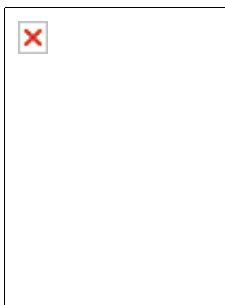


Responsible Care Report 2000

Message from the Chairman

Chairman Japan Responsible Care Council

Akio Kosai



It is my great pleasure to present the JRCC Responsible Care Report 2000, introducing member companies' performances and achievements during the year April 1999–March 2000.

In April 2000, Japan Responsible Care Council (JRCC) celebrated its fifth anniversary. During these five years the number of JRCC member companies increased to 111 as of October 2000 from 74 at the time of JRCC's launch in 1995. The performance of JRCC has achieved a great stride owing much to the devoted efforts of all members and the invaluable guidance afforded us

by many individuals during the term.

Responsible Care is a voluntary initiative by the world chemical industry to "consider the environment, health and safety throughout the entire life cycle of chemical substances seeking the continuous improvement of performances". Responsible Care furthermore aims to communicate with the public in a transparent manner and obtain credibility from the society.

This report presents the performance and achievement of the JRCC members in the form of data and introduces overall JRCC efforts, together with the worldwide collaboration and the dialogue with communities and society. It provides a broad review of JRCC activities not only to member companies but also to the parties concerned in other industries and individuals. Key achievements of JRCC during the year April 1999 – March 2000 include the following:

- 1) As indicated in the data herein, steady improvements have been observed in all areas of the performance, the foremost being environmental preservation. In particular, efforts to reduce hazardous air pollutants were made through voluntary controls, resulting in the achievement of the majority of reduction targets.
- 2) JRCC has been promoting the disclosure of member performances. The number of member companies who also publish environmental reports has increased from 41 in the previous year to 53. These reports include such items as environmental accounting reports.
- 3) The expansion of communication with society is one of the areas aggressively sought by JRCC. In addition to dialogue meetings with consumer organizations and Responsible Care meetings in the regions where chemical complexes are located, off-site Responsible Care meetings were also held in the Toyama/Takaoka district (Central North part of Japan).
- 4) The expansion of international collaboration is another field JRCC continues to seek. Progress was made in the HPV (High Production Volume existing chemical substances) initiative and LRI (Long-range Research Initiative) in partnership with the ICCA (International Council of Chemical Associations). JRCC also has contributed to the new launch of Korea Responsible Care Council (KRCC) December 1999 and to the successive Responsible Care promotion in Korea.

Globalization and increasing concern about the environmental issues call for an enormous change of the chemical industry. The chemical industry nowadays is strongly requested to contribute to the society in the chemical safety for environmental and health preservation. Immediate challenge of full-scale implementation for the Pollutant Release and Transfer Register (PRTR) and further transparency of the performances through continued dialogue with the public are of key importance to get the credibility from the society.

I would like to express my sincere gratitude to those who have contributed to the publication of this JRCC Report. I am full of confidence that their views and opinions will be reflected in our actions in the months and years to come.



Board Members of Japan Responsible Care Council

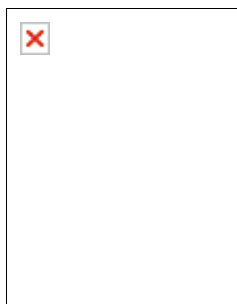
Chairman Akio Kosai	Chairman, Japan Chemical Industry Association, Chairman, Sumitomo Chemical Co., Ltd.
Vice Chairman Tadasu Tachi	Counselor, Kaneka Corporation
Vice Chairman Minoru Ohnishi	Chairman, Fuji Photo Film Co., Ltd.
Auditor Takanori Yoneyama	Chairman, Konica Corporation
Auditor Akira Ohira	President, Mitsubishi Gas Chemical Company, Inc.
Director General Masami Tanaka	Director General, Japan Chemical Industry Association

Responsible Care Report 2000

Message from the Advisory Board

Chairman Japan Responsible Care Council Advisory Board

Jiro Kondo



It is often broadcast that a series of natural calamities happened these days in Japan such as the eruptions of Mt. Usu and Mt. Miyakejima, the torrential rains that come once-a-century, tornadoes. The temperature during the summer this year was also unprecedentedly high. Some experts claim that this is the result of global warming. Japan has been reported to emit 12% of the world's ozone-depleting chlorofluorocarbons (CFCs). But now CFCs from air conditioners and refrigerators are going to be recovered and disposed of safely day by day.

The PRTR system is going to start legally next year. The more accurate state of emission volumes will be known soon. Japan's chemical industry initiated PRTR prior to the legislation under the Responsible Care initiative as repeatedly explained. The PRTR system is now widely accepted by the Japanese chemical industry and the society. This should be inferred that the changing time requires such a initiative. The chemical industry has developed the new substances for the more comfortable daily life such as nylon, CFCs, etc. in the 20th century. We hope that such research and development work of the chemical industry will be continued unabatedly on into the 21st century to the benefit of both the society and the chemical industry.

It is my great pleasure that structural analysis of the proteins and genes of living organisms has developed and that the biotechnology is now permeating the pharmaceutical industry as well. It is reported on the other hand, however, that the release of certain chemicals into the environment appears to cause the endocrine disruption of organism, sterility and lowered sperm counts. Hence, an attention to the negative aspects of chemical substances need to be paid as well. Responsible Care is a initiative which addresses those negative aspects of chemicals. Companies suffer heavy losses from the public criticism of the lack of, or tardiness in, information disclosure as we can see some examples in the automobiles and foods companies. Boycotts were staged by outraged consumers and the manufacturers in question incurred enormous losses. We too must draw a lesson from these incidents and remain on guard, as it is extremely difficult to reverse the effects of such scandals once they have been publicized by the press. Responsible Care needs to be regarded as a method of risk management to prevent such cases.

The chemical industry, in particular petrochemical industry has achieved a development in Japan after WW II. Chemical complexes have been built in coastal regions. Damage to human health due to air pollution etc. has grown to be a prominent issue. JRCC holds Responsible Care meetings at such complexes to communicate with the community. Thanks to the constant support of local community members, these meetings have always been held successfully. Such dialogues will be continued in the months and years ahead.

With little time remaining in the year 2000, a new century is upon us. The Kyoto Protocol was drawn up in December 1997. With COP6 scheduled to be held in The Netherlands at the end of this year, the protocol is going into effect at hand. Around the time this report is published, the United States will have a new president. No matter what the political inclinations of the new government may be, we feel assured that the fundamental significance of the country's environmental policy will remain unchanged. Japan's position in the global chemical industry will be increasingly of great consequence. The further contribution to and participation in the global collaboration by the Japan's chemical industry will be expected by the world chemical industry.

It is extremely gratifying to see this report for the year April 1999–March 2000 compiled. We extend our sincerest thanks to all those involved in its creation. Understanding of the chemical industry is not easy. Only chemical scientists can make proper and accurate reports. Our responsibility is immense in this sense. JRCC now boasts 111 members. It is our hope that the

all the parties concerned including, but not limited to, manufacturers, distributors and customers of the chemical industry will show an interest in Responsible Care and make use of this report for the better understanding of the current chemical industry.



Members of Japan Responsible Care Council Advisory Board

Jiro Kondo	: Professor Emeritus, University of Tokyo	Hiroyuki Torii	: Editorial Writer, Nihon Keizai Shimbun Inc.
Kazuo Akita	: Professor Emeritus, University of Tokyo	Motoo Nakahigashi	: Vice Chairman, The Society of Chemical Engineers, Japan
Yoichi Uehara	: Professor Emeritus, Yokohama National University	Keiko Nakamura	: Deputy Director General, JT Biohistory Research Hall
Mitsuru Uchiyama	: Chairman, Central Pharmaceutical Affairs Council	Nagaharu Hayabusa	: President, The journalist workshop for global citizens
Katsutoshi Kato	: President, Japanese Federation of Chemical Workers Unions	Miyoko Hyodo	: Counselor, Japan Housewives'(IU Association
Masaomi Kondo	: Member, Chemical Product Council	Akio Yamamoto	: Professor Emeritus, Tokyo Institute of Technology
Masatomo Tachi	: Scientific Advisor, Ministry of Labor		

Responsible Care Report 2000

Summary of the Responsible Care Report 2000

This is JRCC's fifth annual report

Features of the Responsible Care Report 2000 :

- This report is an overview and summary of the year April 1999–March 2000 of 98 JRCC members, which submitted the data.
- Number of JRCC members is 110 as of March 2000 and 111 as of October 2000.
- The quantitative presentation of Responsible Care activities has been compiled on the basis of performance data supplied by JRCC member companies, while the qualitative presentation of Responsible Care activities has been compiled on the basis of written reports of 1999 JRCC activities, including surveys carried out among JRCC member companies.
- The figures of data included herein have been changed due to an increase in the data provided and the revision of members' data.
- Some recovery was seen in sales figures for this fiscal year. Thus, although improvement is evident for each objective, unit level figures for each objective have remained virtually unchanged from the previous year.
- The terms of activities listed herein are primarily fiscal 1999.

Summary

Environmental Preservation

- * Although industrial waste emission volumes have increased slightly, recycling and waste reduction efforts have helped maintain a total reduction in the volume of final waste disposal.
- * Although energy consumption levels and CO₂ emission volumes hovered at the approximately the same level as the previous year, figures increased slightly on a unit basis.
- * Low levels of SO_x, NO_x, dust and COD have been maintained.

Investment in Environmental Preservation

- * Percentage of investment in environmental preservation such as energy conservation and CO₂ and other emissions measures against investments has increased.

Process Safety & Disaster Prevention

- * The average number of accidents a year at member companies has remained virtually the same over the past five years.

Occupational Safety and Health

- * The rate of occupational injuries at member companies was 0.26, and the severity rate of injuries 0.09, both per millions of hours actually worked. Both figures are well below the overall frequency and severity rates for the manufacturing and chemical industries.

Product Stewardship

- * 95% of member companies have safety assessment standards in place, and the average rate of Material Safety Data Sheet (MSDS) preparation per company, the rate of MSDS distribution to clients, the comprehension of client application, and the average rate of Emergency Response Card (Yellow Card) preparation amounted to 100%, 92%, 91%, and 95%, respectively.

Recent Chemical Safety Topics

- * As with fiscal 1998, this report discusses the state of efforts aimed at High Production

Volume (HPV) initiatives and the Long-range Research Initiative (LRI) both in Japan and around the world.

Dialogue with Community

- * The second series of regional Responsible Care meetings were held at five locations of petrochemical complexes and, for the first time, at non petrochemical location in the Toyama/Takaoka district.
- * The third round of dialogue meetings with consumer NGOs was held under the main theme of packaging material recycling.

Global Expansion

- * The international Responsible Care Leadership Group (RCLG) now comprises 45 member countries as of Aug. 31, 2000 and is active in each country.
- * In Asia, Japan has assumed the role of official sponsor for the Republic of Korea applying for the membership in the RCLG.

Activities in 1999

- * Reduction of environmental impact and preparation of MSDSs and Emergency Response Cards have gained firm position as key themes of annual plans and reports. Many member companies are also looking into environmental accounting and green purchasing. Also, to further gain the trust of society, information disclosure is being advanced through the issue of Responsible Care reports and the augmenting of the Responsible Care Web site.
- * Of members, 95% are satisfied with their level of adoption of Responsible Care practices into their operating policies, annual improvement objectives, and Responsible Care implementation systems.
- * Results of our membership surveys indicate that 95% of members have in place risk assessment standards for chemical substances and conduct assessments of the influences on health and the environment of both new and existing substances alike.
- * Although the provision of MSDSs has now been mandated by law, 96% of members also proactively disclose information on non regulated substances as well. Also, 55% of members have now acquired ISO certification.

JRCC Activities

- * This report includes major 1999 activities, both domestic and international, as well as the recommendations of the JRCC Advisory Board regarding future issues that should be addressed. Information on JCIA/JRCC sponsored education, training and awards programs has also been included.

Responsible Care Report 2000

Role of the Responsible Care Report

Purpose of the Responsible Care Report

The Responsible Care Report condenses performance data on the Responsible Care activities of JRCC member companies during the fiscal year 1999 in review and summarizes achievements and future tasks. Its purpose is to inform member companies, other parties from other industries who deal with chemical substances, and members of local communities and society at large of the state of JRCC activities.

Reciprocal confirmation of progress between members

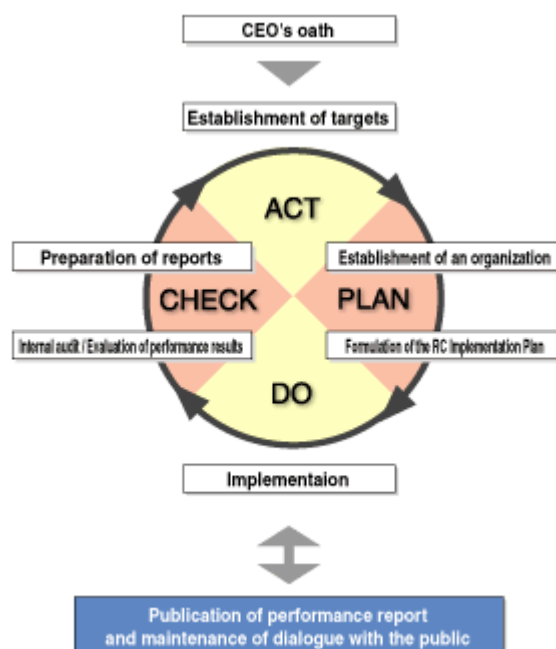
Member companies gather and collate data, with which they confirm their own standings and lay the foundation for future improvement. The PDCA monitoring cycle plays a crucial role in finding room for such improvement.

