inspections.	②Environment and Safety Inspections carried out at principal offices and facilities by responsible officers and Special Inspections implemented by the company president on locations with a poor safety record.	4
		③Hold ES Committee meetings and Product Safety (PL) Committee meetings.	③Meeting of both committees were held twice a year, and PDCA (Plan, Do, Check, Action) cycle promoted.	4
Environment preservation	●Reduce output of substances that negatively impact the environment.	①Continually promote reduction of wastes and their effective utilization for resources.	①Achieved final disposal volume reduction rate of 74% (compared to FY1990: UBE). ●Chemicals and Plastics segment promoted reduction rates further; Construction Materials segment maintained zero emissions.	19
		②Reduce noxious air pollutants.	②-1 Participated in chemical industry's 2nd voluntary management plan and ongoing implementation of reduction measures. ②-2 In particular, focused on benzene, halving output; reduced 1,3-butadiene by two thirds; halved output of acrylonitrile, partially stopping production (all figures compared to FY2001: UBE)	16
		③Cut greenhouse gases (CO_2, etc.)	③-1 Continued to promote PDCA cycle under the Global Environment Preservation Promotion Committee. ③-2 Implementing reduction measures and cutting production, CO_2 emissions fell to 3,464 kt-C (more than 7% reduction compared to FY1990). ③-3 Energy consumption also declined to 26 kl of crude oil, and unit energy consumption improved 1% (both compared to FY2001)	11
		④Continuously implement PRTR practices and follow information disclosure.	④-1 Conducted survey of chemical substances subject to PRTR tracking by the Japan Chemical Industry Association (JCIA) and reported to government; prepared manual for measure to disclose information. ④-2 Emissions: 1,938 t (18% reduction compared to FY2001: UBE)	14, 15
		⑤Follow 5th Areawide Water Pollutant Regulations	⑤Implemented measures to reduce total nitrogen and total phosphorus emissions in some factories.	13
Process safety and disaster prevention	●Thorough implementation of (statutory and voluntary) checks of equipment and facilities.	①Reorganize and propagate plant risk assessment system.	①-1 Reviewed system and reorganized provisions. ①-2 Carried out ongoing safety evaluation (plant safety assessments).	21
		②High-pressure gas: Promote voluntary safe handling and disaster prevention.	②Chiba Petrochemicals Factory: High-Pressure Gas Safety Law: acquired certification for workers to conduct completion inspection and security inspectors	20
Occupational safety and health	●Reinforce health management system.	①Reorganize health management structures.	①Health Care Support Center separated from the Environment and Safety Division and independently established.	22
	●Reduce occupational accidents.	②Review rules for occupational hygiene.	②Basic policy prepared	
		③Promote introduction of OSHMS.	③Risk assessment implemented based on Occupational Health and Safety Management System (OHSMS).	22
Distribution safety	●Promote distribution safety consciousness through Distribution Council.	①Review the Emergency Response Cards.	①Emergency Response Cards prepared and continually updated.	24
		②Hold sessions by every transportation system.	②Area- and institution-based sessions held regularly; studied measures to cope with distribution claims	
		③Implement distribution disaster training.	③ Implemented emergency training for tanker trucks and training on road accidents during transportation.	24
Chemicals and product safety	●Reinforce Group promotion system.	①Reinforce company QC and QA system.	①Company wide promotion system revised: Separated from existing ES Committee and promoted under Product Safety (PL) Committee.	24
		②Revise MSDS to JIS version and improve its management procedure.	②Work corresponding to JIS implemented; MSDS management-related manual reorganized and information publicly posted on Company Intranet.	24
		③Implement thorough process modification management.	③Implemented in accordance with ISO system at each factory.	
		④Join HPV program.	④High production volume (HPV) Program proceeded.	24
Dialog with communities		①Promote communication with community.	①JRCC-sponsored 3rd RC community dialog held in Yamaguchi, participated in 4th RC community dialog in Chiba.	25
		②Improve information disclosure and transparency.	②-1 UBE's RC approach outlined at JRCC-sponsored 3rd RC community dialog in Yamaguchi. ②-2 RC Report published and simultaneously posted on both of UBE's Japanese and English websites.	

Environmental Accounting

Since FY1999, the UBE Group has introduced environmental accounting as a tool for quantitatively understanding and evaluating the costs and effects of environmental protection in the Group's business activities and promoting more efficient sustained environmental protection.
For environment accounting to be effective, it must be incorporated into a company's environmental management, be allowed to function as a decision-making tool, and be used to disclose accurate information on the results of the company's environmental protection activities. The UBE Group will continue to carry out various measures aimed at establishing more effective environmental accounting.
The following tables show the results of activities in fiscal 2002.

Environmental Protection Costs

(Unit: ¥100 million)

Category		Main activity	Capital investment			Cost		
			FY2001	FY2002	Change on previous year	FY2001	FY2002	Change on previous year
Cost by business area	Pollution prevention	Costs of investing in and maintaining air and water pollution prevention facility	6.8	10.4	3.6	48.3	52.0	3.7
	Global Environment preservation	Costs of investing in and maintaining energy saving facility	1.5	2.0	0.5	1.6	3.2	1.6
	Resource recycling	Costs of recycling and reducing industrial wastes	8.8	7.0	▲1.8	17.4	14.2	▲3.2
Costs for upstream / downstream		Costs of packaging recycling, green purchasing	0.0	0.0	0.0	5.2	4.0	▲1.2
Costs of management activities		Costs of acquiring, running and maintaining environmental management systems	0.0	0.5	0.5	5.0	4.7	▲0.3
Research & Development costs		R&D Costs of environmentally friendly products and green technologies	2.7	1.5	▲1.2	5.1	4.3	▲0.8
Costs of social activities		Costs of greening and beautifying offices / facilities and their surroundings	0.1	0.1	0.0	2.1	1.4	▲0.7
Costs of cleaning up environmental damage		Environment-related assessment charges	0.0	0.0	0.0	3.2	4.0	0.8
Total			19.9	21.5	1.6	87.9	87.8	▲0.1

Calculating results
Compared to fiscal 2001, we boosted capital investment by ¥160 million, to ¥2,150 million. The main factors in this increase were a rise in pollution prevention costs (in particular, odor prevention), a decline in resource recycling costs (especially waste recycling), and a drop in R&D costs.
Expenses fell ¥10 million compared to fiscal 2001, to ¥8,780 million. The main factors in this change were a rise in pollution prevention costs (in particular, prevention of water pollution), an increase in environmental protection costs (particularly in energy conservation), a decrease in resource recycling costs (particularly in waste recycling), and a fall in upstream/downstream costs (especially resource and packaging recycling).

UBE Group Environmental Accounting Calculation Method
- Calculated in accordance with the Ministry of the Environment's Environmental Accounting Guidelines (FY2002 version).
- The economic effect is the effect obtained in fiscal 2002 as a result of environmental protection activities. This is limited to what can be calculated rationally, and excludes hypothetical calculations such as the avoidance of the costs of cleaning up environmental damage.
- Consolidated data of 13 UBE Group companies.
- Internal transactions within the UBE Group are treated as mutually offsetting and eliminating.

Effect

(1) Environmental Preservation Effect

Principal effects		Unit	FY2001	FY2002	Change on previous year	Page
Pollution prevention activities	SOx emissions	Tons	2,879	2,961	103%	12
	NOx emissions	Tons	21,013	20,048	95%	
	Dust emissions	Tons	484	527	109%	
	Water usage	1,000 m^3	107,567	92,520	86%	13
	Water effluent discharge	1,000 m^3	201,763	195,559	97%	
	COD emissions	Tons	1,163	1,049	90%	
	Total nitrogen emissions	Tons	1,569	1,647	105%	
	Total phosphorus emissions	Tons	42	33	79%	
	Energy usage	1,000 kl-oil	1,976	1,949	99%	11
	CO_2 emissions (from energy)	1,000 t-C	1,728	1,700	98%	
Global environment preservation activities	Benzene	Tons	＊—	65	—	16
	1,3-Butadiene	Tons	＊—	59	—	
	1,2-Dichloroethane	Tons	＊—	1	—	
	Chloroform	Tons	＊—	0	—	
	Dichloromethane	Tons	＊—	0	—	
	Acrylonitrile	Tons	＊—	93	—	
Resource recycling activities	Final waste disposal volume	Tons	23,327	13,361	57%	19
	Recycled waste volume	Tons	281,197	251,932	90%	

＊No figures for FY2001 are shown because of no data for the 13 UBE Group companies.

(2) Economic Effect

(Unit: ¥100 million)

	FY2001	FY2002	Change on previous year
Income effect	26.9	38.7	11.8
Savings effect	37.6	32.9	▲ 4.7

Result of calculating effects
(1) Environmental preservation effect
Compared to fiscal 2001, in fiscal 2002 UBE succeeded in substantially decreasing total phosphorus emissions and waste disposal volumes.
Please see the relevant page for details of each type of waste.
(2) Economic effect
The income effect was ¥3,870 million, reflecting an increase in income for wastes accepted as materials for cement and as fuel.
The savings effect was ¥3,290 million, reflecting the results of promoting energy saving.

