NIPPON SHOKUBAI

RC Report 2020

Responsible Care®
OUR COMMITMENT TO SUSTAINABILITY

Nippon Shokubai Group Mission

TechnoAmenity

Providing affluence and comfort to people and society, with our unique technology.

Management Commitment

We conduct all of our corporate activities based upon a deep respect for humanity.	We aim at coexisting with society, and working in harmony with the environment.	We pursue technologies that will create the future.	We act on the global stage.

Contents

On publishing the RC Report 2020

Through our commitment to RC activities, we aim to earn greater confidence from the public as a responsible chemical company.

Nippon Shokubai's reports on Responsible Care (RC) initiatives began with the issuance in fiscal 2002 of the "Environmental Report." Along with the improvement of the initiatives, it was renamed the "Environmental and Social Report" and later the "CSR Report," to expand the report contents to include initiatives related to our involvement in society and corporate social responsibility.

In fiscal 2019, in line with the publication of the "**TechnoAmenity** Report" to cover management strategies and financial data, in view of the importance of RC activities, we decided to issue a separate "RC Report," which compiles information exclusively on our RC activities.

Under the principle of sustainable development, the Nippon Shokubai Group has designated environmental protection; process

Corporate Credo

Safety takes priority over production.

Nippon Shokubai Code of Conduct

In the belief that it is our social responsibility to conduct business based upon the principles of compliance and self-responsibility for the sake of proper social development, we have set forth the following basic corporate behavior guidelines as the "Nippon Shokubai Code of Conduct."

❶ Guided by our Group Mission of **TechnoAmenity**, we will conduct all of our actions as a good corporate citizen.
❷ We will comply with relevant laws both inside and outside of Japan, and act in accordance with in-house regulations.
❸ We will create and nurture a sound, vibrant workplace, where each individual can hone their professional competence and find fulfillment in their career.
❹ We will develop and market products and services that are both safe and useful, based upon an accurate understanding of social demands.
❺ We will commit ourselves to eliminating labor hazards and accidents, and constantly strive to protect the global environment.
❻ We will conduct business based on fair and open competition.
❼ We will take a firm stance when dealing with unlawful or antisocial groups.
❽ We will ensure frequent communications with our shareholders and members of society in general, and guarantee the appropriate disclosure of corporate information.
❾ With respect for the culture and customs of every nation/region we serve, we will contribute to their development and wellbeing through community-based business undertakings.
❿ We will ensure the solid and sustainable development of the company through business undertakings based soundly upon the above action guidelines.

safety and disaster prevention; occupational safety and health; chemical safety; quality; and communication with society as the priority areas of its RC activities, in which we are endeavoring to ensure the implementation of the activities. While enhancing our activities based on our Corporate Credo "Safety takes priority over production" and RC Policy, as well as the needs of society, we make continuous efforts to earn greater confidence from the public as a responsible chemical company.

We will also actively promote business activities such as the development and sales expansion of products that contribute to addressing climate change and reducing waste, including at the usage stage (Environmental Contribution Products), and the development of technologies and products that contribute to society and lifestyles.

I hope this Report will help deepen your understanding of the RC initiatives of the Nippon Shokubai Group. We appreciate your support and candid opinions.

Executive Officer, Director of RC Division
Gun Saito

Responsible Care Activities

RC Initiatives

We actively promote our RC initiatives in the priority areas of environmental protection, process safety and disaster prevention, occupational safety and health, chemical safety, quality and communication with society.

RC Initiatives

All companies in the chemical industry responsible for handling chemical substances voluntarily agree to protect the environment, safety and health in all processes ranging from the development of chemical substances to their manufacture, transportation, use, end consumption, disposal and recycling. By disclosing the results of these activities to the public, the companies hold dialogue and communicate with society. These efforts are known as Responsible Care (RC). The RC Global Charter was developed in 2006 and revised in 2014 by the International Council of Chemical Associations (ICCA), which promotes Responsible Care worldwide.

Nippon Shokubai has participated in the Japan Responsible Care Council (currently known as the Japan Chemical Industry Association (JCIA)'s Responsible Care Committee) since it was established in 1995, and has been advancing various initiatives by introducing relevant systems, such as the environmental management system under ISO 14001, the quality management system under ISO 9001, and the occupational safety and health management system (OSHMS).

We are determined to continue contributing to society while fulfilling our corporate social responsibility through our group-wide commitment to Responsible Care.

President's signature on the RC Global Charter (Revised 2014 version)

RC Policy

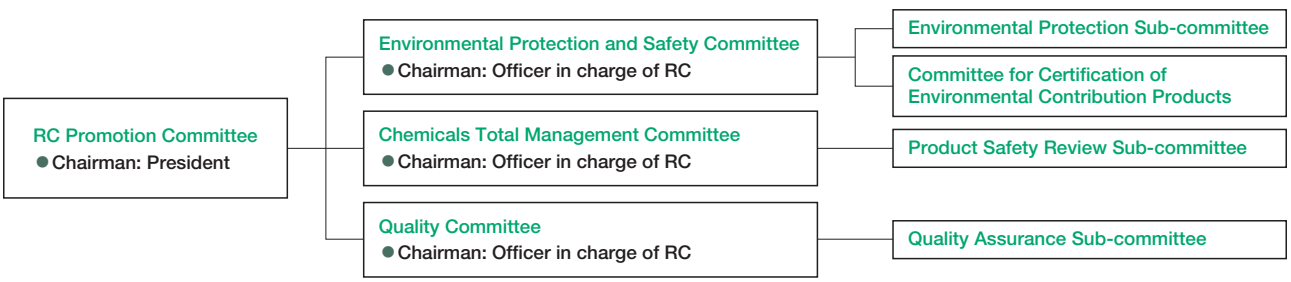
In conformity with the Nippon Shokubai Group Mission, Management Commitment, Corporate Credo, and the Nippon Shokubai Code of Conduct, we rank it as an important management measure to provide products and technologies that contribute to society and environmental protection. In addition, while paying due respect to the principle of Sustainable Development, we are determined to conduct all activities in accordance with the following policy related to environmental protection, safety, and product quality that will bring our business operations into harmony with the global environment.

We will implement this RC Policy in all our business operations by ensuring all employees have a thorough understanding and awareness of its importance. The president shall be the person with the ultimate responsibility for implementing this policy.

1	**Aim at environmental protection and reduction of negative environmental impact throughout the entire life cycle of a product, from development to disposal.**
2	**Ensure the safety of our employees and our communities by targeting zero accidents and zero injuries with a commitment to the Corporate Credo, "Safety takes priority over production."**
3	**Confirm the safety of chemical materials, intermediates and products, and consider the health of our customers, employees of our logistics subcontractors, our employees, and others.**
4	**Stably supply products and associated services that meet customer satisfaction and inspire their trust.**
5	**Publicly announce the results of these activities and make an effort to communicate for proper understanding.**

RC Promotion Organization

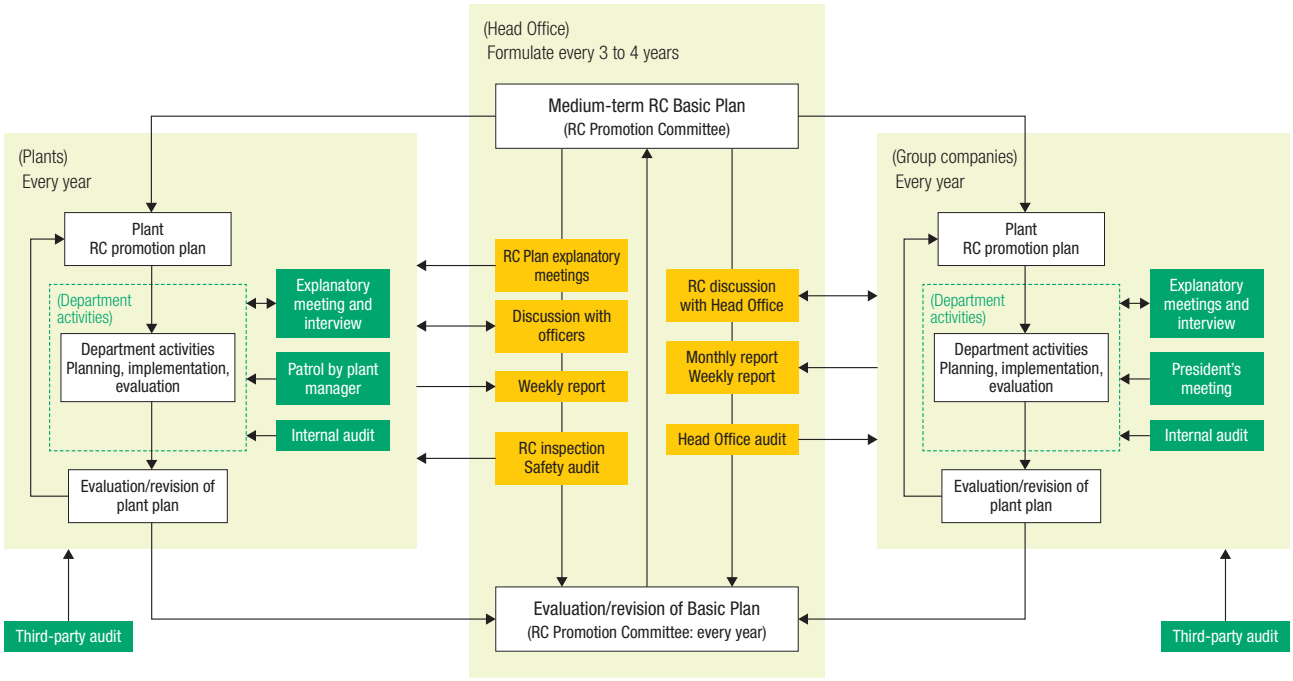
The president is chairman of the RC Promotion Committee, and technical committees and sub-committees are established to promote company-wide RC activities.



Cycle of RC Initiatives Promotion

To implement the RC Policy, the Nippon Shokubai Group promotes RC initiatives by following the PDCA cycle below each year, thereby contributing to society and fulfilling its corporate social responsibility.

Steps to promote RC initiatives



Steps in RC Initiatives Promotion

[Head Office]
The RC Promotion Committee, chaired by the President, formulates the Medium-term RC Basic Plan every three to four years in line with the period of the medium-term management plan. RC inspections and safety audits are conducted every year based on the themes for inspections determined each year in order to check and evaluate the status of implementation of activities at each plant, and revise the plan if necessary.

[Plants]
Each year, the RC committee of each plant chaired by the plant manager formulates its plant RC promotion plan based on the company-wide Medium-term RC Basic Plan and the evaluation results of its plant RC promotion plan of the previous year. Based on this plan and in view of the issues specific to the department, each department formulates the department activities plan as its specific action plan.

The progress of the activities is checked through patrol by the plant manager, department discussion, and internal audits under ISO and various other management systems, as well as through discussion with the Head Office officers, RC inspections, and third-party audits. Based on the results of these checks, the department activities plan is revised as necessary. Thus, following this PDCA cycle, the plant works to continuously improve its initiatives.

[Group companies]
Similar to the case of plants, Group companies plan their activities each year based on the Medium-term RC Basic Plan. Each company formulates its own plant RC promotion plan taking into account its activities and local laws and regulations.

The progress of the activities is shared with the Head Office by means of a weekly report, and other periodic reporting and teleconferences, and checked through regular discussion and audits by the Head Office. Based on the results of these checks, Group companies revise their activities as necessary. By following this PDCA cycle, Group companies work to continuously improve their initiatives.

Moreover, the Head Office encourages exchanges among Group companies, thereby mutually improving the level of their RC activities.

Definitions

PDCA cycle: Plan-do-check-action cycle
An approach for continuous process improvement in the quality management in production. It is designed to continuously improve business processes by iteratively repeating four steps: Plan, Do, Check, and Action.

RC Inspection

Nippon Shokubai conducts RC inspections every year to ensure continuous improvement of RC initiatives at Himeji and Kawasaki Plants by organizing the RC Inspection Committee chaired by the Member of the Board in charge of production and technology, which consists mainly of officers.

RC Inspection

Nippon Shokubai has conducted RC inspections for 45 years since they started in February 1974 (initially named “safety inspections”) to implement our Corporate Credo “Safety takes priority over production,” which was established in 1973.

The RC inspection, which was renamed in fiscal 2003 (previously known as a safety inspection), is currently conducted on the progress of each RC initiative at the plants and their priority theme set for each fiscal year. The priority themes of recent years are as shown below.

Medium-term Plan	Fiscal year	Priority theme
9th FY 2014 to FY 2016	FY 2014 (42nd)	Progress in measures to prevent recurrence
	FY 2015 (43rd)	Measures to prevent recurrence and development of a safety culture
	FY 2016 (44th)	Summary of measures to prevent recurrence
10th FY 2017 to FY 2020	FY 2017 (45th)	Initiatives for environmental protection
	FY 2018 (46th)	Prevention of quality issues and ensuring quality governance
	FY 2019 (47th)	Prevention of recurrence of similar industrial injuries

FY 2019 RC inspection

The RC inspection for fiscal 2019 was conducted on November 12 at Himeji Plant and on November 19 at Kawasaki Plant to check the progress in each of their RC initiative and under the priority theme of “prevention of recurrence of similar industrial injuries.”

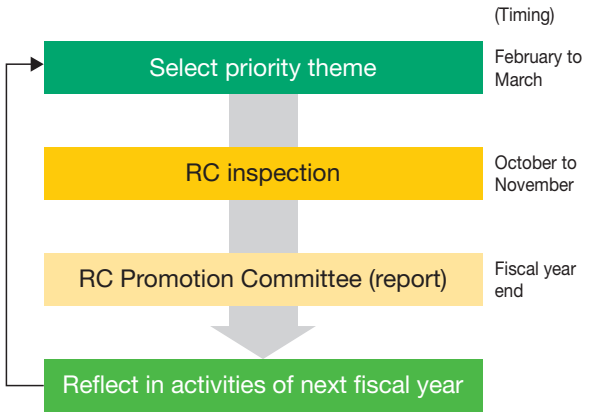
On-site checking

RC Inspection flow

The priority theme of the RC inspection for a fiscal year is determined between February and March of the previous fiscal year based on information on issues inside and outside the Company and the results of internal RC initiatives. Then the RC Inspection Committee conducts the inspection between October and November. The inspection results of both plants are reported to the RC Promotion Committee, which is chaired by the President, and reflected in activities of the next fiscal year.

The flow of an RC inspection is as shown below.

RC Inspection flow



A written report indicating the problems found, proposals for improvement and other matters is issued for the two Plants, with the aim of ensuring continuous improvement of their RC initiatives.