Communicating JRCC accomplishments to interested parties in the chemical industry

The chemical industry, of its own volition, seeks to control and minimize the environmental hazards posed by chemical substances, from raw material procurement through product manufacture, processing, use, and final disposal. The passing on of these efforts to parties in related industries and the fostering of understanding and cooperation is necessary for the proper use of chemical substances at the societal level.

Providing fresh information to individuals with interest in chemicals

This report provides the opportunity to communicate the state of improvement efforts and current tasks of the chemical industry in minute detail and deepen understanding of chemicals and related industries.



Dialogue between JRCC and Society

JRCC promotes the broad maintenance of a dialogue with society through numerous media, including the Responsible Care Report.

- Responsible Care Report (Japanese and English)
- General Annual Report
- Quarterly Council News
- Regional Meetings (multiple meetings annually)
- Discussion Forums (once to twice annually)
- JRCC Member Exchanges (twice annually)
- Internet (year-long)

Based on the opinions gleaned through such communication, JRCC promotes continual improvement throughout the chemical industry.



Responsible Care Report 2000

Glossary of Terms

RC (Responsible Care)

Activities undertaken by the chemical industry by which manufacturers and handlers of chemical substances, under the principle of self-determination and individual responsibility, conduct self-management of environmental and safety issues surrounding aspects of chemical substances, from development through disposal.

ICCA (International Council of Chemical Associations)

A gathering of the world's chemical industry groups, which, as of its establishment in 1990, has included the Japan Chemical Industry Association

RCLG (Responsible Care Leadership Group)

ICCA's organization for the promotion of Responsible Care consists of chemical associations from each country. Present membership totals 45 countries.

HPV (High Production Volume) Preexisting Chemical Substances

An OECD program for collecting and evaluating safety data on chemical substances whose production volume exceeds 1,000 tons per country. For details, please refer to [Recent Chemical Safety Topics](#).

LRI (Long-range Research Institute)

A voluntary long-term plan to study the effects of chemical substances on health, safety, and the environment, one of ICCA's most crucial agendas. For details, please refer to [Recent Chemical Safety Topics](#).

JCIA

Japan Chemical Industry Association

JRCC (Japan Responsible Care Council)

An organization established within JCIA in 1995 for the promotion of RC in Japan

RCAP (Responsible Care Asia Pacific Conference)

An annual event that started in 1995 in Hong Kong

PRTR (Pollutant Release and Transfer Register)

PRTR protocols comprise a system for calculating and recording the degree to which chemical substances are discharged into the environment during production, use, and storage, voluntarily commenced by the JCIA in 1995. In July 1999, "Law Concerning Reporting, etc. of Release of Specific Chemical Substances to the Environment and Promotion of the Improvement of Their Management" was promulgated and will be applied to businesses that manufacture or handle specified chemical substances beginning in 2001.

MSDS (Material Safety Data Sheet)

A safety data sheet provided for each product by chemical product suppliers to users and handlers for the purpose of preventing chemical product related accidents

Product Stewardship

Safety management of chemical products from development to disposal

NO_x (Nitrogen Oxides)

One of the toxic substances contributing to air pollution; calculated in units of NO₂

SO_x (Sulfur Oxides)

One of the toxic substances contributing to air pollution, the principal constituent of SO_x is sulfur dioxide (SO₂). However, as it also contains traces of sulfur trioxide (SO₃), it is often noted as SO_x.

COD (Chemical Oxygen Demand)

An indicator of water tainting by organic substances, whereby the volume of oxygen consumed when an oxidant causes an organic substance to oxidize chemically is measured. It is a tainting indicator for oceans, lakes, and marshes.

COP (Conference of Parties to the UN Framework Convention on Climate Change)

Standards of the UN Framework Convention on Climate Change were adopted in 1992 with the ultimate purpose of stabilizing the concentration of greenhouse gases in the atmosphere to prevent global warming. The conferences of the countries constituting this convention are known as COP (Conference of Parties).

Yellow Card

A card stating the procedures to be taken and contact information for transporters, fire squads, and police in the event of an accident during the road transport of chemical substances

Responsible Care Report 2000

Environmental Preservation (Reduction of Industrial Waste)

● Plan for Reduction of Industrial Waste

JRCC members approach the reduction of industrial waste from a long-term, progressive perspective and have plans for the improvement of recycling efforts and the reduction of final disposal waste sent to landfills.

JRCC plans call for a 140% increase in recycling volumes by 2010 compared with 1990 figures and a 72% decrease in off-site landfill disposal. These plans represent a decidedly high standard when compared to the JCIA's targets of 115% and 40% for these efforts, respectively.

● Current Performances of Waste Disposal

Although the total volume of industrial waste generated in fiscal 2000 increased 106% compared with fiscal 1999, 79% was recycled on site or compacted.

Furthermore, by applying the same disposal methods at outsourced disposal sites, off-site landfill volumes decreased, and the ratio of off-site landfill to total industry waste also improved substantially, from 7.1% to 5.8%.

● Building a Closed Loop Society

A "closed loop" society may be defined as a society that curtails the consumption of natural resources and reduces environmental impact as much as possible.

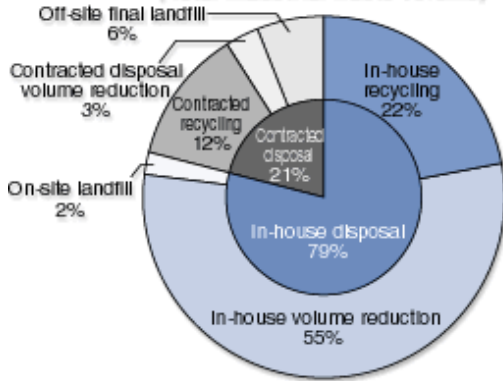
Evolving from a mass production, mass consumption, and mass waste socioeconomic model and the promotion of the efficient use and recycling of substances form the basic principles for the creation of a low resource consumption, low environmental impact closed loop society.

The Law to Promote the Formation of a Closed Loop Society was promulgated in June 2000.

As a result, priorities were determined with regard to: 1) emissions curtailment, 2) reuse, 3) recycling, 4) heat recovery, and 5) proper disposal.

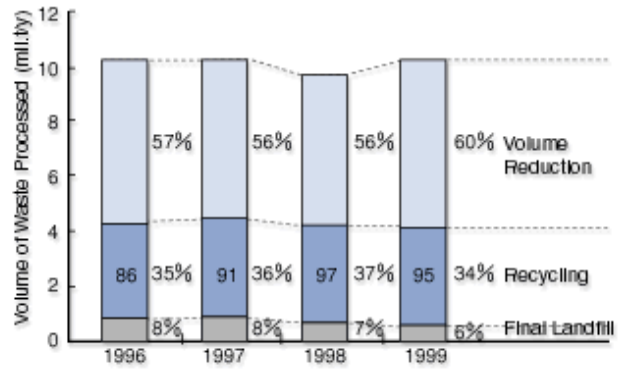
JRCC member companies strive for the effective use of resources and a reduction in environmental impact by improving production yields and curtailing waste generation, recycling waste products, and through such material recycling as blast furnace and cement base fuel conversion, oil conversion, and refuse-derived fuel (RDF) conversion.

Industrial Waste Disposal Performance (JRCC) (Total industrial waste volume)



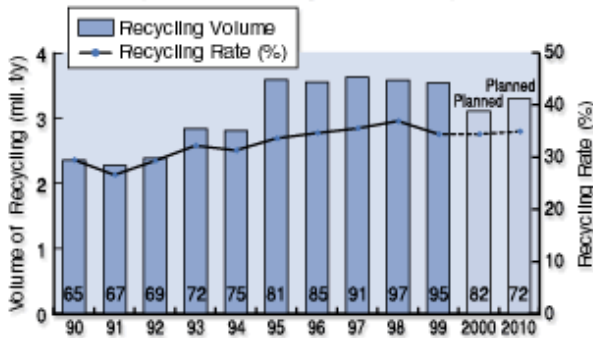
Total industrial waste volume stated herein includes in-house disposal and off-site disposal outsourced to industrial waste disposal contractors.

Industrial Waste Product Processing (JRCC)



Note: Numbers on the bar graph indicate the number of members reporting data.

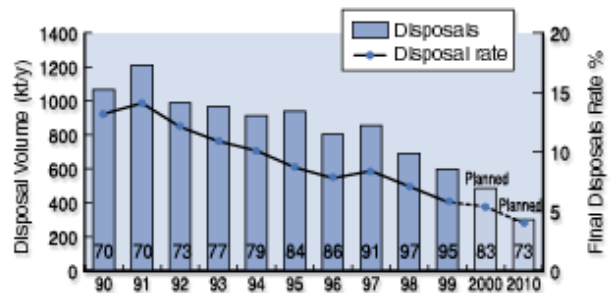
Recycling Volume & Rate (JRCC) (in-house and by contractors)



Note: Numbers on the bar graph indicate the number of members reporting data.

Recycling rate = (in-house + contracted amount) / total waste output

Disposal Volume and Rate of Off-Site Landfill (JRCC)



Note: Numbers on the bar graph indicate the number of members reporting data.

Off-site landfill disposal rate = (off-site landfill disposal amount) / total waste output

Responsible Care Report 2000

Environmental Preservation (Energy Saving, CO2 Gas Emission Control)

To respond to the problem of global warming, every member company has a medium-term plan in place aimed at implementing further energy conservation measures.

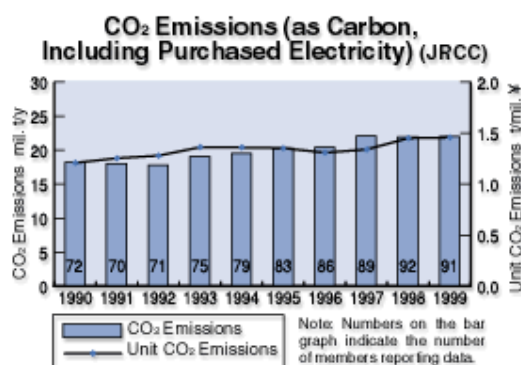
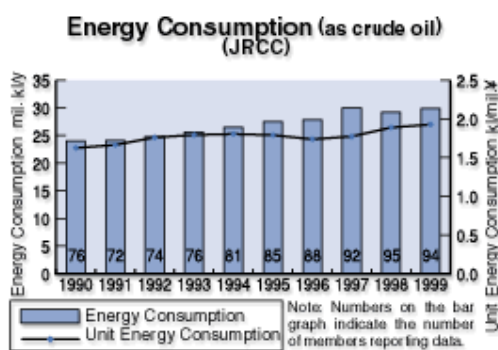
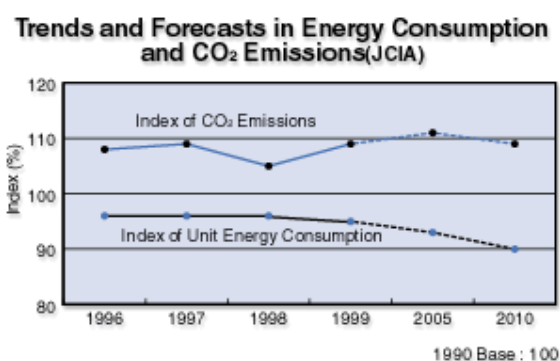
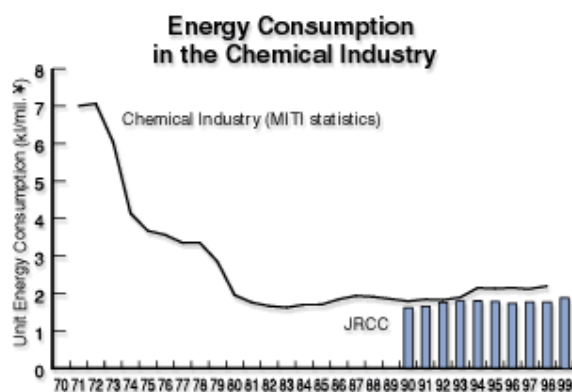
Each member company of JRCC is making efforts to reduce unit energy consumption to 90% of 1990 levels by 2010, as recommended by the JCIA Voluntary Environmental Action Plan.

As can be seen from these tables, since the 1970s, the Japanese chemical industry has succeeded in making significant progress in energy conservation.

Although increased production in the chemical industry since 1990 has given rise to increased overall energy consumption, consumption on a unit basis has leveled off or shown only a slight increase.

The backdrop to these trends includes the higher energy consumption associated with higher-quality products as well as the reduction in the cost of these products. However, the leveling off of energy consumption on a unit basis has been achieved due to the strenuous efforts of member companies.

JRCC members are working to reduce unit emissions of CO₂ in response to global warming. In 1999, CO₂ total emissions and unit emissions both hovered at approximately the same level as in the previous year.



