



**Responsible Care**<sup>®</sup>  
OUR COMMITMENT TO SUSTAINABILITY

The Chemical Industry's Initiative to Protect the Environment and to Promote Health and Safety

# Responsible Care

## Report **2012**



Japan Chemical Industry Association

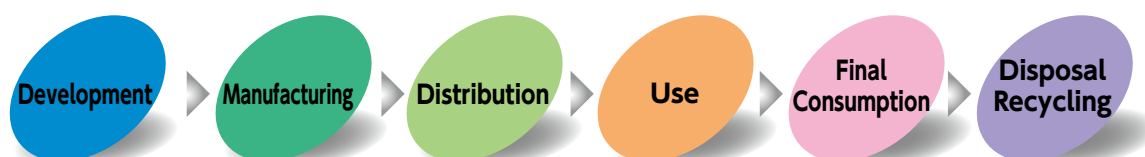
# Do You Know about Responsible Care?

## What Is Responsible Care?

Chemical substances are indispensable to our daily lives. However, if they are improperly handled, they can be hazardous and can damage human health and the environment.

Concerns about health, safety and the environment are increasing due to the escalation of global environmental problems, the expansion of industrialization and new problems arising from technological developments. It is no longer possible to ensure environmental and human health and safety through legislation, and all parties who deal in or manage chemicals are required to take initiatives to protect health, safety and the environment.

The global chemical industry is working voluntarily to protect health, safety and the environment, from the development of chemical substances, their manufacture, distribution, use and final consumption to disposal, as well as engaging in dialogue and communication with the public by openly disclosing performance in these areas. These initiatives are called "Responsible Care."



Responsible Care was initiated in Canada in 1985, and the International Council of Chemical Associations (ICCA) was established subsequently in 1989. A total of 55 countries and regions around the world now implement Responsible Care (as of October 2012). In 1995, the Japan Responsible Care Council (JRCC) was established within the Japan Chemical Industry Association (JCIA) by 74 corporations, primarily companies engaged in manufacturing and handling chemical substances. With the establishment of the JRCC, the environment, safety and health activities of each company were harmonized and further intensified to promote public understanding of the chemical industry. In May 2010, the JRCC was reorganized into the JCIA's Responsible Care (RC) Committee. As of October 2012, the RC Committee comprises 100 corporate members.

## The Responsible Care Logo

The logo, depicting a pair of hands and a model of a molecule, expresses the key message of handling chemical substances with care, and the ICCA has adopted the logo as an international mark to be used by corporations and associations that implement Responsible Care. Permission to use the logo has been granted to chemical industry associations in all ICCA member countries, as well as the respective members of those associations.

In Japan, the Responsible Care logo can be used only by the JCIA and by member companies of its RC Committee (hereinafter, simply referred to as "Members" in this report).



## Responsible Care Implementation Items

The RC Committee and Members take collective action in five principal areas:

- Environmental protection (protecting nature and health globally)
- Process safety and disaster prevention (working to prevent disasters at industrial facilities and implementing measures against natural disasters)
- Occupational health and safety (protecting the health and safety of workers)
- Chemicals and product safety (clearly identifying the properties and methods of handling chemical products and protecting health, safety and the environment for all persons who handle these products, including customers)
- Distribution safety (preventing accidents and disasters at the distribution stage)

The RC Committee and Members publicly report the results of these efforts to promote the following:

- Dialogue with society

These efforts are spearheaded primarily by the Steering Committee and four working groups (Report WG, Dialogue WG, Member Relations WG and Progress Management WG\*) established under the RC Committee.

\*The Progress Management WG is an organization under the GPS/JIPS Promotion Subcommittee, which the RC Committee jointly manages with the Chemicals Management Committee.

For details, refer to the JCIA website: <http://www.nikkakyo.org/>

# Responsible Care

## Report 2012

Do You Know about Responsible Care?.....	2
Message from the Chairman.....	4
The JCIA Guiding Principles for Improvement of Environmental, Health and Safety Conditions...·	4
Topics for Responsible Care Report 2012.....	5
Management of the RC Committee.....	6
The RC Committee Program of Activities and Progress Status.....	7
● Environmental Protection.....	8
Energy Conservation and Anti-Global Warming Measures /	
Industrial Waste Reduction / Chemicals Emissions Reduction	
● Process Safety and Disaster Prevention.....	16
● Occupational Health and Safety.....	18
Measures to Prevent Occupational Accidents / Safety Awards and Symposiums	
● Distribution Safety.....	20
● Investment in Environmental Protection and Safety.....	21
● Members' Management System.....	22
● Chemicals and Product Safety.....	23
● Members' Dialogue with Society.....	28
● RC Committee Activities.....	30
Dialogue with Society	
● Interaction among Members.....	32
● International Activities.....	33
● Responsible Care Verification.....	33
Our Expectations for Responsible Care.....	34
The RC Committee Members.....	35

# Message from the Chairman



**Kyohei Takahashi**

Chairman of the  
Japan Chemical Industry Association

Since last year, we have witnessed the occurrence of a series of serious accidents at chemical factories. On behalf of the chemical industry, I would like to express my deepest sympathy to victims of the accidents and wish for the earliest possible recovery of the injured. I would also like to apologize to the public for the problems and concerns raised by the accidents.

The chemical industry plays the role of creating new markets through the development of new materials and processes, while constantly supplying to society the products that are indispensable to our daily lives. The industry also contributes to society by providing solutions that help tackle a range of problems including those related to the global environment. These important roles necessitate that we give first priority to ensuring safety, including process safety. The JCIA takes these accidents very seriously, and will implement more measures to ensure safety from a strong sense of crisis, regarding this as the top priority for the chemical industry.

To this end, the JCIA sent an alerting message to its Members and organizations in early October, to encourage them to take drastic measures to prevent the occurrence of similar accidents. At the same time, we established a subgroup to examine preventive measures for process safety accidents within the study group on process safety and disaster prevention. This subgroup is composed of member companies and organizations who have expertise in safety assurance. Through this subgroup the JCIA will examine the measures that it will implement to ensure safety and publish an interim report on the examination results this December and a final report in March 2013.

The chemical industry is proactively conducting Responsible Care (RC) activities also this year and has achieved successful results.

In our dialogue with society, we have continued steadily to hold

dialogue meetings with local communities and consumers and published a range of reports. As a result, public awareness of RC activities has been increasing year by year.

In June 2012, the United Nations convened "Rio + 20" as a follow-up to the Conference on Environment and Development (Earth Summit) held in Rio de Janeiro 20 years ago. Subsequently in September, the third session of the International Conference on Chemicals Management (ICCM-3) was held in Nairobi. The year thus became an important year for "chemicals management," which is one of the challenges being tackled by the world's chemical industry. At the ICCM-3, the International Council of Chemical Associations (ICCA) was granted a SAICM Bronze Award from UNEP, which is a subsidiary organ of the United Nations General Assembly, in recognition of its contributions to the implementation of the Strategic Approach to International Chemicals Management (SAICM).

In Japan, the Japan Initiative of Product Stewardship (JIPS) has been fostered as an initiative to be implemented domestically for the Global Product Strategy (GPS), and about 130 GPS/JIPS safety summaries have already been posted on the ICCA GPS Chemicals Portal site by Japanese companies.

In its struggle against global warming, the JCIA published the first version of its report on the life cycle analysis of chemical products in July 2011 in order to introduce the cases of carbon life cycle analysis (c-LCA) carried out in Japan. In the report, the Association clearly showed the public how chemical products can contribute to a reduction in CO<sub>2</sub> emitted by other industries and society at large based on the results of analysis performed in Japan on chemical products across their life cycles, including the exploitation of materials and the manufacture, use, disposal and recycling of the products. Subsequently in February 2012, the JCIA also published guidelines on calculating the contributions made by chemical products to reducing CO<sub>2</sub> emissions with a view to ensuring the transparency and credibility of c-LCA. Moreover, in December 2012 the Association will publish the second version of the analysis report, in which the cases described in the first version will be reevaluated and some new cases will be listed to introduce a total of 10 domestic contributions and four international contributions made by chemical products to reducing CO<sub>2</sub> emissions.

Based on the aforementioned guidelines, the ICCA and the World Business Council for Sustainable Development (WBCSD) began creating five additional test cases in July 2012, and the concept of c-LCA will be spread more widely across the world's industrial circles.

The chemical industry is a mother industry that can contribute to the solution of global challenges such as global warming through the development of new materials and technologies toward the sustainable development of the world. RC activities provide the foundation for the chemical industry to take on various challenges to this end and contribute to the sustainability of the industry itself. It is my great hope that this report will help readers deepen their understanding of the chemical industry's efforts, and I would ask for your continued support for our activities.

November 2012



## The JCIA Guiding Principles for Improvement of Environmental, Health and Safety Conditions

1. To continuously improve the environmental, health and safety performance over the entire lifecycle of our products, from research and development to waste disposal, and to openly report our performance to society
2. To manage our business activities so as to avoid harming people and the environment, as well as to guarantee that our products pose no threat to the environment, health and safety, during their transportation, storage and disposal
3. To promote the conservation of resources and energy, to minimize waste emissions and to recycle waste efficiently
4. To address the concerns of government officials and the public regarding the influence of our products and operations on the environment, health and safety, while disclosing relevant information and participating in dialogue to promote proper understanding of the issues
5. To ensure risk characterization and risk management based on sound scientific information in order to reinforce product stewardship within the chemical industry and with customers throughout the chain of commerce. To improve transparency, including ways to make relevant product stewardship information available to the public
6. To cooperate with governments and organizations in the development and implementation of effective regulations and standards, and to promote and meet voluntary initiatives for improving the environment, health and safety
7. To actively support national and global Responsible Care governance processes in order to ensure accountability in the implementation of Responsible Care for the environment, health and safety
8. To extend local, national and global dialogue processes to address expectations of stakeholders worldwide for the promotion of the environment, health and safety

# Topics for Responsible Care Report 2012

## • Progress of the medium-term plan (fiscal 2009 to 2011)

The plan has been steadily implemented for each of the priority issues specified in the medium-term plan formulated in fiscal 2008. → P7

## • Slight increase in energy intensity

The chemical industry revised its reduction target for average energy intensity during the period from fiscal 2008 to 2012 to "80% of the fiscal 1990 level." The intensity increased by one point from 83% in fiscal 2010 to 84% in fiscal 2011 in the aftermath of the Great East Japan Earthquake. → P8

## • Launch of measures for the achievement of the new target set for the amount of industrial waste sent to final disposal sites

Against the new target of decreasing the amount of industrial waste sent to landfill by about 65% from the fiscal 2000 level by fiscal 2015, JCIA Members as a whole reduced the amount by 56% from the fiscal 2000 level and by 4.3% year on year. The Members are continuing to implement reduction measures to achieve the new target. → P10

## • Emissions of chemical substances specified by the PRTR Act

The number of substances subject to the PRTR Act was increased from 354 to 462 due to the revision of the ordinance, and since fiscal 2010, JCIA Members have been calculating the emissions of the 462 substances. Relative to the baseline year (fiscal 2000), Members, as a whole, reduced the emissions of these substances by 67% in fiscal 2011 (by 64% in fiscal 2010). → P12

## • Measures implemented after the mega-earthquake

Following the Great East Japan Earthquake, most Members have reviewed and steadily improved their measures against earthquakes and tsunamis. Also the JCIA provided Members with an opportunity to increase their awareness about the important preparations to be made to deal with large earthquakes. Specifically, the Association included "Countermeasures for major earthquakes" in the topics to be discussed at the fiscal 2011 meetings organized by the Member Relations WG. → P17

## • Number of occupational accidents remains at the same level

The frequency rates of occupational accidents for Members and their affiliated companies have been lower than those of the entire manufacturing and chemical industries. The average severity rate of Members' affiliated companies has remained at the same level since its substantial improvement in fiscal 2009. → P18

## • A decrease in investment in environmental protection and an increase in investment in safety and in process safety and disaster prevention

In fiscal 2011, Members proactively invested in safety and in process safety and disaster prevention and as a result the investment amount increased year on year, although investment in environmental protection decreased due to severe economic conditions. → P21

## • Risk assessment of chemical substances and provision of more information concerning their levels of hazard and safety

In order to minimize the adverse effects of chemical substances on human health and the environment by 2020, measures to manage chemical substances based on their risk assessment and across the supply chain have been pursued on a global scale. → P23

## • Expansion of biodiversity conservation measures

In fiscal 2011, the number of Members who had implemented biodiversity conservation measures increased from 35% to 39% year on year, while the number of Members who were planning or examining such measures remained at the same level at 19%. → P28

## • Continuous dialogue with society

The RC Committee has been actively holding dialogue meetings with society, including with local communities, consumers, students and teachers. → P30

## • Responsible Care commendation program

To further encourage Members to engage in Responsible Care activities, the RC Committee has been implementing a program to commend individuals and groups that have contributed to Responsible Care activities. → P32

## • Responsible Care verification

In fiscal 2011, a total of 10 companies undertook Responsible Care verification. → P33

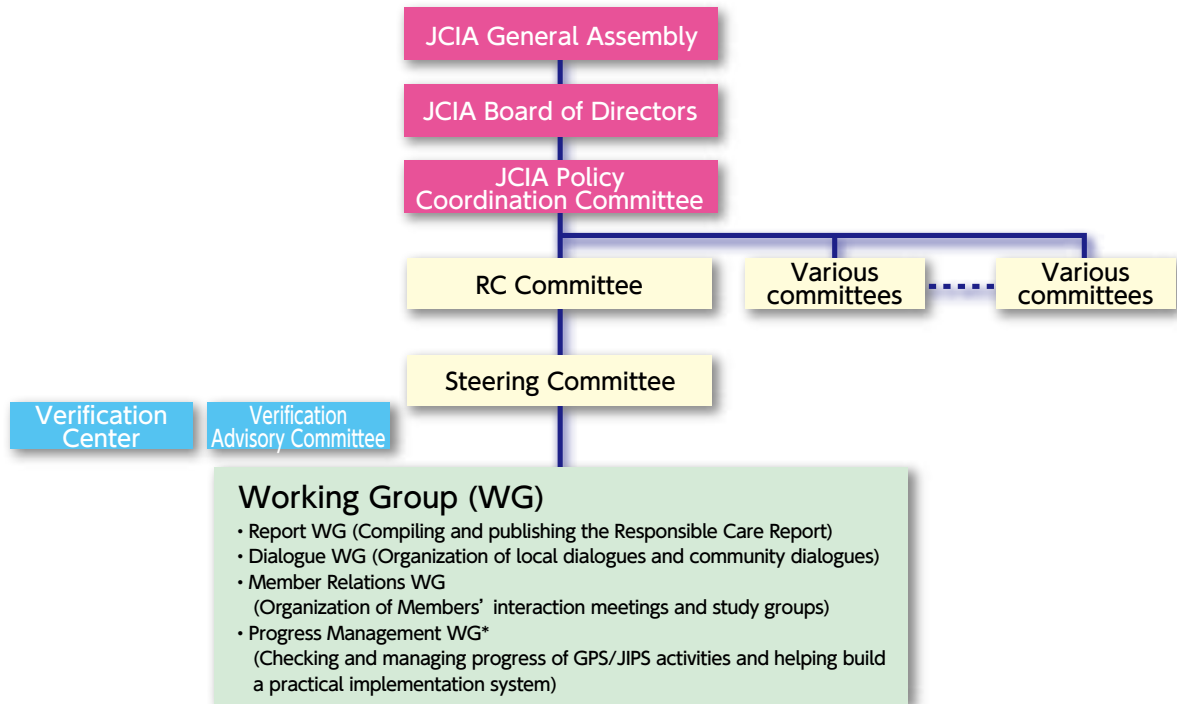
## • Expert opinions

Ms. Yukako Itakura, who is a consumer lifestyle analyst and Associate Professor Norihiro Itsubo of Tokyo City University commented on our Responsible Care activities. → P34

# Management of the RC Committee

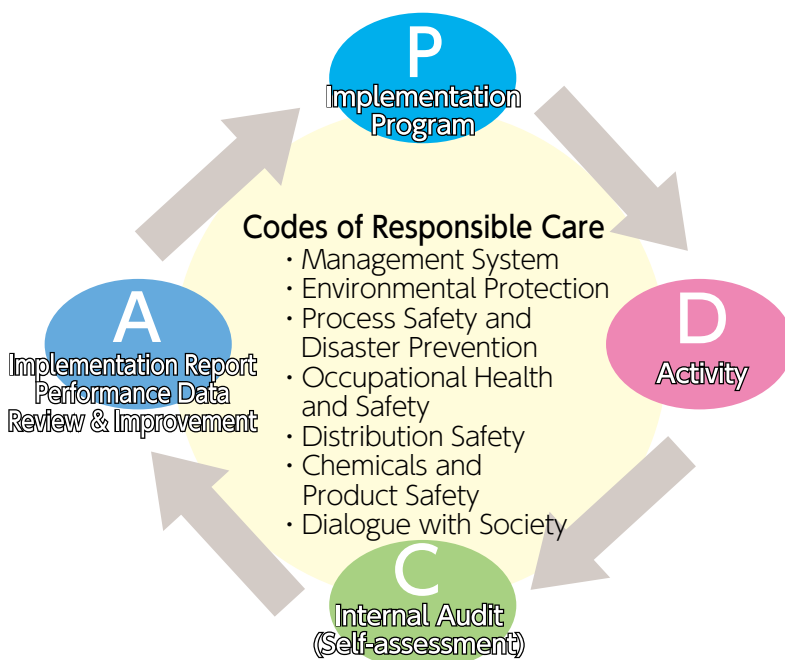
The RC Committee, which was initially established as the Japan Responsible Care Council (JRCC) by the JCIA in 1995, was fully integrated with the Association in 2012, but the name "JRCC" will continue to be used alongside the "RC Committee" until the end of the transition period. At present Responsible Care activities are promoted mainly by the Steering Committee and the four working groups (WGs) established under the RC Committee, which also establishes ad-hoc task forces as necessary.

## Organizational Chart of the RC Committee



\* The Progress Management WG is an organization under the GPS/JIPS Promotion Subcommittee, which the RC Committee is managing jointly with the Chemicals Management Committee.