RC inspection general meeting

10th Medium-term RC Basic Plan (Fiscal 2017–2020) and Results

The 10th Medium-term RC Basic Plan was formulated in order to gain greater public trust by creating the concept of the "Reborn Nippon Shokubai." It reflects a continuation of initiatives adopted for the 9th such plan as well as actual outcomes of problems encountered; moreover, various aspects of our RC initiatives have been modified in response to requests from both inside and outside the company. We will continue to focus on the importance of fostering a safety culture.

In addition, in order to further promote our RC initiatives, we will continue to adopt improvements by setting numerical targets (as key performance indicators, or KPI) wherever possible and will evaluate them on a regular basis.

Evaluation: Achieved / Almost achieved / Not achieved

Environmental Protection

Objectives for Fiscal 2017–2020
- To reduce energy consumption by an amount equivalent to 8,000 kL of crude oil (over 4 years)
- To reduce energy intensity by 5% from fiscal 2015 levels (1% reduction annually to 103.2 L/t)
- To reduce CO_2 intensity by 5% from fiscal 2015 levels (energy source, 1% reduction annually to 0.208 t-CO_2/t-production)
- To reduce fuel consumption intensity for road transport by 5% from fiscal 2015 levels (1% reduction annually to 33.4 L/1,000 t-km)
- To promote modal shift
- To maintain zero emissions[1] (Quantity of final off-site landfill) ≤ (Total amount of waste generated×0.1%)
- To reduce emissions of substances subject to the PRTR Law by 25% from fiscal 2015 levels (81 t/y)

Results for Fiscal 2019
- Energy consumption reduced by 3,646 kL of crude oil equivalent
- Energy intensity: 6.1% reduction • CO_2 intensity: 12.2% reduction
- Fuel consumption intensity for road transport: 2.3% reduction
- Modal shift promotion continues • Zero emissions maintained
- Emissions of substances subject to the PRTR Law: 27.2% reduction

Priority Initiatives
1) Promoted energy conservation initiatives and advanced technical reviews to reduce waste and the release of PRTR-controlled chemical substances.
2) Continued examining the utilization of renewable energy.
3) Evaluated contributions to CO_2 emissions reduction related of our products through c-LCA.[2]
4) Conducted inspections of equipment that uses fluorocarbons as planned.

Process Safety and Disaster Prevention

Objectives for Fiscal 2017–2020
- To achieve zero accidents of Class A[3] and Class B[4] (zero severe process safety accidents)

Results for Fiscal 2019
- Class A process safety accidents: 0 • Class B process safety accidents: 0

Priority Initiatives
1) Implemented systematic risk assessments and other initiatives to prevent accidents and malfunctions.
2) Systematically implemented measures against deterioration and for earthquake response, for example.
3) Continuously improved our process safety management system.
4) Systematically implemented and sought to enhance external education and workplace education and training.
5) Sought to strengthen a safety first mindset through efforts that included Safe Operation Month activities and safe behavior checks.

Occupational Safety and Health

Objectives for Fiscal 2017–2020
- Zero injuries with loss of workdays[5] • Zero injuries without loss of workdays[6] (including contractors)

Results for Fiscal 2019
- Three injuries with loss of workdays • 11 injuries without loss of workdays

Priority Initiatives
1) Advanced basic safety activities and undertook other efforts to prevent injuries.
2) Implemented systematic safety measures by, for example, steadily undertaking the organization-wide introduction of industrial injury examples.
3) Checked the status of every safety activity and sought to continuously improve them.
4) Systematically implemented workplace safety education and sought to enhance workplace education and training.
5) Sought to strengthen a safety first mindset through efforts that included safe behavior checks.
6) Supported the safety initiatives of our contractors through safety education and patrols, for example.

Definitions
[1] Zero emissions: Reducing the quantity of waste subject to final disposal at off-site landfills to less than 0.1% of the total amount of waste generated (In the calculation of total waste, the amount of sludge subject to activated sludge treatment is calculated before dehydration.)
[2] c-LCA (carbon-Life-Cycle Analysis): A method of assessing greenhouse gas emissions throughout the life cycle of a finished product incorporating chemical products and a comparison product containing no such chemical products when used by consumers and in other industries. The evaluation method calculates a chemical product's net contribution to GHG emissions reduction by determining the increased emissions when no such chemical product is used
[3] Level 9 or higher according to the Nippon Shokubai method on the Japan Petrochemical Industry Association chart
[4] Level 3 to 8 according to the Nippon Shokubai method on the Japan Petrochemical Industry Association chart
[5] Injury with loss of workdays: Injury requiring at least one lost workday for medical treatment
[6] Injury without loss of workdays: Injury requiring no loss of workdays for medical treatment
[7] Refers to Group companies inside and outside Japan, unless otherwise specified

Chemical Safety

Objectives for Fiscal 2017–2020
- To achieve zero problems related to chemical safety (legal or social problems)

Results for Fiscal 2019
- Zero problems related to chemical safety

Priority Initiatives
1) Gathered information about the hazardous properties and the legal requirements for chemical substances. In addition to making this information known within the company, also appropriately provided information to customers, including through SDS.
2) Implemented functional improvements to our chemical substance management system and ensured information granularity based on our plans.
3) Properly provided various reports and submitted information within specified time periods in accordance with the legal obligations of Japanese and foreign laws and regulations as well as other requests from authorities.

Quality

Objectives for Fiscal 2017–2020
- To improve customer satisfaction • To attain more trust from customers
- To achieve zero serious quality complaints

Results for Fiscal 2019
- Customer satisfaction improvement not achieved
- Attained more trust from customers • One serious quality complaint was filed

Priority Initiatives
1) Promoted efforts to prevent quality issues.
2) Implemented product safety assessment, product entrustment assessment and screening by the gate system for fine and specialty chemicals and new businesses.
3) Strengthened support for the quality assurance initiatives of Group companies.[7]
4) Implemented quality audits at both our plants and Group companies.
5) Continuously implemented quality education and quality awareness-raising activities.

Communication with Society

Objectives for Fiscal 2017–2020
- To maintain dialogue with stakeholders and implement information disclosure

Results for Fiscal 2019
- Participated in dialogue with local communities
- Published **TechnoAmenity** Report and RC Report

Developing RC among Our Group Companies (Measures Common to Our Group Companies)

Objectives for Fiscal 2017–2020
(1) Environmental Protection:
- To reduce energy intensity
- To reduce final disposal at off-site landfills (Group companies in Japan)
- To reduce the amount of waste (Group companies outside Japan)
- To reduce emissions of substances subject to the PRTR Law

(2) Process Safety and Disaster Prevention:
To achieve zero disasters and zero accidents (equivalent to Class A and Class B severe process safety accidents on the Nippon Shokubai scale)
(3) Occupational Safety and Health: To achieve zero injuries with loss of workdays
(4) Chemical Safety: To achieve zero problems related to chemical safety (legal or social problems)
(5) Quality: To receive zero serious quality complaints
(6) Communication with Society:
To maintain a dialogue with stakeholders and implement reasonable information disclosure

Results for Fiscal 2019
- Two out of 12 Group companies reduced their energy intensity year-on-year
- Waste subject to final disposal at off-site landfills was increased by 19% compared with the level of the previous fiscal year
- Amount of waste generated increased by 0.5% compared with the level of the previous fiscal year
- Emissions of substances subject to the PRTR Law were reduced by 12% compared with the level of the previous fiscal year
- Zero facility disasters • Two facility accidents • Two injuries with loss of workdays
- Zero problems related to chemical safety • No serious quality complaints were filed
- Published an Environmental Report and participated in community events

Priority Initiatives
- Conducted RC discussions and audits, and sought to improve the RC level of the entire Group.

Responsible Care Activities

Environmental Protection Initiatives

We promote initiatives to reduce the environmental impact of our business operations, including tackling climate change and reducing waste through our product supply chains.

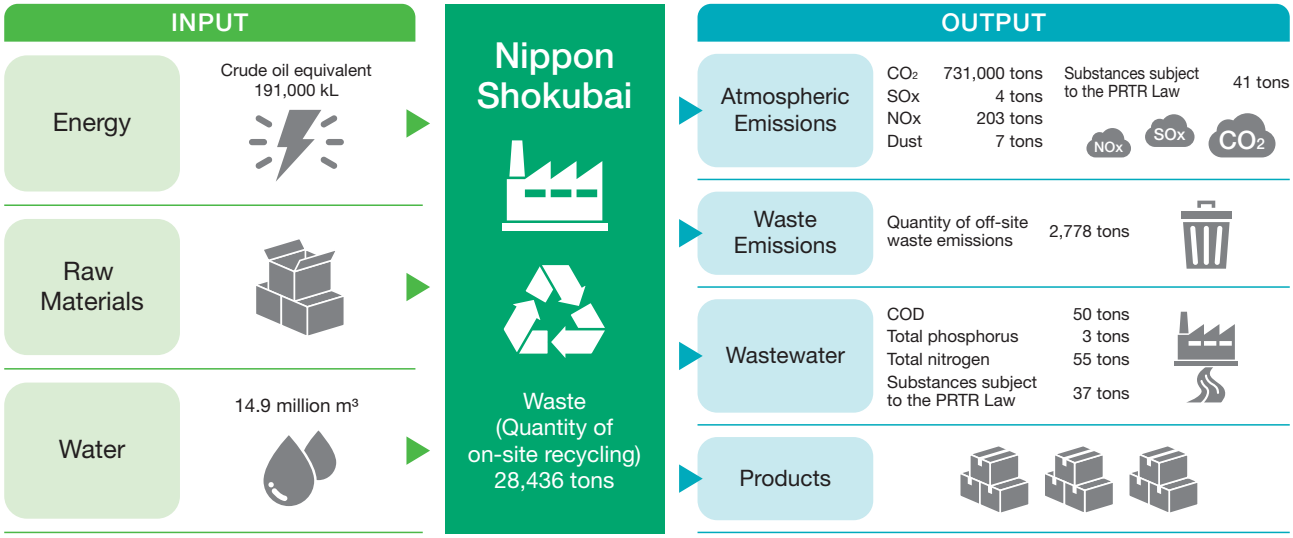
Overview of fiscal 2019

For energy conservation, we achieved a reduction of 3,646 kL (crude oil equivalent) of energy consumption mainly by introducing cogeneration and promoting effective use of exhaust heat from our production processes.

As a result, the reduction achieved between fiscal 2017 and fiscal 2019 totaled 8,114 kL, reaching the target for the 10th Plan ahead of schedule. For substances subject to the PRTR Law, we were also able to achieve the target for emissions reduction ahead of schedule through efforts to reduce the amount of boron, etc. In the second half of fiscal 2019, the Committee for Certification of Environmental Contribution Products was established to verify the certified products and organize the certification criteria. Furthermore, we set the greenhouse gas (GHG) reduction target for fiscal 2030 to be 10% compared to the level of fiscal 2014, by reference to the target of the JCIA.

Environmental Impacts of Our Business Operations

We are engaged in various efforts to not only provide better products and services, but also to reduce the environmental impacts of our business operations, including in our supply chains. We make efforts to conserve energy and tackle climate change of course. We are also managing the water used in our manufacturing sites in order to use water resources effectively, conducting advanced recycling and thoroughly treating water before it is released into the natural environment. Moreover, we also commission odor monitoring as well as conduct odor patrols and regular noise measurements so that neighboring residents can live in peace. In fiscal 2019, we received no reports of environmental pollution incidents or environmental complaints.



Note: This fiscal 2019 data is for only Nippon Shokubai (including our head offices, research centers and other sites).

Employee's Voice **We achieved energy consumption reduction through recovery and reuse of exhaust heat**

At Kawasaki Plant, exhaust heat such as reaction heat generated in the manufacture of ethylene oxide and its derivative products is usually recovered and reused. Recently, we newly installed a heat exchanger on the distillation column for the ethylene glycols manufacturing process so that exhaust heat can be recovered and effectively used.

This project was designed to incorporate the recovered exhaust heat in the existing exhaust heat recovery and reuse process. Therefore, it was very difficult to re-set the conditions corresponding to the operational conditions of the plant and to set the conditions to maximize the total energy-saving effect. Consequently, we modified the operational conditions of hot water, which serves as a heating medium, and achieved a 165 kL (crude oil equivalent) reduction in energy consumption per year for the entire process.

We will continue to make efforts to further increase the amount of energy conserved through the optimization of conditions according to the plant's operational conditions.

Yasuhiro Hashizume
Production No. 3 Section, Kawasaki Plant

Tackling Climate Change

Promoting GHG reduction

Reducing energy use/CO_2 emissions

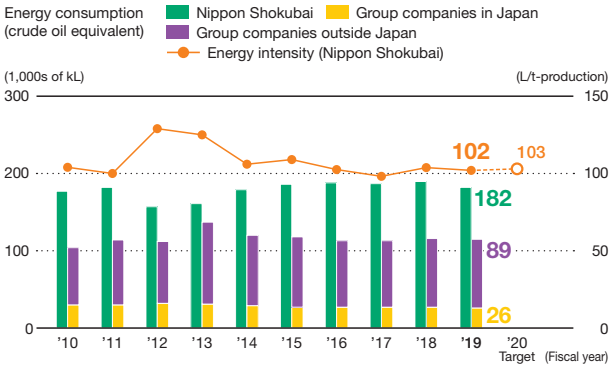
At Nippon Shokubai, in line with the targets set in the commitment to a low carbon society by the JCIA, the RC Promotion Committee, chaired by the President, has formulated the Medium-term RC Basic Plan. Based on this Plan, each plant, under the initiative of the energy management committee, implements activities to help mitigate climate change, including reducing energy consumption and CO_2 emission intensity.

Furthermore, we set the GHG reduction target for fiscal 2030 to be 10% or more compared to the level of fiscal 2014 by reference to the CO_2 emissions reduction target for fiscal 2030 set by the JCIA in March 2019 (10.7% reduction compared to FY 2013).

In fiscal 2019, the results of our efforts to conserve energy aimed at our fiscal 2020 targets were 102 L/t-production for energy intensity and 0.402 t-CO_2/t-production for CO_2 emission intensity, and 0.192 t-CO_2/t-production for energy source CO_2 emission intensity.

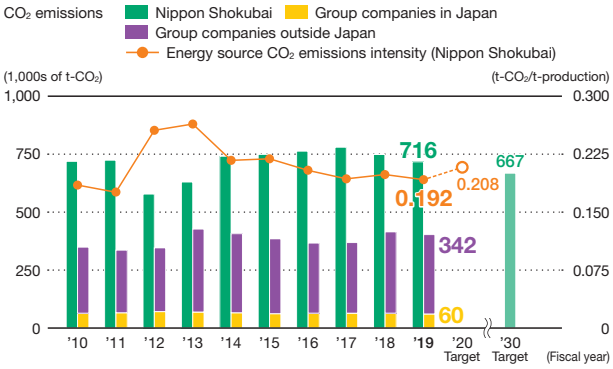
Our Osaka and Tokyo Offices use green electricity (biomass generation) under the Green Electricity Certificate System.