Reference

It was decided at the COP3 conference (the 3rd Conference of Parties to the UN Framework Convention on Climate Change), held in Kyoto in December 1997, that Japan would reduce its emissions of greenhouse gases, including CO₂, by 6% compared to 1990 levels. At COP6, to be held in the Netherlands in November 2000, concrete approaches to the Kyoto Mechanism will be discussed, including emission volumes and cooperative measures. The Kyoto Mechanism seeks to fulfill the agreements of the Kyoto Protocols.

Reference

JCIA Voluntary Environmental Action Plan (Nov. 1996)

The chemical industry will work to reduce unit energy consumption to 90% of 1990 levels by 2010.

Responsible Care Report 2000

Environmental Preservation (Air Pollutants Control and PRTR)

● The Management of Air Pollutants Emissions

Members are pushing forward with voluntary measures to reduce their airborne emissions of 12 chemical substances. The JRCC plan calls for a 30% reduction on average of chemicals from 1995 levels by the end of 1999.

Total airborne emissions of the 12 substances have declined steadily each year and fell 17.5% in 1999, to 10,994 tons. This represents a 46.9% drop from the level in 1995.

The next page lists trends in annual emission volumes for each chemical substance.

Reduction targets were met for all substances with the exception of chloroform.

● Following the Voluntary Plan for Air Pollutants Management

The Chemical Substance Emission Management Promotion Law, which was promulgated in July 1999, went into effect on March 30, 2000. Under the law, companies will begin recording quantitative data on 354 specified chemical substances. These data will be reported annually as of 2002 and will be disclosed through government authorities.

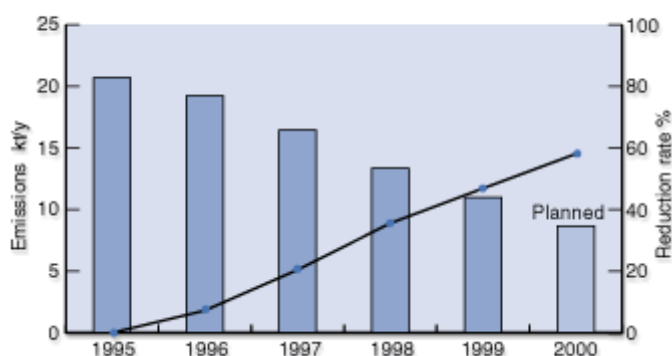
JRCC members consider the chemical industry's reduction of harmful substances released into the environment to be essential to earning the trust of society and have proactively worked to improve leakage prevention, recovery, and recycling as well as promote the conversion to alternative substances.

In addition to the chemical substances specified under the Chemical Substance Emission Management Promotion Law, the JCIA has identified 258 chemicals (some of which are also targeted by the law) for emission and transport volume recording.

In the months and years ahead, JRCC will explore the expansion and revision of targeted chemical substances and set new reduction goals based on the objectives of the Responsible Care ethos and the Chemical Substance Emission Management Promotion Law. By seeing these plans through to completion, JRCC will substantially accelerate the curtailment of chemical emission into the environment.

Moreover, we will implement risk communication with society by publicizing the results of these efforts and strive to create a transparent chemical industry.

Total Air Emission of 12 Chemical Substances (JRCC)



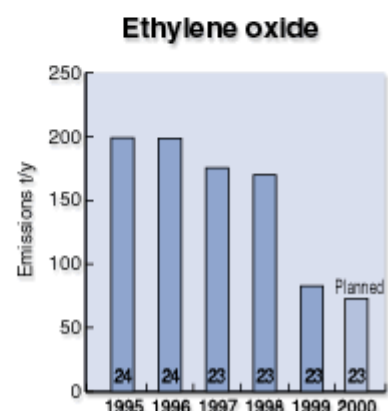
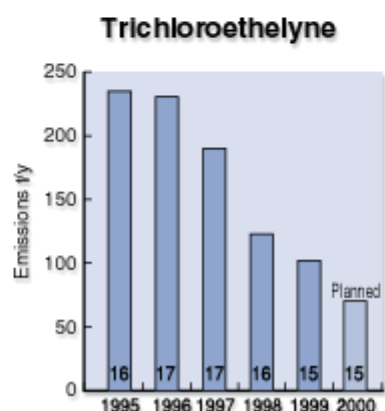
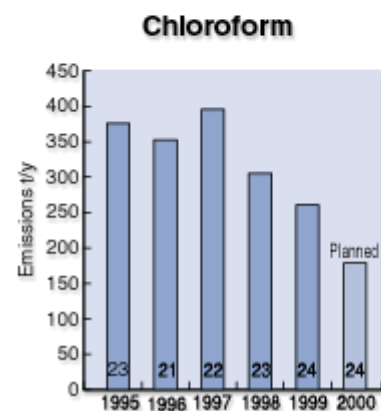
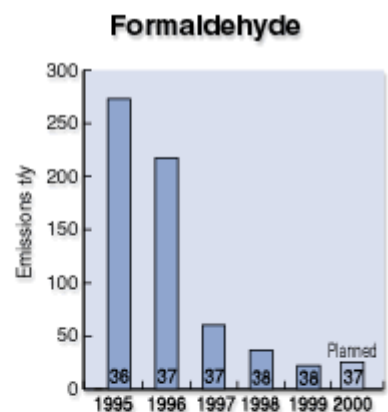
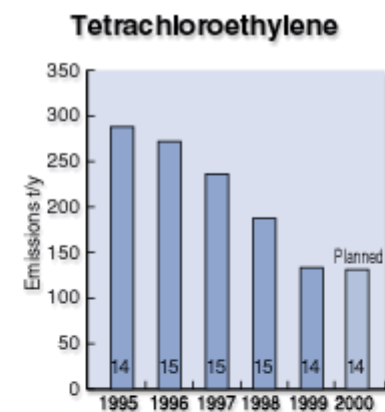
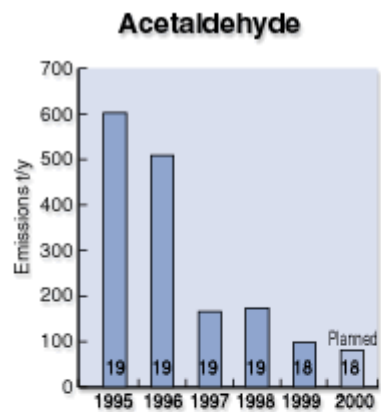
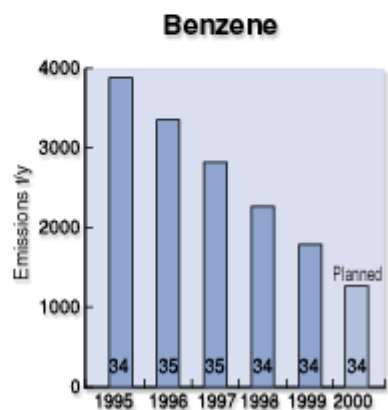
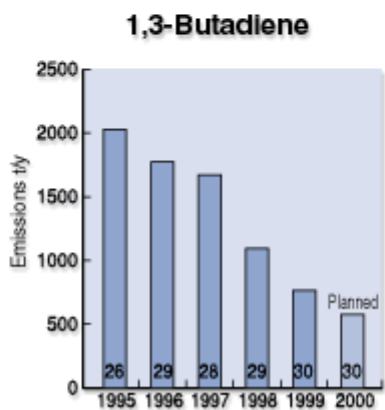
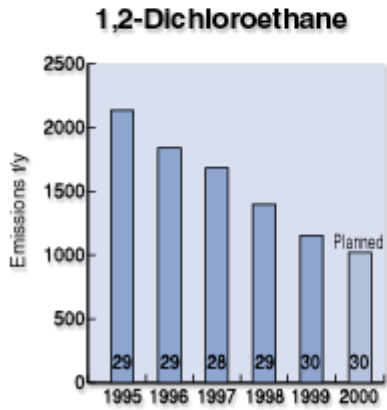
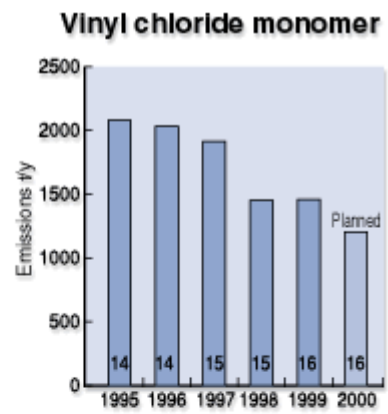
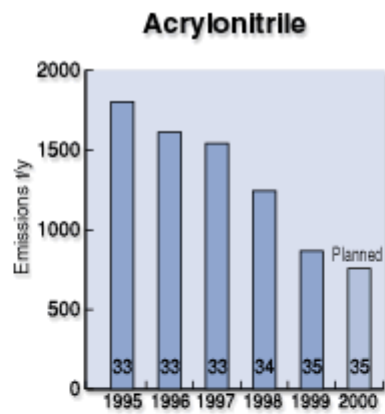
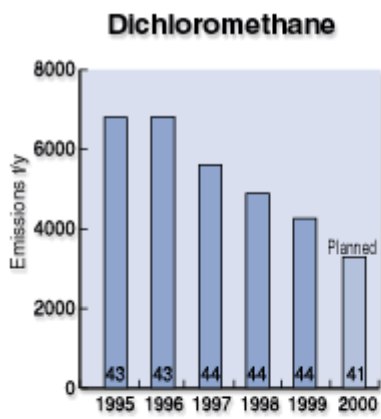
Note: The 12 chemical substances were selected from the list of 22 harmful air pollutants, which was compiled by the Central Environmental Council, and deemed to be of the highest priority. These specified chemical substances are considered particularly harmful and present a relatively high risk to human health and the nation's air quality.

Reference

The PRTR system aims to provide a reporting system that the authorities can use to evaluate chemical risk and to offer information as well as a forum for communication with local communities regarding chemical risk. In addition, it enables objective evaluation of companies' reductions in emissions through increased unit efficiency and efforts to preserve the environment.

History of JCIA Voluntary PRTR Activities

1992	Survey into overseas PRTR systems Pilot survey (13 substances)
1993	Pilot survey (28 substances)
1994	Establishment of survey guidelines
1995	1st survey (55 substances) (Jan. 1997) 43 substances announced at the Chemical Product Council
1996	2nd survey (151 substances) (Jan. 1998)103 substances announced at the Chemical Product Council
1997	3rd survey (286 substances) (Apr. 1999)192 substances announced at the Chemical Product Council
1998	4th survey (284 substances) (Apr. 2000) 200 substances announced at the Chemical Product Council First disclosure of the top five substances with the greatest emission volumes according to individual prefecture
1999	5th survey (284 substances)



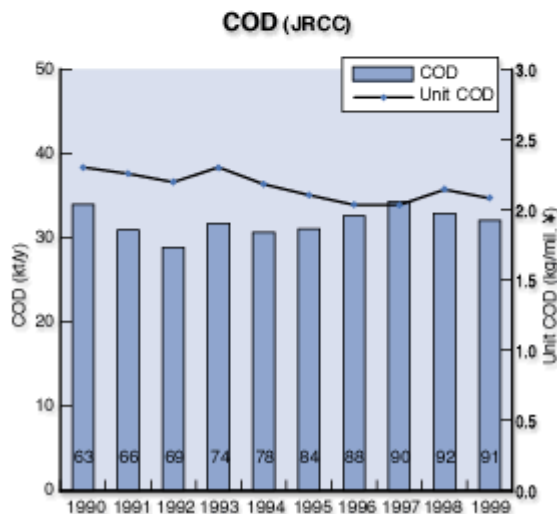
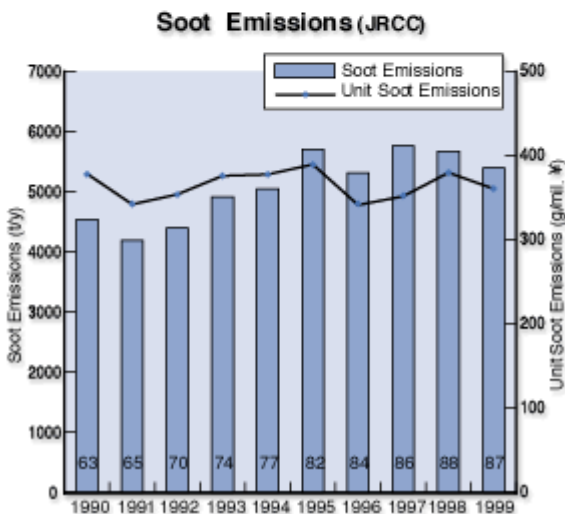
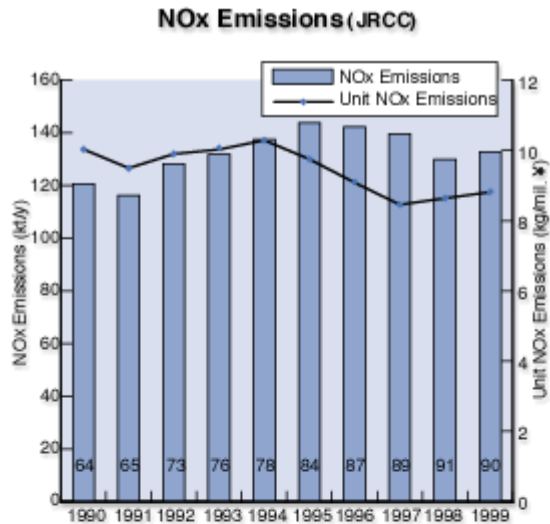
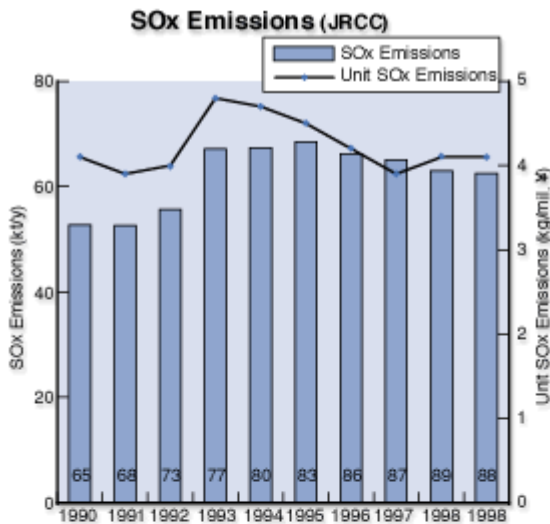
Responsible Care Report 2000

Environmental Preservation (Air and Water Quality)

During the 1970s, the chemical industry invested heavily in pollution-control equipment and facilities and achieved substantial improvement in efforts to preserve air and water quality. Since 1990, the industry has continued to strive to maintain low emission levels by complying with the agreements with local government & own standards set forth by member companies.

