TOSOH

2000

Responsible Care Activities Report

Environment, Safety & Health

TOSOH

TOSOH CORPORATION

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TOSOH CORPORATION

www.tosoh.com

Tosoh Focuses on the Environment, Safety and Health

In all its business activities, Tosoh is aware that protection of the environment and ensuring safety and health are the most important issues for management. Through persistent innovative chemistry, Tosoh contributes to the development of society by providing products and services that earn customer satisfaction.

About Tosoh Corporation

Headquartered in Tokyo, Japan, Tosoh Corporation is a diversified international chemical and specialty materials company. Founded in 1935, the Company has expanded its reach into high value-added businesses such as fine chemicals, scientific instrumentation, optical media, thin film materials and quartzware. Today, Tosoh employs more than 8,000 people worldwide and generates sales of over $3 billion annually.

Tosoh's Environmental Principles

A member of the Japan Responsible Care Council since 1994, Tosoh Corporation strongly recognises its responsibility for protecting the environment and assuring public health and safety. We are striving to contribute to the development of a society where the economy grows in harmony with the environment.

- Tosoh believes that conservation of resources and protection of the environment are essential for the well being of future generations. We do everything possible to obtain the maximum use out of the minimum amount of natural resources.
- We seek to ensure that every one of our employees feels a responsibility for creating products that are environment-friendly from initial development to disposal.
- We ensure the prevention of accidents through strict safety regulations and thorough emergency training.
- We design products and develop product processes that take into consideration environment, safety and health issues.
- To further the goals of environmental protection, we continually evaluate our activities and exchange ideas with parties inside and outside the company.

In this, our year 2000 Responsible Care Activities Report, we present our developments over the past year, as well as on-going operations showing our commitment to placing environmental protection at the forefront of our corporate activities.

Responsible Care

ISO 14001

Topics from the Past Year

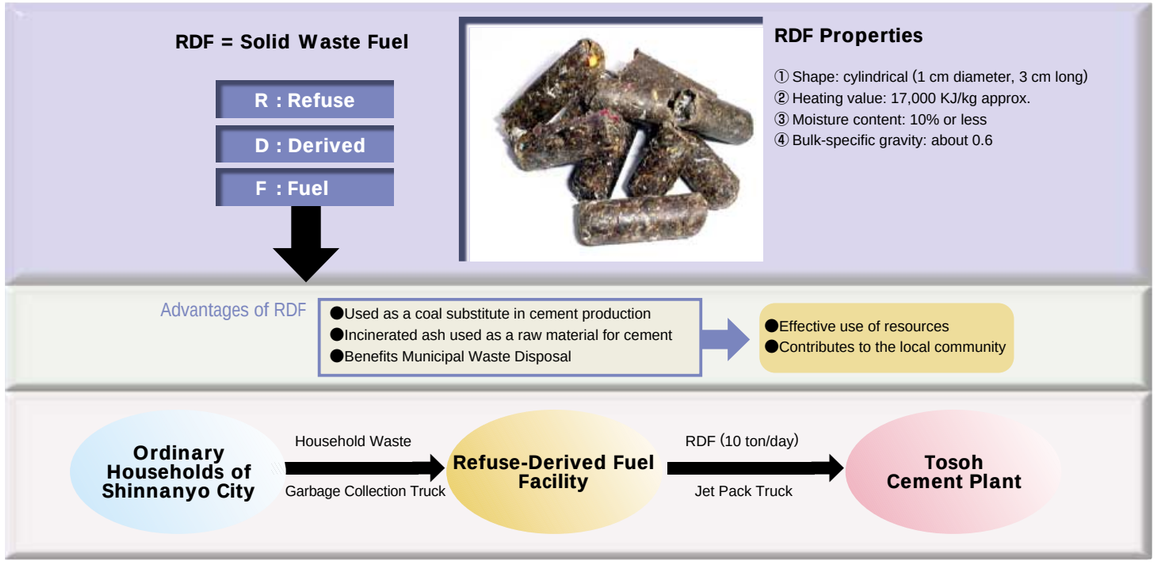
1 All Tosoh Plants Awarded ISO14001 Certification

ISO14001 Certification was awarded to the Toyama Plant and the Nanyo Manufacturing Complex in 1998 and to the Yokkaichi Manufacturing Complex in 1999.
By restructuring environmental control systems based on the ISO management system, Tosoh is further reinforcing its efforts to promote environmental protection.