Trends in Energy Consumption and Intensity



* The amount of energy consumed and CO_2 emissions do not include our head offices, research centers, plant administration buildings or employee welfare facilities.
* The amount of energy consumed and CO_2 emissions in fiscal 2019 totaled 9,000 kL and 15,000 t-CO_2, respectively, for our head offices, research centers, plant administration buildings, and employee welfare facilities of Nippon Shokubai.

Trends in CO_2 Emissions and Intensity



* CO_2 emissions are totals of energy source and non-energy source CO_2 emissions.

Suppression of fluorocarbon emissions

The Act on Rational Use and Proper Management of Fluorocarbons was fully implemented in April 2015 and covers the entire lifecycle of fluorocarbons from production to disposal. In April 2020, regulations for the disposal of specified devices were tightened.

As a "user of specified products," we carry out scheduled simple inspections and periodic inspections as required by law. The amount of fluorocarbon leakage calculated in fiscal 2019 totaled 3,194 t-CO_2 for the entire company, with -580* t-CO_2 from the Himeji Plant and 3,774 t-CO_2 from the Kawasaki Plant. We will continue to strive to reduce the amount of fluorocarbon leakage through initiatives such as strengthening inspections and maintenance, introducing devices that use coolants with a low global warming potential, and implementing proper treatment at the time of disposal of devices, which will help alleviate global warming.

Calculated Leakage of Fluorocarbons in Fiscal 2019

(t-CO_2)

Himeji Plant	−580*
Kawasaki Plant	3,774
Others	0
Entire company	**3,194**

* At the Himeji Plant, 1,217 t-CO_2 for fluorocarbon recovered along with the temporary storage of devices was recorded as a negative figure.

Definitions

Green Electricity Certificate System

Environmental value-added electricity generated from natural energy is certified by a third-party institution, and the certificate issued to the business operator can be traded as a Green Electricity Certificate.

Calculating the CO_2 emissions resulting from our entire supply chain

Calculation of Scope 3 emissions

In Scope 3, the amount of GHG emissions associated with corporate activities in the supply chain is calculated for each category, and the amounts of all categories are aggregated. The GHG protocol classifies GHG emissions into Scopes 1, 2 and 3 as shown below.

Scope 1 Direct emissions:
GHG emissions resulting from the burning of fuel or other products as part of business operations

Scope 2 Indirect emissions:
GHG emissions resulting from purchased energy, such as purchased electric power

Scope 3 Other indirect emissions:
GHG emissions other than Scopes 1 and 2 resulting from operations across the entire supply chain (from raw material extraction to product disposal)

We will continue to calculate Scope 3 emissions in the future as we investigate the possibility of reducing CO_2 emissions resulting from all corporate activities.

Trend in Scope 3 Emissions Calculation extent: Nippon Shokubai only

No.	Category	Emissions (1,000 t-CO_2)		
		FY2017	FY2018	FY2019
1	Purchased goods and services	1,619	1,556	1,510
2	Capital goods	40	31	37
3	Fuel- and energy-related activities (not included in Scope 1 or Scope 2)	62	61	63
4	Upstream transportation and distribution	15	14	14
5	Waste generated in operations	7	7	7
6	Business travel	0.3	0.3	0.3
7	Employee commuting	0.8	0.9	0.9
12	End-of-life treatment of sold products	2,240	2,142	2,068
Total		3,984	3,812	3,701

Initiatives for Eco-friendly Distribution

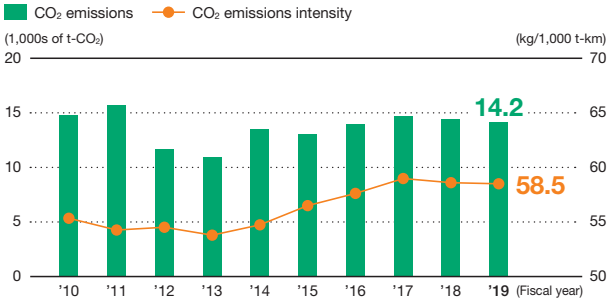
Promoting modal shift

As a way of tackling climate change through our logistics operations, we are taking steps to reduce our CO_2 emission intensity and implement exhaust gas countermeasures to control air pollution. Although changing economic conditions can affect the amount of goods we transport and our CO_2 emissions, we are advancing initiatives to reduce our CO_2 emission intensity. These include modal shifts, improved transport efficiency, introduction of digital tachometers interlocked with GPS and drive recorders, and energy-efficient vehicle operation such as minimal idling and the installation of energy-efficient tires.

We adopted the Kawasaki eco-transportation system as an air pollution control measure (effective April 1, 2010) and introduced three initiatives: eco-friendly driving and display of “eco-drive” stickers, elimination of vehicles that do not comply with laws regulating NOx and PM emissions, and widespread adoption of low-emission and energy-efficient vehicles.

Starting in fiscal 2017, in addition to joint transportation with other companies in the same business and conventional ship transportation by tankers, we have introduced a new type of ship transportation (roll-on/roll-off shipping) to reduce the environmental impact.

Trends in CO_2 Emissions and Intensity Attributable to Domestic Logistics



An example of modal shift (railway tank containers and loading and filling equipment)

Definitions

Modal shift
Changing the mode of transportation to a mass transportation method, such as using railways or ships, thereby improving the efficiency of transportation while also reducing energy consumption and environmental impact.

Kawasaki eco-transportation system
An environmentally friendly transportation system established by a partial amendment to the “Kawasaki City Ordinance for Conservation of Life Environment, including Pollution Prevention.”

Roll-on/roll-off ship
A ship designed to transport wheeled cargo on trucks or chassis cabs.

Ton-kilometer
Transport ton-kilometer is a unit of transportation measurement referring to the freight transport volume. As an index for precisely expressing transport as an economic activity, it is the product of the freight haul distance (in kilometers) and the transported freight weight (tons).

Environmental Protection through Our Products

Promoting Environmental Contribution Products

Chemical products have an impact on the environment because they are produced using the Earth's resources and involve the discharge of CO_2 and other waste. However, looking at the entire product life cycle from raw material extraction to product disposal, in some stages chemical products contribute to a reduction in the environmental impacts.

We evaluate how our products are used to reduce the environmental impacts through the supply chain to produce the various products in our daily life and as equipment to produce our products and in the social infrastructure.

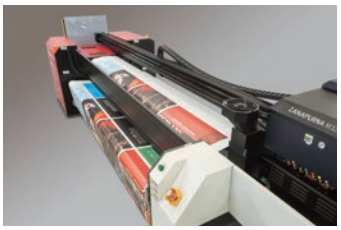
In fiscal 2019, Nippon Shokubai began to review its Environmental Contribution Products by reviewing internal criteria and establishing an internal certification system in which the certification committee examines the checklist items and numerical data and certifies the products.

Applications in parentheses

IONEL™ (Lithium-ion battery materials)

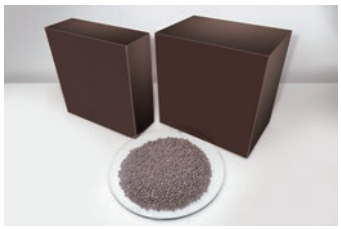
AQUALOC™ (Concrete admixtures)

Electrolyte sheets for solid oxide fuel cells



VEEA™ (UV-curable reactive diluent)

Waste gas treatment catalyst



Environmental Contribution Products

Types of contribution		Product life stage	Applications	Accredited products
Global warming prevention Energy conservation	GHG reduction	Manufacturing	Aquaculture feed binders	AQUALIC™H (for feed)
			Concrete admixtures	AQUALOC™
		Use	Lithium-ion battery materials	IONEL™
	Energy conservation	Manufacturing	UV-curable reactive diluents	VEEA™
		Use	Solid oxide fuel cell materials	Electrolyte sheets for solid oxide fuel cells
			Automotive damping materials	ACRYSET™ (for damping materials)
			Optical and electronic materials	ZIRCOSTAR™
Chemical emission reduction Air quality conservation	Chemical emission reduction	Use	Water-based paints	UWR™, ACRYSET™ (for water-based paints)
			Water-based adhesives	EPOCROS™
	Air pollution prevention	Use	Removal of HC (hydrocarbon), NOx, dioxin and other pollutants from exhaust gas	Automotive catalysts
				Waste gas treatment catalysts
				Denitrification catalysts and equipment
				Dioxin decomposition catalysts and equipment
Water resource conservation Water quality conservation Biodiversity conservation	Water contamination prevention	Use	Oxidation and decomposition of harmful substances in wastewater	Wastewater treatment catalysts for catalytic wet air oxidation
			Water treatment additives	EPOMIN™
		Disposal	Detergent builders	AQUALIC™L (for detergent)
	Biodegradability	Disposal	Detergent ingredients	SOFTANOL™
				HIDS™
Resources use reduction	Resources use reduction	Use	Hollow fiber membranes	Polyvinylpyrrolidone
Waste reduction	Waste reduction	Disposal	Concrete admixtures	AQUAGUARD™

Promoting CO_2 emissions reductions throughout the product lifecycle

We employ the c-LCA method to assess the degree to which our products contribute to reducing CO_2 emissions.

The c-LCA method assesses CO_2 emissions throughout the lifecycle of a finished product incorporating a specific chemical product compared with a product when assuming that the chemical products are not available. The difference in the volume of emissions is calculated as the net volume of emissions that would be avoided as a result of using that chemical product.

Nippon Shokubai's products that are expected to contribute to the avoidance of CO_2 emissions			Assessment prerequisites
AQUAGUARD™	Calculation of CO_2 emissions avoided in one year when all apartments are built as long-lasting structures **3.4 million tons**	AQUAGUARD™ was developed to reduce cracking and spalling in concrete. The combination of AQUAGUARD™ with a high-range water reducer for concrete is expected to contribute to much longer-lasting concrete structures.	Service period: The lifecycle assessment assumes that a long-life apartment has a 100-year service life and a conventional apartment has a 50-year service life. CO_2 emissions associated with the building, use and demolition of apartments are evaluated with reference to the "Guidelines for LCA for Buildings" published by the Architectural Institute of Japan.
ACRYSET™ (for damping materials)	Calculation of CO_2 emissions avoided when an application-type vibration-damping material is installed in all automobiles manufactured in one year **310,000 tons**	We developed an emulsion for application-type vibration-damping materials for mounting on the lower surface of a vehicle body to reduce the noise and vibration from the engine and road surface. Using such material, it is possible to make the vehicle light and energy-efficient.	The annual travel distance is assumed to be 10,000 km with a 10-year service life. Automobiles using asphalt sheeting as a vibration-damping material are compared and evaluated.
ZIRCOSTAR™	Calculation of CO_2 emissions avoided when ZIRCOSTAR™ is incorporated in all smartphones manufactured in one year **220,000 tons**	This product has outstanding optical properties, and using it for plastic lenses, displays, and other optical materials increases the energy efficiency of displays on mobile phones, smartphones, and other handheld devices, contributing to a longer battery life.	According to the usage time described in the Carbon Footprint Product Category Rules, the product was evaluated as being in use for two years. A smartphone incorporating ZIRCOSTAR in the optical material was evaluated as achieving a 3.6% reduction in power consumption as an energy-efficiency benefit.
VEEA™	Calculation of CO_2 emissions avoided by reduction expected from all the UV curable inks produced in one year **330,000 tons**	Use of VEEA™ as UV-curable reactive diluents for inks that are better for the environment makes volatile solvents, as well as related equipment, unnecessary, saves energy and increases productivity.	Printed materials were assumed to be printed in four colors on full A-sized sheets with 3.2 g/m^2 of ink. Commercial offset and commercial UV printing presses were compared for evaluation.
AQUALIC™H (for feed)	Calculation of CO_2 emissions avoided when all aquaculture feed produced in one year is replaced with moist pellets (MP) **80,000 tons**	Dry pellets and MP are mainly used as aquaculture feed. MP is produced by mixing raw feed with fish meal, plant-derived feed and a binder. It contains a smaller amount of fish meal, which requires a large amount of energy in the procurement of ingredients and the drying process. Use of MP therefore results in a reduction of CO_2 emitted in the course of growing fish. AQUALIC™ H is used as the binder, contributing to a reduction in CO_2 emissions.	All feed in the aquaculture industry produced in Japan in one year was evaluated. The comparison target was dry pellets with a high content of fish meal and with no binders used.

Note: The above assumed values are for comparative purposes only; the actual service life and performance are not guaranteed.

Chemical Substances Control Initiative

Reducing chemical emissions

In fiscal 1995, we participated in a voluntary PRTR survey undertaken by the JCIA and have set out to reduce our emissions of chemical substances into the environment.

In fiscal 2019, we released 78 tons of substances subject to the PRTR Law, which represents a 27.2% decrease in emissions compared to fiscal 2015 levels. As a result, we were able to achieve the reduction target for the 10th Plan ahead of schedule.

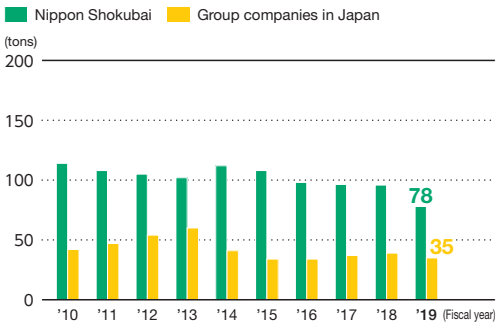
Top 10 Substances Subject to the PRTR Law Released in Fiscal 2019

Calculation extent: Nippon Shokubai only

(tons)

No.	Government Designation No.	Substance Subject to the PRTR Law	Released into Atmosphere	Released into Water	Total Emissions	Amount Transferred
1	405	Boron compounds	0.0	23.5	23.5	0.2
2	4	Acrylic acid and its water-soluble salts	12.2	0.0	12.2	0.6
3	321	Vanadium compounds	0.0	9.5	9.5	0.0
4	80	Xylene	5.8	0.0	5.8	20.8
5	58	Ethylene glycol monomethyl ether	3.9	0.0	3.9	0.0
6	300	Toluene	3.0	0.0	3.0	198.3
7	56	Ethylene oxide	3.0	0.0	3.0	0.0
8	12	Acetaldehyde	2.2	0.0	2.2	0.0
9	7	Butyl acrylate	2.2	0.0	2.2	0.0
10	36	Isoprene	1.6	0.0	1.6	0.0

Trends in Emissions of Substances Subject to the PRTR Law



Definitions

PRTR (Pollutant Release and Transfer Register)

A regulatory system that requires the reporting of emissions of designated chemical substances into the air, water and soil as well as the volume of waste transferred. Data compiled and submitted to governmental agencies are disclosed to the public.