In JRCC surveys, although total emission volumes have increased due to the rise in the number of members reporting data, unit emissions have maintained low levels and in some cases decreased.

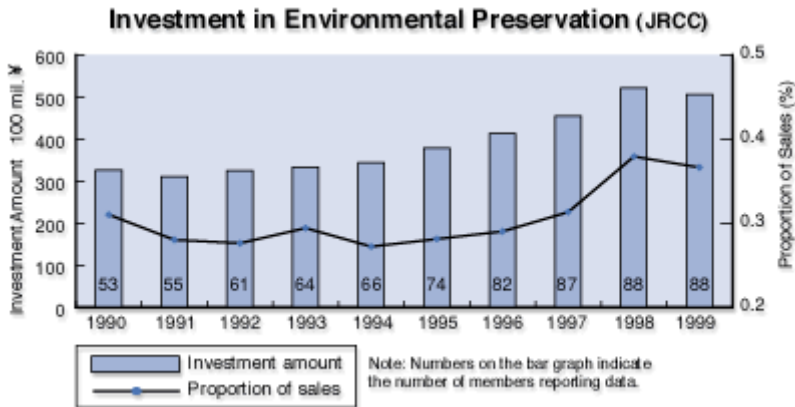
- SO_x and NO_x emissions: Total emission volume and unit emissions have remained in decline since fiscal 1995.
- Dust emissions: Total emission volume has increased slightly; however, unit emissions have remained stable.
- COD (chemical oxygen demand): Total volume has remained stable while unit volumes are in decline.



Note: Numbers on the bar graphs indicate the number of members reporting data.

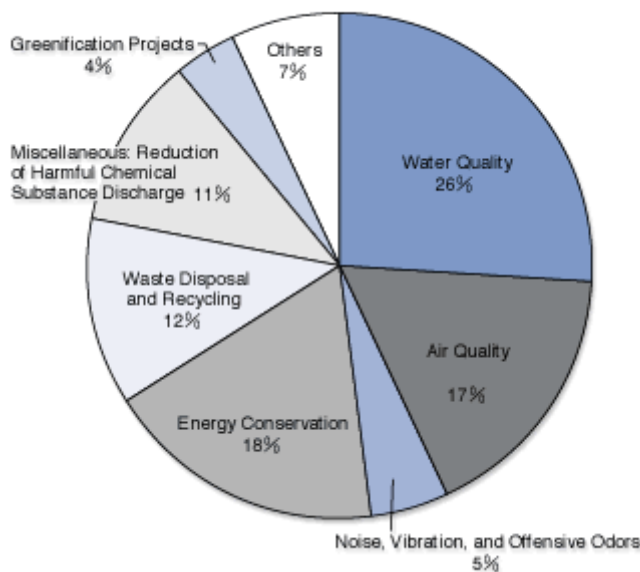
Responsible Care Report 2000

Investment in Environmental Preservation



Member companies have invested ¥40 to ¥50 billion in environmental preservation measures over the past few years. In 1999, this level of investment was equivalent to an average of ¥600 million a company, or 0.4% of sales.

Investment in Environmental Preservation for 1998 (JRCC)



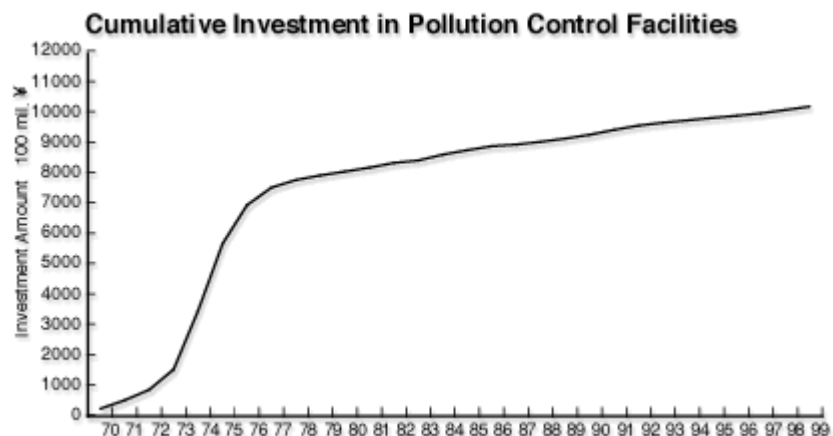
The breakdown of environmental investments by member companies in fiscal 1999 spans a great variety of fields as indicated in the diagram at left.

- The top area of investment has always been in water quality initiatives.
- Air quality measures usually rank second, but, in 1999, investments in energy conservation and CO₂ emission reduction rose to claim the number two position.
- Investments in industrial waste and recycling measures have always accounted for more than 10% of total investments.

Environmental investments are

fundamental data for Environmental Accounting, which has attracted much attention of late, and JRCC will continue to strive for efficient investment.

According to a survey conducted by MITI, large investments were made in pollution prevention facilities in the chemical industry, resulting in rapid improvements in Japan's air and water quality.



Responsible Care Report 2000

Process Safety and Disaster Prevention

- The average number of accidents at a production facility of 94 members was 0.4 cases in 1999, remained at the same level over the past four years.
- In 1999, 81 members invested ¥42.0 billion in process safety and disaster prevention, a respectable increase compared to the previous year. The breakdown of this investment is as follows : replacement of superannuated facilities, 38% ; workplace safety measures, 27% ; explosion, fire, and leakage prevention measures, 19% ; earthquake countermeasures, 8% ; and others, 8%.
- In 1999, 83 members conducted an average of 43 advance facility safety assessments.

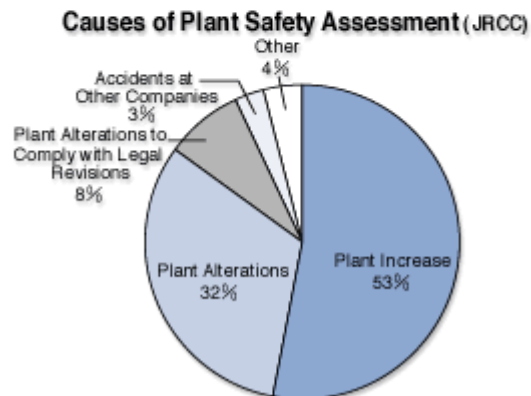
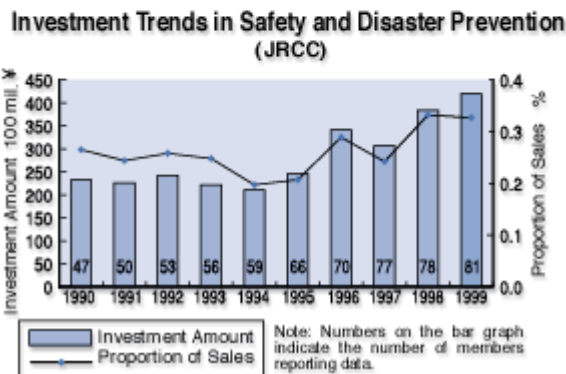
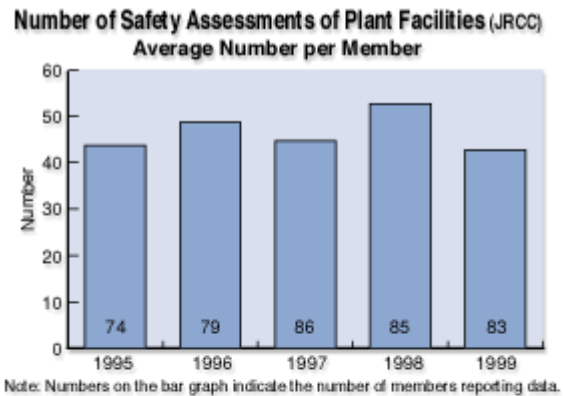
To ensure safe operations, JRCC members implement the following engineering and administrative initiatives aimed at accident prevention.

Engineering Measure for Inherent Safety :

- Prior safety assessment
- Facility automation
- Improvement of working environment
- Earthquake-proofing measures

Administrative Measures for:

- Preparation of safety manuals
- Thorough education of employees on safety matters
- Thorough instructions and directions
- Work hazard prediction
- Regular internal auditing



Progress of Accidents at Petrochemical Complexes (Regions involved in the accident prevention law for petrochemical complexes)

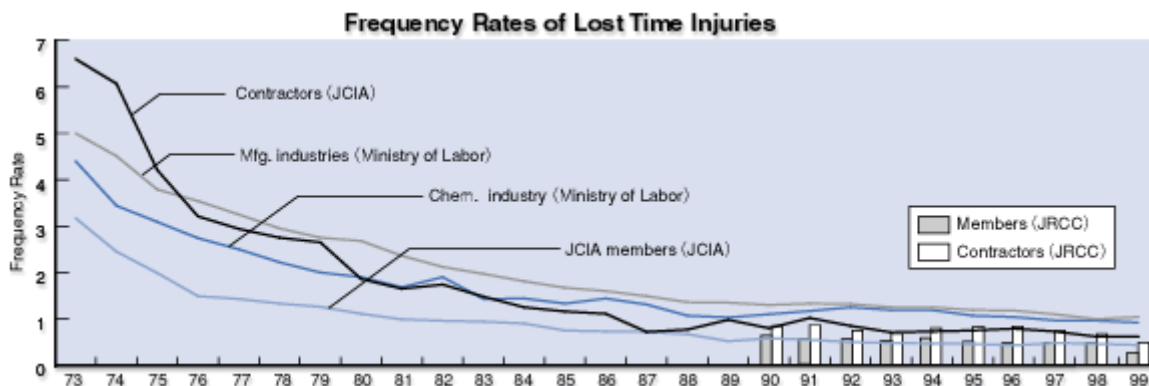
Source	Accident Type	90	91	92	93	94	95	96	97	98	99
High-Pressure Gas Safety Institute	Explosions, fires, eruptions, ruptures, plant destruction	5	7	2	6	6	7	8	7	13	9
Fire & Disaster Management Agency	General Accidents (fires, explosions, leaks)	63	56	53	45	61	67	93	76	74	-

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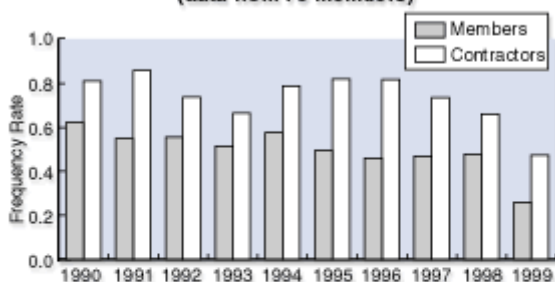
Responsible Care Report 2000

Occupational Safety and Health

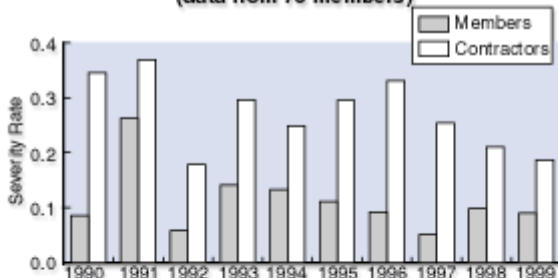
The frequency of labor accidents of JRCC member companies and member company contractors has consistently been lower than that of the manufacturing industry average (Labor Ministry survey). This is a direct result of the persistent efforts in the area of labor safety by all companies in the chemical industry.



Injury Frequency Rate (JRCC)
(data from 78 members)



Injury Severity Rate (JRCC)
(data from 78 members)



$$\text{Frequency Rate} = \frac{\text{number of injured persons}}{\text{millions of hours actually worked}}$$

$$\text{Severity Rate} = \frac{\text{lost days}}{\text{millions of hours actually worked}}$$

Number of Fatality Cases

	1996	1997	1998	1999
Member companies (JRCC)	3	4	3	3
Member company contractors (JRCC)	7	5	9	4
Chemical industry (MOL)	39	34	30	-
Manufacturing sector (MOL)	405	351	305	344

Enactment of Occupational Health and Safety Management Guidelines

In consideration of the April 1999 publication of the Ministry of Labor's (MOL's) guidelines and OHSAS-18001, the JCIA drew up the New Occupational Health and Safety Management Guidelines, which comprise clearly stated systematic requirements rather than mere directional guidelines, and disclosed them in May 2000.