## Member Activities



When Members engage in the practice of Responsible Care, they abide by the seven Codes of Responsible Care, which provide for the basic implementation items, and work to implement the PDCA cycle themselves.

Members prepare their implementation program (Plan), perform their activities (Do), conduct self-assessment with an internal audit (Check), prepare the Implementation Report and Performance Data to be submitted to the RC Committee, and at the same time perform reviews and suggest improvements (Act) for adoption into the next program.

The Internal Audit Assessment Matrix is a checklist based on the respective Codes of Responsible Care, which makes use of a ranking from 1 to 5, with 5 being the highest. Collated results are presented as graphs and are illustrated in this report as "Members' Self-Assessment."

### Self-Assessment Scores and Categories

Higher than 4.5:	Completely satisfactory
3.5 to 4.5:	Nearly satisfactory
2.5 to 3.5:	Somewhat satisfactory
Less than 2.5:	Not satisfactory

# The RC Committee Program of Activities and Progress Status

Based on the policies described in the medium-term plan (for fiscal 2009 to 2011) formulated in fiscal 2008, the RC Committee has been conducting activities focusing on the following key issues.

## The RC Committee's Policies

Promote activities in line with the policies of the Responsible Care Leadership Group (RCLG) of the International Council of Chemical Associations (ICCA)

### Key Issues from the Medium-Term Plan

- ① Further enhancement and promotion of product stewardship
- ② Promotion of Responsible Care activities in partnership with the RCLG
- ③ Fulfillment of accountability by improving verification activities
- ④ Promotion of continuous improvement and dissemination of Responsible Care activities
- ⑤ Further recognition of Responsible Care activities by society

### Fiscal 2011 Program of Activities/Progress Status and Fiscal 2012 Implementation Plan

	Fiscal 2011 Program of Activities	Fiscal 2011 Progress Status	Fiscal 2012 Implementation Plan
<b>Information Disclosure</b>	<ul style="list-style-type: none"> <li>· Preparation and publication of the Responsible Care Report</li> </ul>	<ul style="list-style-type: none"> <li>· Prepared the Report</li> <li>· Held report briefings in Tokyo and Osaka</li> <li>· Responsible Care reports published by a total of 67 Members</li> </ul>	<ul style="list-style-type: none"> <li>· Preparation and publication of the Report</li> </ul>
<b>Communication with Society</b>	<ul style="list-style-type: none"> <li>· Continuation of dialogue meetings with local communities</li> <li>· Skillful selection of the themes for dialogue meetings with citizens, and examination of RC-related teaching materials at dialogue meetings with teachers</li> <li>· Awareness-raising and improvement of the individual dialogue support system</li> <li>· Continuous provision of risk communication training</li> </ul>	<ul style="list-style-type: none"> <li>· Held dialogue meetings with local communities in seven areas</li> <li>· Held dialogue meetings with consumers in Tokyo and Osaka</li> <li>· Held dialogue meetings with junior high school science teachers</li> <li>· Introduced the system to support additional dialogue meetings with local communities at two companies</li> <li>· Introduced the individual dialogue support system at three companies</li> <li>· Held a risk communication training seminar</li> </ul>	<ul style="list-style-type: none"> <li>· Continuation of dialogue meetings with local communities</li> <li>· Introduction of JCIA activities in dialogue meetings with citizens</li> <li>· Awareness raising and improvement of the two support systems</li> <li>· Continuous provision of risk communication training</li> </ul>
<b>Dissemination of Responsible Care Activities</b>	<ul style="list-style-type: none"> <li>· Implementation of activities for the complete integration of the JRCC and JCIA</li> </ul>	<ul style="list-style-type: none"> <li>· Number of companies that registered as a group: 179</li> <li>· New registrations: 15 companies</li> <li>· Cancelled registrations: 4 companies</li> </ul>	<ul style="list-style-type: none"> <li>· Promotion of RC Committee membership among JCIA Members</li> <li>· Promotion of group registration among existing Members</li> </ul>
<b>International Activities</b>	<ul style="list-style-type: none"> <li>· Fulfillment of the role of Chair of the Asia Pacific Responsible Care Organization (APRO)</li> <li>· Provision of support to Indonesia for Asia Pacific Responsible Care Conference (APRCC) in Bali</li> <li>· Participation in RCLG's meeting in Bali</li> </ul>	<ul style="list-style-type: none"> <li>· The APRCC was changed from a biennial to an annual conference.</li> <li>· Supported Indonesia in hosting the APRCC in Bali.</li> <li>· Participated in RCLG's meetings in Brussels and Bali.</li> </ul>	<ul style="list-style-type: none"> <li>· Expansion of the APRCC to include Myanmar and Vietnam</li> <li>· Participation in RCLG's meetings in Miami and Goa</li> <li>· Provision of support to RC activities in Vietnam and Myanmar</li> </ul>
<b>Chemicals and Product Safety</b>	<ul style="list-style-type: none"> <li>· Further enhancement and promotion of PS</li> <li>· Progress monitoring &amp; management for GPS/JIPS activities and support for the creation of a practical implementation system</li> </ul>	<ul style="list-style-type: none"> <li>· Published a Japanese version of the PS guidance (ver. 2)</li> <li>· Conducted a questionnaire survey to check the progress</li> </ul>	<ul style="list-style-type: none"> <li>· Progress monitoring &amp; follow-up for GPS/JIPS activities</li> <li>· Encouragement of JIPS internal audit checklist-based internal audits</li> </ul>
<b>Support for Members' Responsible Care Activities</b>	<ul style="list-style-type: none"> <li>· Organization of interaction meetings and study meetings</li> <li>· Implementation of the Responsible Care commendation program</li> </ul>	<ul style="list-style-type: none"> <li>· Held interaction meetings for Members in Tokyo, Osaka and Kyushu, and also held study meetings in Tokyo and Osaka.</li> <li>· Implemented the sixth Responsible Care commendation program.</li> </ul>	<ul style="list-style-type: none"> <li>· Organization of interaction and study meetings</li> <li>· Organization of the meetings to discuss measures against earthquakes and tsunamis</li> <li>· Implementation of the Responsible Care commendation program</li> </ul>
<b>Responsible Care Verification</b>	<ul style="list-style-type: none"> <li>· Employment of more verifiers</li> <li>· Improvement of the skills of verifiers</li> </ul>	<ul style="list-style-type: none"> <li>· Conducted verification in 10 companies (a decrease of two year on year).</li> <li>· Held two training sessions for verifiers.</li> </ul>	<ul style="list-style-type: none"> <li>· Introduction and spread of verification to new RC Committee members</li> <li>· Review of the report verification procedures and questionnaire form</li> <li>· Preparation for the JIPS verification</li> </ul>

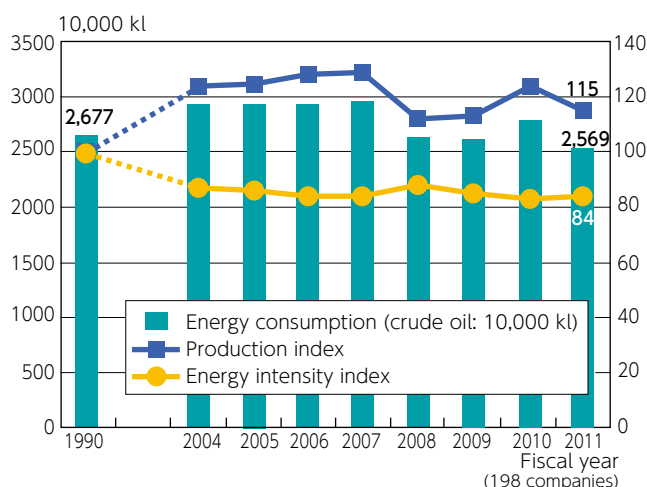
# Environmental Protection (Energy Conservation)

The Japanese chemical industry has made great achievements in conserving energy, reducing the emissions of greenhouse gases (GHGs: CO<sub>2</sub>, PFCs, SF<sub>6</sub> and other CFC alternatives) and conducting other activities to prevent global warming based on the Nippon Keidanren Voluntary Action Plan on the Environment. In fiscal 2011, which is the fourth year of the first commitment period for the Kyoto Protocol (from fiscal 2008 to 2012), the industry's energy intensity decreased to 84% of the fiscal 1990 level. Meanwhile the JCIA has been calculating the contributions made by chemical products to the reduction of GHG emissions across the supply chain. At the International Council of Chemical Associations (ICCA), Japan has been leading the activities of the Energy and Climate Change Leadership Group as the chair country since the organization of the Group in 2007, when "climate change and energy policies" was included in the priority issues of the ICCA.

## Energy Conservation Targets and Performance

In fiscal 2007, the JCIA set a higher target in its voluntary environmental action plan and has since been working to reduce the average energy intensity for the period from fiscal 2008 to 2012, first to 87% and then to 80% of the fiscal 1990 level. In fiscal 2011, the production index decreased by eight points to 115 year on year in the aftermath of the Great East Japan earthquake. Accordingly in fiscal 2011, the energy intensity index increased to 84 year on year, but only slightly by one point. As a means to foster cooperation in the chemical industry regarding the power shortage problem caused by the nuclear accident, the JCIA supported its Members in complying with the regulation on the use of electricity and invited officials in charge from the Ministry of Economy, Trade and Industry to briefings on the power saving measures to be implemented in the summer of 2012 in Tokyo and Osaka.

### Energy Consumption, Energy Intensity Index and Production Index (JCIA data)



## Reduction in Greenhouse Gas Emissions

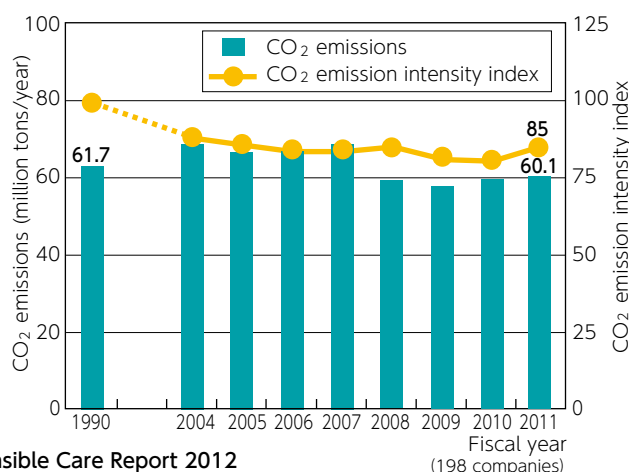
In fiscal 2011, the CO<sub>2</sub> emission intensity index of JCIA member companies increased by six points to 85 year on year, although it decreased by 15 points relative to the baseline year (fiscal 1990). CO<sub>2</sub> emissions from JCIA Members include emissions from the use of purchased electricity, and these emissions are calculated by using CO<sub>2</sub> emission factors set by power source. The operational status of nuclear power plants therefore has a great impact on the calculation results.

Reducing emissions of CFC alternatives: The chemical industry is also proactively working

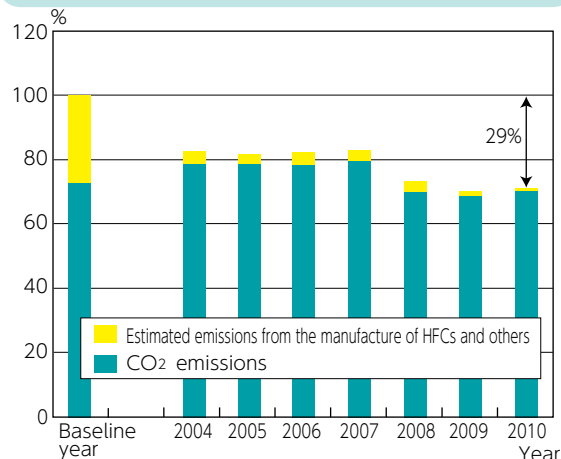
to reduce the emissions of CFC alternatives. The JCIA had set the emission intensity reduction targets (relative to fiscal 1995) for the manufacture of PFCs and SF<sub>6</sub>, and in 2011, reduced the emissions by 90% for PFCs and by 96% for SF<sub>6</sub> against the targets of 50% and 75%, respectively. The Association thus achieved reductions far greater than the targets as in the previous year.

The chemical industry reduced the emissions of CO<sub>2</sub> and three CFC alternatives (HFCs, PFCs and SF<sub>6</sub>) by 29% in 2010 relative to the baseline year.

### CO<sub>2</sub> Emissions and Emission Intensity Index (JCIA data)



### CO<sub>2</sub> Emissions from Energy Use & Emissions of Three Gases Including HFCs Calculated in Terms of GWP (Baseline Year = 100%)





# and Anti-Global Warming Measures)

## Contributions Made through the Supply of Chemical Products

Chemical products greatly help users reduce their GHG emissions. To prove this, the JCIA calculated total GHG emissions from chemical products across the supply chain, and showed the contributions made by nine chemical products to the reduction of GHG emissions in its report on the carbon life cycle analysis (c-LCA) of chemical products carried out in Japan. Moreover the

Association published guidelines to show how to calculate chemical products' contributions to CO<sub>2</sub> emissions reduction with a view to increasing the transparency and credibility of c-LCA and to fostering implementation of the analysis both within and outside Japan. The following shows an example of an LCA made by a Member.

## International Measures

The ICCA has been internationally implementing measures based on dialogues between the chemical industry associations of various countries. Japan serves as a chair country of the ICCA's Energy & Climate Change Leadership Group and is fostering the activities of the task forces set up under the Group on issues such as policies, technologies, c-LCA and public relations. In fiscal 2011, the ICCA cooperated with the International Energy Agency (IEA) in the creation of technology roadmaps, which the IEA was

formulating at the request of the G8 countries. Specifically, the ICCA supported the formulation of roadmaps related to the following issues:

- (i) Biofuel and bioenergy (as next-generation energy and materials)
- (ii) Catalysts (for the reduction of CO<sub>2</sub> emissions by the chemical industry)
- (iii) Energy-saving houses (for the contribution of chemical products to the reduction of CO<sub>2</sub> emissions)

## Examples of Members' Initiatives

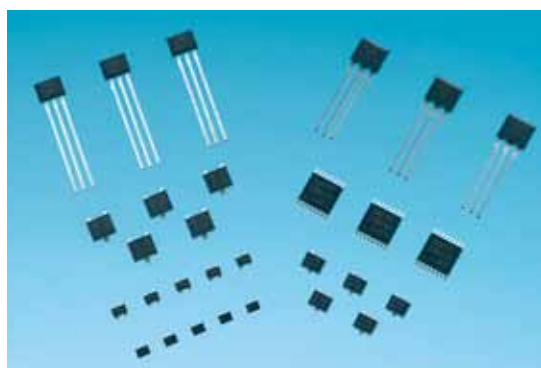
### Implementing LCA to identify Asahi Kasei Group products that contribute to CO<sub>2</sub> emissions reductions

#### Asahi Kasei Corp.

We established the Global Warming Response Committee in the fall of 2009, and have been implementing measures ① to reduce greenhouse gases emitted from the Asahi Kasei Group and ② to provide customers with more products that can help them reduce their CO<sub>2</sub> emissions, which will in turn help us reduce total lifecycle CO<sub>2</sub> emissions from our products.

To provide products that help users reduce CO<sub>2</sub> emissions, we implemented Life Cycle Assessments (LCA) for our products, in which we focused on the environmental impact caused by greenhouse gases. In LCA, we estimated the amount of CO<sub>2</sub> emissions that could be reduced in using the products, set some numerical targets to show the direction of the company up to fiscal 2020, and made it possible to monitor the progress.

Specifically, we estimated total CO<sub>2</sub> emissions for our existing products and products now under development targeting all the lifecycle stages, including the procurement of materials and the manufacture, use and disposal of the products. As a result, we have found out that the following products make greater contributions to reducing CO<sub>2</sub> emissions relative to conventional products used in the field: ① Hall elements and Hall ICs, which are integral parts of inverter-type energy-saving motors for air conditioners (CO<sub>2</sub> emissions reduction: 8.3 million tons per year); ② the electrolysis system using the ion-exchange membrane method, which consumes less electricity than

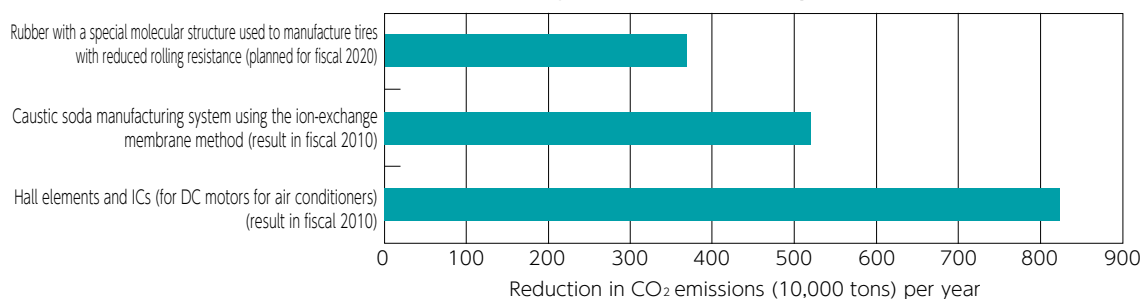


Hall elements and Hall ICs

conventional methods, such as the mercury process or diaphragm method, in the electrolysis of salt solution in the manufacture of caustic soda (CO<sub>2</sub> emissions reduction: 5.2 million tons per year); and ③ synthetic rubber with a special monocular structure, which is indispensable in the manufacture of highly fuel-efficient tires by reducing their rolling resistance (expected annual CO<sub>2</sub> emissions reduction: 3.6 million tons in fiscal 2020).

We will expand sales of these products while developing and commercializing more products to help reduce CO<sub>2</sub> emissions, thereby contributing to society.

### Contributions to Reducing CO<sub>2</sub> Emissions by Product



## Reduction Program

According to the Japanese Ministry of the Environment's Annual Report on the Environment, the Sound Material-Cycle Society and Biodiversity in Japan 2012, the total amount of industrial waste generated in Japan has remained constant in recent years, whereas the remaining lifespan of Japan's industrial waste disposal sites was gradually improved and reached 13.2 years at the end of fiscal 2009 on a national average thanks to a decrease in final disposal waste volumes. Nonetheless the remaining lifespan of exiting industrial waste disposal

sites is only 4.4 years in the Tokyo metropolitan area, where it is difficult to establish new sites. It is therefore important to continue reducing waste toward the realization of a recycling society.