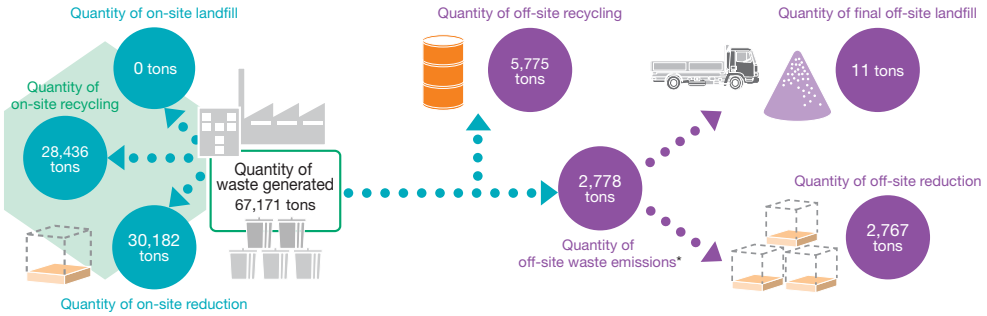
Waste Reduction Initiatives

Reducing the amount of waste subject to final disposal at off-site landfills

Reducing waste is a necessary initiative to support the creation of a society committed to recycling. Toward the goal of achieving and maintaining “zero emissions” (defined as “reducing the quantity of waste subject to final disposal at off-site landfills to less than 0.1% of the total amount of waste generated”), we are introducing sorting for the recovery and recycling of our waste.

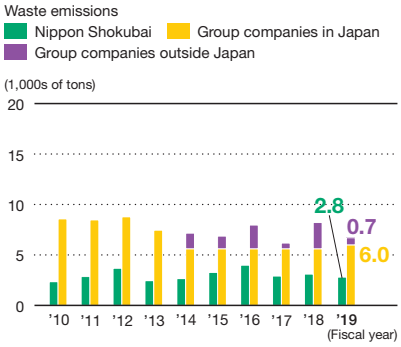
In fiscal 2019, we are continuing to implement our zero emissions policy by reducing the amount of waste subject to final disposal at off-site landfills. In addition to implementing comprehensive sorting for recovery and recycling, we are achieving this by redesigning our processes to reduce waste, reusing byproducts and processing product leftovers on site.

Waste Flowchart

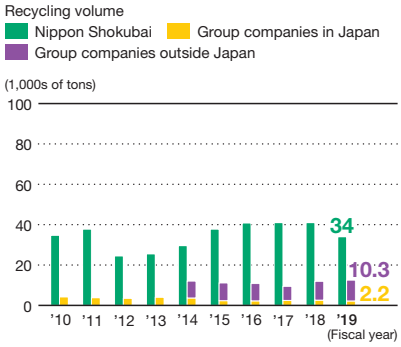


* The figure includes 229 tons for disposal of items damaged by typhoons that occurred in FY2018.

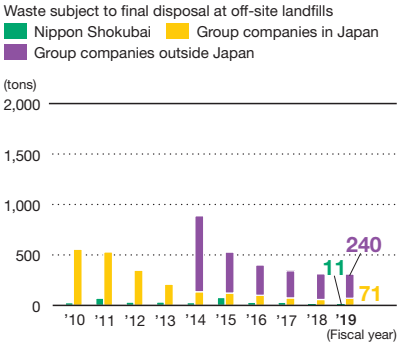
Trends in Waste Emissions



Trends in Recycling Volume



Trends in Amount of Waste Subject to Final Disposal at Off-site Landfills



Employee’s Voice — We enhanced energy conservation and BCP by introducing cogeneration

I was a member of a project team formed for the installation of a new cogeneration facility at the Himeji Plant. I was in charge of the examination of design details and the procedures for operation and safety management.

This facility has a power generation capacity with higher efficiency compared to similar existing facilities and can substantially lower the NOx concentration in the exhaust gas.

Since it started operating at the end of December 2018, the facility has been steadily contributing around 2,600 kL crude oil equivalent of reduction in energy consumption per year. The introduction of this facility has also enabled some of the equipment for acrylic acid and superabsorbent polymers to continue operating in case of commercial power outage, thus contributing to the enhancement of the BCP (business continuity plan).

We will make continuous efforts to establish a stable, safe, and efficient energy supply system.

Daisuke Maeda
Chemicals Production Department,
Himeji Plant

Pollution Control Initiatives Targeting Air and Water

Working to reduce the environmental impact by introducing waste gas treatment catalysts and high-performance activated sludge treatment equipment

We are monitoring our SOx, NOx and dust emissions, and we have installed denitrification equipment, which we developed in-house, for NOx and scrubbers for dust to prevent air pollution. For SOx, we are reducing our heavy oil consumption and progressing with converting fuel to natural gas to reduce emissions. We use the waste gas treatment catalysts we developed in-house for purification of unreacted raw materials and by products generated in the production processes.

To prevent water pollution, we are working to reduce the environmental impact of wastewater from production processes by using waste liquid treatment equipment. In addition to reusing cooling water for more effective use of our water resources, we have adopted high-performance activated sludge treatment equipment that can stably process even high impact substances and are working on reducing sludge waste as well. All emissions are at levels below municipal and prefectural agreements.

Nippon Shokubai

(tons)

	'14	'15	'16	'17	'18	'19
SOx emissions	4	3	3	3	4	4
NOx emissions	178	173	205	204	198	203
Dust emissions	9	5	6	6	6	7
COD of wastewater	54	46	51	54	55	50
Total phosphorus emissions	3	3	3	3	3	3
Total nitrogen emissions	47	51	54	47	58	55

Group companies in Japan

(tons)

	'14	'15	'16	'17	'18	'19
SOx emissions	2	2	2	1	2	1
NOx emissions	45	54	44	48	45	43
Dust emissions	3	5	3	2	2	3
COD of wastewater	48	37	34	45	53	60

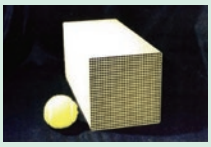
Receives Best Partner Award 2019 from IHI

Nippon Shokubai received the Best Partner Award 2019 from the boiler division (large-scale power generation facility business, etc.) in the Resources, Energy and Environment segment of IHI Corporation, which is a purchaser of our de-NOx catalysts.

Since the launch of de-NOx catalyst business in 1978, Nippon Shokubai has established a solid cooperative system with the boiler division of IHI Corporation and has supplied de-NOx catalysts for their various projects in Japan. In recognition of this relationship, Nippon Shokubai was selected as one of the five Best Partners from among the domestic suppliers of IHI, one of the largest manufacturers in Japan.

We will continue to make efforts to maintain close relationships with our customers and deliver them products that contribute to environmental protection.

Award ceremony



De-NOx catalysts

Environmental Accounting

The values determined in our environmental accounting were aggregated according to the *Environmental Accounting Guidelines for the Chemical Industry* published in 2003 by the JCIA and the Japan Responsible Care Council. We also made reference to the *Environmental Accounting Guidelines 2005* published by the Ministry of the Environment of Japan.

Environmental protection costs & environmental protection benefits

Applicable period: April 1, 2019–March 31, 2020 Calculation extent: Nippon Shokubai only

(millions of yen)

Classification		Main Initiatives	Amount Invested	Expenses	Effects
Business area cost	1. Pollution Control Cost	Preventing air and water pollution, controlling hazardous substances	89	2,572	No pollution problems occurred.
	2. Global Environmental Protection Cost	Initiatives to reduce energy consumption and to tackle climate change	2,841	3,877	We conducted energy efficiency efforts equivalent to 3,646 kL (crude oil) annually.
	3. Resource Recycling Cost	Appropriate treatment and disposal of industrial waste	30	475	We maintained zero emissions by sorting and recycling our solid waste.
Upstream/downstream cost		Reuse of resources	0	51	Some of drum containers are reused.
Environmental management cost		Operation of environmental management structure; acquisition and maintenance of ISO 14001 registration	0	561	All our plants successfully acquired certifications, and we are seeking to enhance our environmental management systems.
R&D cost		Reduction of the environmental impact through development and manufacturing of green products	0	2,109	Conducting R&D of products that contribute to the environment.
Social activity cost		Environmental-related contributions	0	29	Implementing forest development initiatives.
Environmental damage cost		—	0	5	—
Total			2,960	9,678	

Economic effects (monetary benefits) resulting from environmental protection initiatives

(millions of yen)

Effect		Amount
Income	Operating revenue from recycling used products and waste generated by principal business activities	42
Cost saving	Reduction in expenses associated with energy conservation	650
	Reduction in waste disposal cost accruing from resource conservation and recycling	1,885
Total		2,577

Reference Total investment for the period: 11,105 million yen
Total R&D expenses for the period: 12,666 million yen

Rank-based RC Training

We provide ongoing employee training in RC for the purpose of improving their knowledge, skill, and understanding of overall RC initiatives.

In keeping with our training curriculum for fiscal 2019, we have been providing this training to new employees entering our company, to employees being promoted to the position of subsection chief and to employees being promoted to managerial positions. We will continue improving our RC training capabilities in the future.

RC training for new employees

Definitions

Environmental Accounting

This system collects and analyzes the costs and effectiveness of environmental protection in business activities, quantitatively and to the maximum extent, and makes the data available to the public. It is focused on sustainable development for companies with the goal of efficiently and effectively promoting environmental protection initiatives while maintaining a good relationship with society.

Process Safety and Disaster Prevention Initiatives

Under the Corporate Credo “Safety takes priority over production,” all our employees take part in various activities to ensure safety.

Overview of fiscal 2019

We had zero class A and B process safety accidents. In fiscal 2019, we continued to promote our voluntary safety initiatives according to the priority initiatives of the 10th RC Basic Plan, maintaining our basic approach to safety issues. To strengthen our determination never to forget the accident in fiscal 2012, we began to exhibit the tank involved in the accident exclusively for employees of the Company.

Basic Approach to Safety Issues

We have incorporated the lessons learned from the accident at the Himeji Plant in 2012 to reinforce our basic approach to safety issues. We have clarified our Corporate Credo, Safety Oath, and the safety management principles presented below, as well as the roles of the company at each organizational level, and are ensuring that all employees stay fully informed.

Safety management principles

We are putting into practice the fundamental principles for safety management, behavior principles during production activities and other guidelines that are established in the Safety Management Regulations of our company.

<Fundamental principle of safety management (excerpt)>
(1) Assure safety based on our Corporate Credo, “Safety takes priority over production.”

<Behavior principle during production activities>
(1) Stop operation immediately if you discover something abnormal in the functioning of equipment.
No one will ask who was responsible.

Safety Oath

Message from management regarding safety issues

On Safety Oath Day in fiscal 2019, our President said in his speech that safety should be achieved by all employees accumulating daily efforts with awareness of safety. He requested us to thoroughly implement the “Safety takes priority over production” principle by sharing and raising awareness of process safety and disaster prevention, and to hold safety discussions in every company workplace during our Safe Operation Month (September 16 to October 15), at which everyone should reconfirm their individual roles and responsibilities in fostering a safety culture.

In addition, the President visited the Himeji and Kawasaki Plants for safety inspections and talked to employees, reemphasizing the importance of the implementation of “Safety takes priority over production.”

Corporate Credo, “Safety takes priority over production”


Inspection of Kawasaki Plant by President


Inspection of Himeji Plant by President

Promotion of Voluntary Safety Initiatives

Since its foundation, Nippon Shokubai has ensured safe production with the technologies we developed in-house, and the voluntary safety initiatives we have introduced are aimed at zero Class A and Class B severe process safety accidents.

Efforts to prevent accidents and malfunctions

We employ HAZOP to identify latent risks in a plant. We are working to prevent incidents by systematically implementing HAZOP for both routine and non-routine work, and also by conducting Management of Change and non-routine work management.

As small group initiatives, we are promoting HMI activities at the Himeji Plant and TPM activities at the Kawasaki Plant to identify problems and implement improvements.

We will continue with our multi-faceted approach to prevent accidents and malfunctions.

Systematic implementation of safety measures

When an accident happens, we investigate the cause in stages and introduce measures to prevent any recurrence. Long-term maintenance of facilities is incorporated in our maintenance plans and implemented according to the plans. We are also systematically dealing with the aging degradation of our facilities.

Earthquake preparedness

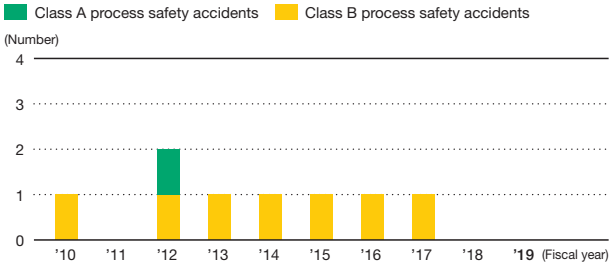
Following the Great East Japan Earthquake of 2011, we reviewed our earthquake preparedness in the event of a future major earthquake and tsunami from both the tangible and intangible aspects and are adopting the necessary measures, which are periodically reviewed and reinforced.

Regarding the existing measures that are in place to improve the seismic resistance of high-pressure gas facilities, we confirmed that all spherical reservoirs with steel tube bracing and those towers and tanks that are important high-pressure gas facilities have seismic designs that meet the seismic standards for reporting to the relevant authorities. We continue to implement seismic resistance measures for our piping facilities in fiscal 2020.

Results of process safety accidents

In fiscal 2019, we had zero class A and B process safety accidents. We will continue our efforts to prevent process safety accidents while constantly improving safety activities.

Trends in the number of process safety accidents



Enhancing education and training

To upgrade the skills and expertise required to maintain safe operations, we are fulfilling the requirements for training-related risk management at our chemical plants.

As in fiscal 2018, we again invited instructors from the Sanyo Association for the Advancement of Science & Technology and held a course on risk management for foremen and higher level employees at each plant and research center and a course on safety management for mainly managerial employees. A total of 51 people participated from all workplaces including members of the research segment.

To increase the competency of the employees who implement HAZOP and to train the next generation, we invited outside lecturers to both plants and held HAZOP trainings again in fiscal 2019.

At both plants, we have collected "know-why" information so that people can understand the origins of our procedures and rules and to enable skills to be passed on. We are using this information for teaching.

The opinions voiced by our employees have encouraged us to continue conducting training both inside and outside the company to improve knowledge of safe operations and to increase safety awareness.

HAZOP training

"Risk assessment based on lessons of accidents" class

Maintenance and improvement of safety management efforts

Each year, RC inspections are conducted by executive management at both Himeji and Kawasaki plants. In fiscal 2019, they verified the safety management activities at both plants.