Revision of Occupational Health and Safety Management Regulations

In April 2000, the revised Occupational Health and Safety Management Regulations went into effect. These new regulations raise health management standards for night-shift workers and ensure the use of MSDs and the thorough notification of hazard information to laborers.

Responsible Care Report 2000

Product Stewardship

● Examples of Product Stewardship Activities

The following activities are conducted in product development, production, distribution, use and final consumption, and waste disposal stages.

Providing Information: Provision of MSDSs ; Carrying of Emergency Response Cards (Yellow Cards); Reporting of information on chemical safety (Chemical Product Information Database established at <http://www.jcianet.or.jp>); Seminar on PRTR and Risk Communication held in December 1998; Seminar on the road transportation of dangerous goods held in November 1999 and annually thereafter

Data Analysis: PRTR, emission volumes and data analysis based on environmental and safety research by JRCC

Safety Assessments: Conducting safety assessments of chemical substances and production facilities; Risk Assessment System (JCIA), Revised Initial Risk Assessment Procedures published in March 1998 in conjunction with a series of explanatory lectures; Seminar on Risk Assessment and System Surveys held in December 1998

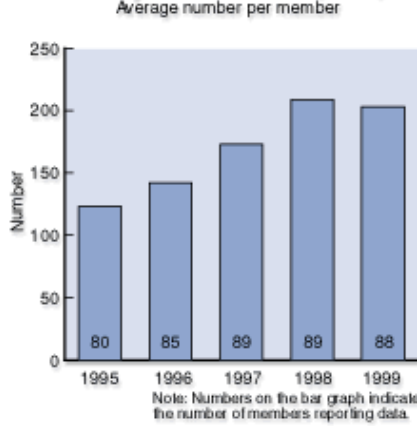
Safety Management: Promotion of voluntary plans for air pollutant control; Promotion of risk management and risk reduction plans; Promotion of disaster prevention measures; Preparation of Disaster Prevention Guidelines and revision of Transportation Safety Management Guidelines in March 1999; Education and training programs held on the Chemical Substance Emission Management Promotion Law in April and June 2000 and similar programs held at the request of small and medium-sized business organizations; New Occupational Health and Safety Management Guidelines drawn up in May 2000 ; Annual JCIA/JRCC Safety Awards held in May

● Results of Chemical Substance Safety Assessments

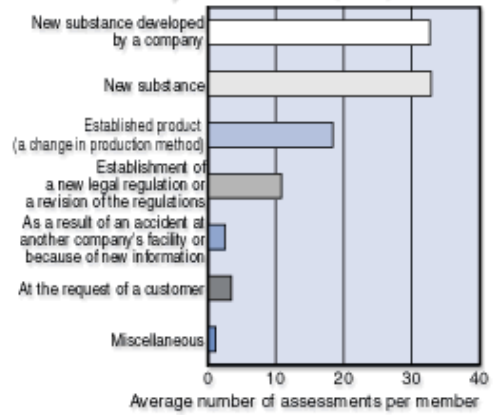
- Number of Safety Assessments:**

In 1999, 88 members undertook an average of 203 chemical substance safety assessments at various stages of development and subsequent use of new chemical substances.

Number of Chemical Substance Safety Assessments (JRCC)
Average number per member



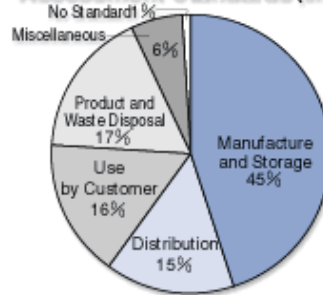
Reasons for Conducting Chemical Substance Safety Assessments (JRCC)



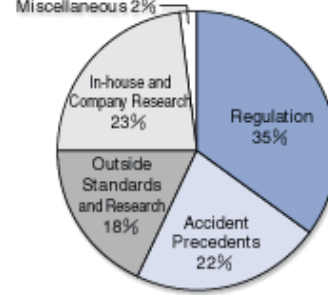
- Reasons for Safety Assessments:**

The chemical substance safety assessments, which are applied to established products as well as new chemical substances, focus on the effects chemical substances have on the people handling them and the environment.

Breakdown of Safety Assessment Standards (JRCC)



Basis of Safety Assessment Standards (JRCC)



- Implementation of Safety Assessments:**

Of 94 members, 95% have their own safety assessment codes.

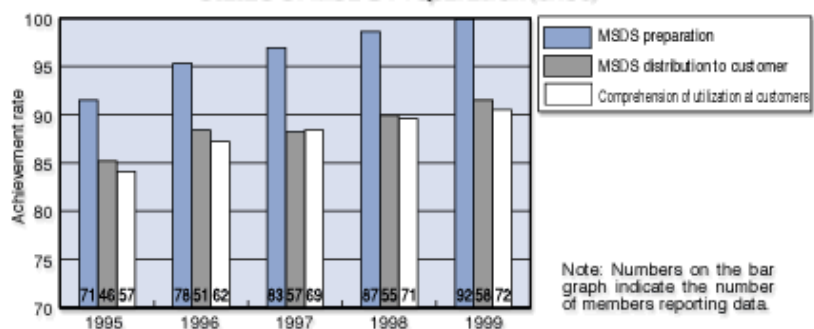
Reference

The results of the 4th Survey on Risk Assessment of Chemical Substances by JCIA in November 1998 show that 89% of chemical companies and 98% of JRCC members conducted this kind of assessment.

Status of Material Safety Data Sheet (MSDS) Preparation

- The MSDS preparation rate has reached 100% (data from 92 members).
- The MSDS customer distribution rate has reached 92% (data from 58 members).
- The comprehension of utilization at customers has reached 91% (data from 72 members).

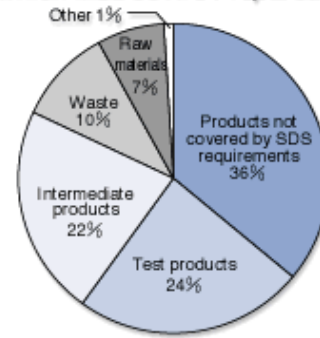
Status of MSDS Preparation (JRCC)



- **Notification of Hazardous Chemicals**

The average number of MSDSs published by 92 members increased to approximately 2,800 (preparation rate: 100%). In addition, many members published MSDSs on low-hazard chemical substances, including those not covered by the hazardous safety data sheet notification requirements. 23% of MSDSs were translated into foreign languages.

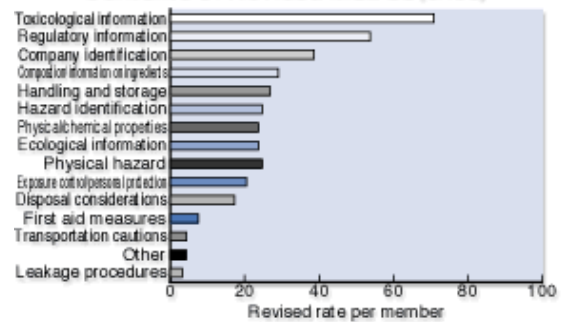
Chemical Substances for which MSDSs Are Prepared (JRCC)



- **Revision of MSDS Contents**

A total of 96% of members have reviewed and revised the contents of their MSDSs. Modified parts of the content are various data as shown in the figure at right.

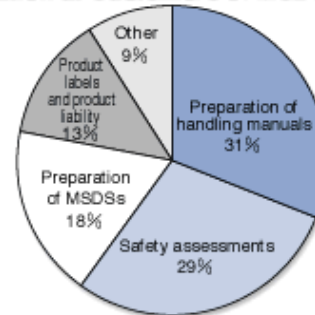
Contents of Revised MSDSs (JRCC)



- **MSDS Distribution and Utilization at Customers**

The distribution of MSDSs to customers has steadily increased. A total of 58 members distribute, on average, 7,900 MSDSs to customers (distribution rate: 92%). Surveys show that customers use MSDSs as an information source for evaluating product safety as well as for preparing manuals on the handling of substances. They are also utilized as basic information for the product processed by the customer.

Utilization at Customers of MSDSs (JRCC)



- **Communication with Customers**

According to customers, communication from manufacturers is extremely important to ensure the safe use of chemical substances and enable appropriate responses to problems. In 1999, the MSDS utilization rate among customers rose slightly, to 91%.

- **Regulatory Legal Requirements for MSDS Distribution**

Regulations have been introduced requiring that MSDSs be attached to extremely hazardous substances and distributed to people handling such substances.

In May 1999, Article 57 of the Occupational Health and Safety Law was revised, and the Chemical Substance Emission Management Promotion Law was enacted in July 1999. Furthermore, in June 2000, the enforcement ordinance of the Poisonous Material Control Law was revised to require the attachment of MSDSs to poisonous materials.

Moreover, in February 2000, JIS Z 7250 standards regarding MSDSs were enacted, and the JCIA is currently considering a complete revision of its MSDS Guidelines (which were issued in 1992 and partially revised in 1993).

Of course, JRCC members will comply with these legal changes in promoting the wider use of MSDSs.

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Emergency Response Cards and Other Transportation Safety Measures

- **What is an Emergency Response Card (Yellow Card)?**

This is the name given to a card that contains information on appropriate measures to take should an accident occur during the transportation of chemical substances and high-pressure gases. This information is useful for truck drivers and other people who may be required to respond to an accident, such as people at accident sites, fire brigade personnel, and police.

- **Emergency Response Card Preparation**

—The average number of Emergency Response Cards published by members has risen to 646 (data from 94 companies).

—The Emergency Response Card preparation rate has increased to 95% (data from 95 companies).

—A total of 90% of members have confirmed that Emergency Response Cards are carried during transportation (data from 96 companies).

Members hand out Emergency Response Cards to truck drivers, educate them in their correct use, and confirm that the cards are carried during transportation.

- **Response Measures against Accidents during Transportation**

—A total of 98% of members maintain 24-hour emergency service contact systems (data from 98 members).

—A total of 84% of members maintain joint accident response services (data from 98 members).

A total of 98% of members have set up 24-hour emergency service contact networks and prepared emergency manuals. Also, 84% of members maintain accident response services that are capable of dealing with various types of chemical substances.

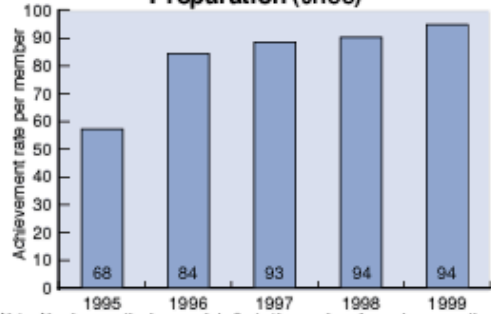
In particular, members have strengthened their cooperation with accident response centers maintained by the High-Pressure Gas Disaster Prevention Committee in the Tokyo metropolitan area and regional areas to create a well-prepared joint accident response system.

- **Emergency Drills**

—A total of 80% of members conduct emergency drills (data from 97 members).

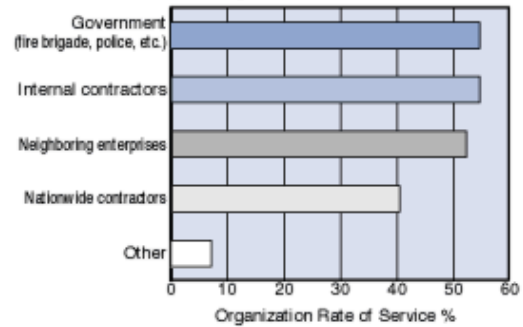
A total of 80% of members conduct drills, including exercises for accidents during transportation, as part of emergency preparation measures. Drills are divided approximately equally between internal company drills and those involving the cooperation of other companies or government organizations, and include communication, location, and desk drills. Also, 90% of members have prepared

Status of Emergency Response Card Preparation (JRCC)

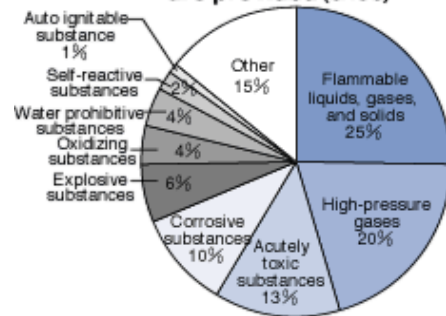


Note: Numbers on the bar graph indicate the number of members reporting data.

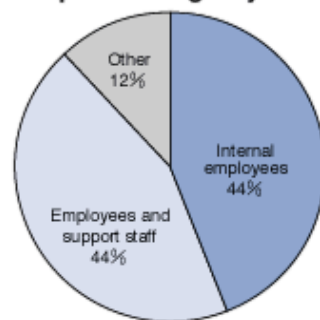
Accident Response Staff (JRCC)



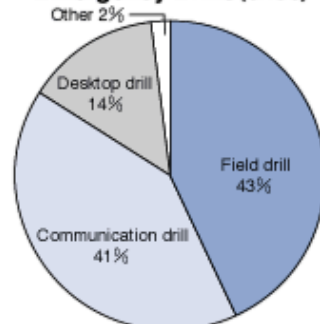
Substances for which Response Services are provided (JRCC)



Scope of Emergency Drills



Emergency Drills (JRCC)



emergency drill manuals.