Environmental Preservation

Environmental Performance

The UBE Group, which evolves a broad range of business operations including Chemicals and Plastics, Construction Materials, Machinery and Metal Products, and Energy and Environment, celebrated its 100th anniversary in 1997.
The Group recognizes that environmentally friendly management is a vital issue for continuing to survive and grow in the 21st century. “Environmentally oriented business practices” is one of the basic policies advocated by the New 21・UBE Plan, the Group’s mid-term business plan. In the future, the Group will promote business activities that contribute to the formation of a recycling–conscious society by promoting measures to prevent global warming, reducing noxious air pollutants, cutting industrial wastes, and using wastes and resources effectively. At the same time, we will contribute to the formation of a sustainable society through our products and services.

＜INPUT＞

◆Energy
(as Crude oil)
1,949 thousand kl

◆Raw materials
(Chemical substances listed under PRTR Law and JCIA*1)
2,031 thousand tons

◆Water Resources
Water used
(excluding sea water)*2
92.5 million m^3

UBE Group business activities (13 companies)

＜OUTPUT＞

◆Environmental preservation economic effect

Income effect	¥3,870 million
Savings effect	¥3,290 million

◆Airborne emissions

CO_2 (from energy)	1,700 thousand t-C
SOx	2,961 t
NOx	20,048 t
Dust	527 t
PRTR substances	2,165 t

◆Waterborne effluents

Waste water*2	195.5 million m^3
COD	1,049 t
Total nitrogen	1,647 t
Total phosphorus	33 t
PRTR substances	223 t

◆Soil wastes

PRTR substances	0 t

◆Industrial wastes

Disposal volume	13,316 t
Recycle volume	251,932 t

*1 Japan Chemical Industry Association (JCIA)
*2 The difference between the amounts of water usage and waste water reflects the fact that some Group company manufacture products using sea water, and this is included in the volume of waste water.

Global Warming Countermeasures

In June 2002, Japan ratified the Kyoto Protocol. If this protocol comes into effect, Japan will be obliged to reduce green house gases by 6% on 1990 levels over the period 2008 to 2012 in relation to average emission volumes.
In 2000, the UBE Group formulated its mid-and long-term Global Warming Prevention Strategy (Environmental Preservation 2010) in pursuit of a greater than 6% reduction in CO_2 emissions by 2010. Then, in fiscal 2001, we established the Global Environment Preservation Promotion Committee to implement reduction proposals for this goal and follow them up.
In fiscal 2002, we implemented CO_2 emission reduction measures that succeeded in reducing our CO_2 emissions by more than 30,000 t-C. These were based on such measures as diversification of fuel, for example by the use of wastes, improving the thermal efficiency of processes, and switching to highly efficient equipment. In the future, we will work to meet the targets (shown below) set for each industry under the Japan Business Federation’s voluntary action plan as we strive to improve energy efficiency by more than 1% a year.

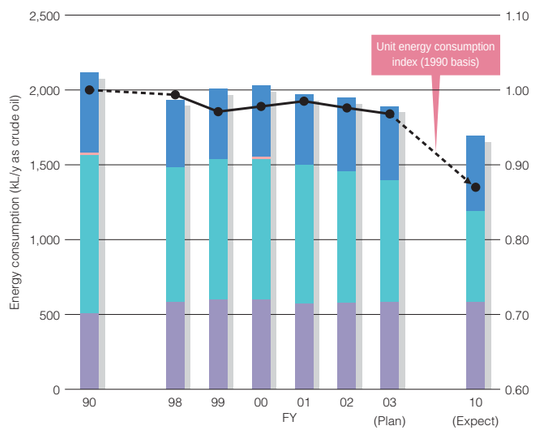
Targets of voluntary action plan by segment

◆Chemicals and Plastics segment: 10% reduction in Unit Energy Consumption by 2010 (1990 basis)
◆Construction Materials segment: 3% reduction in Unit Energy Consumption by 2010 (1990 basis)
◆Machinery and Metal Products segment: 1% per year reduction in Unit Energy Consumption by 2010 (1997 basis)

◆Energy Consumption and Energy Efficiency

Because of the effect of adopting the NSP system in cement kilns in the past and the expansion of our business field, improvements in this area leveled out and temporarily deteriorated. However, from fiscal 2001, with the organization of a company wide promotion system, energy consumption again began gradually declining and unit energy consumption started improving.
In fiscal 2003, unit energy consumption will be improved as a result of energy saving activities and energy use will be expected to decline due to a fall in production.

Energy Consumption and Unit Energy Consumption Index



◆CO_2 Emissions

With the decline in energy consumption, CO_2 emissions also fell. In fiscal 2002, we already succeeded in reducing energy consumption by more than 7% (1990 basis).
In expectation of future business expansion, we will continue to reduce CO_2 emissions, the focus of our energy saving activities.

CO_2 Emissions

【Energy origination: Classified in accordance with the Law Concerning the Rational Use of Energy】

Controlling Air Pollution

UBE has been working in cooperation with the public, academics and administrators to prevent air pollution since 1949. That was long before air pollution first began to attract attention as an environmental issue around 1965. Today, desulfurization, denitrification, and dust removal processes developed by UBE are used to eliminate or reduce such health-threatening substances as sulfur oxides (SOx*1), nitrogen oxides (NOx*2), and dust.

Efforts to reduce emissions include monitoring emissions at their sources and taking emergency measures at the first sign of any change in the natural environment.

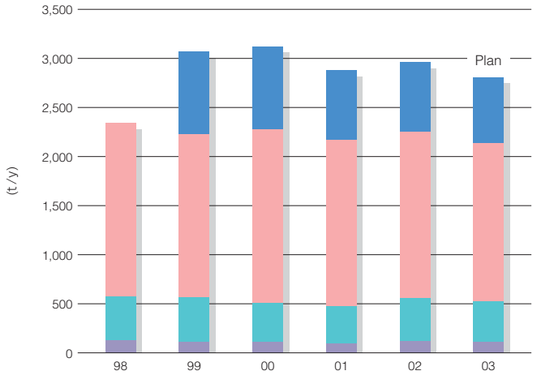
In addition, the Ube Environment Preservation Council continually monitors environmental measurements taken at various sites around Ube City. This measurement data is reflected in factory operations through independent atmosphere management standards, which are already established.

◆SOx Emissions

In 2002, we planned for roughly the same level of emissions as in 2001, but because of a change in the type of fuel coal, emissions increased 3%.

In 2003, we plan to reduce SOx emissions 5% from the 2002 level.

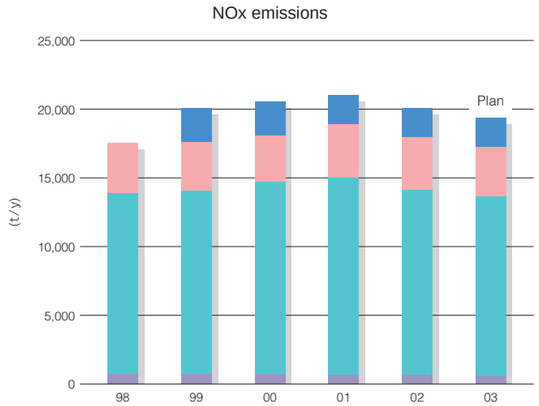
SOx emissions



◆NOx Emissions

While we planned in 2002 to reduce NOx emissions by 7% on 2001 levels for the same reasons as reducing SOx emissions, we achieved a 5% decrease. In fiscal 2003, we plan to reduce NOx emissions by 3% on 2002.

NOx emissions

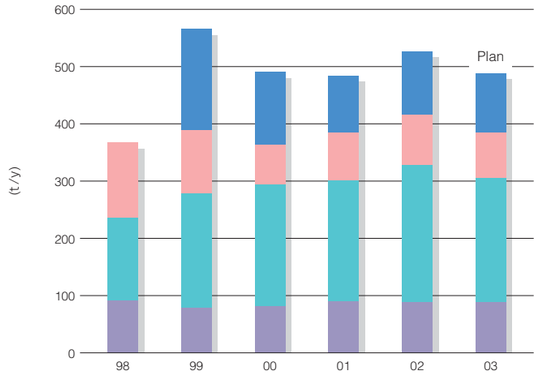


◆Dust Emissions

We continued with ongoing efforts to reduce dust, and succeeded in reducing amounts emitted. However, dust emissions increased 9% as a result of a change in the type of fuel coal.

In 2003, we plan to reduce dust emissions 7% from the 2002 level.