The Executive Officer of the RC Division at our Head Office conducted safety audits as the head of the auditing committee, to ensure continuous improvements to our safety management.

High-pressure gas safety accredited plants

The Ministry of Economy, Trade and Industry accredited the Chidori Plant and the Ukishima Plant located at our Kawasaki Plant as Accredited Completion Inspection and Safety Inspection Executors for high-pressure gas in 1989 and 1991, respectively. Reaccreditation inspections are conducted every five years.

This accreditation permits continuous operation of high-pressure gas production facilities and autonomous safety inspections by companies with competent self-managed safety systems.

Definitions

HAZOP (Hazard and Operability Study)
A safety evaluation method for systematically evaluating the adequacy of safeguards in plants and eliminating latent risks in plants through comprehensive detection

HMI (Himeji Monozukuri Isshin) activities
These activities advance improvement and innovation at the Himeji Plant.

TPM (Total Productive Maintenance) activities
These improvement activities seek to realize production methods that pursue the highest overall efficiency in production systems.

Improving emergency drills

We have established disaster prevention arrangements at every plant, and we systematically conduct a variety of emergency drills every year.

At our Himeji Plant we conducted Comprehensive Emergency drills in collaboration with the Aboshi and Shikama Fire Stations. At our Kawasaki Plant we conducted Comprehensive Emergency drills with the Rinko Fire Station and the local disaster prevention council, and at our Suita Research Center we also conducted Comprehensive Emergency drills with the Suita Minami Fire Station.

By feeding back issues that were made apparent in the emergency drills in the next trainings, we will continue to review and strengthen our disaster prevention, including related arrangements, education and training.

Comprehensive Emergency drill at the Kawasaki Plant

Comprehensive Emergency drill at the Himeji Plant

Comprehensive Emergency drill at the Suita Research Center

Strengthening a culture of "safety prioritization"

Both of our plants are undertaking unique efforts to strengthen a culture of safety prioritization. For example, employees at our Himeji Plant conducted self checks of fundamental safety behavior, and employees at our Kawasaki Plant undertook safety behavior check activities.

In June 2019, the Himeji Plant underwent a third-party evaluation of safety competency (safety infrastructure) by the Japan Safety Competency Center, an NPO. The Plant is scheduled to undergo a third-party evaluation of safety culture in fiscal 2020. The feedback from the evaluations will be reflected in the RC plans, thereby ensuring continuous improvement of our safety competency.

Preventing accidents caused by a loss of collective memory

To show our determination never to forget the accident in 2012 and our resolve never to let such an accident happen again, we held a Safety Oath Ceremony in front of the Safety Oath Monument at the Himeji Plant in fiscal 2019, renewing our commitment to continually improving our safety competency.

As a new measure, we began to exhibit the tanks that were involved in the accident.

Safety Oath Ceremony

Commendations

At the Hyogo High-Pressure Gas Safety Managers' Convention of the Hyogo High-Pressure Gas Safety Organization, an employee of our Himeji Plant received the Chairman's commendation as an excellent high-pressure gas safety manager.

Receiving award at the Hyogo High-Pressure Gas Safety Managers' Convention

Responsible Care Activities

Logistics Safety Initiatives

We have commissioned Nisshoku Butsuryu Co., Ltd. to handle all our logistics operations. To ensure the safety and quality of our logistics tasks, they cooperate closely with the Environmental Safety and Quality divisions of both our Himeji and Kawasaki Plants, where we work diligently to prevent logistics accidents.

With the aim of minimizing damage should an accident occur during product shipment, we periodically conduct drills to respond to accidents on transportation routes. We also conduct tabletop exercises jointly with the Maritime Disaster Prevention Center (MDPC).

Moreover, in support of the White Logistics movement promoted mainly by the Ministry of Land, Infrastructure, Transport and Tourism toward the realization of sustainable logistics, we made the White Logistics declaration.

Training for accidents during product transportation

Occupational Safety and Health Initiatives

Toward achieving the target of zero industrial injuries, we implement activities to ensure occupational safety and health, including improving the working environment, reducing risk factors, and creating pleasant workplaces.

Overview of fiscal 2019

We experienced two injuries with loss of workdays and six injuries without loss of workdays. Our contractors experienced one injury with loss of workdays and five injuries without loss of workdays. In fiscal 2019, "prevention of recurrence of similar industrial injuries" was set as the priority theme for RC inspections. According to this theme, details of activities were verified throughout the Company, with the aim of preventing industrial injuries.

Ensuring Continuous Improvement of Occupational Safety and Health

We have been continuously improving our occupational safety and health based mainly on our Occupational Safety and Health Management System (OSHMS). In addition, we are striving to reduce industrial injuries by systematically implementing various basic safety initiatives, including "*kiken yochi* (KY)" risk prediction, "*hiyari hatto*" near miss and "5S" campaigns, as well as by conducting a variety of education and training courses.

Risk assessment

In accordance with the Occupational Safety and Health Management System, we have been undertaking Task Risk assessment to reduce or eliminate the sources of risks. Moreover, we are systematically implementing risk assessments for chemicals handled at each workplace and working to decrease risks.

Basic safety initiatives

In an effort to prevent industrial injuries, we are committed to daily safety initiatives targeting work-related risks. Specifically, we remain focused on our kiken yochi (KY) or "risk prediction" campaign before work, our hiyari-hatto practice of collecting reports on "close-call" incidents, and our "5S" campaign in the workplace. To maintain and enhance sensitivity to danger, we conduct KY training and KY workshops on a periodic basis, with the aim of improving the level of our daily safety activities. We are also working to familiarize ourselves with basic safety behavior: (1) Think before you act; (2) Pointing and calling; and (3) Hold the handrail when stepping on stairs, by putting up posters and providing related education, thereby helping to prevent industrial injuries.

On-site training sessions

Aiming to improve sensitivity to risks hidden in plant operations, we offer hands-on training in skills such as flange disassembly and reassembly, and ascending and descending rope ladders, as well as an operator training course for young operators.

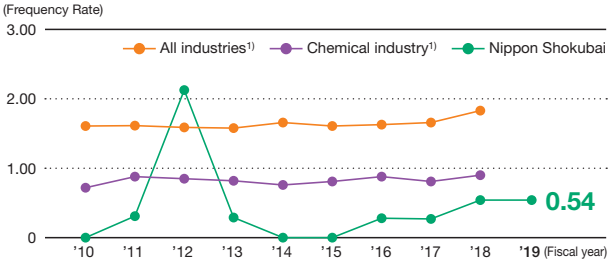
Operator training course

Occurrence of industrial injuries

In fiscal 2019, we experienced two injuries with loss of workdays and six injuries without loss of workdays. Our contractors experienced one injury with loss of workdays and five injuries without loss of workdays.

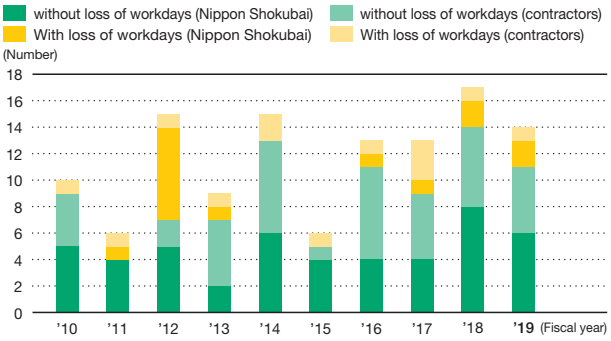
In recent years, industrial injuries have occurred frequently among young workers at Nippon Shokubai, while they have occurred frequently among less-experienced workers at our contractors. We are therefore enhancing safety education for young or less-experienced workers to raise their safety awareness.

Trends in Frequency Rate of Injuries with Loss of Workdays



* Frequency rate: The number of casualties in industrial injuries per million working hours
1) Source: "Survey on Industrial Accidents" by the Ministry of Health, Labour and Welfare

Trends in total number of industrial injuries (with loss of workdays and without loss of workdays)



Addressing the health issues of company retirees

Since our company was established, we have never manufactured products containing asbestos; however, we have used insulation and sealing materials that contained asbestos.

For this reason, we support our retirees by offering consultations on health issues and providing health check-ups to those who request them. Information regarding these services is posted on our website.

Definitions

KY Campaign (risk prediction campaign)
This campaign is intended to prevent injuries by highlighting, at meetings before work, the risk factors (unsafe behaviors and unsafe conditions) that remain hidden in work practices and by implementing measures to address them.

Near miss (*hiyari hatto*, HH)
Even where no accidents have occurred in day-to-day operations, we monitor workers' experiences of "near misses" or "scares" in order to clarify why such events occur and how we can avoid them. From the results, we can adopt safety measures applicable to both facilities and actions.

5S Campaign
This campaign promotes the 5 "S" practices, which can be translated as sort, set in order, shine, standardize and sustain.

Chemical Safety Initiatives

Toward achieving the goal of zero legal and social problems related to chemical substances throughout the lifecycle of products, we are committed to the proper management of chemicals through initiatives including complying with laws and regulations and providing related information.

Overview of fiscal 2019

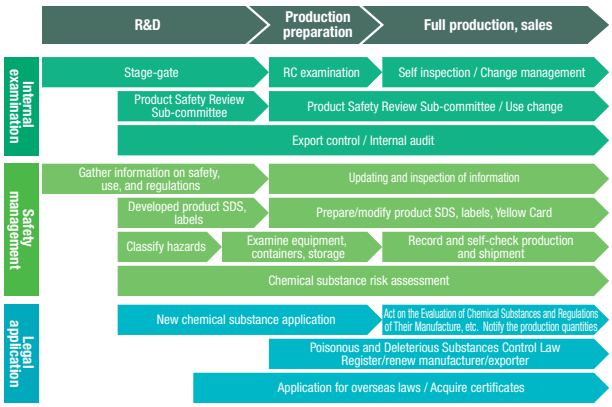
Faced by the tightening of laws and regulations, and industry standards for management of chemical substances, as a result of efforts to collect information related to product safety and applicable laws and regulations, and to disseminate the information throughout the company, we were able to achieve zero legal and social problems in fiscal 2019. We also advanced the development of a system for automatic production of warning labels and other measures for work improvement, thereby enhancing the chemical management system.

We will continue to develop a system for the management of chemical substances capable of adapting to diverse legal and social requests.

Comprehensive management of chemical substances throughout the product lifecycle

Toward achieving the goal of zero legal and social problems related to chemical substances throughout the lifecycle of products, Nippon Shokubai is committed to the proper management of chemicals and implements a variety of initiatives, including upgrading our internal systems to comply with laws and regulations related to chemical products, and providing customers with information on relevant laws and regulations as well as product safety information.

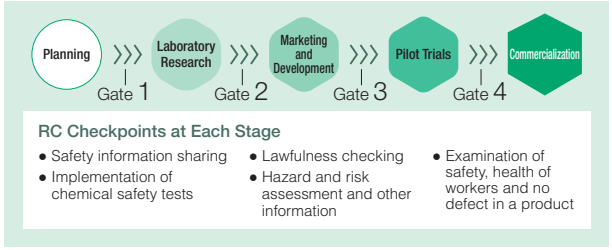
Chemical management system



Ensuring the safety of new products

We have introduced a gate system at each stage from R&D to commercialization. We apply our technical expertise to examine the safety of chemical products throughout the product lifecycle and determine at each stage whether to proceed to the next stage.

Gate System



Product Safety Initiatives

We prepare GHS-compliant SDSs, warning labels, and Yellow Cards and provide information to customers while providing training sessions for our employees. Regarding application-specific products used in pharmaceutical raw materials, pesticides, cosmetics and food additives, our Product Safety Review Sub-committee conducts strict checks while ensuring compliance with the Product Liability Act.

Establishment of a chemical substance management system

We are implementing a comprehensive chemical substance management system that can respond quickly to risk assessments, the issuance of SDS, and surveys from customers querying us on the chemical content of our products. We have created and launched this system by providing centralized management of various types of information encompassing chemicals, raw materials, hazardous materials, and regulations, and are continuously committed to updating the information and improving the system functions. In fiscal 2019, we added to the system the function to output GHS label information, and the automatic production of warning labels using this system will start from fiscal 2020.

Accommodating chemical registration requirements within and outside Japan

In collaboration with specialized institutions and our Group companies outside Japan, we are responding appropriately to laws and regulations, including the Act on the Evaluation of Chemical Substances and Regulations of their Manufacture, etc. and the Industrial Safety and Health Act in Japan, as well as TSCA in the United States and REACH in Europe.

To enhance the employees' legal knowledge regarding chemical management regulations and awareness of compliance with laws, we hold regular education programs on laws and meetings to explain new systems.

Addressing import/export controls

To ensure legal compliance regarding imports and exports, we have streamlined our process for strengthening company regulations, keeping our employees informed about whether a product has been subject to import/export restrictions and improving our shipping management system for coordination with our enterprise resource planning (ERP) backbone accounting system. We also conduct regular internal training. In the internal audit we conduct every year, it was confirmed that there were no problems with exports between January and December, 2019.

Definitions

Yellow Card

Carriers who transport hazardous products must carry a yellow card for reporting information about their cargo to fire squads in the event of an accident. The yellow card lists a product's hazards, first aid procedures in an accident, and emergency contact information. As part of its promotion of RC, the JCIA prepares and manages guidelines on the procedures for preparing a yellow card in order to strengthen first aid measures in the event of an accident.

Responsible Care Activities

Quality Initiatives

Our basic policy related to quality is to provide products and services that fully satisfy our customers while earning their trust. We also work to maintain or improve our quality levels.

Overview of fiscal 2019

One serious quality complaint was filed due to contamination of foreign materials, and although we have completed the corrective actions, we ended up failing to achieve the target of improved customer satisfaction.

On the other hand, quality audits at all our plants and Group companies both inside and outside of Japan were conducted as scheduled, to confirm that compliance is ensured for the entire Group.

Ensuring Continuous Improvement of Quality

Customer satisfaction initiatives

All our plants and all Group companies inside and outside Japan engaged in manufacturing and logistics have introduced quality management systems. We implement our quality assurance initiatives from the customer's perspective from the product development stage through manufacturing and delivery.

We are dedicated to the continuous improvement of our quality management system to ensure our customers are satisfied with the stable high quality of our products and services.

Quality control convention

Promoting initiatives to address quality issues

We respond quickly to any complaints or inquiries from customers concerning our products. At the same time, we prevent quality issues from occurring through company-wide distribution of case studies. Regarding the quality complaints and issues that occurred in fiscal 2019 were shared with the both plants, where permanent measures were taken according to the determined priority order. The information on quality complaints and issues are also distributed to our Group companies in Japan, with the aim of preventing similar quality problems.