In fiscal 2011, in line with Nippon Keidanren's Voluntary Action Plan on the Environment, the JCIA set a new target for reducing the fiscal 2015 final disposal volume by around 65% from the fiscal 2000 level, and has since been implementing measures to achieve this target.

## Status and Performance: Waste Generation Volume, Rate of Effective Use of Resources and Final Disposal Volume

JCIA member companies have taken various initiatives to reduce industrial waste at source. These include improvement of the product yield by reviewing materials and the production process, and the recovery and reuse of waste in the manufacturing process. In fiscal 2011, JCIA member companies generated a total of 4,186,000 tons of industrial waste. The amount was reduced by 36,000 tons year on year and down 47% from the fiscal 2000 level. Furthermore, the companies were proactive in sorting waste and recycling resources, which resulted in an increase in the rate of the effective use of resources (ratio of the amount of

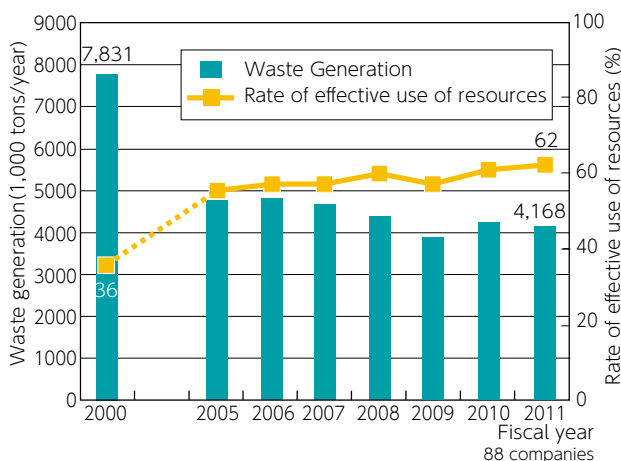
resources effectively used to the amount of waste generated) from 36% in fiscal 2000 to 62% in fiscal 2011.

The total final disposal amount for JCIA Members came to 219,000 tons in fiscal 2011, a decrease of 10,000 tons year on year and also down 56% relative to fiscal 2000 (as shown in the table below). In addition to measures to reduce the final disposal amount, JCIA Members have also been enhancing measures to dispose of waste in appropriate ways, including the proper issuance, recovery and verification of industrial waste manifests and visits to actual disposal sites.

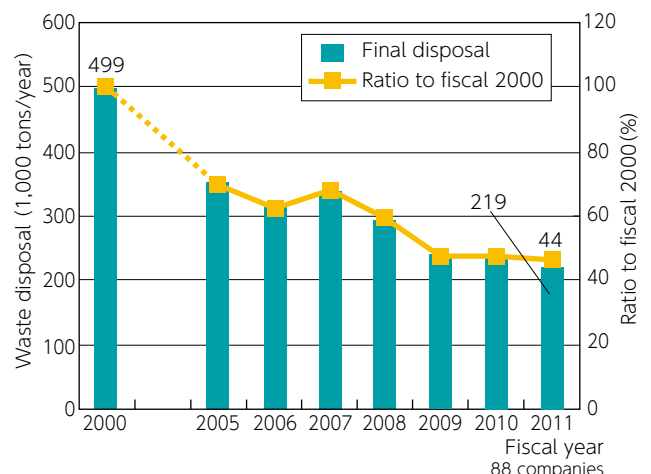
### Fiscal 2011 Results

Item	Relative to fiscal 2000	Relative to fiscal 2010
Industrial waste generation	Reduced by 47%	Reduced by 0.8%
Rate of effective use of resources	Improved by 26 points	Remained at the same level
Final disposal by JCIA Members	Reduced by 56%	Reduced by 4.3%

### Industrial Waste Generation and the Rate of Effective Use of Resources (JCIA data)



### Final Disposal Volume (JCIA data)



# Waste Reduction

## Creating a Recycling Society

In addition to reducing the generation of waste, Members also accept and recycle waste generated outside their premises as part of their efforts to contribute to the creation of a recycling society. Examples of recycling include the use of discarded tires for fuel, use of sludge for raw material in

cement, recovery and reuse of waste aluminum cans and plastics, recycling of waste metal, recycling of chlorine and bromine from waste solutions, reuse of television glass, chemical recycling of chemical fibers and recycling and reuse of packaging materials.

### Examples of Members' Initiatives

#### Recovery and Recycling of Fluorine

##### Asahi Glass Co., Ltd.

Under the slogan, "Chemistry for a Blue Planet," Asahi Glass's Chemicals Company delivers world-class fluorinated chemical products to customers, which they can use safely with ease of mind. In the past, this in-house company disposed of the fluorine-containing sludge generated from the manufacture of fluorinated chemical products as industrial waste, in compliance with the environmental standards on water and soil. Now, however, thanks to its own developed technology, the company can recover fluorine from the sludge and recycle it into fluorite, thereby substantially reducing the disposal of industrial waste.<sup>1</sup> Moreover, the company recovers CFCs pursuant to the Act on Ensuring the Implementation of Recovery and Destruction of Fluorocarbons concerning Designated Products and uses their technology to recycle it into fluorite.<sup>2</sup>

1. Including this activity, the in-house company reduced the final disposal of waste by about 7,000 tons in total in its waste reduction efforts.

2. The amount of CFCs destroyed/recycled in 2010 totaled about 2.5 million tons in CO<sub>2</sub> equivalent.



One of the industry's best CFC destruction facilities, which has a capacity of 1,000 tons/year

#### Use of own recycled oil

##### Sanyo Chemical Industries, Ltd.

To respond to an increase in the amount of waste following an increase in production and changes in the product mix, Sanyo Chemical Industries launched a waste reduction campaign at its factories in fiscal 2008. As a result of drastically reducing waste and losses in its production activities, the company succeeded in reducing the generation of waste by about 40% from the fiscal 2006 level in fiscal 2011. Specifically, it curbed the generation of waste by improving the production process, reduced waste in process sampling, increased the concentrations of waste liquids to reduce the amount of waste discharged outside the company, and found buyers for their waste. Its Nagoya Factory is using its own recycled oil (made from oil recovered from wasted materials) as fuel in the waste liquid condensation equipment to reduce both the generation of waste and purchase of fuel. In fiscal 2011, they used around 800 kiloliters of oil that they had recycled themselves.



Waste liquid condensation equipment fueled by their own recycled oil (The factory has two units, which are nicknamed "Thomas" and "Percy" based on their appearance.)

#### Waste reduction activities conducted by the recycling center

##### JSP Corp.

JSP has a recycling center in Kanuma, which is recycling plastic waste from the company's manufacturing process and secondary processing process and also plastic waste collected from users of its products across Japan, based on the certification system for wide-area collection. Commissioned by Kanuma City, the center is also recycling used plastic trays collected from local supermarkets and other facilities.

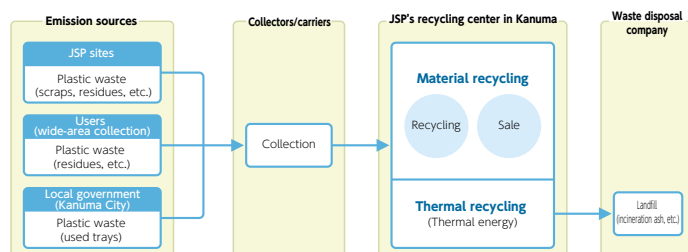
In fiscal 2011, the center recycled about 6,200 tons of plastic waste (by material recycling and thermal recycling), which accounts for 99.4% of the total.



Recycling center in Kanuma (Outside)



Recycling center in Kanuma (Inside)



## Compliance with the PRTR Act

Since the launch of a pilot study on pollutant release in 1992, the JCIA gradually increased the number of substances included in its voluntary investigation to a total of 284 in 1998. Since 2000, the Association has conducted voluntary investigations into 480 substances, including 354 substances specified by the PRTR Act, and one substance group (hydrocarbon chains containing four to eight carbon atoms). Following the revision of the PRTR Act, however, the number of substances subject to the law increased from 354 to 462, and companies began to produce notifications for all 462 substances in fiscal 2011 (on their emissions in fiscal 2010). In response, the JCIA reviewed its own list of substances subject to its voluntary investigations and removed the newly regulated substances from the list. The total release of substances specified in the PRTR Act by JCIA Members amounted to 15,034 tons in

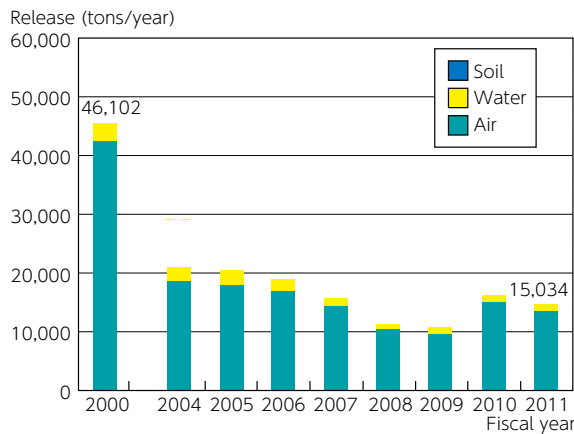
fiscal 2011, down about 67% from the fiscal 2000 level. Release of substances into the air, water and soil accounted for 91.5%, 8.4% and 0.1% of the total, respectively.

Their release of substances subject to JCIA's voluntary investigations (105 substances and one substance group composed of hydrocarbon chains containing four to eight carbon atoms) totaled 19,501 tons in fiscal 2011, down about 65% from the fiscal 2000 level. Release of substances into the air, water and soil accounted for 82.4%, 17.6% and less than 0.1% of the total, respectively. Members are working to reduce environmental emissions by actively implementing measures to prevent the leakage of hazardous substances, improve the recovery/recycling rate and introduce the use of alternative substances.

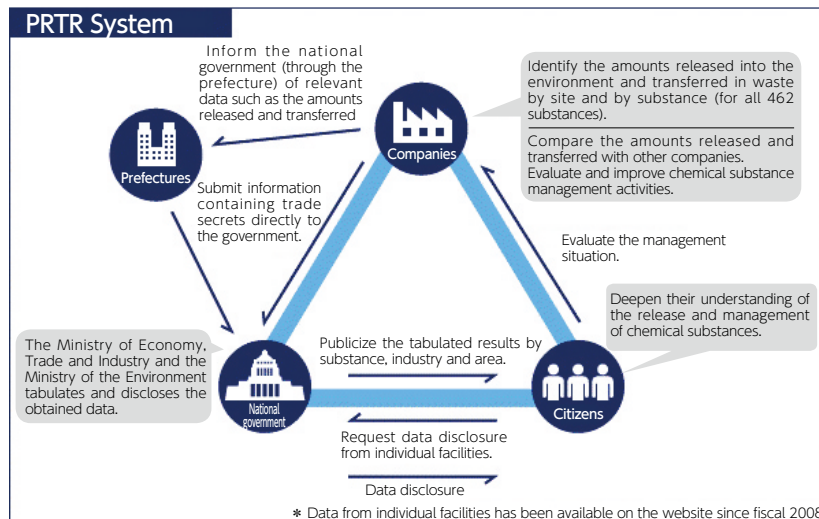
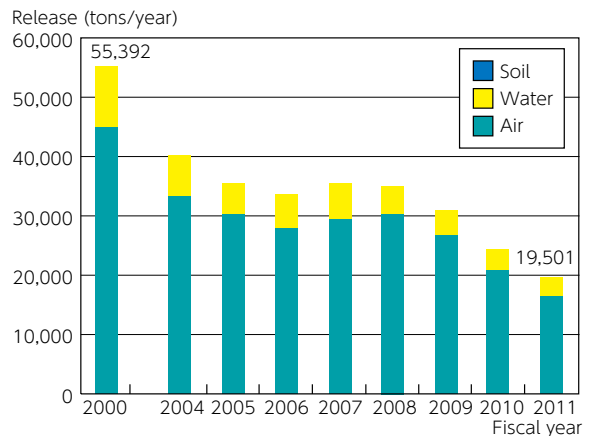
### PRTR

The Pollutant Release and Transfer Register (PRTR) is a system the government uses to identify, tabulate and publicly disclose the amounts of hazardous chemical substances released into the environment from different sources (companies, households, automobiles, and others), and the amounts of such substances that are transferred in waste from company premises to the outside. Companies are obliged to calculate the amounts of chemical substances subject to the PRTR Act that they have released into the environment (air, water and soil) and transferred outside their premises and notify the calculation results to the government. The government tabulates the results obtained from the companies and discloses the tabulated data with estimates on the amounts of chemical substances released from households, automobiles and other sources.

Release of Substances Specified in the PRTR Act (JCIA data)



Release of Substances Subject to Voluntary Investigations (JCIA data)



Created based on information provided on the website of the Ministry of Economy, Trade and Industry.

# Emissions Reduction

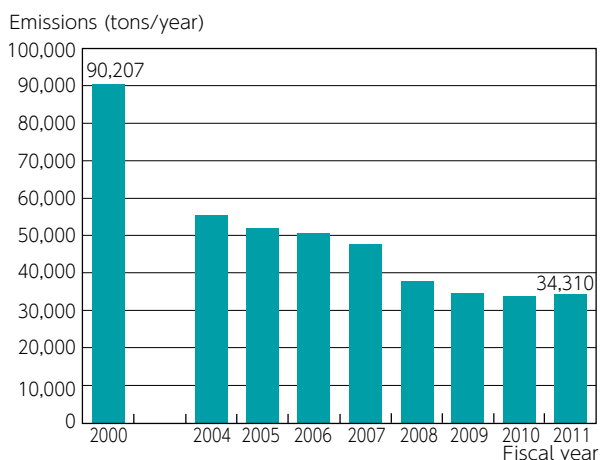
## Efforts to Reduce Volatile Organic Compounds (VOCs)

VOC emissions from JCIA Members totaled 34,310 tons in fiscal 2011 and thus remained at the same level as in fiscal 2010, and Members continued to achieve reductions as high as 62% relative to the baseline year.

The Air Pollution Control Act, revised and enforced in April 2006, provides for the control of emissions of volatile organic compounds (VOCs). The law specifies that emissions of VOCs into the air should be reduced by about 30% from the fiscal 2000 level (baseline year) by fiscal 2010 by means of the best mix of regulatory control and voluntary initiatives by industry. The law aims to prevent the adverse effects of photochemical oxidants. In response, JCIA member companies installed VOC emission reduction devices, improved their processes and made various other efforts. As a result in fiscal 2010, they achieved a 62% reduction against the voluntary target of 52% and their total VOC emissions were reduced by more than 40% nationwide, exceeding the predefined national target. There was, however, no clearly discernible decline in the concentration of photochemical oxidants.

In reference to the results, the Central Environmental Council's working group on air environment is looking into a desirable VOC emission reduction system without

### VOC Emissions (JCIA data)



setting new reduction targets, and accordingly the JCIA will not update its targets. The Association, however, will continue to monitor the VOC emissions of its Members.

### Volatil Organic Compounds (VOCs)

VOC is the generic term used to refer to organic compounds that are volatile and become gaseous in air. Major VOCs are used in paints, printing inks, adhesives and cleaning agents as organic solvents. About 200 substances are classified as VOCs, including toluene, xylene and ethyl acetate.

## Examples of Members' Initiatives

### Reducing the emissions of chemical substances

#### Kao Corp.

In 1999, Kao set the target of reducing its atmospheric emissions of substances subject to the PRTR Act to one ton or below by factory and substance by 2005, and launched measures to achieve this target across the company.

The company reduced the release of VOCs from organic solvents used in the printing process and the release of chloromethane generated from the reaction process by introducing a regenerative thermal oxidizer, while replacing substances subject to the PRTR Act contained in cleaning agents with other substances. Still more, in 2005 Kao set the target of reducing its atmospheric emissions of VOCs to one ton or below by factory and substance by 2010, and began to conduct voluntary VOC emission reduction activities, including recovering and treating VOCs generated from the reception of materials.

As a result, the company attained its reduction targets for substances subject to the PRTR Act in 2003, and in fiscal 2011, total VOC emissions from all its factories came to 1.5 tons, a reduction of 98% over the fiscal 1990 level. The target for VOCs was achieved in 2010 as planned, and in fiscal 2011 emissions from all its factories totaled eight tons, down by 42% from the fiscal 2005 level.

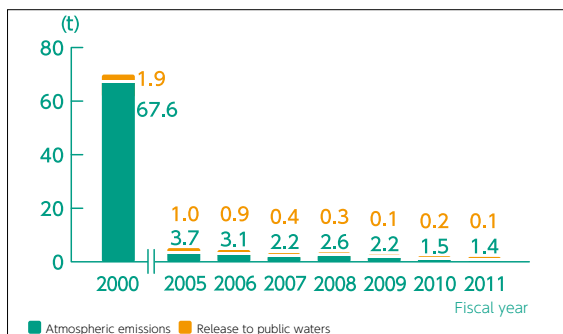
In recognition of these activities, Kao became a winner at the fifth Responsible Care Awards. Members of the company will continue to make efforts to minimize



Regenerative thermal oxidizer (RTO)



Presentation of the activities at the Responsible Care Awards ceremony



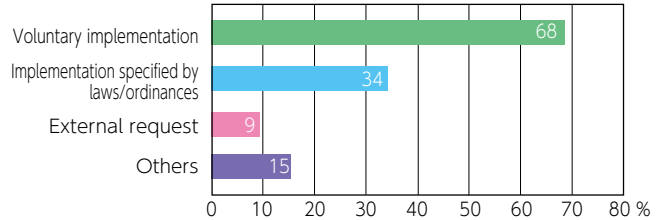
Release of Substances Subject to the PRTR Act

their environmental impact by measures that include the management of chemical substances in line with the Strategic Approach to International Chemicals Management (SAICM).