Dust emissions



*1 SOx: Sulfur oxides originate in the sulfur (S) component of fuels. Boilers are the main producers of SOx.

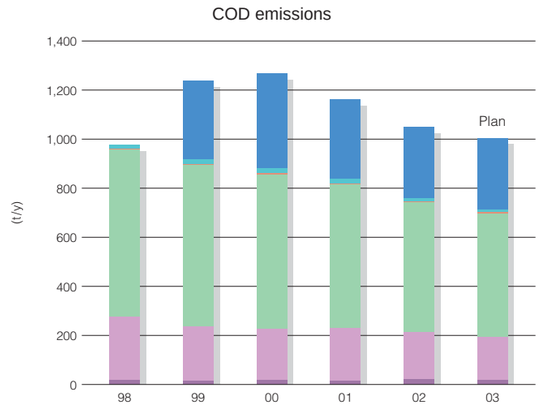
*2 NOx: Nitrogen oxides originate in the nitrogen (N) components of fuel and air when a fuel is combusted in air. Boilers and cement kilns are the main sources of NOx.

Controlling Water Pollution

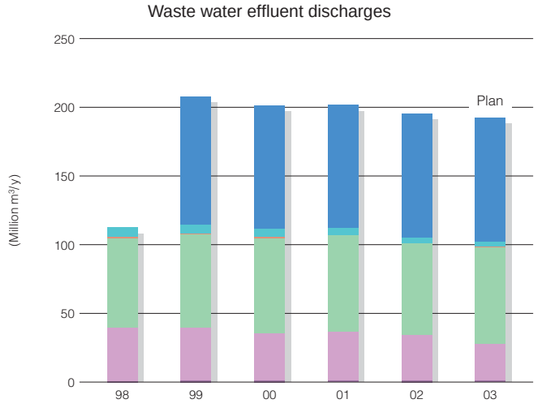
To prevent pollution of common water areas, such laws as the 5th Areawide Water Pollutant Regulations for enclosed sea areas like the Seto Inland Sea have been toughened. The UBE Group, and in particular our chemical plants, which can have a large impact on water quality, discharge water only after it has been purified by such means as activated-sludge or wet oxide processes, and the discharge is always strictly monitored.

The Group also constantly works to reduce COD*1, nitrogen*2, and phorphorus*3, typical indicators of water pollution.

COD emissions



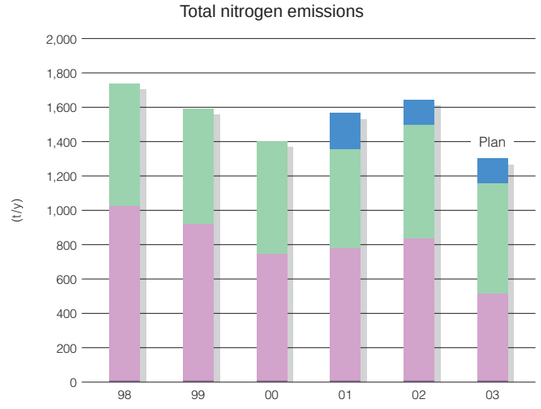
Waste water effluent discharges



*1 COD (chemical oxygen demand): This is an indicator of water pollution by organic substances and is the amount of oxygen consumed in the chemical oxidization of organic matter.

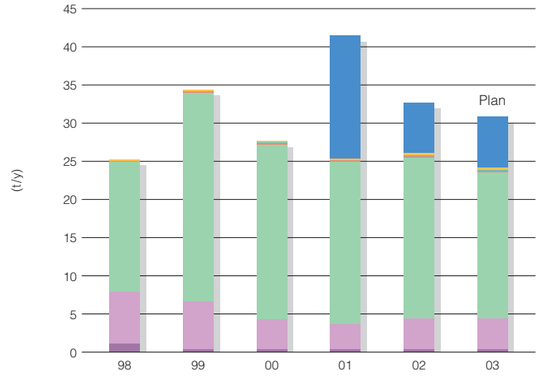
*2, 3: Total nitrogen, total phosphorus: These are water pollution indicators related to the maintenance of the biologic conditions in rivers, lakes, and sea.

Total nitrogen emissions



In 2002, emissions increased as a result of an increase in production volume and changes in production items. (All emission concentrations remained below the regulation values.)

Total phosphorus emissions



PRTR (Pollutant Release and Transfer Register) System

What is PRTR?

The PRTR system aims to track and identify the quantity of chemical substances that are discharged into the environment or transferred to an external location in the form of waste by plants and other facilities in the course of their business activities, and seeks to control and reduce the impact on the environment through the appropriate use and control of chemical substances.
The contents of the register are reported to the government and other official bodies.

Based on the 1999 Law Concerning Reporting, etc., of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in their Management (also known as the Chemical Substance Management Promotion Law, or "PRTR Law"), businesses with 21 employees or more handling any of the 354 class 1 special chemical substances (one ton or more a year, or half a ton or more a year if carcinogenic) must report the amount of wastes discharged or transferred from their business premises.

UBE Group's PRTR

The UBE Group promotes the PRTR system to reduce the impact of chemical substances on the environment in an effort to achieve "environmentally oriented business practices."
In addition to the substances designated under the PRTR Law, the chemical industry similarly controls a total of 480 chemical substances, which it has voluntarily added through the Japan Chemical Industry Association (JCIA). The UBE Group as a whole handles 78, and UBE 60, substances included in this total.

◆UBE Group Data

Unit: t / y

Handling volume (Volume consumed/produced)	Emissioned into atmosphere	Emissioned into public waterway	Emissioned into soil	Total emission	Transfer volume*1
2,031,687	2,165	223	0	2,388	2,686

*1 Transfer volume: Volume treated externally as waste.

Individual emission volumes

No. shown by law	Substance	CAS No.*2	Handling volume (t)	Emission volume			
				Atmosphere	Public waterways	Soil	Total (t)
	Cyclohexane	110-82-7	294,760	969	43	0	1,012
227	Toluene	108-88-3	1,045	222	17	0	239
	Methyl alcohol	67-56-1	5,216	220	0	0	220
	Ammonia	7664-41-7	346,633	141	7	0	148
177	Styrene	100-42-5	56,000	132	0	0	132
7	Acrylonitrile	107-13-1	23,064	93	0	0	93
	n-Hexane	110-54-3	429	82	0	0	82
61	ε-Caprolactam	105-60-2	228,751	0	67	0	67
299	Benzene	71-43-2	97,411	64	1	0	65
63	Xylene	*3	253	60	0	0	60

*2 CAS No: Chemical substance registry No. issued by the Chemical Abstract Service
*3 Isomer mixture

Dioxins

Unit: mg, TEQ/y

Emissioned into atmosphere	Emissioned into public waterway	Emissioned into soil	Total emission
511	2	0	513

PCB (Polychlorinated biphenyl)

We plan, up to July 2018, to appropriately store and treat, PCB in our factories and facilities based on the Law Concerning Special Measures against PCB Waste enacted in July, 2001

◆UBE Data

	Unit: Tons	Change on FY2001
Volume manufactured and/or consumed (amount handled)	1,907,564	2.0%
Total emissioned volume	1,938	▲ 18%
Total transferred volume	1,655	25%

Individual emission volumes

No. shown by law	Substance	CAS No.*2	Handling volume (t)	Emission volume				Total emission % change on FY2001
				Atmosphere	Public waterways	Soil	Total (t)	
	Cyclohexane	110-82-7	294,760	969	43	0	1,012	21%
	Methyl alcohol	67-56-1	5,215	220	0	0	220	37%
	Ammonia	7664-41-7	346,633	141	7	0	148	▲ 66%
227	Toluene	108-88-3	788	111	17	0	128	▲ 55%
	n-Hexane	110-54-3	428	82	0	0	82	0%
61	ε-Caprolactam	105-60-2	228,751	0	67	0	67	▲ 14%
299	Benzene	71-43-2	97,411	64	1	0	65	▲ 53%
268	1,3-Butadiene	106-99-0	89,976	49	0	0	49	▲ 33%
	Butyl alcohol	*3	549	14	13	0	27	▲ 78%
	Methl-butyl-ketone	*3	93	25	1	0	26	▲ 67%

*2 CAS No: Chemical substance registry No. issued by the Chemical Abstract Service
*3 Isomer mixture

Emission volumes were 18% down on 2001. UBE worked to reduce emission volumes of substances by installing gas emission treatment facilities in factories, and improving manufacturing processes (such as introducing closed system and alternating solvents used).