Initiatives toward gaining greater public trust

We have established quality management systems that ensure the safety and reliability of our products. The quality assurance department of our Head Office has conducted quality audits of our plants and Group companies to check the quality assurance systems and the status of quality management at all production sites.

In quality audits for fiscal 2019, both the responses to the past quality issues and the current situation on the corrective actions as a part of the initiatives to prevent recurrence of quality issues, and also the quality training for quality assurance department and the reliability of the inspection data as a part of the initiatives to ensure quality governance were inspected. Through the audits, reanalysis system and other quality matters were discussed with the both plants or the Group companies in Japan.

Supply chain initiatives

Nippon Shokubai promotes initiatives to ensure supplies of safe and reliable products throughout the entire supply chain, from procurement of raw materials to manufacture and sales of products. In accordance with our regulations for green procurement management, we have independently assigned substances that are regulated or highly hazardous to two categories: "prohibited substances" and "restricted substances." We are promoting the development of green products and the procurement of raw materials with low environmental impact while controlling the inclusion of such substances in our products. For information transmission sheets, we have introduced chemSHERPA.

Introducing products with halal certification

Parts of Southeast Asia, most notably Malaysia and Indonesia, are home to many Muslims, and demand for halal-certified ingredients and production processes from food-related businesses has been increasing. In response to this situation, we have acquired halal certification for products for which acquisition of the certification is strongly urged by customers. In fiscal 2019, we acquired halal certification from LPPOM MUI, a halal certification organization, for all products produced at PT. Nippon Shokubai Indonesia (NSI).

Note: The products for which the Nippon Shokubai Group has acquired halal certification (as of April 1, 2020)
Succinic acid, Disodium succinate, Maleic anhydride, AQUALIC™ FH (Food additive), AQUALIC™ MH (Feeding stuff additive) and AQUALIC™ IH (Industry), and All products produced at NSI
(Acrylic acid (AA), Acrylates (AES), Superabsorbent polymers (SAP))


NSI Halal certification

Definitions

chemSHERPA
This shared system for transmitting information about chemicals contained in products to supply chains was developed under the leadership of the Ministry of Economy, Trade and Industry in Japan. Full-scale utilization began in April 2018.

Halal Certification
A certification with religious relevance, granted by the relevant organizations when certain standards are satisfied, for products and services targeted at Muslim customers.

Communication with Society

Guided by the Nippon Shokubai Group Mission of "**TechnoAmenity** — Providing affluence and comfort to people and society with our unique technology," we have adopted a number of social initiatives. These include maintaining clear and open communication with the public as a good corporate citizen that protects the natural environment, works in harmony with local communities and trains the next generation.

Protecting the Natural Environment

With the awareness that all our business activities benefit from the natural environment and impact the natural environment, we are committed to mitigating climate change and protecting the natural environment to preserve biodiversity.

Forest development initiatives

Our employees have volunteered to participate in activities to protect and restore the natural environment. These activities are aimed at training individuals to think independently and take action on the environment.

Contributing to Our Forests and Water Resources

Location: Akasai Valley, Hara, Haga-cho, Shiso-shi, Hyogo prefecture
Start of activity: November 2008

We have been, for example, undertaking management of the headwater forest in the Akasai Valley where originates the Ibo River that passes by our Himeji Plant.

Research on creatures in Akasai River

Japan-Indonesia Friendship Forests of Banten Bay for Biodiversity Preservation

Location: Serang, Banten Province, Republic of Indonesia
Start of activity: September 2018

Nippon Shokubai has launched an initiative aimed at restoring mangrove forests in Banten Province in the Republic of Indonesia, where PT. NIPPON SHOKUBAI INDONESIA is located.

Planting saplings

Contributing to the "Yugawara Myriad Leaves Forest"

Location: Kajiya, Yugawara-machi, Ashigarashimo-gun, Kanagawa prefecture
Start of activity: November 2013

In the headwater forest of upper reaches of the Shinzaki River in Yugawara-machi, we conduct forest improvement and nature observation tours.

Yugawara Myriad Leaves Forest

Japan-China Friendship Forest Development and Global Warming Prevention

Location: Ejin Horo Banner, Inner Mongolia Autonomous Region, China
Start of activity: October 2008

In order to prevent desertification in inland China and regenerate the vast forests that were once there, we have been undertaking tree planting in this area, and observing the growth of the trees.

Trees firmly rooted and grown in the desert area

Note: The forest development initiatives in Japan and China are undertaken in cooperation with NPOs through the Green Fund of the National Land Afforestation Promotion Organization. The forest development initiative in Indonesia is undertaken in cooperation with local NPOs.

Conserving and popularizing the *Nojigiku* chrysanthemum

To protect, conserve, and popularize the endangered nojigiku chrysanthemum, the prefectural flower of Hyogo, our Himeji Plant has cultivated 160 varieties of this flower, including foundation stock, in a 2,000-square-meter green yard by the plant. Cultivation began in 1972 and by 1974 the Himeji Plant began distributing seedlings annually in cooperation with the Hyogo prefectural government.

Nojigiku in a conservation garden

Working in Harmony with Local Communities

Believing that establishing a relationship of trust with local community residents is crucial for stable business operation at each plant, we take various opportunities to communicate with them.

Cleanup campaign

We conduct periodic cleanups of the environs around all our plants as a local beautification initiative.

Cleanup activity

Sweet potato harvest party

We grow sweet potatoes in the potato fields we have created in the green yard of the Himeji Plant. Every year, we invite neighborhood kindergartners and nursery school children to enjoy harvesting our crop of sweet potatoes. We have been holding this activity since 1971, as it has helped us forge strong ties in the community. In fact, some of the children who harvested potatoes in the past are now employed with us.

Children harvest potatoes

Dialogue with local communities

Nippon Shokubai participates in the community dialogue undertaken by the JCIA's Responsible Care Committee and introduces the corporate RC initiatives to the participants from neighborhood associations, local governments, NPOs, industry organizations and companies in areas in which our plants are located. Through such communication, we aim to enhance mutual understanding.

In fiscal 2019, such dialogue was held in the Kawasaki area, in which representatives of the Kawasaki Plant participated.

RC community dialogue

Traffic safety commendation

At the Kawasaki Plant, employees offer traffic safety instructions on the streets of the neighborhood twice a year during the period of the national traffic safety campaign, in cooperation with the Kawasaki Waterfront Traffic Safety Association.

This activity has been continued since 2009 and received the commendation in 2019.

We will continue to deepen ties with local communities and make various contributions, including for traffic safety.

Commendation ceremony

Training the Next Generation

We host and participate in various events to help people become familiar with chemical technologies. We also provide internship opportunities to have work experience through hands-on training. Through initiatives that take advantage of our unique business characteristics, we are contributing to developing the abilities of children who will form the next generation.

Children's Chemistry Experiment Show

We have been presenting an Experiment Show titled "Superabsorbent Polymer, the Mysterious Powder." The children enjoy experimenting with chemistry and show great interest.

Events

- Chemistry Day Kids' Chemistry Experiment Show 2019
- Science Booth Exhibit
- The 16th Kawasaki Science Challenge

Kawasaki Science Challenge

Hosting internship trainees

Our Himeji and Kawasaki plants and our Suita Research Center provide internship opportunities for students from technical colleges.

Internship

Production/R&D Site Reports

Himeji Plant

Plant Outline

Plant Manager	Yukihiro Matsumoto, Managing Executive Officer
Location	992-1 Aza-Nishioki, Okinohama, Aboshi-ku, Himeji
Number of employees	1,216 (including research center)
Products	Acrylic acid, acrylates, maleic anhydride, superabsorbent polymers, resin modifiers, electronic information materials, De-NOx catalysts, dioxins decomposition catalysts, and other products
TEL	+81-79-273-1131
FAX	+81-79-274-3723

Yukihiro Matsumoto, Plant Manager

Fiscal 2019 Results of RC Activities

- **Occupational safety and health**: Two injuries with loss of workdays, eight injuries without loss of workdays (including contractors)
- **Process safety and disaster prevention**: Zero Class A and Class B process safety accidents
- **Environmental protection**: Emission of substances subject to the PRTR Law: reduced by 5 tons from the previous fiscal year; Zero emissions: Zero emissions rate target (0.1% or below) achieved

To support occupational safety and health, we advanced initiatives aimed at eliminating chemical burns. Education materials to show the mechanism and the seriousness of chemical burns were prepared to provide education to employees. The materials were also used for the education of our contractors on chemical burns before they started work. Moreover, to prevent health problems caused by hazardous substances, we have established an evaluation scheme to formulate the criteria for proper selection, washing and reuse of chemical protective gloves.

For process safety and disaster prevention, we underwent an evaluation of our safety infrastructure by a third-party organization as our safety competency evaluation. We received mostly favorable evaluation results, while some challenges were identified. The challenges will be reflected in our RC Plan from fiscal 2020.

On environmental protection, the cogeneration facilities installed in fiscal 2018 have been steadily contributing to a reduction in energy consumption.

We will continue to promote RC initiatives, to earn greater confidence from the public as a responsible chemical company.

Roundtable talk for new employee trainers

At the Himeji Plant, an OJT program for new instructors is provided, targeting persons in charge of training new employees. To enhance this program, the Plant began to hold roundtable talks for new employee trainers across departments in fiscal 2018.

Participants in the roundtable talk gave positive feedback, such as: “They gained the habit of taking memos,” “They became able to understand the importance of meeting deadlines,” and “Many questions asked from new points of view raised my awareness.” They frankly exchanged their opinions about the difficulties they were facing, such as: “I have difficulty maintaining a proper distance from new employees,” “My workload increased and overtime also increased,” “I do not have enough time to train them.”

They also talked about what they want to do as new employee trainers and they gave several positive proposals, such as: “Have new employees record what they did each day,” “Make opportunities for new employees to talk in front of other people,” and “Increase the time to be spent for education.”

By continuously holding such roundtable talks, we will create opportunities for all members of the Plant to think about human resources development.

Roundtable talk

Introduction of Hazardous Material Emergency Response Service (HAZMATers)

The Maritime Disaster Prevention Center (MDPC)’s Hazardous Material Emergency Response Service responds to incidents occurring during the transport of any hazardous material by dispatching incident response teams that are qualified to respond to accidents involving hazardous materials equivalent to those of the US National Fire Protection Association. The teams rush to the incident site in special vehicles loaded with necessary equipment from their bases in Kanto, Kansai and Kyushu within three hours of the incident and deal with the incident jointly with Nippon Shokubai. HAZMATers’ services include stopping the leakage of chemicals, elimination of pollutants after a fire is extinguished using foam extinguisher, water quality analysis of public water areas, and negotiations with the government and neighborhoods.

To help promote understanding of this service and the revised Transportation Safety Management Rules, the Himeji Plant held a general meeting (explanatory session, equipment observation tour), which was followed by a tabletop exercise with the Maritime Disaster Prevention Center based on an assumed case of a dispatch, and technical training for the incident response team.

We will work with this system as part of the initiatives to improve our safety competency through meetings and desktop exercises.

Technical training for an incident response team

Kawasaki Plant

Plant Outline

Plant Manager	Yoshihisa Oka, Executive Officer
Location	Chidori Plant 14-1 Chidori-cho, Kawasaki-ku, Kawasaki Ukishima Plant 10-12 Ukishima-cho, Kawasaki-ku, Kawasaki
Number of employees	364
Products	Ethylene oxide, ethylene glycol, ethanolamine, secondary alcohol ethoxylates, polymers for concrete admixture, acrylic acid special ester, and other products
TEL	+81-44-288-7366
FAX	+81-44-288–8492

Yoshihisa Oka, Plant Manager

Fiscal 2019 Results of RC Activities

- **Occupational safety and health**: Zero injuries with loss of workdays, two injuries without loss of workdays (including contractors)
- **Process safety and disaster prevention**: Zero Class A and Class B process safety accidents
- **Environmental protection**: Reduced energy intensity by 3% from the previous fiscal year. Reduced emissions of substances subject to the PRTR Law by 23% from the previous fiscal year

In terms of occupational safety and health, we had two injuries without loss of workdays (heatstroke, cut wound). We reviewed the work environment and re-educated employees regarding work procedures, with the aim of preventing similar problems.

Regarding process safety and disaster prevention, we carried out construction work to increase production capacity for chemicals such as ethyleneimine and its derivatives. We also had regular maintenance twice in fiscal 2019 because the timing of the maintenance was changed from summer, when heatstroke is more likely to occur, to winter. We thus carried out construction work more frequently than usual but achieved zero accidents by thoroughly implementing measures to ensure safety management.

For environmental protection, we implemented measures for energy conservation, including steam reduction by heat recovery. For substances subject to the PRTR Law, we implemented measures including the collection of boron from wastewater and the enhancement of a detoxifying facility for ethylene oxide to reduce emissions.

We will continue to promote RC initiatives to ensure that our plant remains safe and reliable.

Training for persons in charge of education

The Education & Improvement Activity Center, in cooperation with the manufacturing departments, develops various educational programs to help members of manufacturing departments acquire necessary operation skills at each level.

One such program is training for persons in charge of education at the workplaces to which new employees are assigned, with the aim of having new employees of manufacturing departments completely acquire basic operation skills.

In this program, trainees first receive lectures on how to teach work processes and take a test that checks their own operation skill levels. Based on the test results, staff members of the Education & Improvement Activity Center provide follow-up training on a one-to-one basis, thereby improving their skills as persons in charge of education.

Finally, Center staff members listen to any concerns or difficulties the persons in charge of education face in training new employees, and give advice, thereby supporting them in proceeding with education smoothly.

Through these processes, both the persons in charge of education and new employees can improve their skill levels, resulting in the reinforcement of the infrastructure of people, equipment, and systems that support the Plant.

Training for persons in charge of education

Industrial injury case sheet

The Kawasaki Plant examines cases of trouble and hiyari-hatto “close-call” incidents that have occurred in the past to prevent similar trouble from occurring.

To raise employees’ awareness of risks hidden in their workplaces, we summarized each of the industrial injuries that had occurred within the Plant over the past 15 years on a sheet describing the background, cause, countermeasures taken, risk points, etc.

Illustrations and photos related to the injury were added to the sheet, so that the injury situation can be understood visually. By preparing these sheets, we aim to hand down the experience of past industrial injuries.

The completed sheets are posted in related workplaces and used for workplace safety training and other opportunities, contributing to ensuring safe behavior.