2 Cement Plant Makes Effective Use of Household Waste

As a recycling measure at Shinnanyo City, Yamaguchi Prefecture, a refuse-derived fuel facility (Phoenix) for making RDF from general household waste was built and began to operate in April 1999.
Tosoh is cooperating with the city's environmental administration by using the RDF as fuel for a cement plant.

Shinnanyo City's refuse-derived fuel facility "Phoenix"
The image of the phoenix, an immortal bird, symbolizes "regeneration" and "new life".



Environmental Protection — Waste Reduction

97% Recyclable

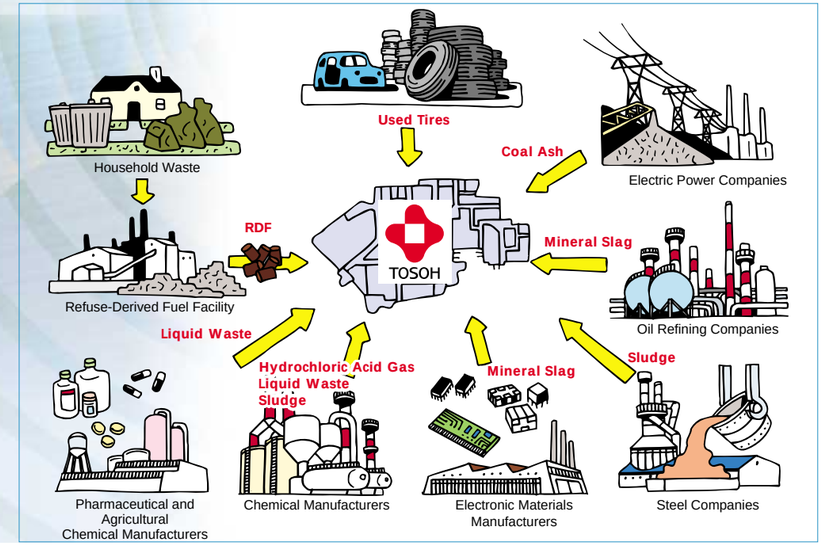
We are striving to use resources effectively by both reducing waste but at the same time, efficiently utilizing inevitable waste materials.
We currently recycle 97% of the sludge, waste acid, alkaline materials and oil produced at the manufacturing complexes and plants, as well as off-site waste material which accounts for 43% of total waste.

Recyclable Resources
730,000 tons
(1998)

The Remaining 3% is used for On-site disposal, Off-site disposal and Off-site Land Reclamation Purposes.

3% 20,000 tons

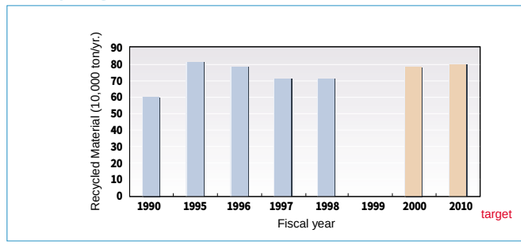
Waste Recycling = Co-operation with the Local Community



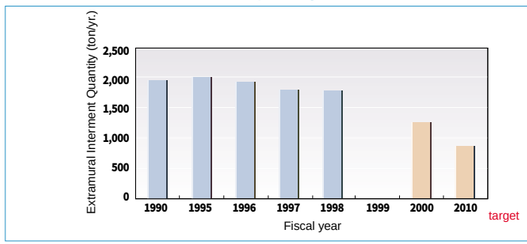
Land Reclamation

After making efficient use of these recyclable resources, we continue our efforts to reduce industrial waste. The remaining waste from the RDF process is subjected to further on-or off-site processing or disposal.
We are currently aiming to reduce the quantity of material to be used for off-site land reclamation by 57% and recycle it instead. This figure exceeds the industry target of 40% for 2010.