Controlling Air Pollution

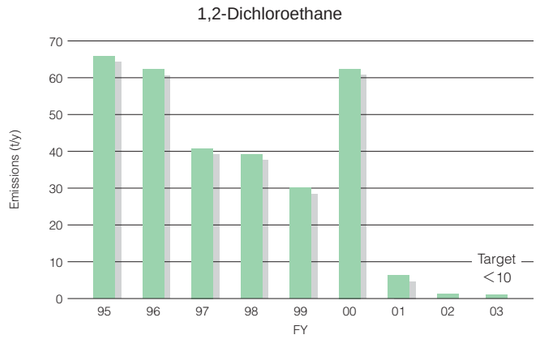
In consideration of their usage volumes and potential harn, the chemical industry has determined 12 harmful air pollutants subject to voluntary controls from a number of harmful air pollutants, and has promoted to reduce emissions of these. From1997, the industry promoted the First Voluntary Control Plan (1997 – 1999), following this up in 2001 with the Second Voluntary Control Plan (2001 – 2003) in an effort to reduce emissions still further.

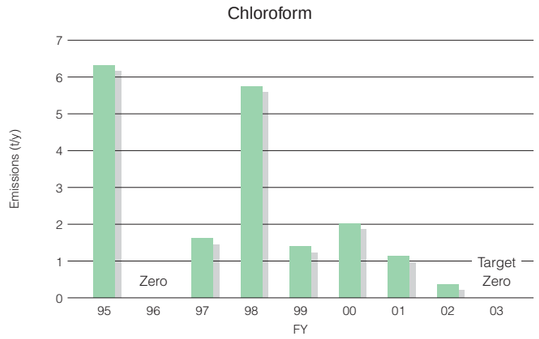
Under the First Voluntary Control Plan, UBE succeeded in reducing emissions by 59% (compared to 1995), and under the Second Voluntary Control Plan is already cutting emissions by 75% (compared to 1999).

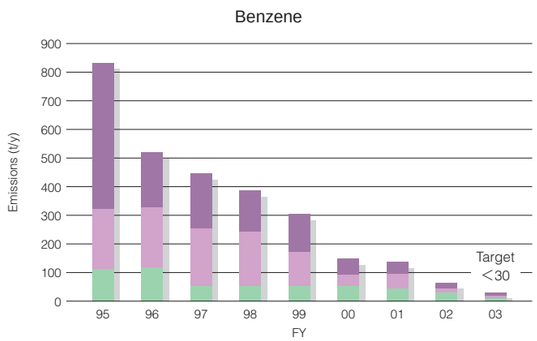
UBE uses 6 of the 12 pollutants subject to voluntary controls, and is working to further reduce emissions of these. The 6 pollutants are: benzene, 1,3-butadiene and acrylonitrile, which are raw materials for synthesis, and 1,2-dichloroethane, chloroform and dichloromethane which are solvents. Benzene is also used as a solvent. Benzene and 1,3-butadiene are particularly harmful, and UBE is doing all it can to make deep cuts in emissions of these.

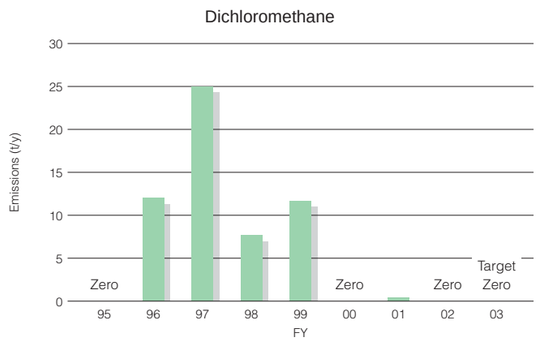
(The other 6 pollutants subject to voluntary controls are: acetaldehyde, ethylene oxide, vinyl chloride monomer, tetrachloroethylene, trichloroethylene, and formaldehyde.)

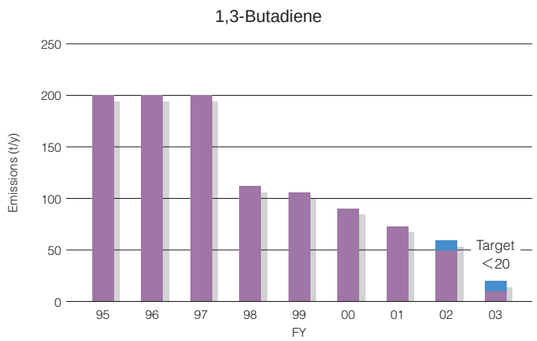
Emissions of Airborne Chemical Pollutants

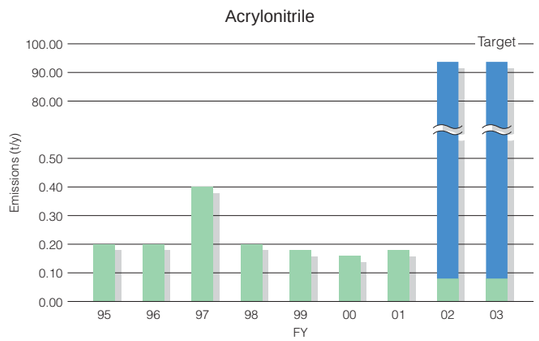












Industrial Waste Measures

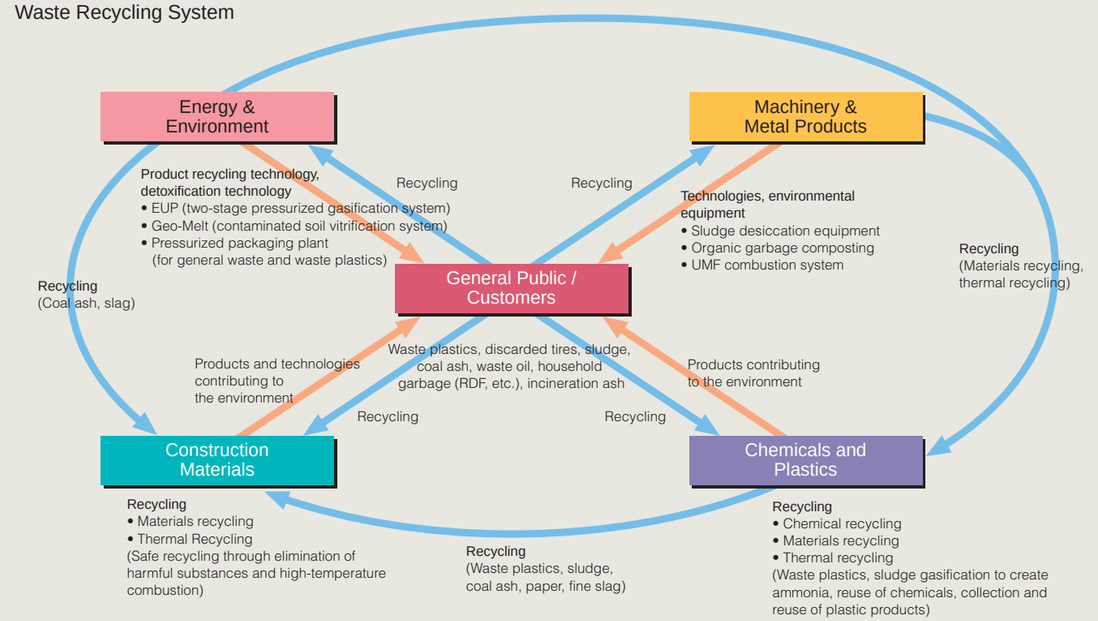
◆Toward Establishing a Recycling-Conscious Society

The UBE Group contributes significantly to the formation of a recycling-conscious society by using wastes for its cement factories and through its original recycling technologies. The Group not only reduces the amount of wastes within the Group, but also promotes activities for cutting down the wastes generated by society at large, and for reducing emissions by recycling.

Group cooperation to create a recycling-conscious society

- The UBE Group factories and facilities try to reduce the wastes generation and use wastes and resources effectively. Our plants also receive wastes generated by companies outside the Group and by the general public and utilize these effectively.
- The Chemicals and Plastics, Construction Materials, Machinery and Metal Products, and Energy and Environment segments utilize the special characteristics of their businesses and technologies to establish mutually advantageous linkages and promote the 3R's in waste handling: Reduce by controlling generation of wastes, Reuse components, and Recycle resources.
- The Chemicals and Plastics segment promotes chemical, material and thermal recyclings.
- The Construction Materials (cement) segment works to conserve natural resources by accepting large volumes of wastes and byproducts, and effectively utilizing these as raw materials and fuel. For example, our 3 cement factories combust bone meal.
- The Machinery and Metal Products segment supplies equipment that minimizes environmental impacts.
- The Energy and Environment segment makes a large contribution to society through such environmental technologies as product recycling technology based on the gasification of waste plastics and soil detoxification technology.