災害事例シート

Example of an injury case sheet

Suita Research Center

Suita District Outline

Representative	Yasutaka Sumida, Director of Innovation & Business Development Division, Executive Officer
Location	5-8 Nishi Otabi-cho, Suita, Osaka
Number of employees	387
R&D organizations	Innovation & Business Development Division, Industrial & Household Chemicals Research Department, New Energy Materials Research Department, Electronics & Imaging Materials Research Department, Process Technology Center, Malonates Business Development Office, Health & Medical Business Development Office, Cosmetics Materials Research Group, DX Promotion Team, General Affairs Suita Department, Responsible Care Suita Department
TEL	+81-6-6317-2202
FAX	+81-6-6317-1578

Yasutaka Sumida,
Director of Innovation &
Business Development Division

Fiscal 2019 Results of RC Activities

Occupational safety and health	One injury with loss of workdays, one injury without loss of workdays (including contractors)
Process safety and disaster prevention	Zero Class A and Class B process safety accidents
Environmental protection	Recycling 100% of waste

Regarding occupational safety and health, we had one injury with loss of workdays and one injury without loss of workdays. Both injuries were attributed to human factors and we therefore enhanced our risk prediction and other safety activities to prevent any similar injuries from occurring.

For process safety and disaster prevention, in addition to holding training by an external organization for risk management in process development, we conducted various emergency drills, including joint drills with public fire departments. We also advanced initiatives to make ourselves prepared so that we can promptly respond to an emergency.

For environmental protection, under the initiative of the zero-emissions committee members selected from each workplace, we implemented comprehensive sorting of waste and continued to achieve 100% recycling of waste in fiscal 2019.

We will continue to promote RC initiatives while maintaining a balance with research, with the aim of ensuring safe research activities with no accidents.

Commitment to education

The research segment conducts systematic education and training for researchers in ability development, intellectual property, and RC.

As part of the RC education, we started an educational program based on an accident that occurred in September 2012.

In the program for fiscal 2019, 78 researchers in both the Suita and Himeji districts reviewed the accident using an internal education material titled “Lessons from the Acrylic Acid Intermediate Tank Explosion and Fire” and then held discussions in groups. In the group discussions, participants shared the fear of the accident and their determination to prevent recurrence of similar accidents, and each group presented the initiatives they would take to ensure safety in research and development processes, thereby mutually raising their safety awareness.

This program will be continued so that all the researchers can participate, and we will make use of the lessons learned from the accident in our future safety activities.

Review of the accident

Group discussion

Initiatives to prevent accidents from occurring and from spreading

The Suita Research Center conducts initiatives that focus on early discovery of and prompt response to emergencies.

To prevent a fire, for example, we work to enable early discovery of any leak of flammable gas. Specifically, we place flammable gas leak detectors and revolving lights in warehouses for dangerous substances and laboratories where flammable gas cylinders are handled. The revolving lights display the names of the gases, and the contacts and the actions to be taken if they light up are also indicated nearby, so as to enable prompt response to the leakage.

Moreover, we have voluntarily installed fire alarms in buildings for which such installation is not mandatory, with the aim of ensuring early discovery of fires. Each department conducts initial response drills that cover all steps from initial firefighting to reporting and evacuation. We are thus working to be prepared to prevent accidents from spreading.

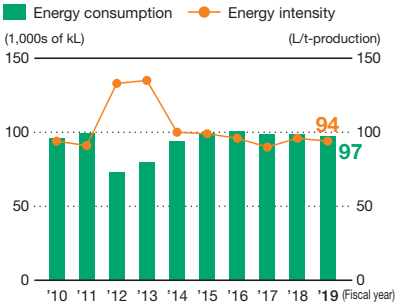
Revolving light and indicated information

Initial response drill

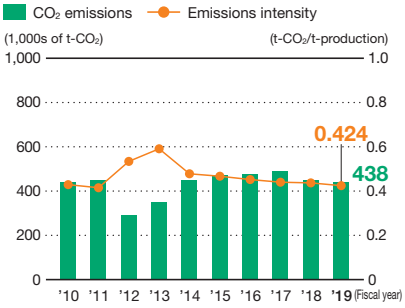
Plant Data

Himeji Plant

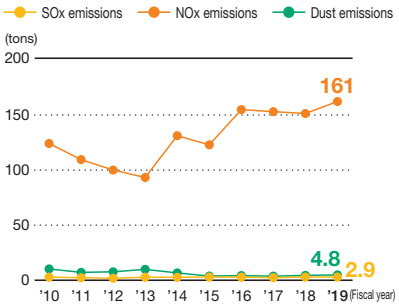
Trends in Energy Consumption and Intensity



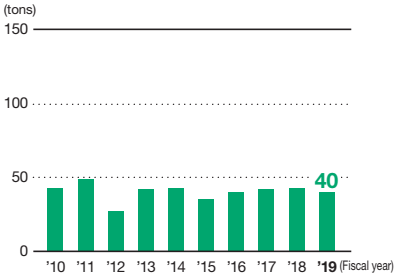
Trends in CO_2 Emissions and Intensity



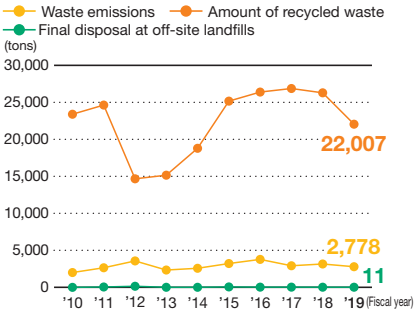
Trends in Emissions of SOx, NOx, and Dust



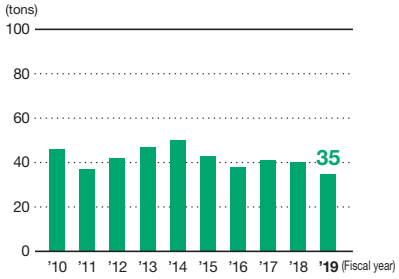
Trend in COD of Wastewater



Trends in Amount of Waste, Recycled Waste, and Waste for Final Off-site Landfill Disposal

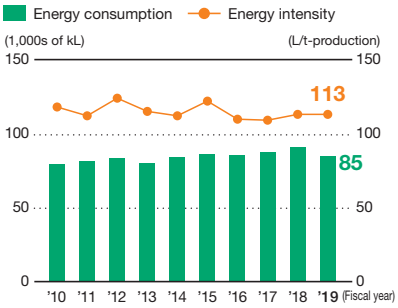


Trend in Emissions of Substances Subject to the PRTR Law

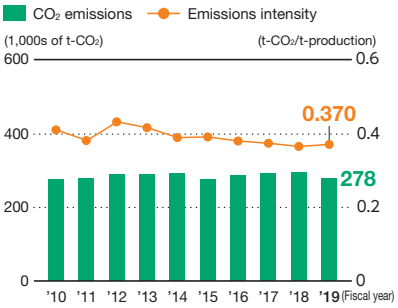


Kawasaki Plant

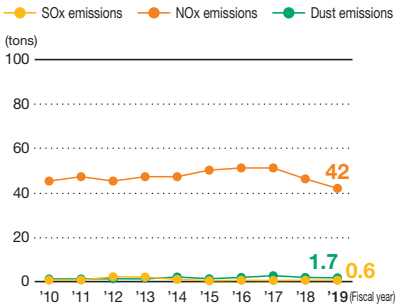
Trends in Energy Consumption and Intensity



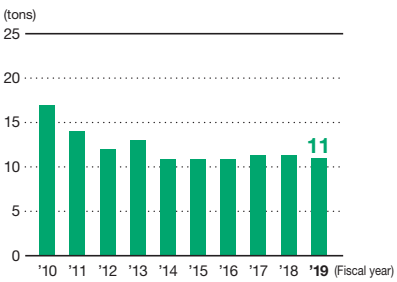
Trends in CO_2 Emissions and Intensity



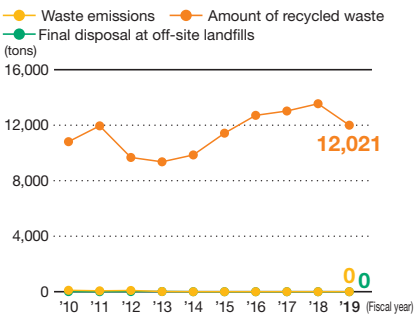
Trends in Emissions of SOx, NOx, and Dust



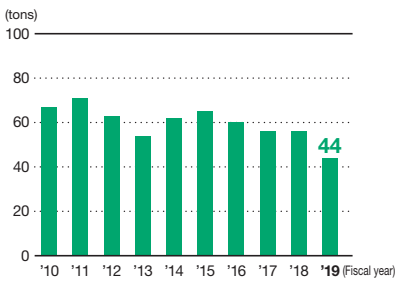
Trend in COD of Wastewater



Trends in Amount of Waste, Recycled Waste, and Waste for Final Off-site Landfill Disposal



Trend in Emissions of Substances Subject to the PRTR Law



Providing Support for Group Companies

In the interests of strengthening group management, we are providing active support for the RC initiatives of our Group companies.

Support for Environment and Safety Activities

RC discussions

The RC Division holds RC discussions to promote and improve RC initiatives for Group companies both inside and outside Japan. In fiscal 2019, the discussions were held at six companies in Japan and three companies overseas.

In these discussions, we received reports on the policies, planning and achievements of each company's RC initiatives as well as reports on individual improvements on-site. We also exchanged opinions with each company and provided them with advice and support.

RC discussion at Nisshoku Techno Fine Chemical Co., Ltd.

RC discussion at Nippon Shokubai Europe N.V.

Environmental and safety audits

We conduct environmental and safety audits at our Group companies in Japan to strengthen our environmental safety management structure and promote system improvements.

In these audits, we confirm compliance with legal requirements as well as regulatory compliance related to safety and the environment.

We also determine whether our environment and safety management systems are properly implemented.

Starting from fiscal 2018, the person in charge of the environment and safety at each Group company participated in an audit of other Group companies, as an opportunity to get to know the RC initiatives and the techniques used to implement management systems at other companies.

Environmental and safety audit at Nippon Nyukazai Co., Ltd.

Environment and safety exchange meeting

Every year, persons in charge of environment and safety at our Group companies in Japan gather at a company in charge to hold an environment and safety exchange meeting.

At the meeting, the company in charge presents their RC activities, based on which opinions are exchanged and information shared, with the aim of improving initiatives at each company. Also at the meeting, participants examine the industrial injuries that have occurred at Nippon Shokubai and its Group companies in Japan, and investigate the cause from the aspects of people, materials and management, and formulated countermeasures to prevent any similar injuries from occurring.

The exchange meeting for fiscal 2019 was held at Nippon Polymer Ind. Co., Ltd., where RC initiatives were reviewed and opinions were exchanged on the difficulties in proceeding with the initiatives.

Support for Quality Activities

Support for quality assurance initiatives

For Group companies in Japan, in fiscal 2019, we continued to provide various advices and supports on their quality activities and quality issues through the quality roundtable meetings.

For Group companies outside Japan, to ensure the high quality at the same level in our all sites for our core businesses, we continued to provide various supports closely by the quality meetings carried out at one site by the persons in charge of quality from all sites (QA manager meetings), the periodic conference with each site, and the quality-related database for overseas sites.

QA manager meeting at Nisshoku Chemical Industry (Zhangjiagang) Co., Ltd.

Quality audits

Quality audits for the Group companies for fiscal 2019 were conducted focusing on two priority themes: initiatives to ensure quality governance, and responses to past trouble and measures to prevent recurrence—the same themes as for plant audits at Nippon Shokubai.

For Group Companies in Japan, both opportunities and good points found through the audits were shared within the Group companies, and reflected in their initiatives for improvement.

For Group companies outside Japan, quality audits are conducted every year on SAP manufacturing sites, with the aim of continuously improving their quality management systems. At other sites, quality audits are conducted every two years. In fiscal 2019, the quality audit was conducted on Sino-Japan Chemical Co., Ltd. and confirmed that their management capabilities had improved due to the establishment of the quality assurance department.

Quality audit at Nippon Shokubai Europe N.V.

Quality exchange meeting

Quality exchange meeting is carried out at one company by the persons at both our company and Group companies in Japan in charge of quality every year. In fiscal 2019, it was held at Nisshoku Techno Fine Chemical Co., Ltd. in the agenda about Approach for activation of internal audit for the purpose of improving quality governance.

It was a very fruitful meeting for each participant because the good practices were presented by each company and they might be introduced into their own company.

Initiatives of Group Companies

Group Companies in Japan

TOKYO FINE CHEMICAL CO., LTD.

Principal business	Manufacture and sale of disinfectants for industrial use, brine, antifouling agents, stabilizers of vinyl chloride resins, etc.

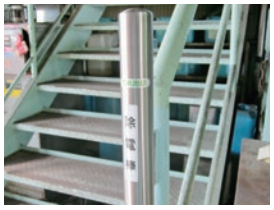
In fiscal 2019, the first year of the 7th RC Promotion Basic Plan, our plant facilities suffered unprecedented damage from natural disasters, such as typhoons No. 15 and No. 19. Despite that, we were able to achieve zero facility accidents and industrial injuries as we did in fiscal 2018.

Regarding environmental protection, as 10 years have passed since we acquired Eco Action 21 certification, and as our awareness of environmental conservation has improved, we have been making continuous efforts to reduce waste and promote recycling through the sorting of waste.

To improve on-site safety, we implemented various safety measures, including establishing the standards for antistatic measures and installing antistatic rods, with the aim of preventing fires caused by static electricity.

We will continue to make company-wide efforts in promoting RC initiatives and work to increase operational safety.

Eco Action 21
Commendation for 10-year continuation



An installed antistatic rod

Interview

We reduced utility costs by renewing boilers and reviewing our overall efforts

As a measure to reduce utility costs, we replaced aged boilers with highly efficient, gas-fired boilers.

Company-wide efforts were made to reduce energy consumption through initiatives promoted at each plant, such as quickly closing valves when steam is not used, addressing steam leakages, and repairing traps.

As a result, we were able to reduce the electric power used for boiler operation by around 50% and thereby contributed to the reduction of NOx emissions.

We will make further efforts to reduce energy consumption at facilities while paying attention to the environmental impact.

Hiroyuki Honma
Team leader, Manufacturing Department
TOKYO FINE CHEMICAL CO., LTD.

NISSHOKU TECHNO FINE CHEMICAL CO., LTD.

Principal business	Manufacture and sale of (meth)acrylic acid derivatives and photo/electro chemicals

Nisshoku Techno Fine Chemical has focused its efforts on preventing industrial injuries through activities such as offering hands-on education programs both inside and outside the company, leading to the achievement of zero injuries in fiscal 2019. Regarding process safety and disaster prevention, a fire occurred in a warehouse at our plant. We are very sorry for the trouble caused. To prevent the recurrence of such accidents, we revised related regulations and reviewed the hazard evaluation. We also held discussions in the safety culture development committee to launch initiatives to raise our safety awareness.

The company undertook environmental protection efforts with the goal of reducing the amounts of waste generated, emission of substances subject to the PRTR Law, and energy use compared to fiscal 2018. Despite our efforts, we were unable to achieve the targets due to changes in production conditions.