Recycling Trends



Off-site Land Reclamation Quantity



Energy Conservation

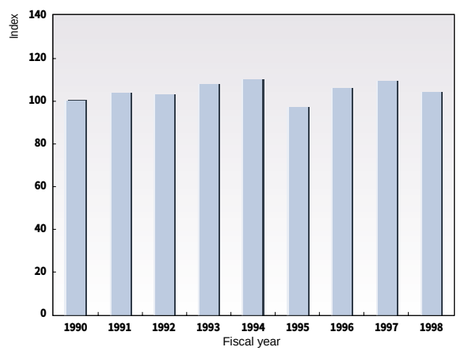
At the Third Conference of the Parties (COP3) for the prevention of global warming held in Kyoto in 1997, Japan agreed to a 6% reduction from the 1990 level of Greenhouse gases such as carbon dioxide, between 2008 and 2012.
The Japan Chemical Industry Association, of which Tosoh is a member, has set a target for 2010 of a 10% reduction in unit energy consumption from the 1990 level.

Case 1: Efficient Use of Gas Turbine Emissions

A gas turbine with a generating capacity of 41,000 kW was installed at the ethylene plant in the Yokkaichi Complex in April 1999. Tosoh makes efficient use of the waste heat in the hot emissions from this gas turbine by leading them to the adjacent naphtha-cracking furnace where the emissons are used as combustion air. This modification to the facility has improved the rate of energy consumption per unit of ethylene produced by more than 7% compared with the 1998 level.

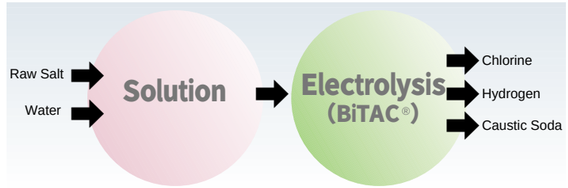
Gas Turbine

Energy Usage (Crude Oil Conversion)



Case 2: Introduction of High Efficiency Salt Electrolysis Equipment

From April to June 1999, highly efficient salt electrolysis facilities were installed at the salt electrolysis plants at the Yokkaichi and Nanyo Complexes. These electrolysis facilities use electrolyzer cells (called BiTAC®) developed by Tosoh and chlorine engineers. BiTAC® reduces power loss due to electrical resistance and has the special feature of high productivity per unit site area. Compared with former types, energy savings of 10% are achieved and for the whole plant, the energy consumption rate per unit of caustic soda produced is reduced by 5%.



Electrolyzer Cell

Energy and Global Warming

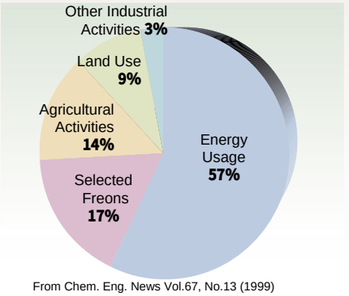
Global Warming is caused by a phenomenon called the Greenhouse Effect and the Greenhouse gases were determined by COP3 to be six substances including carbon oxides, methane, nitrous oxide and freons. Energy usage is believed to cause 57% of Global Warming.
In October 1998, the "Law relating to measures against global warming" was proclaimed, and took effect from April 1999. Tosoh has set up energy conservation plans and implements various measures to control and suppress the emission of Greenhouse gases.

Man-made Emissions of the Main Greenhouse Gases

	CO_2	Methane	Nitrous oxide	CFC-11	HCFC-22	CF4
Pre-industrial revolution emmission levels	280ppmv	700ppbv	275ppbv	0	0	0
1994 emmission levels	358ppmv	1,720ppbv	312ppbv	268pptv	110pptv	72pptv
Global warming index (100 yr.) (Global warming effect of each greenhouse gas over 100 years (where CO2 is 1))	1	21	310	3800	1500	6500

Note: Estimated from 1992-3 data. ppmv is parts per million by volume, ppbv is parts per billion by volume, pptv is parts per trillion by volume.
Data: Data compiled by the Environmental Agency from IPCC (1995) etc.
Sources: IPCC report (IPCC Global Warming Report) "Global Environment 98-99", Global Industrial and Cultural Institute ed., Mioshin.