Waste Recycling System



Chemical recycling: Decomposition through gasification, etc., and reuse as chemical raw materials
Materials recycling: Creating products based on waste materials and components
Thermal recycling: Combusting and reusing wastes as thermal energy

Cooperating with the Community and Other Companies

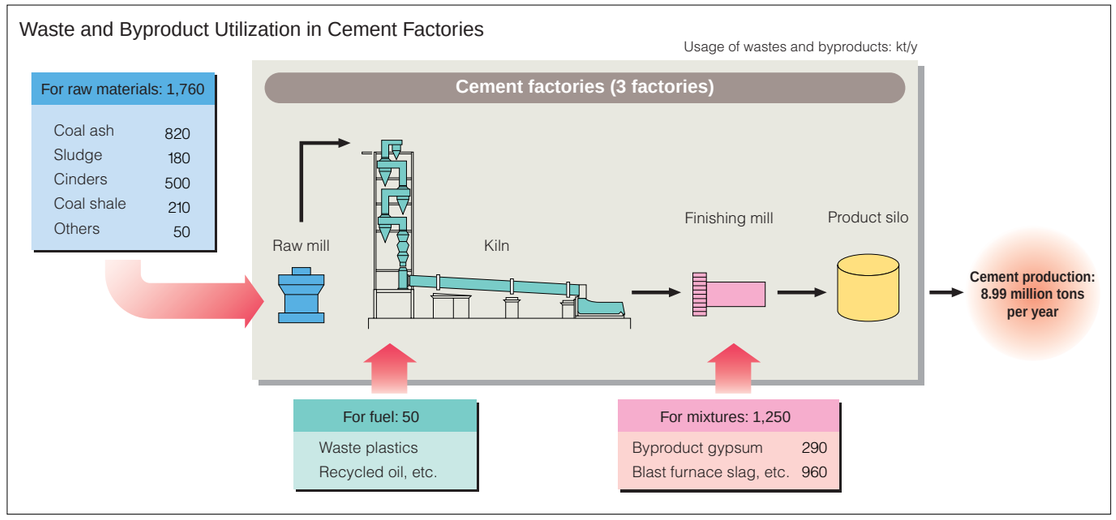
UBE participates in the Yamaguchi Eco-Town Plan, which forms part of the Yamaguchi Prefecture zero emissions promotion project, and is implementing the following two environmental projects:

- Yamaguchi Eco-Technology Corporation, a joint venture between Tokuyama Corporation and UBE, is detoxifying and recycling refuse incineration ash in Yamaguchi Prefecture as a raw material for cement. The venture's processing capacity is currently 50,000 tons a year.
- EUP Co., Ltd. is a joint venture between Ebara Corporation and UBE for gasifying waste plastics and shredder dust and recycling these as chemical raw materials such as ammonia. Fully operational facilities currently include a plant with a processing capacity of 30 tons a day and one with a capacity of 65 tons a day.

◆Waste Utilization

Cement factories are the ultimate resource recycling facilities

Wastes can be used as a part of raw materials of cement (as an alternative to raw materials; material recycling) and as a fuel (as a thermal recycling) in cement making. A wide variety of wastes can be used in this way.
Ash produced by incineration can also be used as an alternative to clay, a component of cement, eliminating the need for final disposal sites for incineration ash. Another advantage is that the high calcining temperature of the cement kilns (1,450°C) burns and destroys substances that cannot be eliminated by ordinary incinerators. The kilns also offer a large waste processing capacity.
UBE's 3 cement factories actively accept and use various waste substances such as slag, coal ash, refuse incineration ash, sludge, waste fluids, and waste plastics from UBE and companies both inside and outside the Group.
In fiscal 2002, our cement factories made effective use of around 3 million tons of wastes and byproducts. Of this, about 2.8 million tons was sourced from outside UBE Group. This is one way UBE contributes to the formation of a recycling conscious society.



Types of Waste Products Utilized

Our 3 cement factories recycle large volumes of the following highly diverse wastes and byproducts:

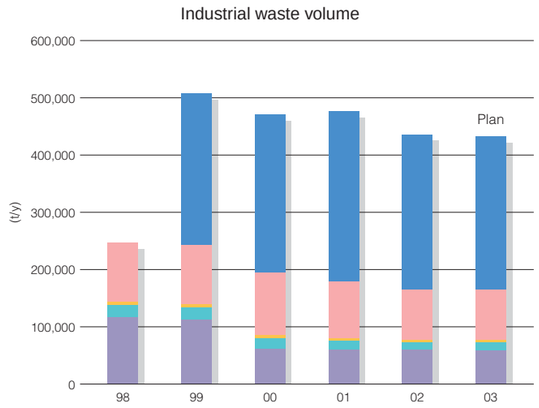
Industry	Type of industrial waste
Local government	Sewage, public refuse incineration ash, water supply sludge, RDF
Steel, non-ferrous metal	Slag, electric furnace slag, gypsum
Electric power	Coal ash, gypsum
Chemicals, paper pulp	Waste plastics, hydraulic cake, gypsum, activated sludge, paper sludge
Petroleum, Petrochemicals	Waste sludge, waste fluids, waste oil
Construction, building materials	Sludge residues, waste board, controlled soil*, waste tatami mats, waste timber
Food and beverages	Shochu lees, organic sludge
Automotive	Waste silica sand, paint residue, waste grinding sand, discarded tires, waste plastics
Others	Waste pachinko panels, bone meal

*Controlled soil: This is soil that falls between level 1 and 2 under the organic substances elution testing method designated by the Soil Contamination Countermeasures Law. Soil that is level 1 and below is "healthy soil," while soil that is level 2 and above is known as "isolation soil."

◆Industrial Waste Reduction

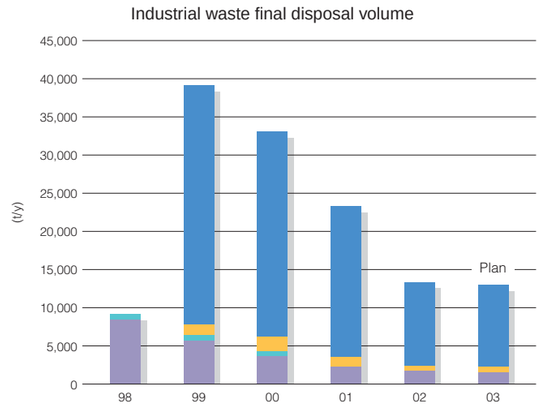
＜Industrial waste volume＞

The UBE Group is working to control and recycle volumes of industrial wastes generated from its various facilities and factories. The Chemicals and Plastics segment generates such wastes as sludge, waste oil and waste plastics; our electric power and ammonia factories generate coal ash; and our magnesium factory produces inorganic wastes.



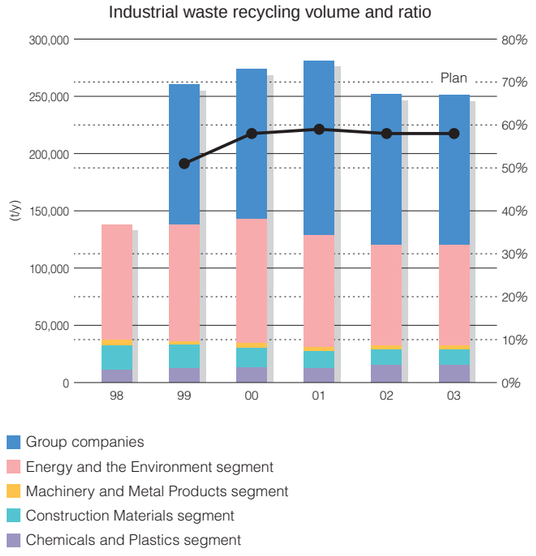
＜Final waste disposal volume＞

UBE cement factories accept large quantities of wastes from both inside and outside the Group, utilizing these as raw materials and fuel and contributing to recycling. In this way, our cement factories continued to achieve zero emissions. As a result of improving our recycling ratio and increasing volume reductions, overall UBE Group reduced final disposal volumes of industrial wastes by more than 40% compared to fiscal 2001.



＜Recycled volume of industrial waste＞

Much of the industrial waste produced by the UBE Group is recycled within the Group, while some is recycled with the cooperation with companies outside the Group.
The volume of wastes recycled declined 10% on fiscal 2001, and as a result, the recycling ratio of UBE Group fell to 58% (UBE: 73%).



＜Industrial waste control＞

Our industrial wastes are stringently controlled to ensure they are treated and disposed of appropriately. When contracting waste treatment or disposal to outside companies, we use an industrial waste manifest system to control transfer volumes and destinations, and the wastes are monitored until final disposal.

Manifest

ISO Certification and Other Approvals

The UBE Group energetically acquires ISO14001 and ISO9000's certifications, which represent international standards of environmental management and quality assurance respectively. In the high-pressure gas, boiler and other fields, UBE has obtained certification for its inspectors and promotes voluntary safety standards.