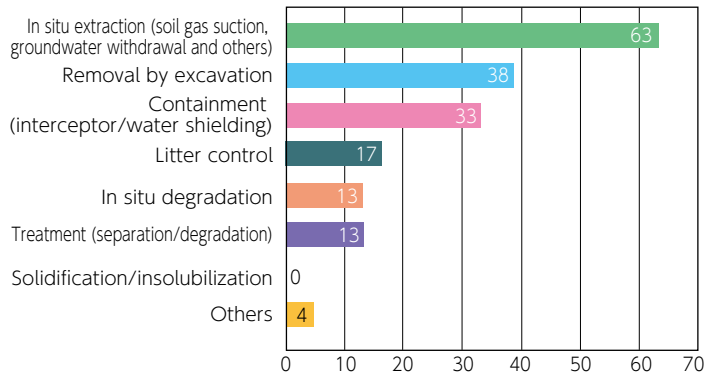
## Initiatives on Soil and Groundwater Contamination

Members are carrying out their own voluntary investigations in addition to those specified in the Soil Contamination Countermeasures Act, and are implementing appropriate measures upon the detection of soil contamination. Of the 75 companies who responded to the questionnaire survey, 47 investigated contamination of soil/groundwater at 89 sites in fiscal 2011. Regarding the reasons for implementing the investigation, voluntary implementation ranked first, accounting for 68%, while implementation according to the law or ordinance accounted for 34%. Substances other than those specified by law were also examined in 15 investigations. Of the above 47 companies, 16 detected contamination that exceeded the environmental standards at 33 sites. In fiscal 2011, a total of 24 companies implemented countermeasures against contamination at 46 sites, including sites where contamination had been detected prior to the fiscal year. For chemical substances, decontamination methods have already been established, and Members are steadily implementing a range of measures, such as in situ extraction, excavation, and containment, as necessary. Due to the revision of the Water Pollution Control Act on June 1, 2012, companies are now required to comply with the criteria on the use of the structures and equipment that are designed for the prevention of underground permeation of pollutants and to perform regular inspections of the equipment and keep records of the results. Of 74 respondents to the questionnaire survey, 58 companies have facilities that are subject to the notification obligation imposed by the law, 37 of these companies plan to improve their structures, etc. and 54 plan to improve their regular inspections and recording of the results.

### Reasons for Implementing an Investigation (multiple answers allowed)



### Countermeasures against Contamination (multiple answers allowed)



## PCB Initiatives

Of the 75 companies that responded to the questionnaire, 63 (84%) retained waste containing PCBs at high concentrations\*<sup>1</sup> and 71 (95%) retained waste containing trace levels of PCBs\*<sup>2</sup>. In fiscal 2011, the numbers of Members who partially disposed of PCB waste according to the scheme promoted by the Japanese government for the appropriate treatment of PCB waste totaled 51 companies (81%) for waste containing high concentrations of PCBs and 24 companies (34%) for waste containing trace levels of PCBs.

The Act on Special Measures Concerning the Promotion of the Proper Treatment of PCB Waste mandates companies to notify the relevant prefectural governor of their current situation concerning the storage and disposal of PCB waste and to

dispose of all PCB waste appropriately within 15 years from the law coming into force (July 15, 2001). Accordingly, Members will continue to dispose of their PCB waste in a consistent manner in line with the governmental guidelines.

(\* 1) Waste containing PCB at high concentrations: Electrical appliances, such as transformers and capacitors that were manufactured before PCB use was prohibited (in 1972) and in which PCBs were used in insulating oil at concentrations ranging from about 50% to 100%

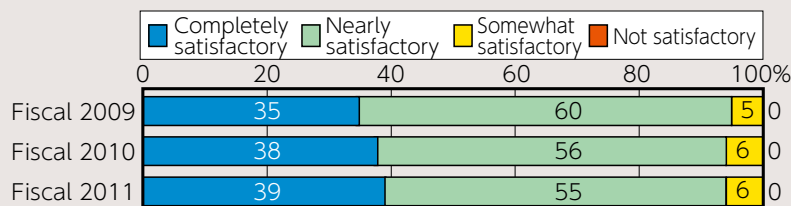
(\* 2) Waste containing trace levels of PCB: Electrical appliances manufactured after PCB use was prohibited, which unintentionally contain trace amounts of PCBs

### Members' Self-Assessment

#### Environmental Protection

Overall rating of nine self-assessment items, including "Policy," "Communication" and "Check/monitoring"

The percentage of Members who rated "Completely satisfactory" or "Nearly satisfactory" has been 90% or higher.



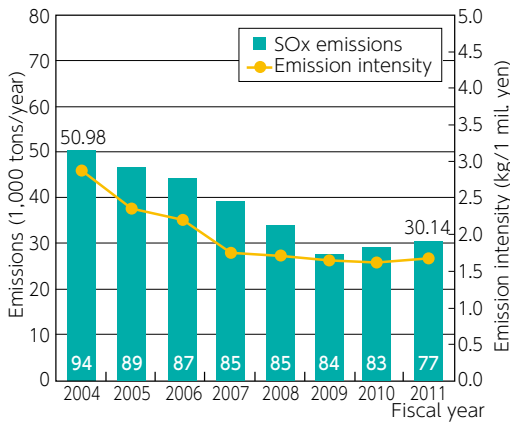
# Emissions Reduction

## Efforts to Prevent Air and Water Pollution

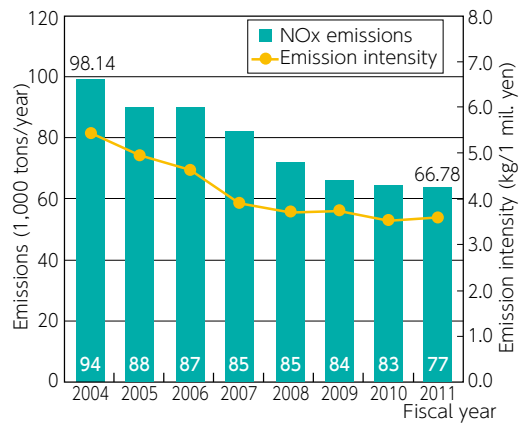
Chemical companies in Japan have significantly reduced air and water pollutant emissions. In particular, Members have established voluntary management criteria that are more stringent than the regulatory standards. Also, by complying with local government agreements, Members are working to further reduce emissions. Moreover, in June 2011, the Minister of the Environment decided on the basic policies for the seventh total water pollutant

load control scheme. According to the policies, and as in the sixth scheme, companies are required to take continuous measures to improve the water environment in Tokyo Bay, Ise Bay and Osaka Bay and to prevent degradation of water quality in the Seto Inland Sea, excluding the Osaka Bay area. In response, Members will continue their efforts to reduce the total emission and emission intensity of water pollutants.

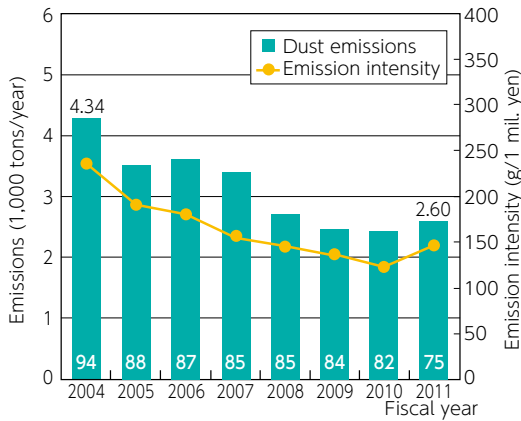
### SOx Emissions



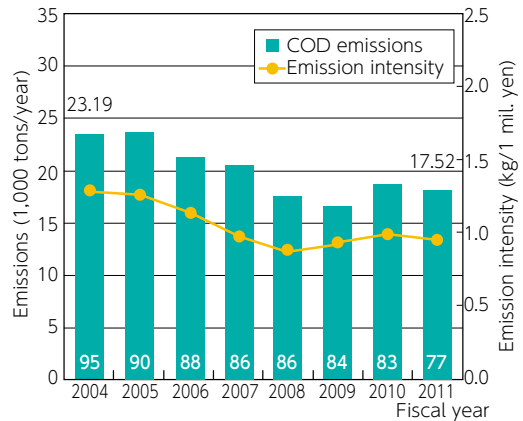
### NOx Emissions



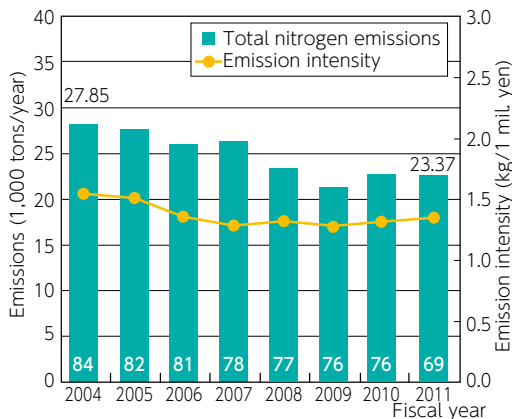
### Dust Emissions



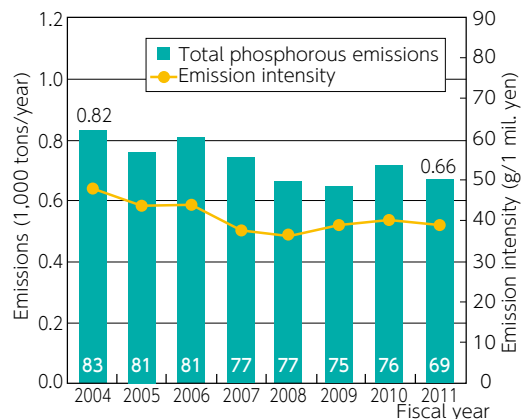
### COD Emissions



### Total Nitrogen Emissions



### Total Phosphorous Emissions



The figures in the bars indicate the numbers of companies that submitted data.

Emission intensity: Since Members' businesses are varied and no single common production unit can be specified, the index is designed to show emissions per sales (in millions of yen).

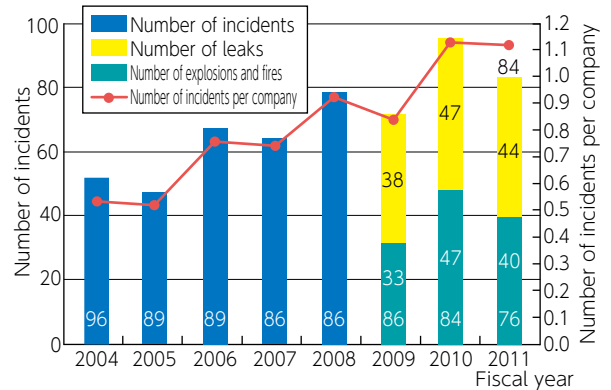
# Process Safety and Disaster Prevention

## Number of Incidents at Facilities

Based on the recognition that disaster prevention is a great challenge for the entire chemical industry, the JCIA has been collecting information from its Members on the incidents that took place at their facilities to examine measures to prevent the occurrence of similar incidents. In fiscal 2011, the total number of incidents at Members' facilities and the number of facility incidents per company both decreased year on year, but not on a level that is high enough to reverse the recent increasing trend.

Under these circumstances, most Members have been reviewing and enhancing their measures for equipment, operational management, and education and training of workers. Specifically, they are implementing the following measures to prevent explosions, fires and leaks: identification of potential risks, implementation and enhancement of inspections, revision of the criteria for operations and management and preparation of teaching materials based on the cases of actual incidents. In fiscal 2012, the JCIA launched a new initiative by establishing a study group on disaster prevention, through which to share information and examine specific measures to ensure safety across the chemical industry.

### Incidents at Facilities (Explosions, fires, leaks, etc.)



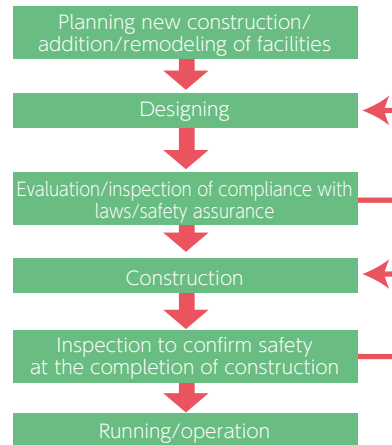
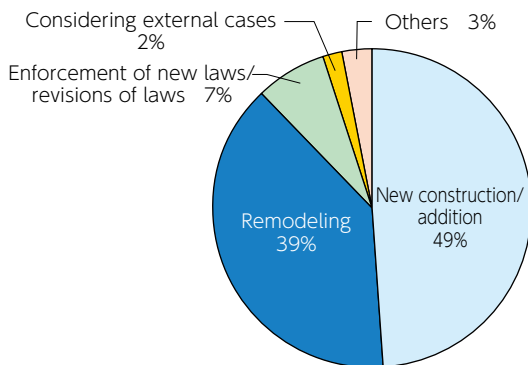
From fiscal 2009 onwards, the breakdown of the number of incidents is indicated by the number of leaks, explosions and fires. The figures in the bars indicate the numbers of companies that submitted data.

## Prior Facility Evaluation and Management

All Members who responded to the questionnaire have their own criteria for the prior evaluation of their facilities. In fiscal 2011, 97% of Members conducted a prior evaluation of their facilities. As the reason for this, 88% of respondents answered "for new construction/addition" and "for remodeling." As illustrated in the flowchart,

many Members examine and assure the safety of their new facilities at the design phase and confirm the safety again after completion of the installation work. They thus carry out risk assessments at each phase to ensure safety and prevent the occurrence of incidents at facilities.

### Reasons for Conducting Prior Facility Evaluations

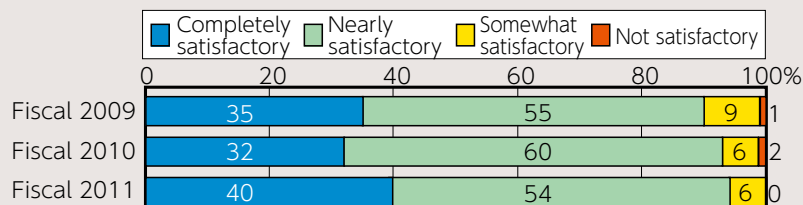


### Members' Self-Assessment

#### Process Safety and Disaster Prevention

Overall rating of nine self-assessment items, including "Policy," "Plan," "Communication" and "Check/monitoring"

The percentage of Members who rated "Completely satisfactory" or "Nearly satisfactory" has been 90% or higher, and the number of those who rated "Completely satisfactory" increased by 8%. By breakdown, the percentage of Members who rated "Not satisfactory" or "Somewhat satisfactory" for "Communication" decreased from 46% in fiscal 2010 to 40%. This implies that Members have made progress in communicating with local communities.





## Countermeasures for Major Earthquakes

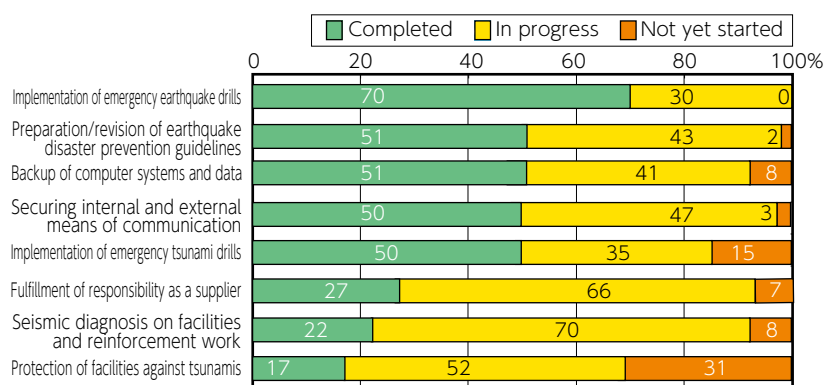
Learning lessons from the Great East Japan Earthquake, many Members reviewed their measures against earthquakes and tsunamis. In the questionnaire survey conducted immediately after the disaster, Members were asked to list the measures to be reviewed, and in the follow-up survey conducted one year later, a lot of Members answered that they had completed the following: "Implementation of emergency earthquake drills" (70%); "Preparation/revision of earthquake disaster prevention guidelines" (51%); "Backup of computer systems and data" (51%); "Securing internal and external means of communication" (50%); "Implementation of emergency tsunami drills" (50%). For these items, 85% or more of the respondents answered, "Completed" or "In progress," and Members are thus steadily making progress.

The percentage of Members who answered "Completed" was low for "Protection of facilities against tsunamis" (17%), "Seismic diagnosis on facilities and reinforcement work" (22%) and for "Fulfillment of responsibility as a supplier" (27%). Nonetheless, even for "Protection of facilities against tsunamis," which recorded the lowest, the percentage increases to as high

as 69% when those who answered "In progress" are included. This implies that Members have made slow but steady progress also for these items.

The JCIA included "Countermeasures for major earthquakes" in the topics for the fiscal 2011 meetings held by the Member Relations WG, thereby providing participants with an opportunity to exchange opinions on the important measures to be implemented by Head Office and other sites in preparation against large earthquakes.

Results of the Questionnaire Survey on Countermeasures for Major Earthquakes (as of today)



Emergency drill (Hokko Chemical Industry Co., Ltd.)



Evacuation drill (Showa Denko K.K.)



Comprehensive emergency drill  
(Mitsubishi Gas Chemical Co., Inc.)



Drill on a marine accident (Tosoh Corp.)

# Occupational Health and Safety (Measures to Prevent Occupational Accidents)

Preventing occupational accidents is a major industry-wide commitment. The frequency rates of occupational accidents for Members and their affiliated companies have stayed flat and below the rates for the manufacturing sector and the chemical industry. The severity rate and number of fatalities have also remained at the same level for both Members and their affiliated companies, though they substantially improved at affiliated companies in 2009.

Under these circumstances, many Members have been reviewing and enhancing their equipment- and operational management-related measures and the education and training of workers to further raise their safety levels. Specifically, they are introducing risk assessments, enhancing measures for dangerous equipment used at their sites, such as rotating machines, creating and revising the criteria, improving KY activities to predict risks and providing workers with hands-on safety training. Members are thus enhancing their safety measures to achieve zero occupational accidents.

## Number of Fatalities from Occupational Accidents

	2004	2005	2006	2007	2008	2009	2010	2011
Member companies	1	1	2	1	2	2	2	1
Affiliated companies	2	2	5	6	5	1	1	1
Chemical industry (MHLW)	22	22	25	17	28	19	11	13
Manufacturing sector (MHLW)	293	256	268	264	260	186	211	182

## Examples of Members' Initiatives

### Kanagawa Factory's Activity to Ensure Adherence to the Basic Rules on Safe Behavior FUJIFILM Corp.

The Kanagawa Factory had a range of safety rules to ensure occupational safety for employees. Some of these rules, however, were not actually followed by employees. During the period from fiscal 2009 to 2010, the Factory conducted an activity to ensure compliance with the rules. In this activity, managers and employees discussed with each other repeatedly and worked together to revise the rules to make them practical enough to be followed by employees.