Human Activities Causing Global Warming



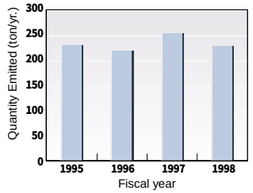
From Chem. Eng. News Vol.67, No.13 (1999)

Environmental Protection — Emissions Reduction

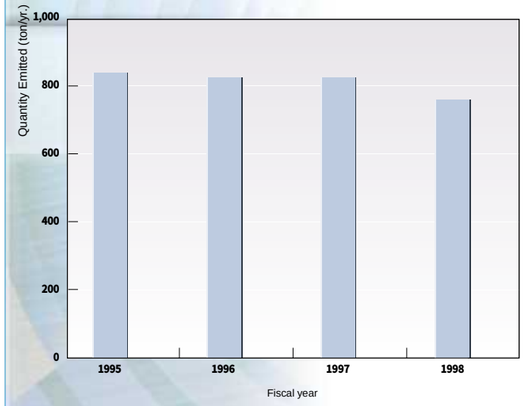
Reducing Atmospheric Emissions

Tosoh is promoting efforts to reduce emissions into the environment through improved manufacturing processes and the appropriate operation of facilities.
This not only involves the observance of regulations and standards, but we are also carrying out voluntary environmental protection programs.

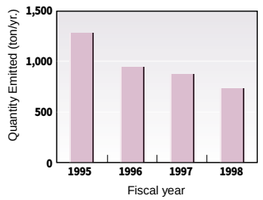
Dust Emissions



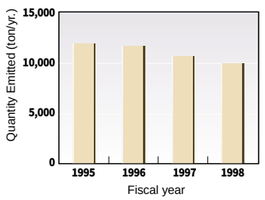
Annual COD Emissions



SOx Emissions



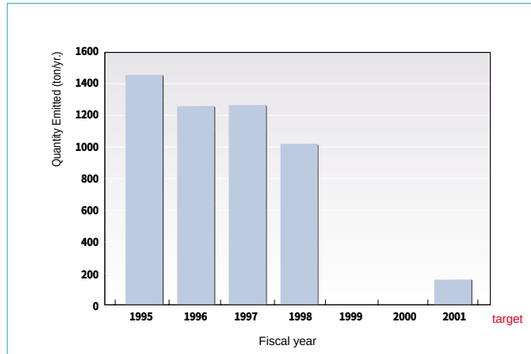
NOx Emissions



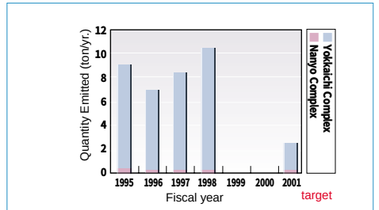
Voluntary Control of Harmful Air Pollutants

The Japanese Ministry of International Trade and Industry and the Environmental Agency have specified twelve substances as harmful air pollutants that require voluntary reduction efforts. Production processes at Tosoh`s manufacturing complexes generate the emission of five of these substances, and in fiscal 1998 the total quantity of emissions (including substances discharged into water) was 1,027 tons, representing a reduction of 30% from the 1995 level of 1,465 tons. The target for fiscal 2001 is to reduce the total quantity of emissions to 87% below the 1995 level. (Fiscal 1999 figures were unavailable at the time of this publication going to print)

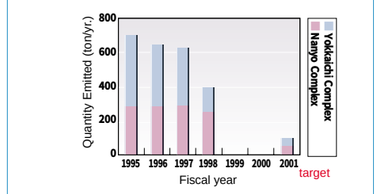
Total Emitted Quantities of Substances under Voluntary Control