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1. HPV program in ICCA Initiative

Among existing chemical substances, those with large production volumes carry a proportional risk. The voluntary assessment of the hazards of such chemicals is proactively promoted as a part of ICCA Responsible Care Initiative.

● What Are ICCA HPV Initiatives?

Among existing chemical substances, those whose annual production volume exceeds 1,000 tons are defined as HPV (High Production Volume) chemicals. In fiscal 1994, there was a total of 4,103 HPV chemicals among the member countries of the OECD and 622 in Japan. The OECD carries out projects to obtain safety data and assess the hazards of these HPV substances. At the ICCA conference in Prague in October 1998, as a voluntary initiative on behalf of the industrial sector, members agreed to form an international consortium and collate data on 1,000 hazardous HPV chemicals by 2004.

● ICCA and JCIA Action

The JCIA announced its intention to cooperate in these initiatives as a member of the ICCA and, as of April 1999, requested that all JCIA members actively participate. At the same time, it concentrated its efforts on deepening the mutual understanding of the initiative through such media as workshops.

Also, in February 2000, an HPV tracking system was added to the ICCA's Web site to compile a database of and publicize officially participating corporations and consortia.

<PROGRESS of ICCA Initiatives>

November 1998	ICCA Special Initiative Section and ICCA Initiative Team established
April 1999	JCIA Chairman requests all JCIA members' participation in ICCA initiatives
May 1999	JCIA HPV Workshop
August 1999	ICCA list of 1,000 chemicals completed (http://www.icca-chem.org/hpv/infopac.htm)
September 1999	ICCA Tokyo Workshop
February 2000	ICCA HPV Tracking System starts (http://www.iccahpv.com/)
May 2000	JCIA HPV Workshop
June 2000	ICCA Tokyo Workshop

● Progress (As of July 31, 2000)

- 1. Registration by Japanese Companies 329 Chemicals**
Registration as Leader Company : 47
Registration as Co-sponsor : 282
- 2. ICCA Tracking Site Official Participant Registration**
Approximately 450 chemical substances from Japan, North America, and Europe are officially registered on the ICCA Tracking Site. Furthermore, when added to the substances already registered under the HPV Challenge Program of the United States, a total of approximately 850 substances have been targeted in some respect.
- 3. Establishment of International Consortia**
As large European corporations and the United States industry groups continue to approach Japanese corporations, at present approximately 50 international consortia are being initiated.
- 4. Preparation for Delivery of SIDS (Screening Information Data Set) Initial Assessment Reports (SIAR) to the OECD**
For the next and following SIDS Initial Assessment Meetings (SIAM 11 and 12) the ICCA has dedicated itself to providing at least 50 assessment reports to the OECD and to national governments.

In Japan, with the cooperation of member corporations, three SIARs from the industrial community are scheduled for delivery at the next SIAM.

● Future Activities

At ICCA's April meeting of its operating committee, the committee resolved to clearly assign corporations and consortia the charge of the ICCA HPV list of 1,000 chemicals by October 2000. ICCA is currently working toward this goal.

2. The Long-range Research Initiative (LRI)

The LRI comprises long-term research on the effects of chemical substances on human health and the environment with the cooperation of the chemical industries of Japan, North America, and Europe (JCIA, ACC, and CEFIC, respectively) and is one of ICCA's Responsible Care efforts.

● LRI Objectives

The objectives of the LRI are to extend the knowledge of the effects of chemical substances on health and the environment, develop testing and screening methods, and promote the safe use of chemical substances. By providing information to support public policies based on its scientifically grounded results, the LRI will serve the cause of Responsible Care.

● Progress of the LRI and JCIA

At the end of 1999, the JCIA assembled its LRI Promotion Organization (see chart below), composed principally of the Scientific Task Force, the LRI Strategy and Coordination Working Group, and the Planning and Management Panel. Membership for each organization was determined in February 2000, and concrete work was commenced.

In April 2000, the JCIA compiled essential research topics for collection in the fields of chemical carcinogenesis and hypersensitivity. Research was conducted during the two-month span of May through June, and 33 replies were received from universities, national laboratories, and research contractors across Japan. A peer review committee composed of independent scientists then performed a primary screening of the entries, after which a secondary interview screening processes was conducted for research providers. Finally, eight research topics for the LRI in fiscal 2000 were chosen (five chemical carcinogenesis and three hypersensitivity topics with a combined research budget of ¥60 million). Research on the chosen topics is scheduled to begin on September 1, 2000. Furthermore, developmental research in risk assessment systems, contracted by NEDO, is also included in the JCIA LRI.

● Results Anticipated through LRI Participation

Along with the results of the research itself, participation in the LRI enables the nurturing of the human resources that will handle future research tasks as well as the preparation of systems to respond swiftly to urgent contingencies that may develop.

By including LRI participation in the ICCA outline, we are afforded access to European and North American information networks and timely access to information, including research results.

As international regulation and control of chemical substances intensifies, research results and activities can be leveraged in approaching mass media, NGOs, government bodies, and international organizations.

● LRI News

To encourage understanding of LRI activities not only among member companies but also

among the general public, the JCIA issues the LRI News, which reports on activity progress. This publication is available over the Internet via JCIA's Web site (<http://www.nikkakyo.org/LRI.html>)

JCIA LRI Promotion Organization



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● Community Responsible Care Meetings Held at Six Regions

In continuation from the previous fiscal year, the second series of Responsible Care meetings at nine major Japanese petrochemical complexes were held in 1999 in the districts of Mizushima, Sakai/Senboku, Oita, Iwakuni/Otake, and Yamaguchi (expansion of the previous Tokuyama district). The first meeting was also held in the Toyama/Takaoka which is not a petrochemical complex district.

Participants newly joined include local council members and representatives of other local administrative bodies, expanding the total number of participants to between 100 and 150 per meeting.

Presentation content has been enhanced to include : 1 (at Mizushima) a video demonstrating an actual explosion disaster at manufacturing facility occurred 25 years ago and their analysis as well as the introduction of improved prevention measures, 2 (at Oita) a comparison of performance between the data the prefecture government produced and the data of JRCC member companies, 3 (at Iwakuni/Otake) a comparison of a member's performance data between the whole company and the site where the meeting was held, and 4 (at Yamaguchi) a trial poster session. Participants were highly satisfied with these presentations.

As it was the first such meeting in the Hokuriku region, member companies from Niigata, Fukui, and Ishikawa also participated in the Toyama/Takaoka meeting.

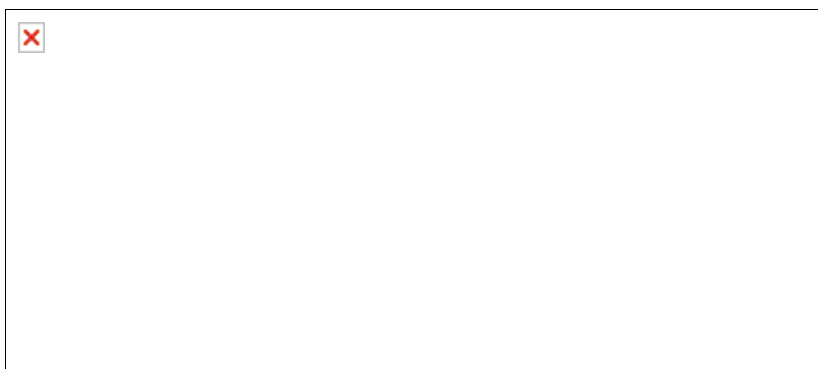
Listed below are the main opinions expressed by participants:

- **Local Representatives:** Companies' concerns can now be reported to the administrative council; a one-page synopsis of information would be useful; want to see meetings continue
- **City Council Members:** Although small, accidents are on the increase; hope that corporations remain mindful of safety considerations and strive for harmonious existence with local citizens
- **Government Officials:** Praised PRTR action in advance of legal requirements; will consider risk communication a major issue

● Dialogue with Consumer Organizations

The third Responsible Care dialogue meeting was held on December 14, 1999, with the cooperation of consumer organizations from across the country. Seven consumer representatives and 15 corporate representatives provided basic presentations on the two themes of packing material recycling and risk communication, after which the two sides exchanged opinions. At the conclusion of the meeting, the consumer representatives remarked that "if we can receive accurate information from the corporations, we would then like to provide statements as well as advance our own understanding."

In the months and years ahead, JRCC intends to continue such Responsible Care meetings in their present locations while also expanding into new districts and hold new dialogue meetings with other organizations.



Responsible Care Report 2000

Global Expansion of Responsible Care Activities

● Support for Responsible Care in the Republic of Korea

The Responsible Care Leadership Group (RCLG) consists of 45 countries where Responsible Care is being implemented.

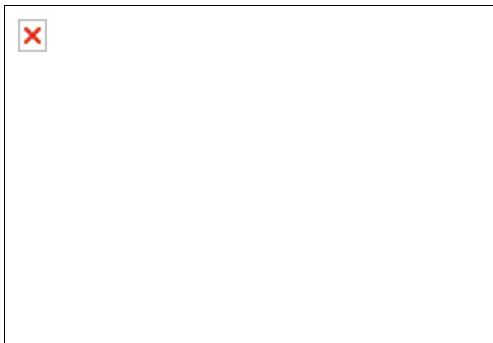
However, neighboring Korea has been unable to meet the basic conditions for entry into the group since the country had no central organization unifying its chemical industry.

In December 1999, however, the industry coordinating the Korea Responsible Care Council (KRCC) was launched, and the foundation for Responsible Care

promotion was aligned. A general operating structure is also steadily taking shape. Council status have been enacted, committees have been organized, and standards and guidelines for implementation are surely and steadily being developed.

JRCC has been appointed by RCLG as Korea's sponsor and has supported KRCC since its establishment by enthusiastically providing advice, standards, and guidelines based on JRCC experience.

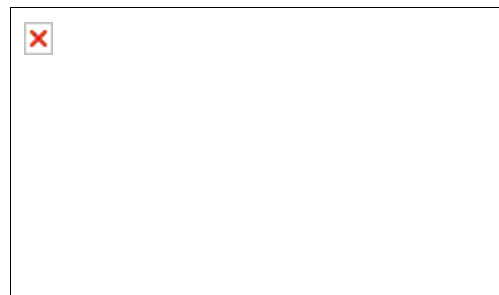
Current KRCC membership comprises 64 companies and approximately 40,000 employees, representing 64% of sales in Korea's chemical industry. Related governmental bodies have also lent steadfast support, and Responsible Care in Korea has definitely taken a firm step forward.



● Shanghai RCAP Conference

From November 8 through 10, 1999, the Responsible Care Asia-Pacific (RCAP) Conference, a forum to discuss Asia-Pacific Responsible Care activities, was held in Shanghai. In addition to the Asia-Pacific members of ASEAN countries, Korea, the People's Republic of China, Japan, Taiwan, the United States, New Zealand, and Australia, representatives from Europe also attended, resulting in approximately 350 participants, and highly enthusiastic discussions were held.

The 14 companies and 16 participants from Japan provided a presentation on the state of Responsible Care activities in Japan. The Japanese delegation also took charge of nine sectional committees and deepened understanding of Responsible Care circumstances in the Asia-Pacific region. The first annual RCAP conference was held in Hong Kong in 1995, with the second, third, and fourth following in Beijing, Tokyo, and Taipei, respectively. The 1999 Shanghai venue marked the fifth annual conference. The sixth is scheduled to be held in Singapore in November 2000.



● Introducing the new RCLG Chairman, Stanley Szymanski



Stanley Szymanski has succeeded Don Bausano as chairman of the RCLG, which is an arm of the ICCA. As the international manager of environmental safety at Occidental Chemical, Corp., Mr. Szymanski has been active in Responsible Care for many years. As such, he is well versed in matters concerning the environment, health, and chemical safety and also familiar with such programs as the United Nations Environment Plan (UNEP) and Awareness and Preparedness for Emergencies at Local Levels (APELL). Mr. Szymanski has also served in the International Chemical Accident Coordination Group of the CMA (currently the ACC), currently serves on the International Relations Roundtable, and has strong ties to numerous chemical industry

members of the RCLG around the world. We are honored to welcome Mr. Szymanski as the

RCLG's new chairman.

For more information, please refer to his interview at http://www.care-line.org/ISSUE_17.htm or Careline Issue 17, Oct.–Dec. 1999, page 25.

Mr. Szymanski's thoughts on the future of Responsible Care and its upcoming challenges are included on pages 14–16 of Careline Issue 19, Apr.–June 2000.

● New Codes of Ethics Developed

In Canada and the United States, where the history of Responsible Care activities started more than a decade ago, ethics regulations and leadership principles have been revised to comply with a new era. Under the name "Repositioning", the former CMA of the United States has changed its name to the ACC as well as revised its leadership principles to aggressively promote its Responsible Care activities. For more information, please refer to the following Web sites.

