# (Key Sustainability Issues)
# Reduction of Wastewater and Industrial Waste

## Policy and Basic Approach

The Nippon Kayaku Group, in the course of its business activities, uses and discharges vast amounts of water resources. We view water resource use as an issue for all of our business sites, and are therefore mindful of using water appropriately and conserving the local environment. With respect to water discharge, we hold ourselves to yet stricter standards than those laid down in law and at regional and local government regulatory level.

When it comes to waste, we must drive forward efficient use and recycling of substances from production through to consumption and disposal, so as to minimize resource usage and advance towards a recycling society with low environmental burdens. That is why our **KAYAKU Vision 2025** (**KV25**) lists recycling rates and zero-emission rates among our key performance indicators (KPIs), and why, in addition to working on waste reduction, we are perceiving waste produced in the course of business as a future resource which should be efficiently used.

Furthermore, April 2022 saw the implementation of a Law on Plastic Resource Recycling, underlining the fact that the conditions imposed on plastics are ever-changing and ever-stricter. The backdrop of problems stemming from climate change and plastic refuse has led to yet livelier moves towards plastic waste recycling in Japan as much as anywhere. With respect to the waste discharged from the plastic used by the Nippon Kayaku Group, we are moving forward with 3R initiatives (reduce, reuse and recycle) firmly in our minds.

## System

› System for Promoting Responsible Care

## Audit

In order to confirm whether wastewater and waste are being appropriately managed at every business site and Group company, the Nippon Kayaku Group conducts audits in the form of Core Environment, Safety and Health Diagnostic Checks. These Checks allow us to confirm any problems or inadequacies regarding compliance with laws and regulations on wastewater and waste treatment, run our eye over wastewater treatment areas and waste disposal areas, and grasp any problems with the management situation.

› Responsible Care Audits

## Indicators

› Environmental Management

## Initiatives

### Wastewater

#### ◆ Protection of the Water Environment

The Nippon Kayaku Group holds itself to yet tougher standards than those laid down by laws or regional and local regulations, and makes sure to comply with them when discharging. We also handle color material products such as dyes and inkjet printing ink, and the plants which manufacture them, Fukuyama and Tokyo, make sure that any colored wastewater produced during manufacturing is given decoloring treatment prior to discharge.

| Indicators | Covering | Unit | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|
| COD | consolidated | tons | 231.9 | 218.8 | 223.6 | 243 | 274 |
| Total phosphorus | consolidated | tons | 10.6 | 3.2 | 11.2 | 7.1 | 18.5 |
| Total nitrogen | consolidated | tons | 74.8 | 83.2 | 73.5 | 114.0 | 68.5 |
| SS* | consolidated | tons | 46.0 | 48.4 | 49.9 | 49.2 | 44.6 |

* SS - Suspended solids: Refers to particulate matter of 2mm diameter or less either floating or suspended in water, including fine particles from minerals, plant and animal plankton or the carcasses of such, sewage, organic matter and metal sediments originating from plant wastewater. If present in large amounts, suspended solids can negatively affect water transparency and appearance, and – through impeding light-ray penetration – underwater photosynthesis as well

#### ◆ Business Site Initiatives

**Education and Training**
**Head Office**
**A Seminar on the Soil Contamination Countermeasures Act**

September 2023 saw our Technology Unit's Technical Administration & Engineering Division open a seminar on the Soil Contamination Countermeasures Act for domestic business site in-charges and environmental protection managers, aimed at deepening understanding of environmental laws. The Soil Contamination Countermeasures Act is geared towards grasping soil pollution situations and implementing relevant measures to prevent health hazards. As Nippon Kayaku handles a multitude of chemical substances, we must gather the requisite knowledge on soil contamination prevention measures in order to appropriately apply the law when, for example, decommissioning facilities which handled designated hazardous chemicals or encountering changes in soil characteristics (due to excavations or embankment-building). The seminar saw around 50 employees given the chance to learn about the outline and purpose of the Act and the process for filing applications from a specialist who introduced actual case studies. The future will see us hold such internal seminars periodically to deepen employee understanding as we work on fully observing the law.

### Joetsu Plant
**Training on Wastewater Issues**

The Joetsu Plant manufacturing process for polarizing plates gets through some 20,000m$^3$ of water a month.
Such manufacturing operations cause discharged wastewater to contain various chemical substances. Once put through treatment equipment, though, we can reuse such wastewater as process water and thereby decrease industrial waste volumes. We also use analyzers to monitor wastewater discharged into rivers, and hold ourselves to standards yet higher than those laid down in regulations, discharging only wastewater which meets those standards.
The same plant also hosts training seminars given by Facility Safety Division employees on water treatment equipment and discharge methods, with production employees and managers learning how water used in production is treated prior to discharge into rivers. We will continue holding these training sessions on a regular basis so as to deepen employee understanding and lower environmental burdens.