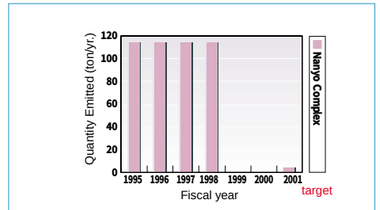
Benzene



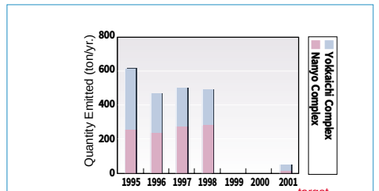
Vinyl Chloride Monomer



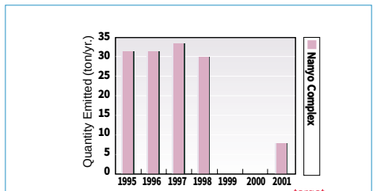
Chloroform



1.2-dichloroethane



1.3-butadiene



PRTR

PRTR, a register of quantities of selected chemical substances released into the environment, is being promoted internationally as an overall and effective means for reducing and controlling impediments to environmental protection caused by chemical substances. Adopted at the 1992 Global Summit in Rio, PRTR was recommended in Agenda 21 of the Rio de Janeiro Documents. The PRTR Law was enacted in Japan in July 1999.
Tosoh is producing or using 60 of the 284 PRTR substances which are voluntarily monitored by the Japan Chemical Industry Association (JCIA); 26 of these are being emitted at a rate of more than one ton per year. In co-operation with the JCIA, Tosoh is continuing its efforts to reduce the emissions of these substances.

Accident and Disaster Prevention

Safety Assurance

Aiming to eliminate accidents and disasters, Tosoh strongly enforces safety measures and safe operation and proper maintenance of equipment. Safety measures include design safety assessment at the time of new installations, safety inspection before operation, employing the latest inspection and maintenance technology to ensure that equipment is in sound condition, and preparing and periodically reviewing the operating supervision and manuals that include safety control systems.

Particularly important safety measures that are being implemented are as follows:

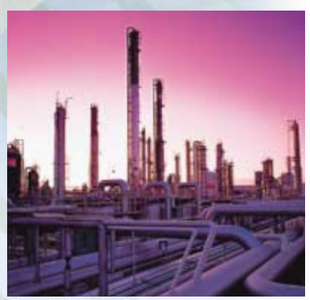
- Improving and maintaining safety technology by means of voluntary safety approvals.
- Insisting on quantitative assessments of equipment.
- Eliminating industrial accidents through the analysis of previous accidents and close calls.

Voluntary Safety Approvals for High Pressure Gases

Under this system, the Ministry of International Trade and Industry and the High Pressure Gas Safety Institute of Japan evaluated Tosoh's self-assessment of its supervision of operations, equipment maintenance, safty systems and inspections. After this, Ministerial approval was granted to both the Nanyo and Yokkaichi Complexes.

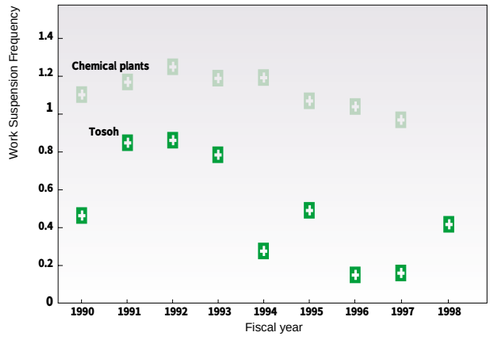
The acquisition of this approval proves that a stringent third party inspection has found that attitudes, controls and facilities with respect to safety are above standard. The point that this is an inspection from outside is similar to the ISO management system with respect to quality and the environment. As a tool for safety control, the inspection is implemented whenever the subject plant is expanded and after two and four years of continuous operation. Lateral development of this system is being continued to all manufacturing complexes.

Tosoh strives to improve and maintain safety technology through voluntary safety approvals.