Canadian Ethics:

<http://www.ccpa.ca/english/who/rc/index.html>

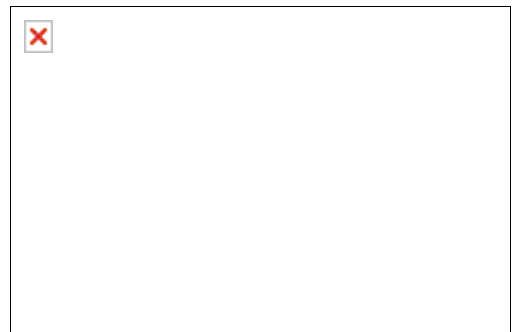
Careline Issue 20, July–Sept. 2000, page 3

United States Guiding Principles:

<http://www.cmahq.com/> → Responsible Care → About Responsible Care → General Information

● ASEAN Training Program

Two environment health and safety (EH&S) training programs were held, in December 1999 and February 2000, for government and corporate representatives from ASEAN countries. The programs were jointly sponsored by MITI and JRCC/JCIA (Japan Chemical Industry Association), under the auspices of ASEAN and the Japan Economic and Industrial Cooperation Committee. The focus of the second program, held in Yokohama, was on the dioxin and endocrine-disrupting chemical problem. After completing classroom training, participants toured waste incineration facilities in Tokyo's Minato Ward and keenly felt the immediacy of the dioxin issue. Participants also expressed deep praise for Responsible Care and asked numerous questions about the state of initiatives both in Japan and around the world. JRCC/JCIA provided explanations of the Responsible Care activities of ICCA and JRCC.



Responsible Care Report 2000

Responsible Care Implementation Target Items

The following chart outlines the principal Responsible Care initiatives of JRCC members.

Item/FY	1995/1996	1997	1998	1999	2000 objectives
Performance	Environmental load reduction; energy conservation; resource conservation; industrial waste reduction	Environmental load reduction; energy conservation; resource conservation; industrial waste reduction	Environmental load reduction; energy conservation; resource conservation; industrial waste reduction recycling	Environmental load reduction; energy conservation; resource conservation; industrial waste reduction recycling	Environmental load reduction; energy conservation; resource conservation; industrial waste reduction recycling
Chemical product safety management (Product Stewardship)	MSDSs; Yellow Cards	MSDSs; Yellow Cards; enhanced product stewardship	MSDSs; Yellow Cards; enhanced product stewardship; hazard and risk assessment	MSDSs; Yellow Cards; enhanced product stewardship; hazard and risk assessment; low environmental impact product development; HPV initiatives; LCA introduction	MSDSs; Yellow Cards; enhanced product stewardship; hazard and risk assessment; low environmental impact product development; HPV initiatives; LCA introduction
Chemical substance emissions survey	152 substances	286 substances	284 substances	284 substances	Approx 500 substances
ISO certification	Certification to ISO 9000 and Study ISO 14000	Certification to ISO 9000+14000	Certification to ISO 9000+14000	Certification to ISO 9000+14000	Certification to ISO 9000+14000
Chemical Safety in R&D		Hazard & risk assessment	Hazard & risk assessment	Hazard & risk assessment	Hazard & risk assessment
Improvement of social reliability				RC reports; Website Environmental Reports and policies; community dialogue; environmental and safety management in international business; consideration of environmental accounting; Green purchasing; volunteer activities; OHSMS introduction	RC reports; Website Environmental Reports and policies; community dialogue; environmental and safety management in international business; consideration of environmental accounting; Green purchasing; volunteer activities; OHSMS introduction

JRCC member companies have constantly challenged new targets since the commencement in 1995. Reduction of environmental loads, conservation of energy and resources, waste reduction and further promotion of recycling are regular targets for improvement. Chemical safety is strengthened by complete implementation of MSDS and Yellow Card (transportation instructions) and establishing a good data base for safe handling. Member companies had prepared themselves for emission reporting well in advance of PRTR law enforcement. Hazard and risk assessment is enhancing product stewardship. More environmentally friendly products are being developed and LCA (Life Cycle Assessment) is under study for future introduction. A great number of members have already been certified on ISO 14000 and following up introduction of OHSMS. One of the most remarkable effects of Responsible Care activities in Japan is communication. Member companies are giving great efforts to improvement of credibility from society through active communication. Most of companies publish Responsible Care reports and disclose information through internet. Environmental Accounting and Green Purchasing are also studied. Member companies also actively promote volunteer programs and dialogue with communities to improve trust and credibility from society.

Responsible Care Report 2000

Self-Evaluation of Responsible Care Activities and Management Systems

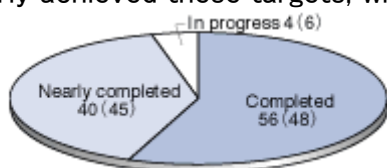
Every year, member companies submit their Responsible Care activity reports together with plans for the upcoming year to JRCC. Member companies also report their self-assessment of their Responsible Care management systems based on their internal audits. Since the establishment of JRCC, members have continuously improved their management system. New members have also acted quickly to establish Responsible Care management systems.

Self-Assessment Scores (% for 85 members) *1998 figures in parentheses

* Scale:5 points = satisfied 4 points = mostly satisfied 3 points = in progress 2 points or 1 point = needs improvement

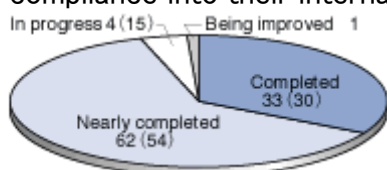
1. Management systems and targets

All member companies include Responsible Care in their management systems and set ambitious Responsible Care targets annually. A total of 96% of members have achieved or nearly achieved these targets, while 4% are progressing toward their targets.



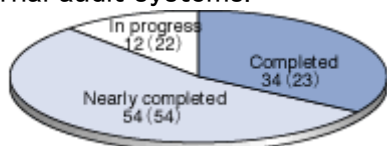
2. Implementation systems

A total of 95% of member companies have executive officers designated responsible for Responsible Care and internal management systems and, at the same time, actively introduce ISO compliance into their internal systems.



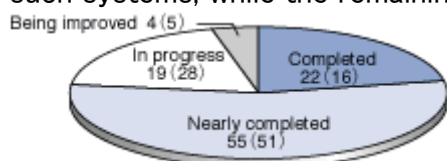
3. Internal self-auditing systems

All members are required to establish an internal self-auditing system and verify the implementation and management status of Responsible Care plans. A total of 88% of the members satisfactorily met these objectives, and 12% are in the process of establishing internal audit systems.



4. Education systems

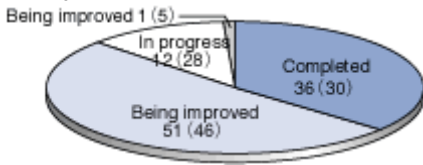
The establishment of in-house education systems for employees and other related parties is a very important part of the Responsible Care program. Of the members, 77% have established such systems, while the remaining 23% acknowledge the need for improvement.



5. Implementation plans and annual reports

Approximately 87% of members evaluate their Responsible Care implementation plans and

implementation reports and plans as satisfactory, while the remaining 13% recognize the need for improvement.



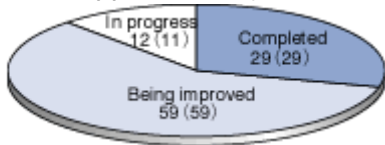
6. Environmental and safety management on production, handling, distribution, use and final consumption, and disposal

Production and handling: Approximately 88% of members are satisfied with their production and handling management.

Transportation: Approximately 83% of members are satisfied with their distribution management.

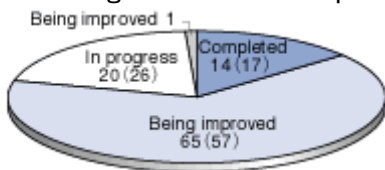
Use and final consumption: Approximately 85% of members are satisfied with their level of use and final consumption management.

Disposal: Approximately 89% of members are satisfied with their disposal management.



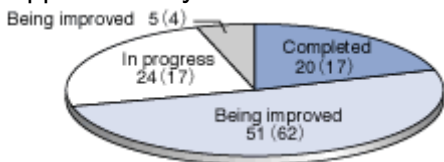
7. Environmental and safety management regarding R&D and new businesses

A total of 79% of members are satisfied with the level of management, while 21% are implementing measures to improve R&D and new business management.



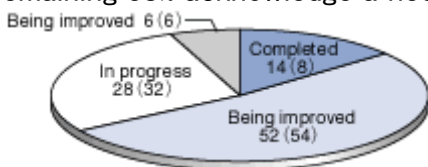
8. Environmental and safety management regarding international operations

Approximately 71% of members are satisfied with their level of management.



9. Winning public trust

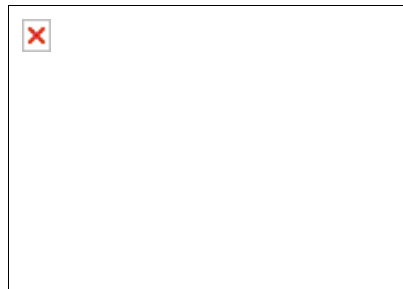
While 66% of members are satisfied with their ability to win the trust of the community, the remaining 38% acknowledge a need to improve their performance.



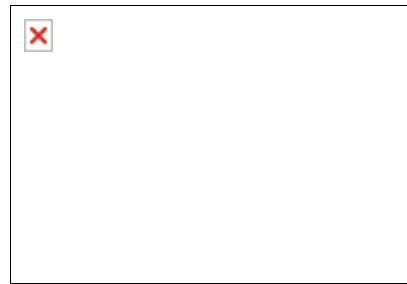
Responsible Care Report 2000

Communication with Society

JRCC members recognize the importance of harmony with local communities and proactively conduct numerous voluntary social programs to win credibility and trust from the wide society.



Children's laboratory tours



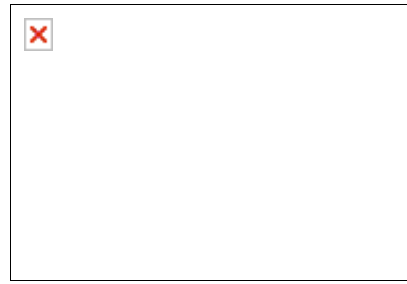
Children's plant tours

Examples ;

- Welcoming Plant and Site tours/visits by neighbors, schools, and others
- Dialogue and exchange with local citizens and organizations (neighborhood associations, fishing industry associations, etc.)
- Close coordination with local governments
- Volunteer programs (clean-up, beautification, support for environmental conservation, etc.)
- Information disclosure through environmental reports and corporate briefing sessions
- Community disaster prevention programs



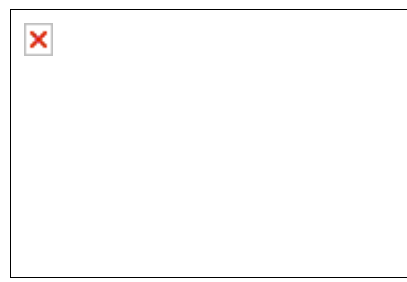
Children's environmental education



Chemical class at neighboring primary school



Sponsored sports meeting



Public Relations Magazines

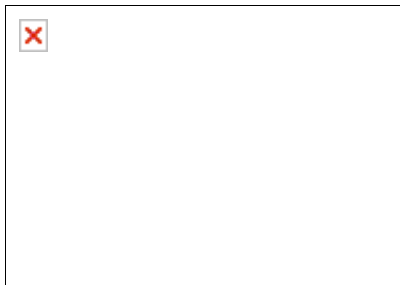
Nearly all members possessing manufacturing plants conduct activities such as the above on a regular basis.

Additionally, to promote harmonious coexistence and solve specific local issues, many corporations undertake local monitoring (noise, odors, etc.) programs, as well as cooperate in disaster prevention and emergency measures, participate in and support open houses and local festivals, and support athletic meets and environmental fairs. Members recognize the necessity for risk communication and have begun undertaking several studies and plans.

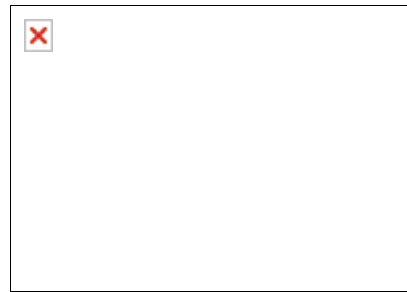
Member companies, together with JRCC, conduct briefing sessions at chemical complexes and strive to promote the understanding of Responsible Care among local citizens, neighboring corporations, and local governments. Moreover, the valuable opinions and advice gleaned through dialogue and exchange with consumers, academic societies, and the mass media help reconfirm the importance of further the promotion and communication of Responsible Care activities on the part of JRCC member corporations.



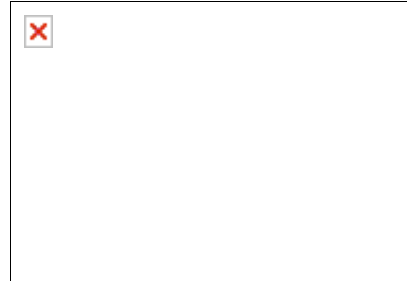
Observations of the Quick Snap Inverse Manufacturing Factory



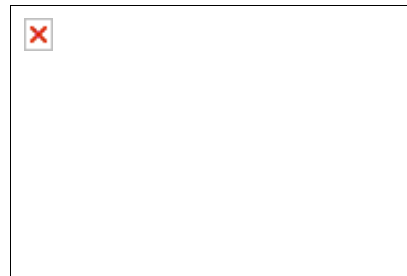
Participation in citizen activities



Community visits—visitors view their homes from the rooftop of a company building.