■ ISO14001 (Environmental Management System) Certification

	UBE	Group companies
1998		●Fukushima Ltd. (February) ●Seibu Petroleum Co., Ltd. (December)
1999	●Cement Production Department Isa Cement Factory (January) Ube Cement Factory (August) Kanda Cement Factory (August) ●Chiba Petrochemicals Factory (July) ●Machinery and Engineering Works (November) ●Corporate Research and Development Division (December) Polymer Laboratories (Chiba, Ube) Ube Research Laboratory	●Ube-Mitsubishi Cement Research Institute Corporation, Ube Center (September) ●UBE Scientific Analysis Center (December)
2000	●Sakai Factory (February) ●Ube Chemicals Factory (March) ●Coal Center (March) ●Power Division (March)	●Ube Cycon Ltd. (currently known as UMG ABS Ltd.) (June) ●Supermix Concrete Pte Ltd. (Singapore) (September) ●U-Mold Co., Ltd. (December) ●Thai Synthetic Rubbers Co., Ltd. (Thailand) (December)
2001	●Environment Business Division (March) ●Nishioki Factory (August)	●Ube Ammonia Industry Ltd. (March) ●Thai Caprolactam Public Co., Ltd. (October)
2002		●Meiwa Kasei Industries Ltd. (April)

■ ISO9000's (Quality Management System) Certification

	UBE	Group companies
1992		●Ube Cycon Ltd. (currently known as UMG ABS Ltd.) (May)
1994	●Ube Chemicals Factory (February) ●Chiba Petrochemicals Factory (February)	●Supermix Concrete Pte Ltd. (Singapore) (April)
1995	●Isa Cement Plant (August)	
1996	●Machinery and Engineering Works (July) ●Kanda Cement Factory (August) ●Sakai Factory (October)	
1997	●Ube Cement Factory (July)	●Ube-Nitto Kasei Co., Ltd. (Gifu Factory) (March) ●Fukushima Ltd. (March)
1998		●U-Mold Co., Ltd. (July) ●Nanjing Ube Magnesium Co., Ltd. (PROC) (December)
1999		●Ube Information Systems Inc. (January) ●Ube-Nitto Kasei Co., Ltd. Fukushima (March) ●Meiwa Kasei Industries, Ltd. (June) ●Ryukyu Cement Co., Ltd. (Yabe Plant) (December) ●Ube Steel Co., Ltd. (December)
2000	●Nishioki Factory (February)	●Ube Electronics, Ltd. (June)
2001		●Yamaishi Metal Co., Ltd. (January) ●Ube Industries Consulting, Ltd. (March) ●Ube Material Industries, Ltd. (Chiba Plant) (July)
2002		●Hagimori Industries, Ltd. (March) ●Shin Kasado Dockyard Co., Ltd. (March) ●Ube Shipping and Logistics Ltd. (March) ●Ube Techno Eng. Co., Ltd. (May) ●Thai Caprolactam Public Co., Ltd. (Thailand) (August) ●Ube Nylon (Thailand) Ltd. (August) ●Thai Synthetic Rubbers Co., Ltd. (Thailand) (August) ●Ube Chemical Europe S.A. (Spain) (October)

Where a factory has obtained multiple certification, the date of the first certification only is specified.

■ Acquisition of certification for workers engaged in high-pressure gas safety and completion inspection

Content of certification	Plant certified	Date certified
Certification of workers engaged in high-pressure gas safety and completion inspections (High-Pressure Gas Safety Law)	●Sakai Factory ●Nishioki Factory ●Chiba Petrochemicals Factory	February 1999 June 2001 April 2003
Certification for inspections when operating boilers and class 1 pressure vessels are operated (Industrial Safety and Health Law)	●Nishioki Factory ●Chiba Petrochemicals Factory ●Sakai Factory	July 1997 November 1997 June 1998

Process Safety and Disaster Prevention

To ensure the safe operation of its factories and facilities and prevent work accidents, the UBE Group implements regular training on emergeney and safety patrols.
By running a range of safety education programs for employee, we try to inculcate a culture of safety across the whole Group.

◆Safety Education

Through an overall education policy, new employees are taught the importance of and correct attitude toward the environment, safety and health, and practical training programs are implemented in each workplace. In addition, managers and executives are also taught about the regulations and laws applied.

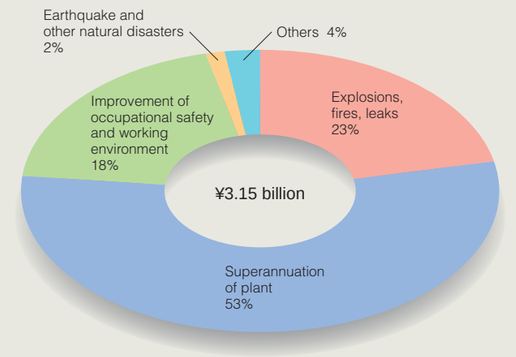
◆Prior Plant Safety Assessments

The methods stipulated in the in-house plant safety assessment standards are used when carrying out prior and post plant safety assesment on newly installed, additional or modified facility, and when establishing or amending related regulations. In fiscal 2002, the UBE Group carried out 29 assessments.

◆Disaster Prevention Spending

In fiscal 2002, the UBE Group spent ¥3.15 billion on safety and security measures.

■ Breakdown of plant safety and disaster prevention measures



◆Training for Emergencies

Every month, each office or facility carries out emergency training programs, mutual workplace diagnoses by safety supervisors, and mutual safety patrols with cooperating companies. These programs are reported on our website. We also send useful information to those who were unable to participate in training or patrols.

Marine disaster prevention training (laying an oil fence)

◆Personnel with Environmental and Safety-Related Qualifications

We encourage our employee to obtain legal qualifications for the safe operation and management of our workplaces.

Qualification	Number of qualified personnel
Pollution control manager and chief	363
Environment measurement expert	3
Working environment measurement expert	56
Health supervisor	107
Energy supervisor	127
Hazardous materials supervisor	3,247
Operations chief for work handling specified chemical substances	605
High-pressure gas production safety chief	774

(As of April 2003: UBE)

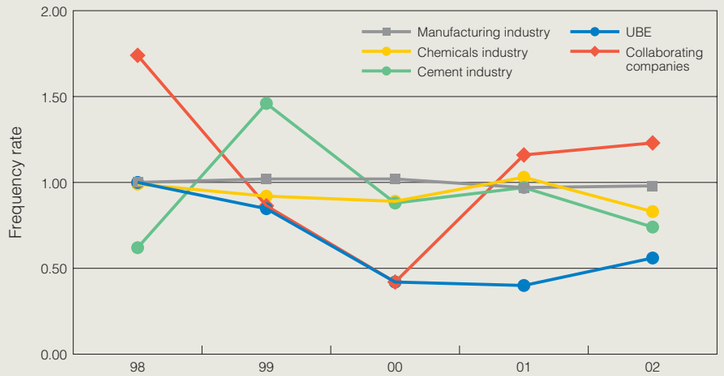
Occupational Safety and Health

Under the Environmental and Safety Principle: “Respecting people means putting safety first in all areas,” The UBE Group promotes safety, health and plant safety measures at all offices and facilities.

- We carry out various safety and disaster prevention activities, including danger prediction training (so called KYT), total productive maintenance (TPM), “hiyari-hat” activities, “identifying and naming,” accident case study, and risk assessment in an effort to prevent disasters and accidents.
- In addition, we have been working to review our rules and procedures, and to ensure internal audit so that implementational control conforms with the Occupational Safety and Health Management System (OSHMS).
- Based on procedures designated in safety assessment standards, we also perform prior chemical substance safety assessments on chemical substances that we have developed or plan to start handling. In fiscal 2002, the UBE Group performed 30 prior chemical substance safety assessments.
- The UBE Group Meeting on Safety and Hygiene promotes safety awareness among UBE Group and collaborating companies. Safety commendations are awarded at the meeting.

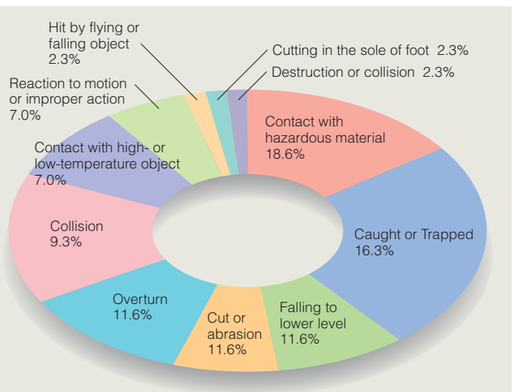
UBE Group Safety and Hygiene Meeting

◆Lost-time Injury Frequency Rate



Notes:
(1) Data on lost-time injury frequency rates for the manufacturing, chemical, and cement industries are based on Ministry of Health, Labor, and Welfare data.
(2) Frequency rate = number of lost-time injuries / million working hours

◆Breakdown of Accidents



◆Health Care

Reflecting the importance of health management of our employees, in October 2002 we established the independent Health Care & Support Center separated from the Environment and Safety Department. Over and above our legal requirements in employee health care, we work to maintain and promote the physical and mental health of employees in accordance with our Environmental and Safety Principles and Personal Action Guidelines. This stance is based on the conviction of the whole Group that the maintenance and promotion of the health of our employees is one of the basic conditions for maintaining and improving corporate activities.
In fiscal 2002 we focused particularly on the areas below.