Tosoh's Yokkaichi Plant

Industrial Accident Frequency

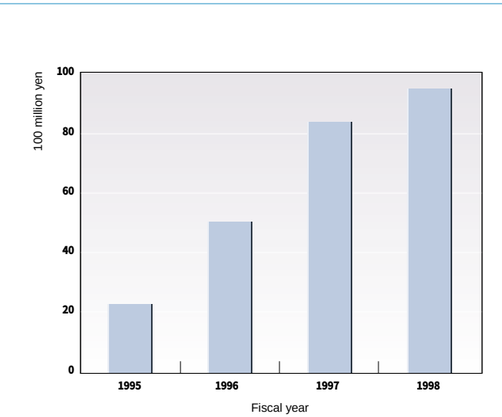


Work suspension frequency = (No. of casualties due to industrial accidents)/(total hours worked) x 1,000,000

Analysis of Previous Accidents

Examples of accidents inside and outside the company are analyzed thoroughly to prevent similar incidents. In analyzing and applying examples of close calls, any alarming experience encountered by an employee, or a detail of work that is considered to be dangerous is entered in a database and applied in the study and implementation of safety measures, education and training. By analyzing their experiences of close calls, employees improve their awareness of safety and contribute to the reduction of industrial accidents.

Cumulative Total Investment in Environment, Safety and Health Facilities (since fiscal 1995)



Investment in Environment, Safety and Health Facilities

Tosoh continues to make productive investments in facilities related to the environment, safety and health. During this four-year period, an average of 1.5% of sales revenue was invested in these facilities.

Product Stewardship

Product Safety

From the acquisition of raw materials until product disposal, Tosoh's products are designed in consideration of the environment, safety and health throughout the life cycle of the product. Tosoh has established a system of commercialization based on approval by the Product Safety Inspection Committee. Materials Safety Data Sheets (MSDS) are prepared for all Tosoh's chemical products to provide appropriate information for the user concerning risk and toxicity. Tracking forms are also issued to industrial waste disposal contractors in a thorough effort to prevent accidents.

Data Collection

Tosoh participates actively in the voluntary activities of the International Council of Chemical Associations concerning the accumulation of data necessary for assessing the toxicity of chemical substances with a high production volume (ICCA HPV Initiative).

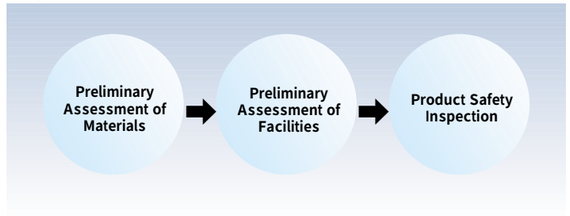
Distribution Safety Measures

Tosoh fully complies with transportation safety guidelines put forth by the RC distribution organization which are designed to prevent accidents during the transportation of chemical substances. The operator carries a yellow card (Emergency Notification Card) to ensure that appropriate action will be taken in the event of an accident. The information on this card covers high-pressure gases, poisons and other dangerous substances (including corrosive-types).

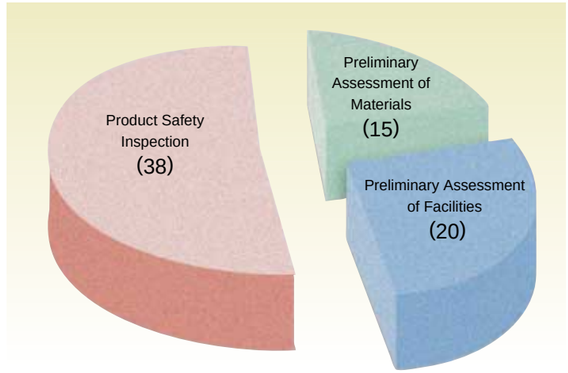
Yellow Card (Emergency Notification Card)

The yellow card was revised in all aspects in fiscal 1998 and has been in use from fiscal 1999. This card takes into consideration high pressure gases, poisons and dangerous substances as proclaimed by the fire service law (including corrosive substances).