First, the occupational accidents that took place over the past 10 years were thoroughly analyzed and seven basic rules on safe behavior were formulated to be strictly obeyed by employees to prevent the occurrence of serious accidents. Employees, however, insisted that they could not obey all the rules in some of the manufacturing operations, such as wiping a rotating drive roll with a cloth.

Of about 600 operations listed by all the departments as operations in which compliance with the rules was difficult, 40% were removed from the list as a result of employees proposing improvement ideas, such as updating the equipment and tools to make it unnecessary for workers to touch them with their hands. As for the remaining 60%, they were classified as "operations under special management" and to ensure the safety of these operations, now only qualified employees who are to receive the necessary training on a continual basis are allowed to carry out those operations.

Since then, the seven basic rules on safety behavior have been strictly obeyed by employees and the Kanagawa Factory has continued to achieve zero lost-time injuries since fiscal 2011.



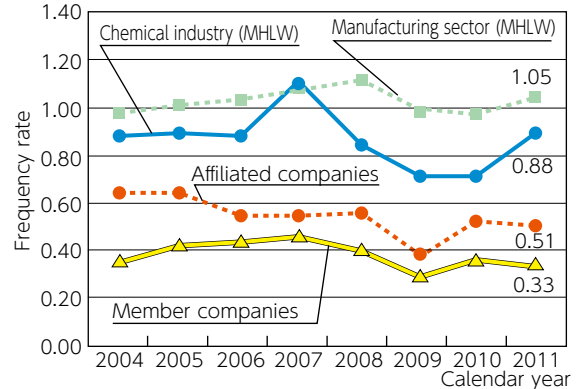
Employees point to and read out the basic rules before starting work.



The Factory became a winner at the sixth Responsible Care Awards.

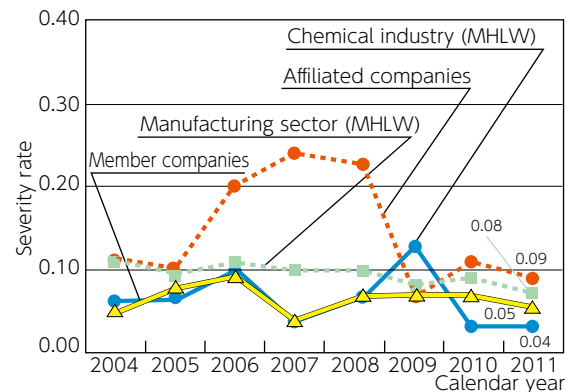
## Change in the Frequency Rate $\text{Frequency rate} = \frac{\text{Number of lost-time injuries}}{\text{Total work hours (per million hours)}}$

Indicator that shows the frequency of occupational accidents



## Change in the Severity Rate $\text{Severity rate} = \frac{\text{Lost days}}{\text{Total work hours (per thousand hours)}}$

Indicator that shows the severity of occupational accidents



# Occupational Health and Safety (Safety Awards and Symposiums)

As a means to encourage companies in the chemical industry to implement measures for process safety and occupational health, the JCIA gives awards to exemplary companies that conduct excellent safety activities, and holds an annual safety symposium in which the award winners report on their safety assurance activities.

In fiscal 2011, a total of 19 chemical company sites applied for the awards, from which three were selected by the JCIA's Safety Awards Council as winners. JSR Corp's Yokkaichi Plant, which won the Grand Prix Safety Award, has recorded no occupational accidents in 17.9 million work hours with about 1,700 employees. Under its management system, the Plant makes it a rule to assess safety when making any changes to its operations, while continuously identifying and reducing risk factors. The Plant is also making other safety efforts to continue achieving zero occupational accidents, including ensuring compliance with safety rules by all employees and conducting their KZ activity to reduce risks and injuries to zero and their TZ activity to reduce problems to zero.

The directors of the winning plants reported on their safety management activities at the safety symposium held on June 22, 2012 with the participation of about 100 people.

At the panel discussion held as the second part of the symposium, the directors discussed how to maintain a zero occupational accident record. These panelists received a range of questions from the audience. In response, they introduced the safety measures taken at their plants, including how they had responded to recent process safety issues, and reaffirmed their commitment to safety.

### Grand Prix Safety Award:

Yokkaichi Plant, JSR Corp.

### Safety Award:

Yokohama Plant, Showa Denko K.K.

Minamata Factory, JNC Corp.



Directors of the award winning plants and the Chairperson of the Safety Awards Council



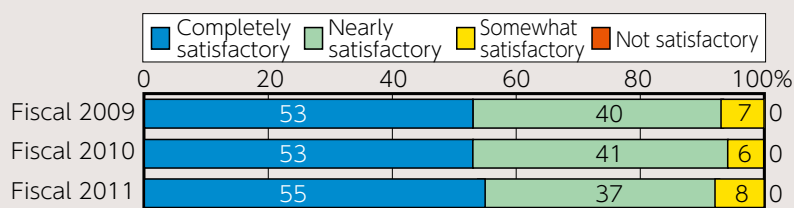
Yokkaichi Plant, JSR Corp.

## Members' Self-Assessment

### Occupational Health and Safety

Overall rating of eight self-assessment items, including "Policy," "Plan," "Communication" and "Check/monitoring"

The percentage of Members who rated "Completely satisfactory" or "Nearly satisfactory" has been 90% or higher.



# Distribution Safety

Members conduct a range of activities to reduce environmental and safety risks in the transportation of chemicals. They assess the impact of chemicals and evaluate the safety of transportation facilities to prevent accidents, while implementing emergency drills so that employees involved in the transportation of chemicals can cope immediately with emergency situations such as leaks. In addition, they prepare Yellow Cards and urge the transporters to carry these cards to ensure that all those involved can get the information needed in case of emergency.

## Preparation of a Yellow Card/Container Yellow Card

Transporters are required to carry official transportation documents for chemicals covered by the Poisonous and Deleterious Substances Control Act and the High Pressure Gas Safety Act. Considering the possibility of unpredictable accidents during transportation of substances that are not controlled by the laws, the JCIA promotes the use of emergency contact cards that describe the necessary emergency measures to be taken by tanker drivers, firefighters, police officers and others involved. Because these important measures are printed on highly visible yellow paper, the contact card is called a Yellow Card.

When a range of chemicals are transported in containers simultaneously, multiple Yellow Cards will be carried with the chemicals. For such cases, the JCIA recommends to use label-type Yellow Cards (Container Yellow Cards). These cards are placed on the containers of the chemicals so that they can be identified promptly

and accurately to allow people involved to make quick responses in case of an emergency.

### Use of Yellow Cards

Of Members supplying products for which the use of Yellow Cards is recommended as a voluntary safety measure, 92% answered that the cards were always carried by the transporters of their products.

### Introduction of Container Yellow Cards (label-type cards)

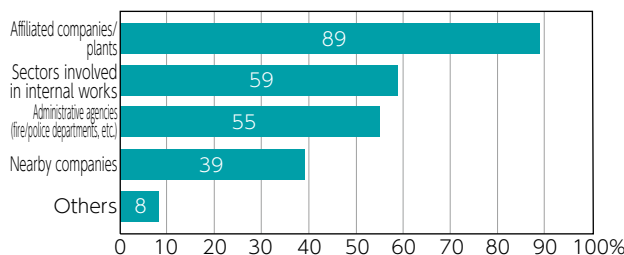
Container Yellow Cards were introduced in fiscal 2002 and 91% of Members supplying products for which Yellow Cards are used have completely or partially adopted these label-type cards. Even after the introduction of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS), these cards will continue to be used to provide the people who have to handle emergency situations with the information they need.

## Measures for Emergencies

Almost all Members have prepared their own emergency response manuals and have established their own around-the-clock contact networks. Also, 85% have established mutual support systems for emergencies involving combustible solids/liquids/gases, high-pressure gases, corrosive substances and acutely toxic substances. Mutual support partners include

affiliated companies/plants, the sectors involved in internal works and administrative agencies (fire/police departments), and 86% of Members have implemented emergency drills with mutual support partners, including communication training and desktop/field training, as shown in the table below.

Mutual Support Partners for Emergencies (multiple answered allowed)



Emergency Drills with Mutual Support Partners (Number of Companies Implementing the Drills)

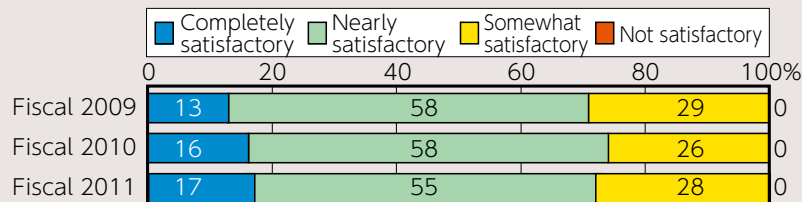
Type of training	Mutual support partners		
	Communication training	Desktop training	Field training
Administrative agencies	24	12	19
Nearby companies	21	14	19
Affiliated companies/plants	36	17	32
Sectors involved in internal works	32	17	31



### Distribution Safety

Overall rating of 10 self-assessment items, including "Policy," "Plan," "Communication" and "Check/monitoring"

Nearly 30% of Members rated items as "Not satisfactory" or "Somewhat satisfactory." Almost half of Members rated "Not satisfactory" or "Somewhat satisfactory" for the item "Coping with emergency situations." For "Corrective and preventive measures," the percentage of Members who rated "Not satisfactory" or "Somewhat satisfactory" decreased by 5% year on year.



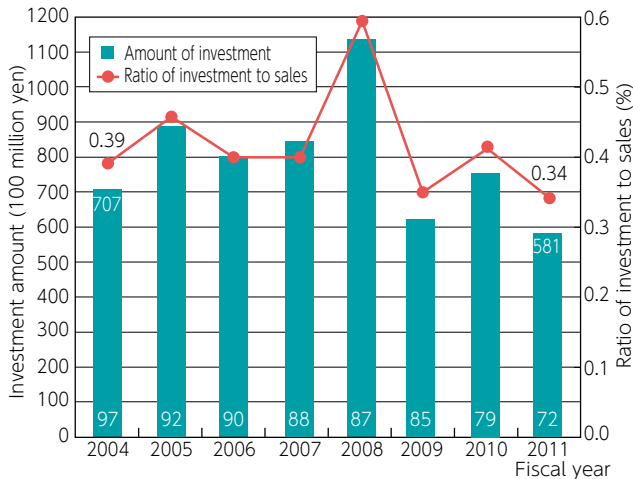
# Investment in Environmental Protection and Safety

## Trends in Investment in Environmental Protection

Members recognize the importance of environmental protection and continue to invest in environmental measures. In fiscal 2011, they invested a total of 58.1 billion yen (down 24% year on year) in the construction and maintenance of environmental facilities to save energy and reduce CO<sub>2</sub> emissions

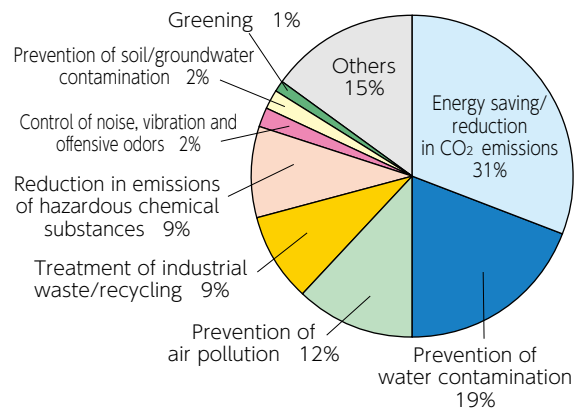
as well as in the development of environmentally friendly technologies and products. The ratio of investment to sales came to 0.34%, down 21% year on year. Members have continued to invest in environmental measures to steadily improve their environmental performance.

### Investment in Environmental Measures



The figures in bars indicate the number of companies that submitted data.

### Categories of Investment in Environmental Measures in Fiscal 2011

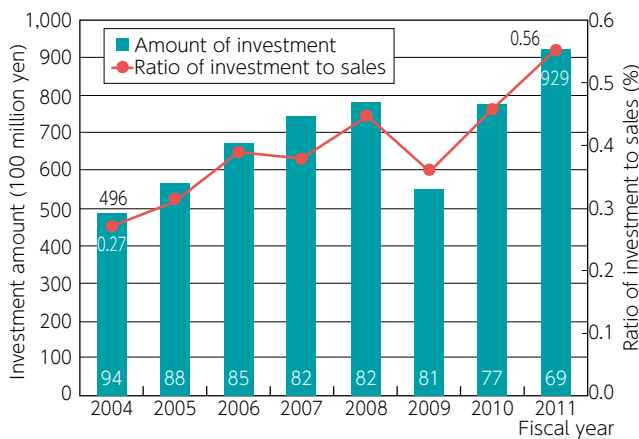


## Trends in Investment in Process Safety and Disaster Prevention

Based on the recognition that the prevention of occupational and facility accidents is a major industry-wide commitment, Members have been continuing to invest in both equipment and operational management to ensure process safety and prevent disasters. In fiscal 2011, they invested

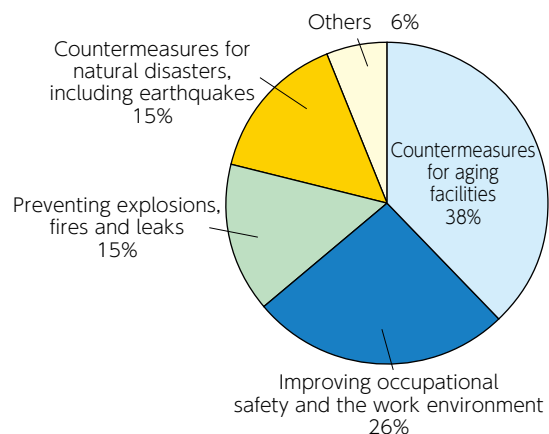
a total of 92.9 billion yen, up 17% year on year, and the ratio of investment to sales came to 0.56%, also up 24% from the fiscal 2010 level. Members have thus been proactively making investments to ensure process safety and prevent disasters.

### Investment in Process Safety and Disaster Prevention



The figures in bars indicate the number of companies that submitted data.

### Categories of Investment in Measures for Process Safety and Disaster Prevention in Fiscal 2011



# Members' Management System

Responsible Care entails the implementation of the Plan, Do, Check and Act cycle (the so-called PDCA cycle). As a tool to implement this cycle, an increasing number of organizations are introducing ISO 14001-based and other environmental management systems (EMSs) as well as occupational safety and health management systems (OSHMSs).

## Status of Members' Adoption of Management Systems

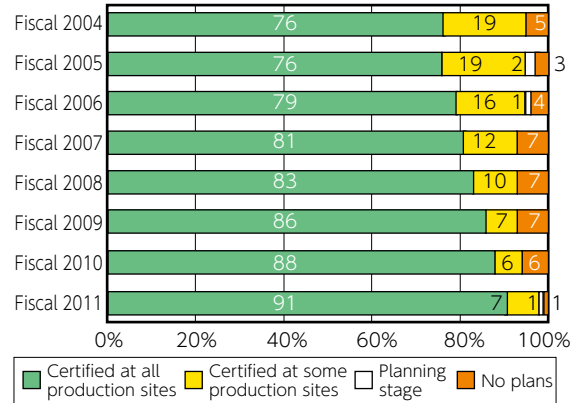
### Environmental Management Systems (EMSs)

Companies use EMSs to set their environmental policies and targets and implement measures to achieve the predefined goals. In the questionnaire survey conducted on Members, 91% of respondents have acquired certification such as ISO 14001 for their EMSs at all their production sites (plants). An increasing number of companies are thus introducing EMSs.

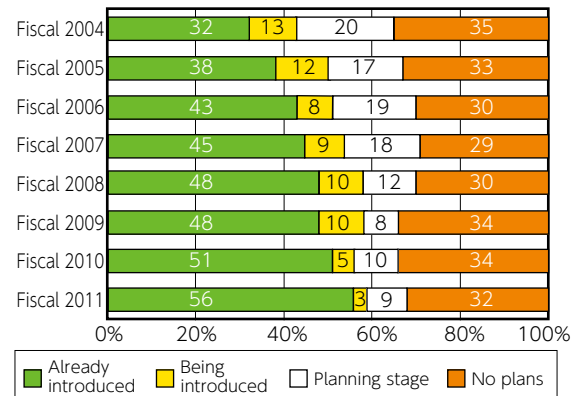
### Occupational Safety and Health Management Systems (OSHMSs)

An OSHMS is designed to support companies in voluntarily and continuously conducting activities for occupational health and safety management. The system helps reduce latent risks and raise health and safety standards in the workplace, which will in turn help achieve zero occupational accidents. A gradually increasing number of companies are introducing this system. In the questionnaire, 59% of respondents have introduced OSHMSs. They have acquired external certification for the systems, such as OHSAS 18001, or verified them through internal audit.

#### Status of EMS Certification



#### Trend in Adoption of OSHMSs

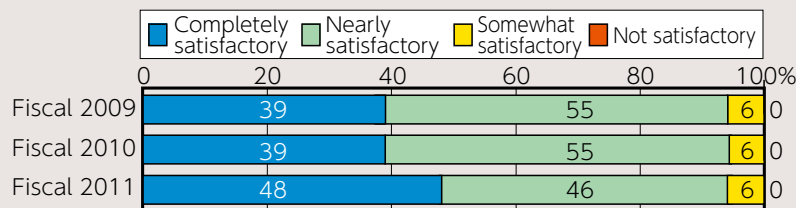


### Members' Self-Assessment

#### Management System

Overall rating of 16 self-assessment items, including "Policy," "Plan," "Communication" and "Check/monitoring"

Management systems such as ISO 14001-, OHSAS 18001- and ISO 9001-compliant systems have been steadily introduced to Members, and as high as 94% of Members rated "Completely satisfactory" or "Nearly satisfactory." The percentage of Members who rated "Completely satisfactory" increased by 10% year on year, and this shows that an increasing number of Members are evaluating their management systems as appropriate enough.