(1) Fighting lifestyle diseases (health and nutrition advice following diagnosis)
Among our staff in the Ube area who were instructed by occupational health physicians to seek medical guidance as a result of a regular checkup, 133 took health and nutrition advice. This represents an advice follow-up rate of 97%, a vast improvement on the rate of 58% for fiscal 2001. In the future, we will carry out this program companywide.

(2) Quit Smoking program
For 30 staff expressing a desire to give up smoking, we ran a three-month Quit Smoking program using nicotine patches. After 10 months, around 85% of the participants were still smoke free.

- Smoking/non-smoking area sticker system (strict non-smoking areas)
We participated in Yamaguchi prefecture-wide smoking/non-smoking area sticker system to clearly separate smoking from non-smoking areas. This was introduced in Yamaguchi Prefecture, the first prefecture in Japan to do so, on World No Tobacco Day, May 31, 2002. The Ube Research Laboratory was the first corporate institution in Ube City to be screened and certified as a level 3 workplace, the highest level, reflecting full implementation of the system.

Participants in Ube Quit Smoking program

Response to Resin Effluent Spillage Incident at the Isa Cement Factory

On December 6, 2002, at our Isa Cement Factory (Mine City, Yamaguchi Prefecture) resin effluent containing phenol, which had been accepted as industrial waste and incinerated, leaked through a coupling in a waste feed pipeline and was accidentally discharged through a drainage channel in the factory grounds into the neighboring Isa and the Asa Rivers. Although this incident did not cause any harm to humans, it poisoned fish in the Isa River and interrupted the water supply for Sanyo Town, causing considerable disruption to large numbers of people, including local citizens and the authorities.
We thoroughly investigated the cause of this incident to prevent any future recurrence, and implemented the following exhaustive remedial measures.

Cause and remedial measures
The above incident resulted from a leakage with compound causes that included the pipe’s flange (joint) section being incorrectly reassembled after being taken apart, the use of incorrect gasket material in the flange section, and a partial pressure fluctuation when the pipe became internally blocked.

The following measures have been taken under the guidance of related governmental agencies:
1. Immediately after the incident, the Isa Cement Factory stopped handling the resin effluent involved in the leakage.
2. The Isa Cement Factory has also stopped handling other waste effluents.
3. UBE has carried out a general overall check of the Isa Cement Factory’s facilities and reviewed its manuals and crisis management system.
4. To check the safety of the wastes we accept, we established an Advance Safety Screening Committee and stepped up advance screening for safety.
5. We upgraded the drainage channels inside the factory and ensured that effluent in the factory cannot be discharged into the river during normal operation.
6. We expanded our oily water separation tanks and reinforced oil film detector.
7. We strengthened staff education and training.

So that such an incident cannot occur again, we share problems throughout the UBE Group, taking every measure to prevent a repetition of such an incident and actively striving to contribute to the formation of a recycling-conscious society.

Product Stewardship

The UBE Group operates Group Product Safety (PL*) Committee to ensure a uniform level of safety and quality assurance in all its products. In addition to examining safety measures for individual products, the Committee screens, report on, and review Group activity plans, help ensure reliable product liability, and support product quality activities.

*PL: Product liability

◆Material Safety Data Sheets (MSDS)

To ensure our chemical products are used safely, we prepare MSDS's, which we distribute to customers. In addition, we share the MSDS's throughout the company through a database on our inhouse Intranet.

MSDS preparation standards and updating rules have been added to the UBE Group's internal regulations. We gather all kinds of information on chemical substances (including information on hazardous data and changes to the legal system) and update the MSDS's so that they always reflect current information. The MSDS information format conforms to the guidelines for preparing MSDS's issued by the Japan Chemical Industry Association (JCIA) and is in accordance with the JIS system.

MSDS: A data sheet that concisely presents such information as the usual name of the product, its physical and chemical characteristics, how to use, and its hazard and toxicity.

◆Emergency Response Cards (Yellow Cards)

To transport chemical products safely, the driver carries an Emergency Response Card. At factories, check is done regularly whether the drivers of the chemical transporting trucks are carrying the cards.

Yellow Card: A card, to be used in case of accident during transportation, listing the name of the product, its characteristics, handling information, response procedures if an accident occurs, and who to report to in an emergency.

◆Labelling

Warning labels are affixed to the product packaging or container to ensure safe transportation. Because the yellow card system may not work effectively when several types of transportation are combined or when only a small quantity of a chemical product is sent, we are promoting the introduction of "container yellow cards (labels)" listing the guideline No. and the UN No.

Warning label: In addition to such legal information as the name of the product, manufacturer's address, address of the manufacturing factory, and contact information, lists hazard and toxicity data and handling information reflecting the characteristics of the product.

◆Collecting Chemical Product Safety Information, and Risk Assessment

Through the Japan Chemical Industry Association, UBE is participating in the ICCA (International Council of Chemical Associations) HPV (High Production Volume) Initiative, a voluntarily run international chemical substance safety management program. We also gather safety information on HPV chemical substances, carry out hazard assessments, and evaluate risk assessment documents.

UBE also participates in an ICCA, LRI (Long-range Research Initiative) relating to long-term voluntary research on the impact of chemical substances on human health and the environment. This initiative is promoted by the ICCA, representing the chemical industries of Japan, the United States, and Europe.

Communication with the Community

The UBE Group carries out various projects to help the local community understand it better, and participates actively in local community activities. Every year we publish out Responsible Care Report and use it as a tool for dialog with the community.

Touring

We organize tours of Group factories and the Ube Research Laboratory, inviting large numbers of people from various organizations, including local schools. We also offer regular factory tours for the families of employees.

Factory tour

Responsible Care community dialog

The Japan Responsible Care Council holds RC community dialogs mainly in petrochemical complex destricts. As a member of JRCC, UBE participated in the 4th RC community dialog in Chiba.

Chiba RC community dialog

Guided Experimentation

Every year, as part of the Summer Junior Science Education program, we invite elementary and junior high school students to the Ube Research Laboratory to get a feel for the fascination that chemistry has to offer.

"Yamaguchi Kirara Expo" Memorial Event

As a local corporation, UBE set up a "Technology you can See" corner displaying a photocatalyst fiber that destroys harmful substances such as bacteria and dioxins on exposure to light, and demonstrated and displayed a thermoelectric conversion material that generates electrical power when one side is cooled and the other heated.

Participating in other local activities

As volunteer activities, we participate in flower gardening, street cleaning, hosting overseas technical trainees, and forestry experience exchange programs.

Voluntary street cleaning

Environmentally Friendly Products and Technologies

In all its business areas, the UBE Group develops products and technologies that have a low environmental impact as it seeks to protect the environment and contribute to the formation of a recycling-conscious society. Let us look at some of the main products and technologies that clearly reflect this philosophy.

《Chemicals》

◆Heliofresh

This is a new fragrance with fresh, marine associations. Originally, this kind of fragrance was created from the Sassafras tree grown in the tropical forests of Vietnam and Southern China, but once this tree is cut down, it takes 30 years to be replaced. To get over this problem and help preserve tropical forests, we have succeeded in synthesizing this fragrance from a fine chemical — catechol — we manufacture ourselves.

Heliofresh is widely used as a marine-type fragrance.

◆1,6-Hexanediol

This represents an effective use of the effluent produced when manufacturing cyclohexan, an intermediate raw material of nylon. In addition to being used as a raw material for paints and polyurethane resin, 1,6-hexanediol is also used in ultraviolet ray hardening resins (solventless coatings), in powder paints, and in solventless hot-melt adhesives.

1,6-hexanediol

◆Polycarbonatediol (PCD)

Polycarbonatediol, produced by UBE own C-1 chemicals, is a raw material in the manufacture of top–quality polyurethane. Used to produce imitation leather goods that feel just like natural leather, PDC helps protect valuable natural resources.

Chemically produced imitation leather products

◆Dimethyl Carbonate (DMC)

Used in the methylation, carbonylation and carbomethoxylation reactions of all types of chemical compounds. As well as being used as a raw material in the manufacture of polycarbonate resin in place of the traditionally used phosgene, DMC's almost complete absence of toxicity makes it a logical choice as a substitute for dimethyl sulfate and methylene chloride, whose residual toxicity caused problems. In addition, it is also used as a solvent for gravure ink, for example, instead of organic solvents such as toluene.

DMC manufacturing plant

◆Separation Membranes

UBE's gas separation membranes use hollow polyamide resin fibers. In addition to being used to separate and recover CO_2 in the atmosphere, these separation membranes have superb characteristics for the recovery of perfluorocarbon, (PFC) and other chemical substances that harm the environment, and are playing an important role in purifying the atmosphere.