Products and Catalogs approved by the Product Safety Inspection Committee are delivered to the customer



■ Numbers of Preliminary Assessments (fiscal year, ending March 31st. 1998)



■ Preliminary assessment of materials is a system for assessing the risk and toxicity of a material by toxicity testing.
■ Preliminary assessment of facilities is a system for inspecting the plant equipment, usually at the time it is installed in the manufacturing complex.
■ Product safety inspection is a system for inspecting the safety of a product, including its container, packaging and labeling before it is put on the market.

System for Emergency Notification in Case of an Accident

A system for emergency notification in case of an accident was developed in fiscal 1998. To enable assistance to be given promptly at the time of an accident, the entire country is divided into zones and a base has been appointed to give technical support in each zone.

Material Safety Data Sheets (MSDS/SDS)

The items to be filled in on the MSDS include responses to fire or leakage, physical and chemical properties, risk and toxicity information, precautions during disposal, precautions during transportation and who is to be notified.

Industrial Waste Disposal Tracking System

The system is a method by which an operator who has discharged waste material issues waste disposal verification forms to the disposal contractor who is engaged to dispose of the waste material. After the disposal has been completed, a copy of the forms returned to the discharge operator confirms that the waste disposal contractor has handled the disposal appropriately.

Equipment Dispatch Management Zones

Tohoku Tosoh Chemical Co., Ltd.
Head Distribution Office
(Toho Unyu Co., Ltd.)

Toyama Plant General Affairs Division
(Toyo Koun Co., Ltd., Toyama Business Office)

Osaka Regional Office
(Kansai Kaiun Co., Ltd.)

Nanyo Complex General Manager's Office
(Toyo Koun Co., Ltd., Head Office Distribution Office)

Head Office Distribution Office
(Toyo Koun Co., Ltd., Tokyo Regional Office, Funabashi Center)

Yokkaichi Complex General Manager's Office
(Toyo Koun Co., Ltd., Yokkaichi Regional Office Distribution Office)

Assessment & Communication

Local explanatory meeting, Yokkaichi

Responsible Care (RC) Inspections
RC Inspections of Manufacturing Complexes

Inspections, supervised by the director of environmental safety and quality control, are carried out every year.

Fiscal 1999

Nanyo Complex

Preliminary inspection	November 1999
Full inspection	November 1999

Yokkaichi Complex

Preliminary inspection	November 1999
Full inspection	December 1999

Toyama Plant

Preliminary inspection	December 1999
Full inspection	December 1999

In summing up the inspections, Mr. Yukihiro Tsutsumi, Chairman of Tosoh's RC Committee states:

"With respect to accidents concerning sub-contracted companies, transmission of accident reports and clarification of the responsibility of the departments involved requires improvement. Environmental control systems have become more solid as a result of ISO14001 awards which should further improve Tosoh's environmental record."

RC Inspection of all Tosoh Plants

In February 1999, the results of on RC inspection of all Tosoh Plants (appraisal of records with regard to guidelines and objectives) was reported to and reviewed by President Tashiro. He approved the fiscal 1999 Responsible Care plan and stressed the importance of analyzing potential causes of accidents and knowing how to react to an industrial disaster.

Conference with the Labor Union

Twice each year, a report on RC activities is given to labor union representatives and a discussion meeting is held. Topics for the conference held in May 1999 were:

1. Status of RC activities (fiscal 1998 report, objectives and measures for fiscal 1999)
2. Latest trends in environmental safety
3. Results of periodic medical examinations

Dialogue with Local Communities
Local Explanatory Meeting for Yokkaichi RC Zone

On June 8, 1999, Tosoh organized a meeting in Yokkaichi City. One hundred and seventy people, including the administration, local residents, people connected with schools, local businesses and labor unionists participated in the meeting. A regional report summarizing the RC activities of several companies within the Kasumi Complex was issued and explained, and an address was given by the International Science & Environmental Technology Transfer Research Center, which supports global environmental protection activities.