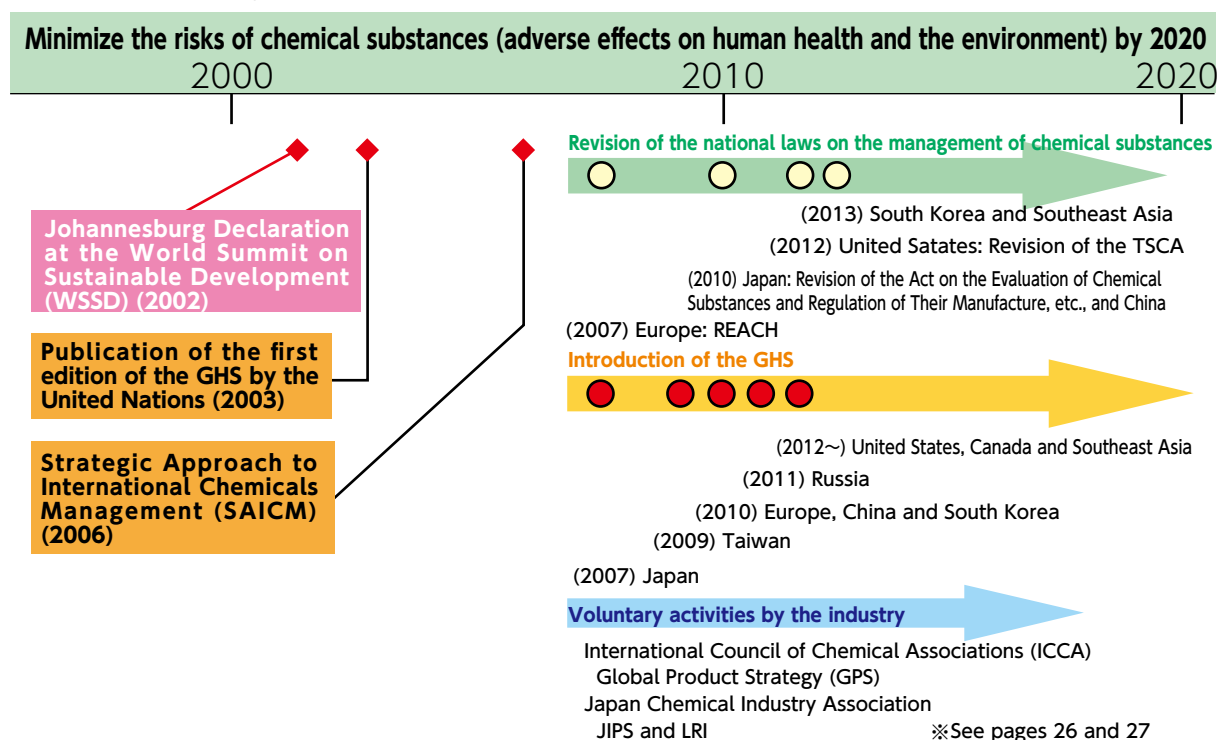
# Chemicals and Product Safety

## Risk Assessment of Chemical Substances and Provision of More Information on Their Hazard Level and Safety

Our lives are supported by a variety of chemical substances and we benefit in a number of ways from their use. These substances, however, can do harm to users if treated inappropriately, and may cause adverse effects on human health and the environment. In a survey conducted in fiscal 2010 by the Cabinet Office on chemical substances used in daily life, 69.7% of respondents regarded chemical substances as "something dangerous" because "there are so many different kinds, including those that are hazardous," and expressed opinions such as "I am not sure whether companies are treating chemical substances appropriately or not" and "The information labeled on chemical products is difficult

to read or understand or is insufficient." Problems concerning the treatment of chemical substances are prevalent around the world and persist throughout their life cycle, not only in the consumption stage but also in the manufacturing, processing and distribution stages. To solve these problems, efforts are being made to fully assess the risks of chemical substances and to communicate the results to users clearly and appropriately, including the global initiative implemented to minimize the risks of chemical substances (adverse effects on human health and the environment) by 2020.

### Flow for the management of chemical substances



At the World Summit on Sustainable Development (WSSD) held in 2002, participants made the Johannesburg Declaration to demonstrate their commitment to creating compatibility between greater convenience in people's lives and protection of the global environment by reducing the risks posed by chemical substances. Subsequently in 2003, the United Nations published the first edition of the GHS, and in 2006 the Strategic Approach to International Chemicals Management (SAICM) was adopted. In response, countries have been introducing ① regulations on the use of chemical substances based on their risk assessment (ordinances on the management of chemical substances) and ② systems to communicate information on chemical hazard levels based on the Globally Harmonized System of Classification and Labeling of Chemical Substances (GHS). The systems should be operated by chemical product suppliers, who are accelerating the implementation of the measures to manage chemical substances appropriately and ensure they are used safely by users. With global efforts focused on achieving the 2020 target, both individual companies and the

entire industry are expected to play even greater roles. Hazard levels and their environmental and human exposure levels for new chemical substances to be released into the market will be appropriately surveyed, and their usage, including the amount and place of use, will be limited based on the results. Additionally, for substances already on the market, the national laws on the management of chemical substances have been revised to mandate suppliers to assess the hazard and exposure levels and review the amount and place of use according to the results. Specifically, the REACH regulation was enforced in Europe in 2007, and the revised Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc. came into force in Japan in 2010. Also in China, a new law on the management of chemical substances came into force in 2010. In the United States, the revision of the Toxic Substances Control Act (TSCA) is currently being discussed and similar measures will also be implemented in South Korea, Taiwan and Southeast Asia.

# Chemicals and Product Safety

## Risk Management

### New chemical substance management measures and responses by Members

#### 1. Management of chemical substances based on their risk assessments

Under the revised/new regulatory systems, chemical substances are managed based on the results of their risk assessments. The risks that chemical substances could pose must be assessed based on their hazard \*1 and exposure\*2 levels. In order to keep their risk levels below the threshold for use without any concerns over adverse effects on human health and the environment,

the exposure levels need to be managed in reference to the hazard levels for the substances. Then the specific amount of use (concentration) and how to use it safely are determined in consideration of the conditions under which the substance is used.

\*1. Undesirable effects of chemical substances on human beings and other living creatures in the environment

\*2. Amounts (concentrations) of chemical substances to which human beings and other living creatures in the environment are exposed to

**Risk management**

**Level of risk = Hazard x Exposure**

**< Threshold for use without any concerns over adverse effects**

The risks can be reduced by minimizing exposure, even if the chemical substances are very hazardous.

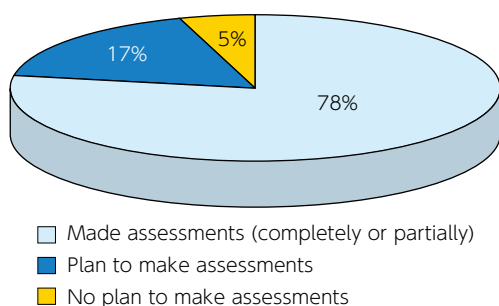
The risks increase as exposure increases, even if the chemical substances are not very hazardous.

#### 2. Implementation of risk assessments by Members

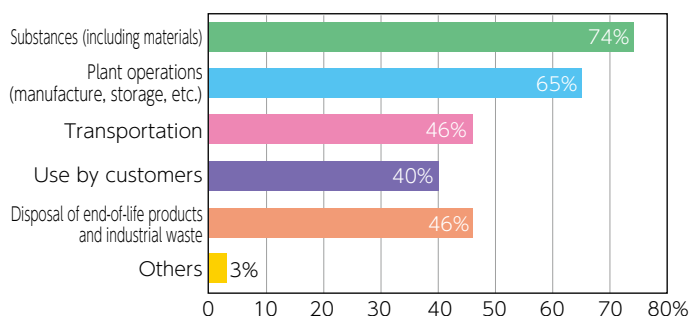
In the management of chemical substances, 78% of Members have already implemented risk assessments

and 17% plan to make assessments. The scope of risk assessments covers the entire life cycle of chemical substances, including R&D, manufacture and disposal.

#### Implementation of Risk Assessments by Members



#### Scope of Risk Assessments Covered by Members

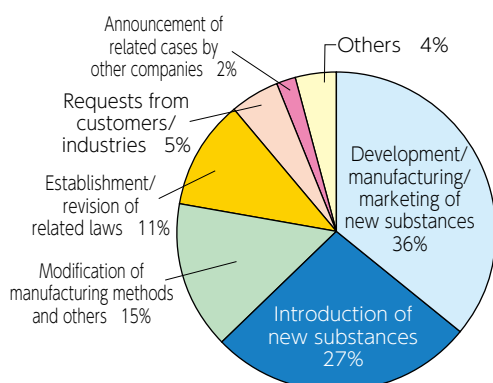


## Prior Chemical Substance Safety Assessment

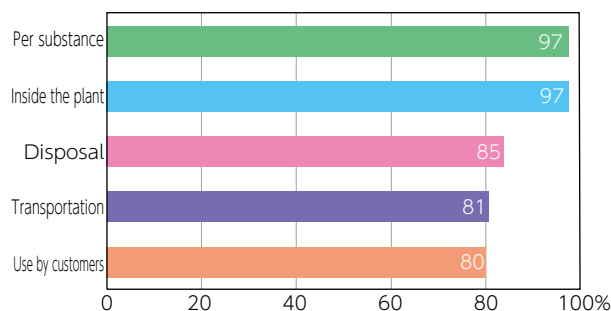
A Prior Chemical Substance Safety Assessment is conducted to identify the safety issues and concerns for chemical substances (explosiveness, inflammability, acute/chronic toxicity) and evaluate their effects on users' health and the environment. This assessment is made when a new substance is developed, manufactured and sold, when an existing substance is used for the first time, and when the methods of manufacturing, transportation, use or disposal

for existing substances are changed. It is useful for emergency response as well as for risk reduction. All Members responding to the questionnaire have prior assessment standards. The assessment standards are being widely applied not only to each substance and inside the plants but also to various situations in which substances are handled, including transportation, use by customers and disposal.

#### Reasons for Implementing Prior Assessment



#### Application of Prior Assessment Standards (multiple answers allowed)





## Provision of Product Information

### Preparing and Distributing Safety Data Sheets (SDSs)

An SDS is a written instruction that is distributed by the supplier of chemical products to user companies. The sheet provides the users with the information necessary to handle chemical products safely to avoid any related accidents, including the harmful impact of the products on human health and the environment, flammability, explosiveness and other properties, cautions for use and emergency measures.

Although substances for which SDSs are to be submitted are specified in the PRTR Act, the Industrial Safety and Health Act and the Poisonous and Deleterious Substances Control Act,

74 of the 75 Members who responded to the questionnaire voluntarily issue SDSs for additional substances (products) that are not subject to the laws and distribute the sheets to their customers based on the concepts of Responsible Care and product stewardship.

From a Responsible Care viewpoint, chemical product suppliers must know how their customers use the products and process them into their own products to be delivered to consumers, and 60 of 75 respondents said that they collected information on the purpose of use for 80% or more of the products they supplied to customers.

## Measures for the GHS

### Implementation of the GHS by Members

#### Communication of hazard- and safety-related information by the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

The use of the GHS has been promoted by chemical product suppliers across the world, with a view to providing users of their products with consistent information on their hazards and safe handling. In the past, the hazard classification criteria and labeling methods differed by country and region, and accordingly, information labeled on the same chemical substance was not always consistent, which could hinder the safe treatment of the substance. The GHS represents an initiative taken by the chemical industry to foster the use of the same classification criteria and labeling method across the world, and SDSs and labels are used in the system to clearly and definitely communicate information about the hazard levels and safe handling of chemicals to users. Japan introduced the GHS ahead of other countries in 2006 and under the Industrial Safety and Health Act and the PRTR Act, Japanese chemical companies are required to make efforts to create GHS-compliant SDSs and labels. The introduction of the system has also been fostered in various other countries and regions.

Members have thus already been using GHS-compliant SDSs and labels to communicate information about the hazards and safe handling of their products to users clearly and definitely.

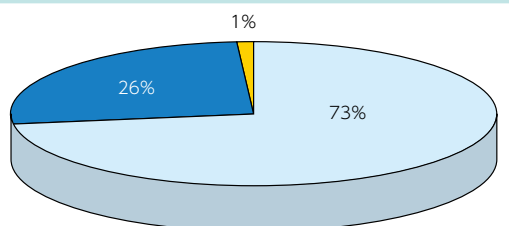
#### (1) Use of GHS-compliant SDSs

All Members who have created SDSs comply with the GHS in regard to the substances and products for which compliance with the system is mandated under the Industrial Safety and Health Act. Moreover 99% of Members have already met the requirements on the efforts to be made in and after fiscal 2012 to ensure compliance with the GHS under the Industrial Safety and Health Act and the PRTR Act, with 73% of Members meeting the requirements for all targeted substances and products and 26% for part of them.

#### (2) Use of GHS-compliant labels

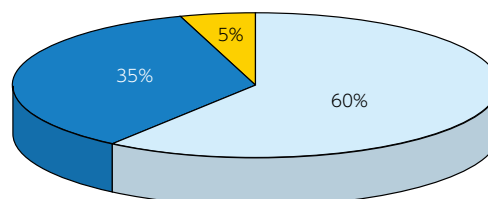
For all the substances and products for which compliance with the GHS is mandated by the Industrial Safety and Health Act, all Members ensure compliance with the system. Moreover 95% of Members have already met the requirements on the efforts to be made in and after fiscal 2012 to ensure compliance with the GHS under the Industrial Safety and Health Act and the PRTR Act, with 60% of Member meeting the requirements for all targeted substances and products and 35% for part of them.

### Use of GHS-Compliant SDSs by Members



- · Have met the requirements on the efforts to be made to ensure compliance with the GHS under the Industrial Safety and Health Act and the PRTR Act for all the targeted substance and products.
- · Have met the aforementioned requirements for part of the targeted substances and products.
- · Have met the requirements for the substances and products for which compliance with the GHS is mandated by Article 57 of the Industrial Safety and Health Act.

### Use of GHS-Compliant Labels by Members



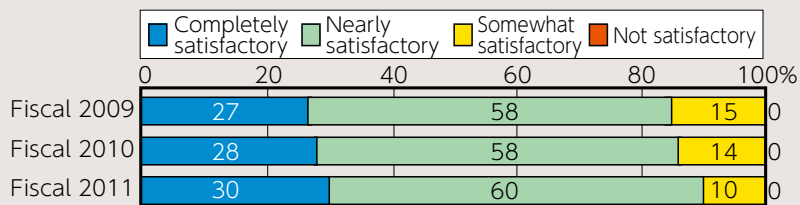
- · Have met the requirements on the efforts to be made to ensure compliance with the GHS under the Industrial Safety and Health Act and the PRTR Act for all the targeted substance and products.
- · Have met the aforementioned requirements for part of the targeted substances and products.
- · Have met the requirements for the substances and products for which compliance with the GHS is mandated by Article 57 of the Industrial Safety and Health Act.

## Members' Self-Assessment

### Chemicals and Product Safety

#### Overall rating of nine self-assessment items, including "Policy," "Plan," "Communication" and "Check/monitoring"

The percentage of Members who rated items "Completely satisfactory" or "Nearly satisfactory" increased by 4% from the previous fiscal year's level to 90%. For individual items, improvements seem to be required regarding "Targets for chemicals and product safety" and for "Operational control."



# Chemicals and Product Safety

## Outline of the Initiatives for Chemicals Management

For the global management of chemicals, the relevant international organizations, governments and companies are beginning to implement full-scale measures across the entire supply chain based on both risk assessment and product stewardship. In response to this trend, the JCIA is enhancing the system to support its Members in meeting the related challenges and conducting the following activities:

- (1) Promote the ICCA<sup>1</sup>-led GPS<sup>2</sup> in the Asian region and foster the JIPS<sup>3</sup> (Japanese version of the GPS) for the voluntary risk management of chemicals in Japan.
- (2) Proactively participate in UNEP<sup>4</sup>, OECD<sup>5</sup>, APEC<sup>6</sup>, AMEICC<sup>7</sup> and other international organizations' programs and in the ICCA-related activities.

## Chemical Regulation Trends and Responses to Them

**Revision of the Japanese Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture, etc.:** The revised law came into force in two stages, with the first being launched in April 2010 and the second in April 2011. Following the second stage, notifications were mandated for the manufacture and import of general chemical substances, and selection, screening and risk assessment were started for priority assessment chemical substances. The JCIA worked to help chemical companies steadily implement measures to comply with the revised law, and supported the establishment of the screening and risk assessment methods by participating in the council jointly established by the three ministries in charge. To the council, the Association gave specific comments from the viewpoint of the chemical industry on the international harmonization of the classification criteria for hazard assessment (uncertainty factors), proactive introduction of QSAR<sup>8</sup>, treatment of substances for which hazard data is not available and on other matters.

**GHS:** In March 2012, the JIS Z 7253 standard was formulated as a common platform for information communication (labels and SDSs) as required by domestic laws and regulations. The JCIA served as the secretariat for the committee established to formulate the JIS draft standard and collected opinions from both the government and chemical companies. Following the formulation of the standard, the ordinance on the PRTR Act and the rules on the Industrial Safety and Health Act were revised to mandate chemical companies to make efforts to provide labeling and SDSs when transferring or providing chemicals that have any of the hazards specified by the GHS. (The rules on the Industrial Safety and Health Act, however, do not provide for environmental hazards.) Chemical companies are deemed to comply with the laws and rules if they conform to the JIS Z 7253 standard.

**REACH<sup>9</sup> regulation in Europe:** Regarding the REACH regulation, preparations are being made for the registration of chemical substances that are manufactured in or imported into Europe at a level of 100 tons or more and below 1,000 tons per year by the second deadline of May 31, 2013. The ECHA<sup>10</sup> disclosed the names of a total of 73 substances that might be subject to approval for use as "substances of very high concern (SVHC)" by December 19, 2011, with an eye to designating a total of

136 substances as SVHC by the end of 2012. As for the regulated substances, the JCIA submitted in February 2012 its opinions on the proposal made by Denmark for the regulation of phthalate. The Association has been providing the latest information on REACH to its Members through its website and via other media, while addressing the problems related to REACH registration and notification.