## Waste

### ◆ Responding to the Law on Plastic Resource Recycling

Amid the ever-changing, ever-stricter environment around plastics did Japan introduce a Law related to the Promotion of Recycling of Plastic-related Materials (Law on Plastic Resource Recycling) in April 2022. Under this Law, Nippon Kayaku can be defined as a “heavy waste producer”. Hence, in order to contribute to a sustainable society, we are mindful of the 3Rs (Reduce, Reuse and Recycle) as we drive forward efforts to systematically fix plastic waste targets and reduce the volumes produced.

**Plastic Waste Emission Amounts**

| Indicators | Covering | Unit | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|
| Plastic waste emissions | Non-Consolidated | tons | 954 | 888 | 885 | 788 |
| Recycling rate | Non-Consolidated | % | 80.2 | 80.8 | 81.8 | 91.0 |

### ◆ Business Unit Initiatives

### Fukuyama Plant
**Pursuing Zero Emissions through Effective Use of Waste**

In addition to cutting volumes of waste produced, Nippon Kayaku promotes exploring the reuse of waste as a future resource. Of the many types of waste generated by the Fukuyama Plant, sludge produced during microbial water treatment comes in particularly large amounts. As the moisture component of sludge makes it difficult to treat, we formerly sent it to landfill after the proper management processes. But after we examined its resource potential with the aim of decreasing environmental burdens, an incineration company informed us that sludge could potentially be recycled as a heat-adjustment fuel (a so-called “heat-reducing fuel”), and is currently using our sludge for that purpose. Additionally, the ash from the incineration process is now being effectively repurposed for cement and roadbed materials. The Fukuyama Plant is also looking at ways of utilizing other forms of industrial waste, and continues to achieve rates of 0% landfill and 100% recycling.

Going forward, we will endeavor to maintain the proportion of industrial waste earmarked for incineration (the Zero-Emissions Rate) at 1% or less, and raise recycling rates to 80% or more.

### Kayaku Safety Systems de Mexico
**Industrial Waste Management**

Kayaku Safety Systems de Mexico (KSM) properly sorts its solid waste into wood, cardboard, nonferrous metals, aluminums and plastics, and is constantly on the lookout for external suppliers who can reuse these materials. The materials are stored in a fixed place for 2 to 3 months before being collected by government-certified suppliers.
The recyclable elements of industrial waste are delivered to various recycling companies so that wood being can be repurposed for wooden palettes, cardboard is also reused, and new materials can be generated from plastic, aluminum and steel.
This program also extends into areas outside production. One example would be the setting up of a breakroom which allows users to sort plastic bottles, organic and inorganic waste.
The end of 2021 brought waste management improvements. Prior to that, we had no proper sorting system, meaning that waste was sent for treatment while containing resources that could yet be effectively used. We have now rectified that by fixing reuse and waste standards for each type of waste, and sorting in line with those standards. This has made sorting decisions easier for workers, thereby increasing efficiency, accuracy, and recyclable amounts of metals, wood and plastic. We have also boosted reusable materials by reassessing plastics formerly designated as waste. Our higher recycling amounts have also produced the secondary benefits of less municipal waste and landfill disposal.
FY2023 saw negotiations with customers result in permission being given for the reuse of polyester packaging materials, which we plan to commence during FY2024.

**Recycling amounts**

| Category | Covering | Unit | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Metals | KSM | tons | 1 | 3 | 9 |
| Plastics | KSM | tons | 50 | 73 | 77 |
| Lumber | KSM | tons | 10 | 4 | 9 |
| Cardboard | KSM | tons | 24 | 23.3 | 26 |
| Municipal waste | KSM | tons | 160 | 165 | 112 |

## Waste Data

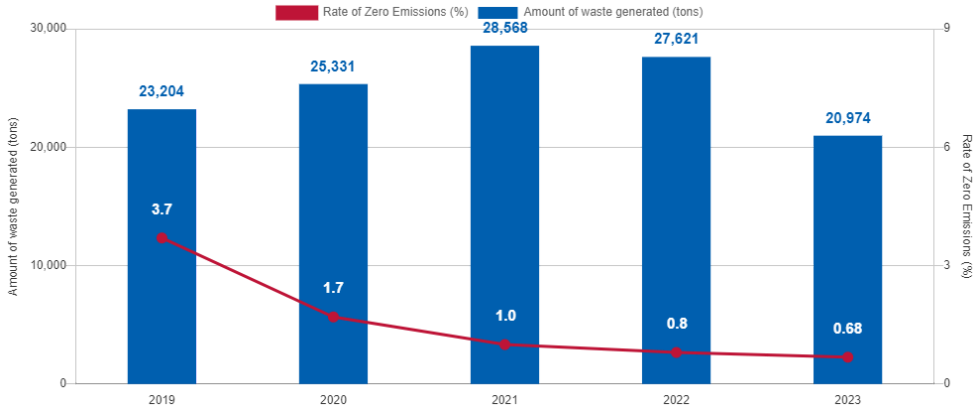
The total volume of waste produced by the Nippon Kayaku Group in FY2023 ran to 22,030 tons, which was 24% down on the 28,934 tons produced in FY2022. In our non-consolidated business, we have also been promoting the recycling of waste previously landfilled or incinerated. Our continued efforts at reducing the environmental burden in this way have yielded a 143-ton (39%) year-on-year reduction in landfilled waste, and a further 0.1% year-on-year fall in zero-emission rates from 0.8 to 0.7%.
We will continue promoting waste volume reduction and effective use of waste, easing the heavy environmental burdens posed by landfilled waste, and working towards environmental conservation and a sustainable society.