Vinyl Chloride Recycling Exhibition

Tosoh communicates with the local community by explaining the relationship between chemical substances and environmental issues and the recycling processes at each manufacturing complex. In the year 2000, Tosoh will promote various regional public relations activities, such as an exhibition of products made from recycled polyvinyl chloride.

Factory Tours for Primary School Pupils

Tosoh has been conducting factory tours for primary school pupils at the Yokkaichi and Nanyo complexes since 1992. Every year about 500 children visit the plants and view the industrial complex and public piers from inside a bus. Employees acting as guides have long since been won over by the enthusiasm of the visiting children in what has become a worthwhile experience for all involved.

A Factory Tour

Japan Responsible Care Council
RC Implementation Statement

Having established the Japan Responsible Care Council in 1995, Tosoh is focused on promoting "voluntary activities to ensure safety and environmental protection throughout the entire life cycle of our products, from their development and manufacture throughout their use and disposal."

ISO Management System Approvals Awarded

ISO14001 Certification

*** Tosoh Corporation**

Toyama Plant	ISO14001	registered September	1998
Nanyo Complex	ISO14001	registered December	1998
Yokkaichi Complex	ISO14001	registered December	1998

*** Tosoh Group**

Tosoh SMD, Inc. (USA)	ISO14001	registered October	1998
Holland Sweetener Company V.O.F (The Netherlands)	ISO14001	registered November	1998

ISO9000 Series Certification

*** Tosoh Corporation**

Nanyo Complex	ISO9001, ISO9002	registered October	1993
Tokyo Research Center	ISO9001	registered November	1994
Toyama Plant	ISO9002	registered June	1995
Yokkaichi Complex	ISO9001, ISO9002	registered December	1995

*** Tosoh Group (Domestic Affiliates)**

Tosoh Akzo Corporation	ISO9001	registered May	1993
Toso Electronics Co., Ltd.	ISO9002	registered May	1993
Tosoh Hyuga Co., Ltd.	ISO9002	registered January	1994
Nippon Silica Glass Co., Ltd. (Yamagata)	ISO9002	registered January	1994
Nippon Silica Glass Co., Ltd. (Shonai)	ISO9002	registered June	1994
Plas-Tech Co., Ltd.	ISO9001	registered October	1994
Akzo Kashima Limited	ISO9002	registered November	1994
Tosoh Specialty Materials Corporation	ISO9001	registered February	1995
Tohoku Tosoh Chemical Co., Ltd. (Sakata)	ISO9002	registered December	1995
Taihei Chemicals Limited (Souka)	ISO9002	registered December	1995
Organo Co., Ltd.	ISO9001	registered January	1996
Nippon Polyurethane Industry Co., Ltd.	ISO9001	registered January	1996
Lonseal Corporation (Tsuchiura)	ISO9001	registered February	1996
Hodogaya Chemical Co., Ltd.	ISO9002	registered December	1996
Rin Kagaku Kogyo Co., Ltd.	ISO9001	registered May	1997
Nippon Silica Glass Co., Ltd. (Sakata)	ISO9002	registered February	1998
NSG Yamaguchi Co., Ltd.	ISO9002	registered March	1998
F-Tech, Inc.	ISO9002	registered March	1998
Tohoku Denki Tekko Co., Ltd.	ISO9001	registered December	1999
Nippon Silica Industrial Co., Ltd.	ISO9001	registered December	1999

*** Tosoh Group (Overseas Affiliates)**

Delamine B.V. (The Netherlands)	ISO9002	registered December	1990
Weiss Scientific Glass Blowing Co., Inc. (USA)	ISO9001	registered December	1993
Tosoh SMD, Inc. (USA.)	ISO9001	registered March	1994
Tosoh Hellas A.I.C. (Greece)	ISO9002	registered March	1994
Cryco Quartz, Inc. (USA)	ISO9001	registered October	1994
Nippon Silica Glass Europe Ltd. (UK)	ISO9002	registered February	1997
Holland Sweetener Company V.O.F.(The Netherlands)	ISO9001	registered November	1998
Eurogenetics N.V. (Belgium)	ISO9002	registered April	1999