**TSCA<sup>11</sup> in the United States:** A bill to revise the law was submitted to both Houses of the Congress but abolished in 2010. Again in April 2011, the bill was submitted by a senator as S. 847 and the JCIA sent its written concerns about the bill in May 2011. The Houses of Congress have yet to deliberate on the bill, which will not be passed within 2012. Meanwhile the state governments are showing a tendency to tighten their regulations on toxic substances. For example in the state of California, an unofficial draft to regulate consumer products to increase their safety was unveiled in October 2011, as part of the Green Chemistry Initiative implemented by the state government. The JCIA has provided its Members with recent information concerning these trends in the United States.

**Regulations in Asian countries:** China enforced the ordinance on the safe management of hazardous chemical substances in December 2011 and has since been establishing the related laws and regulations. Also in South Korea, substantial movements have been made toward the establishment of a new chemicals management law (K-REACH). In Taiwan, the existing list of chemical substances has been updated under the labor safety and health law and the toxic substance control law, while efforts are being made toward the establishment of a new chemical substance notification system. The Japanese Ministry of Economy, Trade and Industry is supporting these movements based on its new growth strategies under the Asian Sustainable Chemical Safety Plan. The JCIA is cooperating with the government by dispatching lecturers to seminars held by the Ministry in Asian countries. The Association is also collecting information through participation in a range of international conferences and onsite surveys on the management of chemicals in ASEAN countries, and is working to have the chemical industry's opinions incorporated in the measures implemented by national governments.

## Participation in and Promotion of ICCA Activities

The ICCA has been fostering the global implementation of the GPS, with chemical industry associations in Europe, the United States and Japan leading the activity. As of April 2012, more than 2,000 safety summaries have been uploaded and disclosed at the online portal opened by the ICCA. To foster the implementation of GPS in the Asian region, the JCIA has been supporting workshops held by local chemical industry associations in Southeast Asia, including Taiwan, Singapore, Indonesia and the Philippines. Also in Japan in August 2011, the JCIA opened a portal to foster GPS/JIPS activities, posted FAQs on the website and began receiving related inquiries. Subsequently in November

of that year, the Association created a second version of the JIPS risk assessment guidelines and also in March 2012 created a second version of the product stewardship guidance. For JCIA Members, GPS/JIPS seminars were held a total of seven times, four times as introductory seminars in March and April 2011, and three times as practical seminars in November and December 2011. In order to achieve results for the ICCM-3, the JCIA has been implementing measures to foster the uploading and disclosure of safety summaries under the initiative of GPS/JIPS facilitators designated by 117 JCIA member companies.

## LRI<sup>12</sup> Activities

The JCIA has been implementing an LRI to research into the adverse effects of chemical substances on human health and the environment. In order to fundamentally review this initiative, the Association commissioned the analysis of the present situation of the LRI and recent research trends in Japan and overseas to an external research agency, and established a working group to study how to reform the LRI. As a result, the JCIA formulated a draft for a “new LRI” to conduct research to solve the problems faced by the

chemical industry. The Association incorporated the current social needs and urgent requirements into the draft, which was created also in reference to recent world trends on the management of chemical substances, Japan's present situation concerning research into chemical substances and research developments in the world. The draft was approved by the JCIA Board of Directors at the end of fiscal 2011, and specific activities were launched for the new LRI in fiscal 2012.

## Cooperation with International Organizations

**OECD:** Based on the results of the 47th joint meeting of the OECD's Chemicals Committee and Environment Policy Committee held in June 2011, the JCIA has been collecting information and conducting activities through the taskforces on hazard assessment, exposure assessment, test guidelines, nanomaterials, QSAR and others in its capacity as a member of the BIAC<sup>13</sup>. At the 48th joint meeting of the Committees held in February 2012, participants gave approval to the following issues: the survey on the effects of chemicals on children's health; implementation of a program to assess the hazard levels of new chemical substances, definitions of nanomaterials and formulation of a toxicity test method; examination of combined exposure to multiple chemical substances, and the utilization of QSAR. The JCIA continued to cooperate closely with the NBCI<sup>14</sup> on nanomaterials, and also proactively began conducting activities for technical issues related to QSAR and others mainly through the new

working group established to deal with risk assessment technologies. The Association made recommendations regarding the OECD's document on skin sensitization and also held study meetings in cooperation with the National Institute of Technology and Evaluation (NITE).

**United Nations (UNEP/SAICM):** At the “Rio + 20” 15 conference held in June 2012, issues that might raise concerns in the chemical industry were discussed regarding the enhanced management of chemicals and waste, including cost sharing by the industry and extended producer responsibility. Moreover the UNEP presented a concept note on measures to deal with the adverse impacts of waste electric and electronic products on human health and the environment and proposed to make a request to the industry about its role and responsibility for the measures.

## Measures for Users

The management of chemical substances has shifted to risk-based regulations on their use, and chemical substances are now required to be managed across the supply chain, including by customers and consumers. In response, the JCIA is making efforts to facilitate the appropriate management of chemical substances based on closer cooperation across the supply chain. For example, the JCIA sends its Members to the Japan Automobile Manufacturers Association's working group on the substance list and to the Japan Auto Parts Industries Association's study group on the regulations on chemical substances. Moreover, the JCIA is participating in the activities of the GASG<sup>16</sup>, an international

organization of automakers established for the voluntary management of chemical substances. Representing the chemical industry, the Association is playing a central role in the activities by supporting the maintenance and management of the GADSL<sup>17</sup> and by exchanging information and promptly responding to trends in the international regulations. Also, the Association is maintaining cooperative relations with the electrical and electronics industries by serving on the IEC<sup>18</sup> TC 111<sup>19</sup> domestic committee, while continuing to cooperate with the Joint Article Management Promotion-consortium.

## Abbreviations

<sup>1</sup> **ICCA** : International Council of Chemical Association

<sup>2</sup> **GPS** : Global Product Strategy

<sup>3</sup> **JIPS** : Japan Initiative of Product Stewardship

<sup>4</sup> **UNEP** : United Nations Environmental Programme

<sup>5</sup> **OECD** : Organization for Economic Co-operation and Development

<sup>6</sup> **APEC** : Asia-Pacific Economic Cooperation

<sup>7</sup> **AMEICC** : ASEAN Economic Ministers and METI Economic and Industrial Cooperation Committee

<sup>8</sup> **QSAR** : Quantitative Structure-Activity Relationship

<sup>9</sup> **REACH** : Registration, Evaluation, Authorisation and Restriction of Chemicals

<sup>10</sup> **ECHA** : European Chemicals Agency

<sup>11</sup> **TSCA** : Toxic Substances Control Act

<sup>12</sup> **LRI** : Long-range Research Initiative

<sup>13</sup> **BIAC** : The Business and Industry Advisory Committee to the OECD

<sup>14</sup> **NBCI** : Nanotechnology Business Creation Initiative

<sup>15</sup> **Rio+20** : Officially, the United Nations Conference on Sustainable Development. Convened as a follow-up to the Earth Summit held in Rio 1992, where the results of 20-year activities and future challenges were examined.

<sup>16</sup> **GASG** : Global Automotive Stakeholders Group

<sup>17</sup> **GADSL** : Global Automotive Declarable Substance List

<sup>18</sup> **IEC** : International Electro technical Commission

<sup>19</sup> **TC111** : Environmental Standardization for Electrical and Electronic products and systems

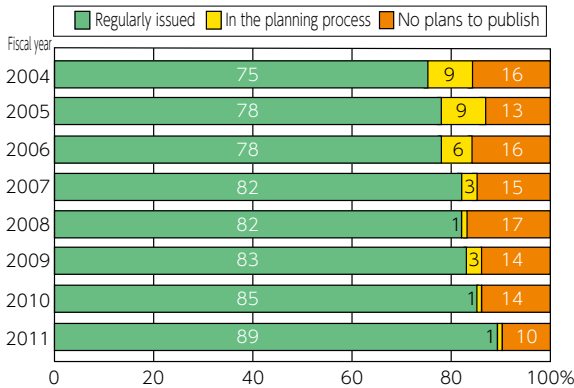
# Members' Dialogue with Society

## Publication of Responsible Care Reports

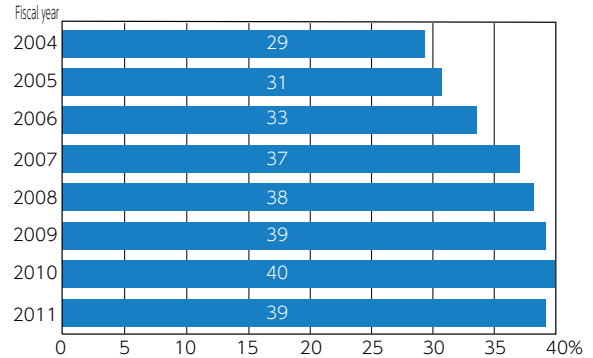
In fiscal 2011, 89% of Members who responded to the questionnaire survey had published Responsible Care reports. The percentage increased year on year, and further rose to 96% if it includes companies that did

not publish their own reports but were introduced in the reports published by their parent companies. Also in the survey, 39% of respondents answered that they had published local site reports.

### Publication of Responsible Care Reports



### Publication of Site Reports



## Content of Reports

According to the results of the questionnaire survey, 79% of Members referred to the six Responsible Care items (environmental protection, process safety and disaster prevention, occupational health and safety, chemicals and product safety, distribution safety and dialogue with society) in their Responsible Care reports. In particular, nearly 100%

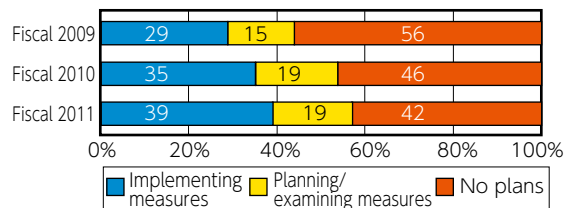
of respondents to the survey provided data on energy conservation, prevention of global warming, industrial waste, and air and water quality with regard to environmental protection, in order to improve their accountability in response to increased social concerns over global environmental problems.

## Measures for Biodiversity Conservation

In time for the 10th meeting of the Conference of the Parties to the Convention on Biological Diversity (COP10), Nippon Keidanren (the Japan Business Federation) and others launched an initiative named "Japan Business and Biodiversity Partnership." More than 30 Members are participating in this initiative. The percentage of Members who answered "Implementing measures (to conserve biodiversity)" increased year on year from 35% to 39%, while the percentage who answered "Planning or examining measures" remained on the same level at 19%. These percentages are expected to increase in the future. In the survey, 17 companies answered that they were implementing measures related to the procurement of materials. Members are also taking

measures to conserve forest resources by planting trees, conserve river and ocean resources, restore ecosystems in their neighborhoods and other places, create biotopes at green spaces in factories, conserve water resources and protect endangered species.

### Measures to Conserve Biodiversity

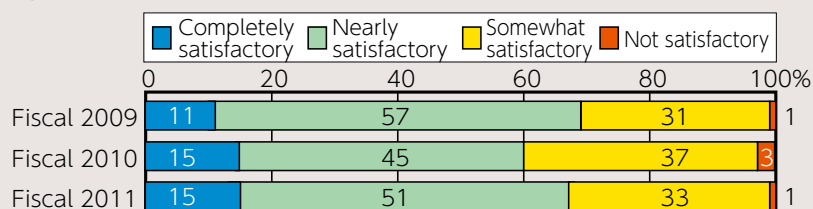


## Members' Self-Assessment

### Dialogue with Society

Overall rating of six self-assessment items, including "Policy," "Plan," "Communication" and "Check/monitoring"

The percentage of companies who rated "Not satisfactory" or "Somewhat satisfactory" decreased by 6% to 34% year on year, but is still high. As for individual items, improvements need to be made regarding "Targets" and "Education and training on dialogue and information disclosure."



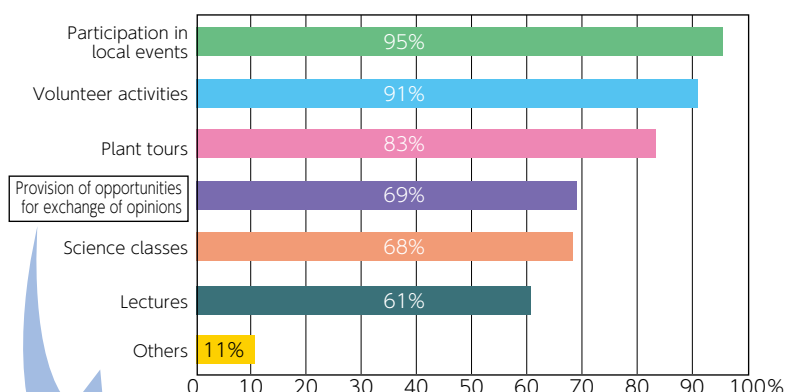
## Dialogue with Society

In working to promote communication with local communities, Members participate in and support local events and voluntary activities, arrange plant tours for local residents and elementary/junior high school students and hold lectures in schools and at educational seminars held for citizens. In fiscal 2011, 69% of Members provided local residents with opportunities to exchange opinions with them. Specifically they held a total of 406 dialogue meetings with local citizens in 124 areas.

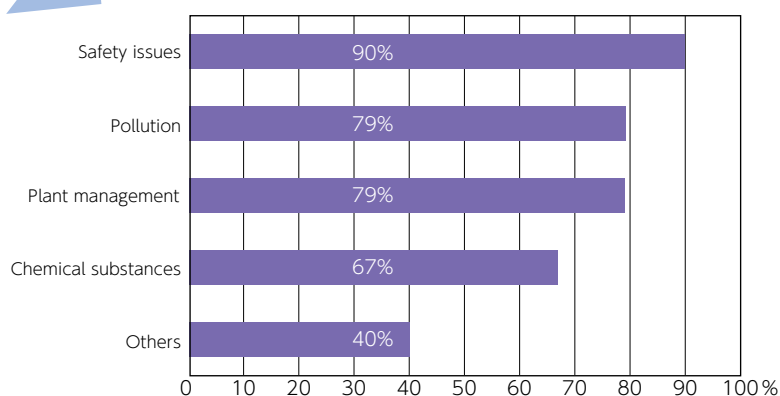
At these meetings, participants primarily discussed the following issues, which were closely related to their community: safety issues, including countermeasures for occupational accidents and other disasters; pollution; issues concerning chemical substances; and plant management issues, including the addition of facilities and changes of land use. All of the above activities demonstrate the commitment of Members to promoting communication with local communities in their business operations.

The percentage of Members engaged in educational activities, such as organizing science classes, increased by 10 points year on year, reflecting the growing hope that children, from whom the next generation of leaders will emerge, will have an increased interest in chemistry and science.

### Means of Communication (multiple answers allowed)



### Issues Discussed in Meetings for Exchanges of Opinions (multiple answers allowed)



Clean-up campaign (Mizusawa Industrial Chemicals, Ltd.)



Stakeholder dialogue (Toyo Ink SC Holdings Co., Ltd.)



Factory tour (Toagosei Co, Ltd.)



Summer festival (Ube Industries, Ltd.)

# RC Committee Activities <Dialogue

It has become essential for chemical companies to publicly disclose the results of the activities they have voluntarily conducted for the environment, safety and health in their Responsible Care activities to deepen mutual understanding with society. In this context, the RC Committee supports Members by widely introducing their activities in its quarterly journal titled JRCC News and in this Responsible Care Report, while also helping Members hold dialogue meetings with local communities.

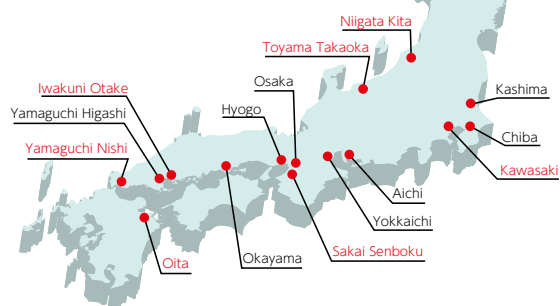
## Dialogue with Local Communities

Across Japan, chemical companies' sites concentrated in the same area, mainly within the same chemical complex district, have formed an organizer group to invite local residents, NPOs, educators, and government officials to joint dialogue meetings with local communities. At the meetings, the companies introduce their activities, mainly those conducted for process safety, disaster prevention and environmental protection, and local residents and other participants raise questions and make requests to the companies, which they incorporate into their future corporate activities improvement. The meetings are also designed to help the companies foster communication with local residents.

These local dialogue meetings began in 1996 and are now held biennially in 15 areas across Japan. In fiscal 2011, the meetings were held in seven areas (Niigata Kita, Yamaguchi Nishi, Kawasaki, Sakai Senboku, Oita, Iwakuni Otake and Toyama Takaoka). To prepare for the meetings, the organizer groups formed by chemical companies located in the same areas hold multiple meetings and implement measures to make the meetings stimulating for participants, including conducting questionnaire surveys to identify the themes that will interest participants, inviting experts to give lectures at the meetings, holding factory tours as part of the meetings, and employing professional meeting facilitators. As a result of the groups making these efforts, an increasing number of local residents have been participating and expressing their opinions in the meetings across Japan in recent years. In

### 15 Areas Where Local Dialogue Meetings Were Held

Areas where the meetings were held in fiscal 2011 are shown in red.



response, the companies are allocating more time at the meetings to answering questions and listening to the opinions of participating citizens. Chemistry, however, is a subject that is difficult for non-experts to understand, and a number of participating citizens have commented that the explanations given by companies at the meetings are difficult to understand. To address this problem, the RC Committee has been holding annual risk communication training seminars to help chemical companies acquire the skills to give



Local dialogue meeting held in the Niigata Kita area



Local dialogue meeting held in the Sakai Senboku area



Niigata Kita area: Tour of Mizusawa Industrial Chemicals' Nakajo Plant



Sakai Senboku area: Tour of Kyowa Hakko Kirin's Sakai Plant

# with Society》

easy-to-understand explanations to citizens. Chemical companies have accomplished a lot by holding these local dialogue meetings jointly with other chemical companies located in their neighborhood. Moreover, an increasing number of Members are fostering dialogues with local residents in their daily business operation, too. For the benefit of these Members, the RC Committee established a new system to support the individual sites of

chemical companies located in the 15 areas in holding supplementary dialogue meetings with local communities, in addition to the existing individual dialogue support system implemented in other areas. A total of five dialogue meetings have been held under the new support system, and it is anticipated that dialogue with local residents will be further fostered by companies, their sites and also small groups at the sites making use of the support systems.