Local community beautification efforts



Participation in Citizens' Reed-cutting held along Lake Biwa

Responsible Care Report 2000

Surveys of Responsible Care Activities

1. Investment

Although approximately 50% of investment for environmental conservation was focused on water, air, and noise pollution measures, investment in energy conservation and CO₂ emissions reduction measures increased to approximately 20%, followed by measures for waste and recycling, reduction of hazardous emissions, and greenification.

Investment for disaster prevention and safety was focused on equipment superannuation, labor safety, workplace environment improvement, and measures against explosions, fires, leakage, and earthquakes.

2. Chemical Substances Risk Assessment

Of members, 95% have risk assessment systems in place in the areas of manufacturing, storage, transportation, customer use, and disposal procedures. 67% of risk assessment is conducted in response to the development, manufacture, sale, or adoption of new substances. Assessment standards are based not only on legal requirements but also on the results of voluntary research or previous accident records.

3. Risk Assessment of Plant Facilities

A total of 95% of members have assessment systems for facilities in operation at manufacturing plants as well as for storage and transportation infrastructure. Members review safety to prevent such accidents as explosions, fires, and leaks, and the assessments are conducted to reflect the improvement of existing facilities, changes in legislation, data on previous accidents, and surveys and research. Assessments are conducted in particular regarding the renewal, addition, or upgrade of facilities.

4. MSDSs

All members prepare MSDSs for listed substances, and 96% of members prepare them for other substances. MSDSs are updated whenever additions or changes are made to laws and regulations regarding hazardous substances and are an indispensable information source for customers' risk assessment and instruction manual drafting.

Moreover, as of the April 2000 partial revision of Industrial Safety and Health Law and the January 2001 enforcement of Law Concerning Reporting, etc. of Release of Specific Chemical Substances to the Environment and Promotion of the Improvement of Their Management, MSDSs are required for the chemical substances specified by the respective ordinance or law, and the MSDS format is expected to be standardized in the near future.

5. Emergency Response Card

The carrying of Yellow Cards during transport has been firmly established. A total of 90% of members prepare emergency networks for 24-hour response systems in the event of accidents. In addition, 80% of members have mutual support agreements among neighboring companies, industry associations, and authorities for accidents involving high-pressure gas, flammable, poisonous, and corrosive materials and also conduct accident emergency response drills.

6. Community Relationship

Responsible Care reports are published by 50% of members. In addition to Responsible Care reports, members also disclose information via the Internet and publicize such information as corporate policies, Responsible Care management systems, and performance (waste, energy conservation, air, water, safety and disaster prevention, occupational health and safety, etc.) in an effort to further the understanding of society. Also, the majority of members maintain close

ties to their communities through events, volunteer programs, and plant tours as well as strive to improve cooperative and trustful relations with local communities through opinion exchange forums and the conclusion of agreements.

7. ISO Certification

A total of 82% of members have been accredited for ISO 9001 and 9002 (product quality management) compliance, and 55% have obtained ISO 14001 (environmental management) certification, although approximately 40% are currently preparing for this certification.

Responsible Care Report 2000

JRCC Activities

As of October 2000, there were 111 JRCC members.

Regional Responsible Care Meetings and Dialogue Meetings

During 1999, the second series of Regional Responsible Care meetings were continued, with meetings held in the Mizushima, Sakai/Senboku, Oita, Iwakuni/Otake, and Yamaguchi districts of Japan's nine major petrochemical complex districts. Also, the first meeting outside of petrochemical complex districts were held in the Toyama/Takaoka district. Furthermore, in continuation of JRCC efforts to promote mutual understanding, the third dialogue meeting was held for consumer representatives.

Responsible Care Report Meeting and Panel Discussion

JRCC 1999 Annual Report meetings were held in Tokyo and Osaka. Risk communication and the state of information disclosure were among the topics of panel discussion.

Sixth JRCC Advisory Board Meeting

The following issues were brought up: 1. activities to promote the dissemination and knowledge of the PRTR system have play a leading role ; 2. PRTR which has been legislated shoulders high expectation from the society as a social system ; 3. in dialogue with society, important not only for self-assertion but also for mutual understanding ; 4. the objectives of verification are to gain trust and increase transparency.

Main Activities of JRCC

	Japan	International
1995/ 5	JRCC General Meeting	
/ 7	Members' exchange meeting	
/ 8		RCLG Meeting (Sao Paulo)
/10		ICCA Board Meeting (Monterey)
/11	Participation in INCHEM Tokyo 99	RC Asia Pacific Meeting (Shanghai)
/12	International Symposium on Environmental Endocrine Disrupters 1999 Third Dialogue Meetings	General meeting for the launch of the Korea Responsible Care Council (Seoul)
2000/ 1	Regional RC meeting (Mizushima)	
/ 2	1999 Annual Report meetings (Tokyo, Osaka) Regional RC meeting (Sakai/Senboku,Oita,Toyama/Takaoka)	
/ 3	Sixth JRCC Advisory Meeting 1997 Regional RC meeting (Iwakuni/Otake)	

Issues 13 through 16 of JRCC News issued by JRCC



● PRTR Education and Training

Law Concerning Reporting, etc. of Release of Specific Chemical Substances to the Environment and Promotion of the Improvement of Their Management was put into effect in March 2000. Henceforth from April 2001, emission and transport volumes of specified chemical substances will be monitored, with the results reported, compiled, and publicly disclosed. Among the law's objectives is the improvement and strengthening of businesses' voluntary management efforts without the use of legal regulation and the coordination of a framework for the prevention of environmental contamination.

These voluntary management efforts perfectly capture the spirit of Responsible Care (RC), and, as part of JCIA and JRCC voluntary efforts for PRTR adoption, surveys of member company emission and transport volumes of independently selected chemical substances have been conducted annually since 1995, with the results publicly disclosed.

The provision of MSDSs to clients has also become legally required by Law Concerning Reporting, etc. of Release of Specific Chemical Substances to to the Environment and Promotion of the Improvement of Their Management, the revision of the Industrial Safety and Health Law, and the revision of Poisonous and Deleterious Substances Control Law. For its part, JCIA has long conducted such knowledge enhancement activities, including the issuing of Product Safety Data Sheet Guidelines.

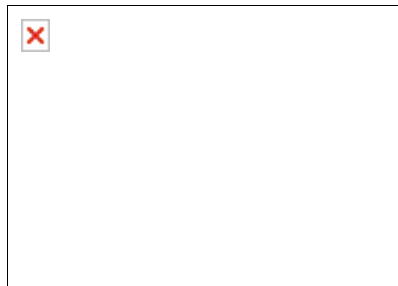
With the enforcement of Law Concerning Reporting, etc. of Release of Specific Chemical Substances to to the Environment and Promotion of the Improvement of Their Management during the year, JCIA and JRCC are fervently striving to promote education and training, both through their events and activities but also through requests for participation from government bodies and other organizations. Especially for small & medium enterprises, the training has been held by JCIA/JRCC at each prefecture in turn, in collaboration with Japan Small and Medium Enterprise Corporation.

● Safety Awards

Accident prevention and occupational health and safety are crucial themes for Responsible Care activities.

As such, the safety awards program that JCIA has single-handedly conducted for several years was relaunched in fiscal 2000 as a joint JCIA/JRCC safety awards program.

Entries are collected from member company facilities, and recipients are carefully and fairly judged and selected by the safety awards council. This year, the Safety Award was awarded to one facility and safety effort awards to four facilities. It is the hope of the JRCC that through these awards, the safety records of member facilities will be steadily improved.



the exterior of Dainippon Ink & Chemicals, Inc. Mikawa Plant



the monument of 27 years with no accident in Mikawa Plant

Award	Facility	Number of employees	Unique accomplishments
Safety Award	Dainippon Ink & Chemicals, Inc. Mikawa Plant	178	27 years with no accidents; use of PSM ¹⁾
Safety Effort Award	Asahi Chemical Industry Co., Ltd. Chiba Plant	208	23 years with no accidents; use of STOP ²⁾
ditto	Daiichi Pharmaceutical, Co., Ltd. Tokyo R&D Center	965	I-I ³⁾ implementation; monitoring by an industrial physician
ditto	Chisso Petrochemical, Corp. Goi Factory	748	Thorough implementation of recurrence prevention measures
ditto	Toray Industries, Inc. Okazaki Plant	726	KTM ⁴⁾ programs; copious use of "Safety" signs

¹⁾ – Process Safety Management

³⁾ – Identity-Innovation

²⁾ – Safety Training Observation Program

⁴⁾ – Thorough implementation of established policies.

Responsible Care Report 2000

JRCC Members List

Total: 111 companies (in alphabetical order, 1 October 2000)

AgLead K.K.
Air Products Japan, Inc.
Akzo Kashima Limited
Asahi Chemical Industry Co., Ltd.
Asahi Denka Kogyo K.K.
Asahi Glass Co., Ltd.
BASF Japan Ltd.
Bayer Ltd.
Central Glass Co., Ltd.
Chevron Oronite Japan Ltd.
Chisso Corporation
Ciba Specialty Chemicals K.K.
Clariant (Japan) K.K.
Daicel Chemical Industries, Ltd.
Dai-ichi Kogyo Seiyaku Co., Ltd.
Daikin Industries, Ltd.
Dainichiseika Color & Chemicals Mfg. Co., Ltd.
Dainippon Ink & Chemicals, Incorporated
Dai Nippon Toryo Co., Ltd.
Daiso Co., Ltd.
Denki Kagaku Kogyo Kabushiki Kaisha
Dow Chemical Japan Limited
Dow Corning Toray Silicone Co., Ltd.
DuPont Kabushiki Kaisha
DuPont-Mitsui Fluorochemicals Company Limited
DuPont-Mitsui Polychemicals Co., Ltd.
Fuji Photo Film Co., Ltd.
Hitachi Chemical Co., Ltd.
Hodogaya Ashland Co., Ltd.
Hodogaya Chemical Co., Ltd.
Hokko Chemical Industry Co., Ltd.
Idemitsu Petrochemical Co., Ltd.
The Inctec Inc.
Ishihara Sangyo Kaisha Co., Ltd.
Japan Acrylic Chemical Co., Ltd.
Japan Elastomer Co., Ltd.
JSR Corporation
Kaneka Corporation
Kansai Paint Co., Ltd.
Kanto Denka Kogyo Co., Ltd.
Kao Corporation
Koei Chemical Company, Limited
Konica Chemical Corporation
Konica Corporation
Kuraray Co., Ltd.
Kureha Chemical Industry Co., Ltd.
Kyowa Hakko Kogyo Co., Ltd.
Lion Corporation
Maruzen Petrochemical Co., Ltd.
Mitsubishi Chemical Corporation
Mitsubishi Gas Chemical Company, Inc.
Mitsubishi Rayon Co., Ltd.
Mitsubishi-Tokyo Pharmaceuticals, Ltd.
Mitsui Chemical Inc.

Mizusawa Industrial Chemicals, Ltd.
Montell SDK Sunrise Ltd.
Nankai Chemical Industry Co., Ltd.
NIHON NOHYAKU Co., Ltd.
Nippon Bee Chemical Co., Ltd.
Nippon Chemical Industrial Co., Ltd.
Nippon Kayaku Co., Ltd.
Nippon Paint Co., Ltd.
Nippon Petrochemicals Company Limited.
Nippon Polyurethane Industry Co., Ltd.
Nippon Shokubai Co., Ltd.
Nippon Soda Co., Ltd.
Nippon Steel Chemical Co., Ltd.
The Nippon Synthetic Chemical Industry Co., Ltd.
Nippon Unicar Company Limited.
Nippon Zeon Co., Ltd.
Nissan Chemical Industries, Ltd.
NOF Corporation
Osaka Petrochemical Industries, Ltd.
Polyplastics Co., Ltd.
Rohm and Haas Japan K.K.
Sakai Chemical Industry Co., Ltd.
Sanko Co., Ltd.
San Nopco Limited
Sanyo Chemical Industries, Ltd.
Sekisui Chemical Co., Ltd.
Sekisui Plastics Co., Ltd.
Shell Japan Ltd.
Shikoku Chemicals Corp.
Shin-Etsu Chemical Co., Ltd.
Showa DDE Manufacturing K.K.
Showa Denko K.K.
Showa Highpolymer Co., Ltd.
Showa Tansan Co., Ltd.
Sika Japan Ltd.
Solutia Japan Limited
Sumitomo Bakelite Co., Ltd.
Sumitomo Bayer Urethane Co., Ltd.
Sumitomo Chemicals Co., Ltd.
Sumitomo Dow Limited
Sumitomo Seika Chemicals Co., Ltd.
Takeda Chemical Industries, Ltd.
Taoka Chemical Company Limited
Tayca Corporation
Techno Polymer Co., Ltd.
Teijin Limited
Toagosei Co., Ltd.
Tokuyama Corporation
Tonen Chemical Corp.
Toray Industries, Inc.
Tosoh Corporation
Toyo Ink Mfg. Co., Ltd.
Toyo Kasei Kogyo Co., Ltd.
Tsurumi Soda Co., Ltd.
Ube Cycon, Ltd.
Ube Industries, Ltd.
Union Carbide Japan K.K.