| Indicators | | Covering | Unit | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|
| Non-hazardous waste | | non-consolidated | tons | 17,971 | 19,411 | 22,069 | 21,154 | 16,146 |
| | | Group companies | tons | 4,240 | 996 | 1,199 | 1,242 | 1,087 |
| | | **Total** | **tons** | **22,211** | **20,407** | **23,268** | **22,396** | **17,233** |
| | General waste | non-consolidated | tons | 714 | 643 | 673 | 648 | 464 |
| | | Group companies | tons | 647 | 504 | 449 | 559 | 513 |
| | | **Total** | **tons** | **1,361** | **1,147** | **1,122** | **1,207** | **977** |
| | Industrial waste | non-consolidated | tons | 17,256 | 18,768 | 21,396 | 20,506 | 15,682 |
| | | Group companies | tons | 3,593 | 493 | 750 | 682 | 574 |
| | | **Total** | **tons** | **20,849** | **19,261** | **22,146** | **21,188** | **16,256** |
| Hazardous waste | | non-consolidated | tons | 5,231 | 5,925 | 6,503 | 6,467 | 4,828 |
| | | Group companies | tons | 190 | 92 | 86 | 71 | 59 |
| | | **Total** | **tons** | **5,421** | **6,017** | **6,589** | **6,538** | **4,887** |
| | Source-specific hazardous industrial waste | non-consolidated | tons | 131 | 221 | 146 | 182 | 182 |
| | | Group companies | tons | 0 | 0 | 0 | 0 | 0 |
| | | **Total** | **tons** | **131** | **221** | **146** | **182** | **182** |
| **Total**[*1] | | | **tons** | **27,631** | **26,426** | **29,857** | **28,934** | **22,119** |

| Indicators | | Covering | Unit | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|
| Types of waste | Sludge | non-consolidated | tons | 2,206 | 1,979 | 2,309 | 2,338 | 2,291 |
| | | Group companies | tons | 267 | 131 | 336 | 258 | 115 |
| | | **Total** | **tons** | **2,473** | **2,110** | **2,645** | **2,596** | **2,406** |
| | Waste oil | non-consolidated | tons | 5,296 | 5,766 | 6,386 | 5,848 | 4,809 |
| | | Group companies | tons | 95 | 94 | 87 | 71 | 59 |
| | | **Total** | **tons** | **5,391** | **5,860** | **6,473** | **5,919** | **4,868** |
| | Spent acid | non-consolidated | tons | 617 | 2,244 | 2,185 | 1,523 | 1,116 |
| | | Group companies | tons | 1,916 | 3 | 2 | 8 | 13 |
| | | **Total** | **tons** | **2,533** | **2,247** | **2,187** | **1,531** | **1,129** |
| | Waste alkali | non-consolidated | tons | 13,399 | 13,382 | 15,784 | 16,064 | 11,219 |
| | | Group companies | tons | 631 | 17 | 11 | 11 | 8 |
| | | **Total** | **tons** | **14,030** | **13,399** | **15,795** | **16,075** | **11,227** |
| | Plastic waste | non-consolidated | tons | 642 | 954 | 888 | 885 | 788 |
| | | Group companies | tons | 731 | 235 | 277 | 326 | 326 |
| | | **Total** | **tons** | **1,373** | **1,189** | **1,165** | **1,211** | **1,114** |
| | Others | non-consolidated | tons | 1,041 | 1,010 | 1,021 | 962 | 751 |
| | | Group companies | tons | 790 | 609 | 572 | 640 | 624 |
| | | **Total** | **tons** | **1,831** | **1,619** | **1,593** | **1,602** | **1,375** |
| Landfill amount | | non-consolidated | tons | 844 | 404 | 298 | 233 | 144 |
| Recycling rates[*2] | | non-consolidated | % | 84 | 81 | 82 | 87 | 84 |
| Zero-emissions rates | | non-consolidated | % | 3.7 | 1.6 | 1 | 0.8 | 0.7 |

*1 As figures have been rounded off, the totals in some columns do not exactly match the sum of each item above.
*2 Includes recovered and reused solvent

**Trends in Waste Generation Amounts and Rates of Zero Emissions (Nippon Kayaku alone)**




## Costs Associated with Pollution, Waste and Resource Reuse

> Environmental Accounting

## Responses to Environmental Regulations

At every plant do we prepare treatment equipment to deal with manufacturing process wastewater depending on its composition, and hold ourselves to higher standards than those imposed by law and local authority regulations when keeping tabs on water pollution figures. We are happy to report that FY2023 saw no violations of laws such as the Water Pollution Prevention Law and related regulations, and zero violations of wastewater discharge laws such as the Waste Disposal and Public Cleaning Law.

> Numbers of Environmental Violations