For process safety and disaster prevention, the company is working to improve its departments to respond in an emergency. In addition to the annual comprehensive emergency drills, the company conducts emergency drills at each of its departments and receives guidance and training from the Ichikawa Joint Disaster Prevention Team for training on the handling of equipment. We also participated in the self-defense firefighting competition organized by the Ichikawa City Fire Department and gained fifth place.

Comprehensive emergency drill

Self-defense firefighting competition

NIPPON POLYMER INDUSTRIES CO., LTD.

Principal business	Manufacture and sale of acrylic resins

Nippon Polymer Industries installed a new hydrant plumbing system dedicated for use by public fire departments, apart from the existing hydrant facilities.

The new facility has a water capacity of 3,100 L/min., which is sufficient for large fire engines. The joint emergency drill with a public fire department and the Nippon Shokubai Himeji Plant held in June 2019 confirmed that the facility had sufficient watering capacity.

Moreover, construction of a new indoor warehouse for dangerous materials, which was launched as an internal project in fiscal 2018 in response to the increase in production, was completed at the end of August 2019, and the warehouse has started operations. For this warehouse, a robust protective fence that can be easily opened and closed with a simple operation was newly incorporated for the entire rack, with the aim of preventing materials stored in high places from falling in case of an earthquake.

The company will continue to enhance its facilities related to process safety and disaster prevention and improve its RC initiatives through education and training, placing the highest priority on safety.

Joint emergency drill

New indoor warehouse for dangerous materials

Group Companies in Japan

NIPPON NYUKAZAI CO., LTD.

Principal business	Manufacture and sale of surfactant and other chemicals

In fiscal 2019, Nippon Nyukazai proceeded with the RC activities of the 4th Medium-term RC Promotion Plan (spanning fiscal 2017-2020) in its third year.

Regarding occupational safety and health, the company had two injuries without loss of workdays at its Kawasaki Plant. We thoroughly examined the causes of and countermeasures for these injuries and shared the details throughout the company, including the Kashima Plant, thereby preventing the recurrence of similar injuries. We will distribute the hiyari-hatto close call cases reported in each division throughout the company as necessary, with the aim of achieving zero injuries.

For environmental protection, we set up a working team for wastewater reduction and worked to reduce wastewater by setting numerical targets. We have implemented a number of energy-saving measures related to wastewater reduction, which have been showing steady effects. We will continue to promote initiatives to reduce environmental impacts.

Regarding process safety and disaster prevention, the company continued to hold an educational program in which experienced employees pass down their skills to younger employees. In fiscal 2019, the program was held twice. By allowing the experiences of veteran employees to be shared, the company aims to help young employees who have been worked for less than three years, in particular, sharpen their sensitivity to danger.

The company will continue to work to make its operations safe and to enhance its RC efforts.

Presentation meeting to hand down skills

CHUGOKU KAKO CO., LTD.

Principal business	Manufacture and sale of adhesive-processed Principal business products and fine sphere particles

Chugoku Kako have many facilities for dangerous materials, including general handling facilities and underground storage tanks. We therefore make efforts to properly maintain such facilities by conducting daily checks and annual inspections. As a result of these efforts over a long time, our manufacturing managers were commended as excellent hazardous materials engineers by Kurashiki Fire Prevention Association. The company also removed the No. 1 coater, which was inefficient in several aspects including the environment, and installed a new trial machine taking into consideration safety and the work environment.

Regarding safety and health, although we have achieved the target of zero injuries with loss of workdays for 1,200 days, we had an injury due to a cutter without loss of workdays. We will improve our ability to predict risks even in routine operations by learning from risk assessments, hiyari-hatto close call reports and past cases of industrial injuries, thereby preventing injuries from recurring.

We will continue to make efforts to become a company trusted by the local community, aiming at zero injuries and accidents.

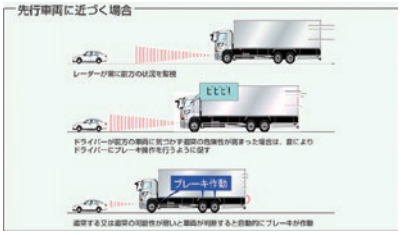
Commendation ceremony

Nisshoku Butsuryu Co., Ltd.

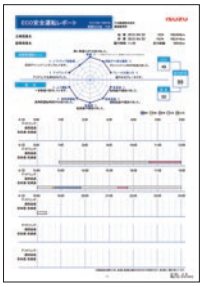
Principal business	Logistics of chemicals

The Nisshoku Butsuryu Group positions “providing environment-friendly, safe, and high-quality logistics services for chemicals and contributing to society through its RC initiatives” as its key management policy. Under this policy, we have been working on the reduction of GHG emissions as an initiative to reduce environmental impacts and promoting risk prediction as an initiative to achieve zero accidents and injuries. We also promote proper operation of advanced operation information systems and the introduction of vehicles equipped with Advanced Emergency Braking System as priority tasks.

In fiscal 2019, we focused on “renewal of aged facilities and handling of serious trouble through corrective actions and ensuring the implementation of preventive measures,” “clarification of criteria for transportation in a natural disaster,” “response to the transportation of hazardous and poisonous substances,” and “promoting the realization of unloading improvements and conclusion of safety agreements” as priority tasks.



Advanced Emergency Braking System



“Mimamori-kun” advanced operation information system

NIPPOH CHEMICALS CO., LTD.

Principal business	Manufacture and sale of iodine, iodine compounds, raw materials for pharmaceuticals and pesticides and natural gas

In fiscal 2019, Nippoh Chemicals achieved zero industrial injuries and zero quality complaints, demonstrating the effects of the various RC initiatives the company has been committed to over the past several years.

Since industrial injuries often occur from contact with chemical substances, we organize workshops for employees to experience contact with chemical solutions and conduct health damage risk assessments for all the chemicals handled at the Company.

To prevent human error, we host workshops and promote better labeling. We also make steady efforts to improve the work environment by ensuring 5Ss as a measure to prevent foreign matter inclusion.

For plant sites, the company resumed the practice of inviting proposals, which had been suspended, four years ago.

Around 300 proposals are submitted each year. The company commends good proposals with the aim of raising the employees’ awareness of improvement. We will continue to promote RC initiatives participated in by all members.

Workshop to experience contact with chemical solutions (Elimination of clogged pipes)

Workshop on chemical substance risk assessment (Hands-on practice)

Group Companies Outside Japan

NIPPON SHOKUBAI EUROPE N.V. (Belgium)

Principal business	Manufacture and sale of acrylic acid and superabsorbent polymers

Every year, NSE performs emergency exercises with the local fire brigade and internal fire brigade. This year, based on the opinion of local operators, NSE organized a completely different type of exercise, which was to evacuate operators who are feeling unwell while climbing the plant tower.

Evacuation by crane at such a height was not easy, even for the local fire brigade called the "RED team" equipped with highly professional knowledge. However, the team finally succeeded in evacuating the operators. This exercise has proven to be very useful for both the local fire brigade and our internal brigade.

We believe that next time, any evacuation will be performed with higher efficiency.

Evacuation exercise from a high location using a crane

Interview

Last Minute Risk Analysis (LMRA)

Following the corporate credo 'Safety takes priority over production,' NSE has several systems in place to guarantee the safety of all employees and facilities.

One such system is the Last Minute Risk Analysis (LMRA). Despite the daily effort to make the workplace safe, injuries and incidents do happen. From the analysis of these injuries and incidents, it was found that in many cases the last step in identifying risks was missing. LMRA was introduced to address this problem.

In LMRA, a tailor-made LMRA sheet with a checklist of items to be confirmed before the start of work is used. We must confirm that there are no problems with all listed items before work starts.

We will continue to think about safety and take action to ensure safety.

LMRA symbol
(Stop before starting work, check the list items, and then start work)

Ms. Ilse De Paepe
Responsible Care Manager
Nippon Shokubai Europe N.V.

PT. NIPPON SHOKUBAI INDONESIA

Principal business	Manufacture and sale of acrylic acid, acrylic esters, and superabsorbent polymers

The groundbreaking ceremony for the project to enhance acrylic acid production facilities was held on July 11, 2019, with the invitation of honorable guests from the Cilegon Local Government. The project has been progressing smoothly so far.

A power outage occurred on August 4, 2019 in West and Mid Java, including the capital city of Jakarta. All plants stopped due to the outage but successfully restarted without any trouble.

On October 16, 2019, we acquired halal certification for all products manufactured at PT. Nippon Shokubai Indonesia. We will continue to provide safe and reliable products for Muslim customers.

Groundbreaking Ceremony for the project to enhance acrylic acid production facilities

Halal certification

SINGAPORE ACRYLIC PTE LTD

Principal business	Manufacture and sale of crude acrylic acid

On May 30, 2019, we conducted an ISO tank chemical spillage drill with Singapore Civil Defense Force (SCDF) as part of our plant expansion project. This was our first drill since running the ISO tank loading facility in May 2018. We have learnt some valuable lessons from the feedback given by the SCDF team after the drill. For example, water spray was still useful even though there was no fire, as the water spray can prevent spilled gas from diffusing.

In 2019, we celebrated the 20th anniversary of SMAG (a chemical complex formed by four neighboring Japanese chemical manufacturers), of which Singapore Acrylic is part. In commemoration of the more than two decades of growth and success that SMAG members have jointly experienced, we relaunched the SMAG complex company video and organized a party for the 20th anniversary.

ISO tank chemical spillage drill

SMAG 20th anniversary party

Group Companies Outside Japan

SINO-JAPAN CHEMICAL CO., LTD. (Taiwan)

Principal business	Manufacture and sale of surfactant and other chemicals

In March 2018, the International Organization for Standardization (ISO) released ISO 45001, the first international standard for occupational safety and health. To adapt ourselves to global occupational safety and health management standards, we reviewed our work standards and improved the facilities, and finally obtained ISO 45001 certification.

Moreover, in order to demonstrate that we pay attention to the sustainable growth of the palm oil business industry and the conservation of the global environment, we participated in the Roundtable on Sustainable Palm Oil (RSPO) and obtained RSPO certification.

We will make continuous efforts to promote occupational safety and the health of our employees and environmental protection, with the aim of becoming a company playing an active role not only within Taiwan but on a global scale.

ISO 45001 certificate

RSPO certificate

NISSHOKU CHEMICAL INDUSTRY (ZHANGJIAGANG) CO., LTD. (China)

Principal business	Development, manufacture and sale of superabsorbent polymers and polymers for concrete admixture

As part of our “Near Miss – Kaizen Activity 2019,” a total 42 proposals – 6 of which were related to safety – were submitted. Once every half-year period, rewards are given to those who submitted the best proposals and those who submitted the most proposals.

The company also conducts emergency drills twice a year jointly with the regional fire department and the regional emergency response center, with the aim of improving employee capabilities in the event of an emergency. In November, to help employees improve their first-aid capabilities, first-aid training was carried out by inviting external professional instructors.

Moreover, an audit of safety standardization by the Chinese government was carried out in August, and we passed the audit.


Near-Miss Kaizen Activity 2019 award ceremony


Emergency drill


First-aid training


Audit of the safety standardization

Nippon Shokubai America Industries, Inc.

Principal business	Manufacture and sale of superabsorbent polymers, polymers for concrete admixture, water soluble polymers and acrylic emulsions

In 2019 Nippon Shokubai America Industries, Inc. (NAII) strived for excellence in achieving their safety and environmental performance goals at both of its US-based facilities. The Houston plant achieved ISO 45001 certification, an international standard for occupational safety and health management system. The Chattanooga plant is looking to gain certification in 2020.

The Houston plant also held its annual safety slogan contest to actively involve employees and to highlight the importance of working safely during the turnaround. The winning slogan for 2019 was: “Safety’s Intention is Accident Prevention!”

The Chattanooga plant upgraded or replaced all of the safety showers and eyewashes throughout the facility. Process Hazard Analyses (PHAs) were performed on existing and changed processes, and many points requiring safety and process improvements were identified. Other improvements have been made to lessen the environmental footprint of the facility, including LED lightning added in the Administration building, optimization of nitrogen storage and delivery systems, and renovation of the stormwater outfall area.

As a result of active employee involvement in Kiken Yochi (KY) before work and KY training, the Houston and Chattanooga plants respectively celebrated six and eight years with no injuries resulting in lost workdays.

Winner of the Safety Slogan Contest

ISO 45001 certificate

About this RC Report 2020

This RC Report 2020 was prepared to explain in more detail our RC initiatives reported in the **TechnoAmenity** Report, which we began publishing in 2019.

In preparing this Report, we have focused on increasing both the readability and ease of understanding for the benefit of our stakeholders.

TechnoAmenity Report 2020 presents our initiatives toward achieving the Nippon Shokubai Group Mission "**TechnoAmenity** — Providing affluence and comfort to people and society, with our unique technology," covering financial information such as our business performance, business plans and results, as well as our corporate social responsibility (CSR) initiatives, which were initially reported in the CSR Report. We would recommend that you read the **TechnoAmenity** Report along with this RC Report 2020.

Scope of This Report

Organization (Unless otherwise stated, all provided data refers solely to Nippon Shokubai Co., Ltd.)

NIPPON SHOKUBAI CO., LTD.
- Osaka Office
- Tokyo Office
- Himeji Plant
- Kawasaki Plant
- Suita Research Center
- Himeji Research Center

Group Companies in Japan
- NIPPOH CHEMICALS CO., LTD.
- TOKYO FINE CHEMICAL CO., LTD.
- CHUGOKU KAKO CO., LTD.
- NIPPON POLYMER INDUSTRIES CO., LTD.
- NISSHOKU TECHNO FINE CHEMICAL CO., LTD.
- NIPPON NYUKAZAI CO., LTD.
- Nisshoku Butsuryu Co., Ltd.

Group Companies Outside Japan
- Nippon Shokubai America Industries, Inc.
- PT. NIPPON SHOKUBAI INDONESIA
- NIPPON SHOKUBAI EUROPE N.V.
- SINGAPORE ACRYLIC PTE LTD
- NISSHOKU CHEMICAL INDUSTRY (ZHANGJIAGANG) CO., LTD.
- SINO-JAPAN CHEMICAL CO., LTD.

Reporting period: April 1, 2019–March 31, 2020
Some topics in and after April 2020 are also contained in the report.

Publication date: November 2020

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TechnoAmenity

Providing affluence and comfort to people and society,
with our unique technology.

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NIPPON SHOKUBAI

Our company logo
represents the spirit of
TechnoAmenity

Hexagon	One of the fundamental symbols used in chemistry
Cosmo yellow	Represents the hidden energy of the sun
Earth green	Represents the life-supporting nature of the earth
Horizon between two colors	Represents the future we always seek

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