Separation membrane module

◆Silicon Nitride and Tyranno Fiber

Diesel engines, despite their many excellent characteristics, are a major impediment in efforts to lower levels of NOx and suspended particulate matter in vehicle exhaust gases. To mitigate this problem, diesel engines use ceramic glow plugs and diesel particulate filters (DPF). Silicon nitride powder and Tyranno Fiber, which are highly heat resistant, are used in the manufacture of these.

Ceramic glow plug

Diesel particulate filter (DPF)
(Photo from APEX DPF System)

◆"Aqua Solution" Photocatalyst Fiber Module

For the first time UBE has succeeded in developing a revolutionary photocatalyst fiber capable of completely breaking down harmful substances simply by exposure to light, and has commercialized a water purifier using the fiber. UBE further developed the functions that have proved highly effective in destroying coli and legionnaires bacteria, and eliminating dioxins. UBE intends to develop the large market for environmental equipment, including air purification systems.

Aqua Solution

◆Hydrogen Peroxide (Kemira-Ube, Ltd.)

Welcomed as an alternative to chlorine, our hydrogen peroxide is used in a wide range of fields, including paper, pulp, and fiber bleaching and sterilization, etching electronically printed circuit boards, and purifying waste water.

A tank truck carrying hydrogen peroxide

◆Slow-Release Fertilizer (Ube Agri-Materials, Ltd.)

The fertilizer component Oxamide dissolves slowly in soil and remains effective for a long time. Because this fertilizer is physiologically and chemically neutral, it is environmentally benign and does not produce harmful substances after breaking down in the soil.

Slow-release fertilizer has earned a good reputation in agriculture and gardening applications

◆Eco-Soft, Poly-Wrap (Ube Film, Ltd.)

These are polyolefin wrap films. Because neither contains chlorine, they produce no harmful gases when incinerated. In particular, Eco-Soft is a specialized food wrap product with a carefully selected material composition designed for strength, beauty, and sealing effectiveness.

Wrap products can be used in total safety

◆EUP: Two-Stage Pressurized Gasification Process

This is a chemical recycling technology jointly developed by UBE and Ebara Corporation. This system gasifies organic wastes such as waste plastics and shredder dust in a combination of low-temperature and high-temperature gasification furnaces, and produces synthesis gases, mainly composed of hydrogen and carbon monoxide, for use as the raw materials for chemicals. Another reason the process is attracting widespread interest is because prior removal of vinyl chloride resin is not necessary because the system can neutralize hydrogen chloride and convert it to ammonium chloride. This technology won the Nikkei Global Environment Technology Award from the Nihon Keizai Shimbun Inc., the Japan Industrial Technology Award from the Nikkan Kogyo Shimbun Inc., and the Technology Award from the Society of Chemical Engineers, Japan.

The EUP Plant, which has been attracting considerable interest

◆Geo-Melt

With this technology, a vitrification system known as Gio-Melt, soil contaminated by organic chlorine compounds or heavy metals or difficult-to-process harmful substances, are melted in situ using Joule heat from an electric current and turned into harmless vitrified solid. This system has already established a successful record in Japan where it has been used for the first time to treat wastes from deconstructed incinerator contaminated with high level of dioxins, and is attracting considerable interest from various quarters.

Soil undergoing vitrification to form glass

◆Z-Sand

This is an artificial sand produced by recycling coal ash (fly ash) from coal-fired thermal power stations. A small amount of cement is added to the fly ash to pelletize it. The lightness, permeability, and environmental friendliness of the resulting product makes it suitable as a fill or roading material to replace natural sand and soil.

"Z-Sand" and its production plant

◆Compressed Waste Packaging Plant

This is a facility to compress general wastes and waste plastics into packages that cannot damage the environment. The facility reduces the volume of wastes and has earned a high reputation for facilitating waste disposal.

Compressed waste packaging plant

◆Recycling Incineration Ash (Yamaguchi EcoTech)

In partnership with Tokuyama Corporation, UBE has established technology to recycle the ash from waste incineration facilities as a raw material for cement, and is using this technology in Yamaguchi Prefecture. For the first time in Japan, dioxins can now be removed from ash and the ash dechlorinated by rinsing. This safe and stable system enables treated ash to be used in high-temperature cement kilns and recycled as cement.

Plant to turn incinerator ash into raw material for cement

◆Recycling Green Wastes (Nishi-Nihon Green Recycling, Inc.)

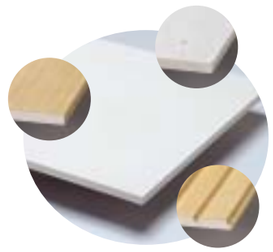
In the past, most waste wood produced by tree felling, root-removal, trimming, and lawn cutting was incinerated or used in landfill. Now, we have developed a way to recycle these wastes and use them as resources. The wastes are chipped and used in paper pulp, used as mulching, or composted and reused in organic cultivation to bolster the soil. These activities help contribute to the formation a recycling-conscious society.

Wood chips and compost made out of green wastes

《Construction Materials》

◆"Friendly Wall" (Ube Board Co., Ltd.)

This new construction material used for interior panels was created by drying diatomaceous earth, a natural construction material that suppresses the generation of volatile organic compounds (VOC's) that causes "sick house" syndrome, condensation, and molds. Because of its friendliness to humans and the environment, the new product is attracting considerable interest.



"Friendly Wall" panel

◆Calbreed SII (Ube Material Industries, Ltd.)

This is a slaked lime that efficiently absorbs harmful acidic gases generated when industrial wastes are incinerated. This is an ultra-highly reactive slaked lime, whose specific surface area has been greatly enlarged by special processing, and is highly effective at gas absorption. Calbreed SII is used at various local body waste incineration facilities and is winning a solid reputation all over the country.

Incinerator using Calbreed SII and Solbalit

Highly reactive Calbreed SII

◆Solbalit (Ube Material Industries, Ltd.)

This product absorbs and removes harmful substances such as dioxins found in the waste gases of incinerators and power generator boilers.

Solbalit in the form of a fine chemical powder

◆U-Stabilizer (Ube-Mitsubishi Cement Corporation)
Green Lime (Ube Material Industries, Ltd.)

These are soil stabilizers developed to treat and stabilize soft soil, sludge, and sewage mud. U-Stabilizer is a cement-chain soil stabilizer, while Green Lime is a limestone-chain stabilizer and both are extremely effective in solidifying road beds and filling foundations, and in stabilizing slopes, sludge, and construction residue.

U-Stabilizer being put to use

◆Clear Water, Calsan Marine (Ube Material Industries, Ltd.)

Based on magnesium hydroxide and quick lime, these products were developed to improve water quality. Effective in improving the quality of the water and sediment at the bottom of the sea and lakes, they are used in aquaculture areas and closed bodies of water where water and bottom quality can become a problem. These products have wide application in such areas as helping purify sludge, eliminating sludge odor, suppressing water-bloom, and purifying water.

A lake that remains a clean water environment

Clear Water

Calsan Marine

《Machinery and Metal Products》

◆Rollerless Conveyor (Ube Machinery Co., Ltd.)

This is a revolutionary conveyor whose belt floats on a cushion of air. Because the device does not use rollers, it is quiet and vibration free with a low coefficient of friction, which means the motor driving it can be smaller and energy can be saved. Another major advantage is that equipment savings can be made because the belt can operate at high speed. In addition, the conveyor is completely sealed, keeping the surrounding environment free of dust and odors and enhancing safety. The air cushion conveyor's development objective was environmentally friendliness, and it is attracting interest from a range of industries.

Rollerless conveyor in action

◆All-Electric Injection Molding Machine (Ube Machinery Co., Ltd.)

This is a large, all-electric injection molding machine that avoids using hydraulic fluids and coolants. It is also extremely energy efficient, using only one third of the power and two thirds of the cycle time of conventional hydraulic machines. In fiscal 2001, this all-electric machine received the Director-General's Award from the Agency for Natural Resources and Energy in the 22nd energy saving machinery commendations sponsored by the Japan Machinery Federation. And because this machine is capable of extremely precise molding, it has opened the way to a world of new molding technologies including die-pressed molding (integrated plastic and surface material molding) and the in-pressed process, which performs the molding and coating at the same time within the mold.

Largest class all-electric injection molding machine

◆Aluminum Wheels (Ube Automotive, Ltd.)

Based on its own unique "Squeeze Process", UBE manufactures aluminum wheels with features of fine metalic structure, a high tenacity and design flexibility. Though cast, they have the same strength of forged wheels. This allows them to be lightened, which contribute to improving fuel economy and reducing exhaust emissions. These wheels enjoy a very high reputation on the world market.

Aluminum wheels for luxury vehicles

Wings of technology
Spirit of innovation
UBE

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