## Dialogue with Citizens

In addition to the dialogue meetings held by Members by inviting citizens living in the neighborhood of their sites, the RC Committee is also holding dialogue meetings with ordinary consumers and consumer NPOs by inviting multiple consumer organizations to participate in the meetings through the network of these organizations. In fiscal 2011, the Committee held one such meeting in Osaka on November 25 and another one in Tokyo on December 6.

In the dialogue meeting held in Osaka, participating consumer organizations referred to the problems concerning the mercury regulations and to developments on endocrine disruptors, and participating companies mentioned the carbon life cycle analysis (c-LCA) of chemical products in Japan as a new initiative for greenhouse gas emissions reduction. Subsequently, participants discussed freely with each other and expressed various opinions, including the following opinion on mercury: the substance is no longer used in the manufacturing processes and products of chemical companies, and it is therefore essential for the government to ensure the appropriate management of consumer products in which mercury is used, such as fluorescent lamps.

As in the meeting in Osaka, in the meeting in Tokyo participating companies also referred to c-LCA. In response, the consumer side requested the companies to take a broad view on conducting LCA



Dialogue meeting with citizens held in Tokyo

and in consideration of environmental pollution, such as water contamination, instead of focusing only on CO<sub>2</sub> emissions. Also the companies were requested to provide consumers with information on the activities of the JCIA as a whole and changes made to their Member companies as a result of the Great East Japan Earthquake. The company side explained JIPS activities for chemicals management and introduced the power saving and disaster recovery support efforts made by individual companies.

## Report Presentation

The RC Committee has been holding annual public meetings in Tokyo and Osaka to present the content of its Responsible Care Report, thereby increasing the awareness of RC activities not only among Members but also among the mass media, universities and NGOs. Copies of the Report are also distributed widely to governmental agencies, libraries across Japan, universities, newspaper companies and NGOs. In fiscal 2011, the public meetings held in Tokyo (on February 13) and in Osaka (on February 20), attracted 119 and 81 participants, respectively. At the meetings, after a lecture on the recent measures taken by the chemical industry to tackle global warming, the RC Committee briefed participants on the Responsible Care Report 2011 and related data. Then three member companies gave presentations: Showa Denko on environmental protection, Kao on process safety and disaster prevention, and Daikin Industries on occupational health and safety.

Typically, after the meetings, the Committee conducts a participant questionnaire survey and incorporates the results when organizing the next meeting. In the last survey, as many as 86% of respondents answered

that their understanding of Responsible Care had either "improved" or "greatly improved" as a result of the meeting. For the lecture given at the meeting, 89% of the respondents answered "quite intelligible" or "generally intelligible." Some respondents, however, wanted the meetings to be improved, and the Committee will make more efforts to meet these requests.



Report presentation in Tokyo

# Interaction among Members

## Responsible Care Award

The Responsible Care Award was initiated in fiscal 2006 to commend individuals or groups of individuals who contributed to promoting and improving Responsible Care activities. This award is intended to increase the motivation in those engaged in Responsible Care activities and encourage these activities. The following table shows the award winners for fiscal 2011, which is the sixth year of the award.

Award Winners	Reason for Commendation
Takashi Ueda, Hitoshi Saito, Hisao Suzuki and Kazuyuki Hirabayashi Kawasaki Plant, Showa Denko K.K.	Reduced the amount of industrial waste sent to landfill.
Takao Mizuno, Yoshiyuki Koizumi and Masaki Nozawa Ehime Works, Sumitomo Chemical Co., Ltd.	Implemented measures to reduce the concentration of nitrogen in waste water from the Ehime Works.
Mitsuro Kamata, Kiyoshi Imamura, Tatsuo Yoshizawa and Fumiyuki Yoshinaga Kanagawa Factory, FUJIFILM Corp.	Conducted activities to ensure compliance with the basic rules on safe behavior at the Kanagawa Factory.

The RC Committee held the commendation ceremony as part of the biannual interaction meeting held in Osaka on July 11, 2012. After receiving commendations from the Committee, representatives of the winning groups gave presentations on the Responsible Care activities they had long been conducting. The presentations were all very useful for other companies.



Responsible Care Award winners

## Interaction Meetings for Members

The Member Relations WG holds interaction and study meetings to promote information exchange and to upgrade Members' skills.

The WG held the first biannual interaction meeting for 2011 in Osaka on July 13 with 80 participants, at which the ceremony for the Responsible Care Awards was also held. Subsequently, the WG held the second biannual interaction meeting for 2011 in Tokyo on February 22, 2012 with the participation of 55 people. As in the previous fiscal year, the WG also organized an interaction meeting for the Kyushu district in Kokura on November 10 with 25 participants. The WG chose "Countermeasures for major earthquakes" as the topic to be discussed at all the meetings, where participants also discussed the following themes in groups: "Reducing industrial waste," "Occupational health and safety," "Chemicals management," "Revisions to the Water Pollution Control Act" and "Developing human resources." Participants introduced their problems and success examples on each of the themes and

actively exchanged opinions.

In fiscal 2011, as in the previous fiscal year, the WG held a study meeting on the basic theme of "safety culture" and specifically on a strategy to create a safety culture based on the lessons learned from the nuclear accident. The meeting was held in Tokyo on December 1, 2011 with 58 participants and in Osaka on December 6, 2011 with 33 participants.



Interaction meeting held in Kokura



# International Activities

The JCIA proactively participates and expresses Japan's opinions in the biannual meetings of the ICCA's Responsible Care Leadership Group (RCLG). At present, the RCLG addresses the evaluation of RC activities based on the eight principles of Responsible Care, promotion of RC activities in China and India, process safety and a review of the key performance indicators (KPIs) as important issues. Also as the chair of the Asia Pacific Responsible Care Organization (APRO), the JCIA began collecting opinions and requests on RC activities from Members to introduce them at the RCLG's meetings. The JCIA dispatched personnel to seven associations belonging to the APRO in July and September 2011 to collect opinions about the examination items decided by the RCLG and to discuss the management of the APRO. As a result of the visits, APRO members agreed to increase the number of their meetings from once every two years to every year and also agreed that the member serving as the chair of the Organization would dispatch personnel to other members for discussions as necessary.

In fiscal 2011, the biennial Asia Pacific Responsible Care Conference (APRCC) was held in Bali, Indonesia in October. The JCIA supported the Indonesian Responsible Care organization KN-RCI in hosting the conference financially and also by sending human resources to the organization.



Meeting of the RCLG held in Brussels

# Responsible Care Verification

More than 10 years have passed since the Responsible Care verification was launched in 2002, and an outline of the verification system was introduced again in Responsible Care NEWS No. 64 published in February 2012.

## Responsible Care Verification for Fiscal 2011

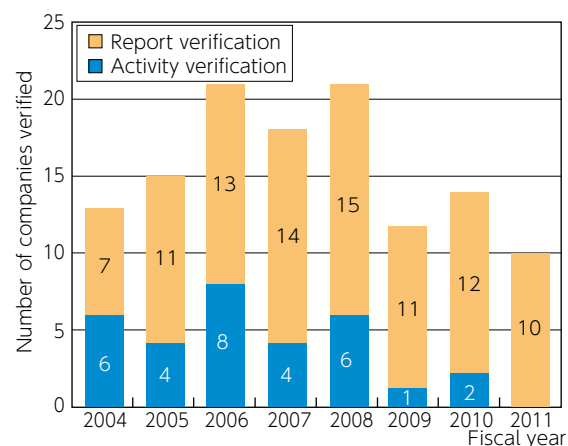
**Report verification (10 companies):** Sanyo Chemical Industries, Ltd., Daicel Corp., Nippon Shokubai Co., Ltd., Shin-Etsu Chemical Co., Ltd., Kao Corp., Kaneka Corp., Asahi Kasei Corp., Ube Industries, Ltd., JSR Corp. and Sumitomo Seika Chemicals Co., Ltd.

In fiscal 2011, 10 companies underwent report verification, and verification has been performed on a total of 140 companies.

Report verification is carried out to (1) help Members improve their Responsible Care reports in reference to the expert opinions given on the quality of the reports and (2) help companies improve their Responsible Care activities. Specifically in the report verification, expert opinions are expressed in writing on ① the rationality of the methods used to calculate and tabulate the performance indicators and the accuracy of the numerical data, ② whether the information provided in the reports (other than performance indicators) is consistent with the evidence, ③ evaluation of Responsible Care activities, and ④ the features of the reports. For companies where Responsible Care managers have been replaced, explanations given on the concept (ethics) of Responsible Care by the verifiers must be very useful.

Publication of Responsible Care reports is quite important for companies to fulfill their accountability

to society, and in the reports they need to disclose both positive and negative information. Companies are recommended to undergo Responsible Care verification to improve their Responsible Care activities and Responsible Care reports.



# Our Expectations for Responsible Care



**Yukako Itakura**  
Consumer Lifestyle Analyst

Responsible Care activities are defined as the activities conducted voluntarily by companies dealing with chemical substances, in which they work to protect human health, safety and the environment throughout the life cycle of their products, including the development of chemical substances and the manufacture, distribution, use, final consumption and disposal of the products. Also in Responsible Care activities, they disclose the results and foster communication with society. The term "Responsible Care (activities)," however, is not widely known to the public. Even some of my acquaintances who are experts in the safety of chemical

substances did not know the term, and I myself happen to know it through reading a company's CSR report. Unfortunately in Himeji in September 2012, there was a fire at the manufacturing site of a company engaged in Responsible Care activities and a firefighter lost his life due to this incident. Also at a printing company in Osaka City, a number of former employees have developed bile duct cancer and similar cases have been reported at printing companies across Japan, although there are still doubts about whether organic solvents used by the companies have caused the cancer. These incidents make me think that Responsible Care activities are conducted only in a limited way.

People tend to forget about past accidents as time goes by, but companies must never forget to ensure the safety of their products. Following the Consumer Product Safety Act and the Consumer Safety Act coming into force, the Ministry of Health, Labour and Welfare prepared safety manuals for household goods in which a range of chemicals are used, and the manuals are easily available on the Internet. A number of companies, however, are making their products without any awareness of these trends and the following developments.

Not only manufacturers, but also distributors and consumers both within

and outside Japan are increasingly involved in sharing information on assessing the safety of chemical substances, and initiatives have been implemented in line with the REACH regulation, including the introduction of safety data sheets (SDSs) for chemical substances.

Consumers distrust the terms "artificial" and "synthetic," and although their lives have become more convenient thanks to advances in the use of chemical substances in various products, they are always concerned that using the products might have adverse effects on the environment and human health. Chemical companies, however, are not providing consumers with sufficient information about the substances to allay their concerns. Companies have not disclosed enough information on the risks of chemical substances and have not provided their stakeholders with opportunities to discuss with each other on an equal footing.

Consumers need to participate in society more proactively through their consumption patterns so that they can make greater contributions to creating a sustainable society. To help meet this requirement, the chemical industry must review the meaning of Responsible Care and encourage more SMEs and consumers to get involved its Responsible Care activities.



**Norihiro Itsubo**  
Associate Professor  
at Tokyo City University

Life cycle assessment (LCA) of products has been fostered as a tool that helps deepen communication between stakeholders through the visualization of environmental information. In Japan, 700 products are presently registered and information on the products is disclosed as a result of the pilot carbon footprint (CFP) project, and now LCA is being used for a wider range of purposes to meet the expanding social needs for such assessment. Specifically, the use of LCA has been expanding in the following four directions.

LCA used to be carried out on products, but now the target is **being expanded to assess companies themselves**. In Scope 3, the amounts of CO<sub>2</sub> emissions from the procurement of materials and

from the use and disposal of products by their purchasers are calculated in addition to emissions from corporate activities. In the Carbon Disclosure Project (CDP), the Scope 3 calculation results are disclosed for 500 Japanese companies in the form of a report.

In Europe, the European Commission has been leading the introduction of "environmental footprints" on the assumption that **all 14 environmental impact footprint categories** will be covered, including climate change, acidification, resource consumption, and water consumption.

In the United States, the Sustainability Consortium has developed the "sustainability assessment" method and is looking at the establishment of a system to share information for assessment, including not only information on the environment but also on **human rights, labor and other social aspects**.

The United Nations Environment Programme (UNEP) is implementing measures to **foster LCA in emerging economies and developing countries** based on the Life Cycle Initiative, and Europe, the United States and Japan are conducting R&D to have their environmental assessment methods widely adopted across the world.

In addition to expansion into the aforementioned four directions, LCA is also increasingly used in combination with risk assessment (RA). The Great East Japan Earthquake on March 11 and the nuclear accident at the Fukushima

Daiichi Nuclear Power Station have reminded us that there is no perfect safety. Now energy policies need to be implemented not only in consideration of global warming but also based on the assessment of risks caused by radioactivity and by various other accident- and disaster-related risks.

I expect that the chemical industry's expertise in the risk assessment of chemical substances will be fully utilized in assessing energy policies carried out in consideration of accident-related risks and impact on local inhabitants. In the chemical field, the development of environmental assessment models has been fostered since the 1980s, including models for fate and exposure analysis and for cancer risks. The industry has accumulated a wealth of data for the inventory of chemical substances, such as PRTR-related data. The data could be quite useful in promoting LCA on all chemical substances, but in Japan interdisciplinary cooperation has yet to be fostered. To this end, activities to perform RA and LCA in combination are being promoted through the Green Sustainable Chemistry (GSC) initiative, and I strongly hope that the chemical industry will make more efforts to combine the two assessment methods, to make better use of their respective merits, and eventually to establish and propose an approach to carrying out sustainability assessments from a broader viewpoint.

## The RC Committee Members

100 companies as of October 2012 (listed in alphabetical order)

ADEKA Corp.  
Air Products Japan, Inc.  
Air Water Inc. Chemical Company  
Asahi Glass Co., Ltd.  
Asahi Kasei Corp.  
BASF Japan Ltd.  
Central Glass Co., Ltd.  
Chugai Pharmaceutical Co., Ltd.  
Chugoku Kayaku Co., Ltd.  
Daicel Corp.  
Daihachi Chemical Industry Co., Ltd.  
Dai-ichi Kogyo Seiyaku Co., Ltd.  
Daikin Industries, Ltd.  
Dainichiseika Color & Chemicals Mfg. Co., Ltd.  
Dai Nippon Toryo Co., Ltd.  
Daiso Co., Ltd.  
Denki Kagaku Kogyo K.K.  
DIC Corp.  
DNP Fine Chemicals Co., Ltd.  
Dow Chemical Japan Ltd.  
DuPont Kabushiki Kaisha  
DuPont-Mitsui Fluorochemicals Co., Ltd.  
DuPont-Mitsui Polychemicals Co., Ltd.  
Evonik Degussa Japan Co., Ltd.  
FUJIFILM Corp.  
Hitachi Chemical Co., Ltd.  
Hodogaya Chemical Co., Ltd.  
Hokko Chemical Industry Co., Ltd.  
Huntingdon Life Science Co., Ltd.  
Idemitsu Kosan Co., Ltd.  
Ishihara Sangyo Kaisha, Ltd.  
ITOCHU Corp.  
Japan Carlit Co., Ltd.  
JNC Corp.  
JSR Corp.  
JSP Corp.  
Kaneka Corp.  
Kansai Paint Co., Ltd.  
Kanto Chemical Co., Inc.  
Kanto Denka Kogyo Co., Ltd.  
Kao Corp.  
KH Neochem Co., Ltd.  
Koei Chemical Co., Ltd.  
Kuraray Co., Ltd.  
Kureha Corp.  
Kyowa Hakko Kirin Co., Ltd.  
Lion Corp.  
Maruzen Petrochemical Co., Ltd.  
Methanex Japan Ltd.  
Mitsubishi Chemical Holdings Corp.  
Mitsubishi Gas Chemical Co., Inc.  
Mitsubishi Shoji Foodtech Co., Ltd.  
Mitsui Chemicals, Inc.  
Nankai Chemical Co., Ltd.  
Nihon Nohyaku Co., Ltd.  
Nippon Chemical Industrial Co., Ltd.  
Nippon Steel & Sumikin Chemical Co., Ltd.  
Nippon Kayaku Co., Ltd.  
Nippon Paint Co., Ltd.  
Nippon Polyurethane Industry Co., Ltd.  
Nippon Shokubai Co., Ltd.  
Nippon Soda Co., Ltd.  
Nippon Unicar Co., Ltd.  
Nissan Chemical Industries, Ltd.  
Nitto Denko Corp.  
NOF Corp.  
Osaka Organic Chemical Industry Ltd.  
Otsuka Chemical Co., Ltd.  
Polyplastics Co., Ltd.  
Rhodia Japan Ltd.  
Rohm and Haas Japan K.K.  
Sakai Chemical Industry Co., Ltd.  
Sanyo Chemical Industries, Ltd.  
Sekisui Chemical Co., Ltd.  
Sekisui Plastics Co., Ltd.  
Shell Chemicals Japan Ltd.  
Shin-Etsu Chemical Co., Ltd.  
Showa Denko K.K.  
Sika Ltd.  
Sumika Bayer Urethane Co., Ltd.  
Sumitomo Bakelite Co., Ltd.  
Sumitomo Chemical Co., Ltd.  
Sumitomo Seika Chemicals Co., Ltd.  
Takeda Pharmaceutical Co., Ltd.  
Taoka Chemical Co., Ltd.  
Tayca Corp.  
Teijin Ltd.  
The Nippon Synthetic Chemical Industry Co., Ltd.  
Toagosei Co., Ltd.  
Tokai Carbon Co., Ltd.  
Tokyo Ohka Kogyo Co., Ltd.  
Tokuyama Corp.  
Tonen Chemical Corp.  
Toray Industries, Inc.  
Tosoh Corp.  
Toyo Ink SC Holdings Co., Ltd.  
Ube Industries, Ltd.  
Wilbur-Ellis Co., (Japan) Ltd.  
Yuki Gosei Kogyo Co., Ltd.  
ZEON Corp.



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OUR COMMITMENT TO SUSTAINABILITY

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