

**KIOXIA**

**2023  
Environmental  
Report**



**KIOXIA Iwate Corporation**

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## Company Profile

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Company name: KIOXIA Iwate Corporation  
Current address: 6-6, Kitakogyodanchi, Kitakami-City, Iwate  
Established on: December 25, 2017  
President: Koichiro Shibayama  
Business contents: Manufacturing of NAND flash memory

### Reporting Period

The “KIOXIA Iwate Corporation Environmental Report 2023” describes our efforts in fiscal year 2022 (April 1, 2022 to March 31, 2023). Some content includes reports of efforts outside of FY2022.

## Message from Our President

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KIOXIA Iwate Corporation  
President and Chief Executive Officer  
Chief of environmental conservation  
**Koichiro Shibayama**

KIOXIA Iwate was established as a production base for flash memories. Flash memories are essential to our everyday lives as a medium that ‘stores’ information such as in smartphones, automobiles, and data centers.

Supply and demand in the flash memory market is constantly changing. Under these circumstances, the company is working to strengthen its production system by improving productivity and training employees in anticipation of medium- and long-term demand.

Many of you may be concerned about the impact of semiconductor manufacturing on the surrounding environment. KIOXIA Iwate is taking various measures to advance its business without causing any worries or troubles for stakeholders.

Examples of environmental measures include environmental measurements, routine checks of facilities, and environmental patrols around the plant.

This report summarizes KIOXIA Iwate’s environmental conservation efforts, including prevention of environmental problems as well as environment-related community contributions.

We hope that KIOXIA Iwate will be a vibrant presence in the community. I would like to thank you all for your ongoing support and understanding and ask for your continued support of our business activities.

# Environmental Policy

The KIOXIA Group established the “KIOXIA Group Environmental Policy” to demonstrate its fundamental philosophy regarding the environment, and shares the contents of this policy throughout the entire group.

## KIOXIA Group’s Environmental Policy

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### **Mission**

KIOXIA Group’s Environmental Policy ensures we conduct business in a way that enhances and preserves the environment. Through purposeful, sustainable actions, we’re prioritizing being responsible stewards of the environment to do our part in maintaining our planet’s health for years to come.

### **Policy**

In addition to complying with environmental laws and regulations in the regions in which it operates, KIOXIA Group considers environmental stewardship to be one of our primary responsibilities. We take actions to limit our environmental impact throughout our supply chain of memory, applied, and related software products that support information infrastructure. From taking systematic and globally accredited steps to reduce our pollution and greenhouse gas emissions from our manufacturing processes, to regularly auditing and reviewing our activities to constantly improve our environmental management system, KIOXIA Group takes deliberate action to ensure efficient and effective operations.

### **Implementation**

1. We strive to make sustainable memory, applied, and related software products by using high-capacity, miniaturized and power-saving technologies. We also perform ongoing environmental assessments of our products and manufacturing processes, as well as a targeted effort to reduce our overall raw material usage.
2. We are doing our part to help prevent global warming through initiatives that directly reduce greenhouse gas emissions. This includes the development of energy-saving technologies – especially within power systems and manufacturing machinery – productivity improvements, and introducing clean energies.
3. We purposefully take actions aligned with the “three Rs” – reduce, reuse, recycle. Specifically, we focus on developing resource-saving technologies and implementing productivity efficiencies, as well as limiting the use of water resources around our plant sites and returning water used in production to the environment after effective purification

treatment.

- 4 .We limit environmental risk in our operations by being conscious of the chemicals we use in production and developing technologies that reduce our use of certain chemicals. Through responsible handling and management of production-related chemicals, we also strive to prevent associated pollution.
- 5 .We strive to reduce the impact of our business activities on biodiversity, and pursue activities that aim to preserve biodiversity in order to help conserve the environment.
- 6 .We regularly disclose information and updates on our sustainability efforts – including new energy-saving technologies – through environmental advertising, exhibitions, media, and collaboration with various stakeholders including the local communities in which we operate.
- 7 .We underscore the importance of environmental stewardship with our employees, who promise to keep sustainability top-of-mind in all business activities.

This Environmental Policy is core to KIOXIA Group’s operations – it is available internally to global employees of KIOXIA Group and externally to customers, media, and the general public. We are committed to pursuing corporate activities that are in line with policy.

Nobuo Hayasaka  
President and Chief Executive Officer  
KIOXIA Holdings Corporation

## Topics

### Installation of Self-Consumption Solar Power Generation System

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In order to promote the use of renewable energy, KIOXIA Iwate installed the KIOXIA Group's first large-scale self-consumption solar power generation system in January 2023. The new photovoltaic system has a generating capacity of approximately 3.6 MW. The annual power generation is expected to be approximately 3,500 MWh, which will reduce CO<sub>2</sub> emissions by approximately 1,600 t/year.



Solar Power Generation System

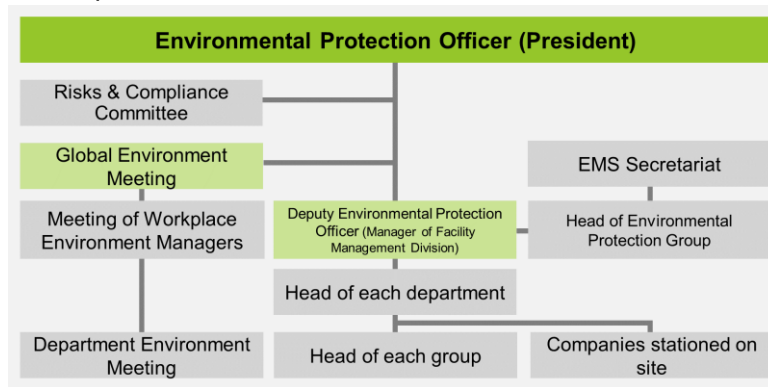
# Management Structure for Environmental Conservation

## Environmental Conservation Team Structure

To continuously and effectively promote environmental conservation efforts, KIOXIA Iwate has established an environmental conversation team structure led by the president. Clarifying the roles of the organization for environmental conservation will allow us to work on environmental conservation efforts throughout KIOXIA Iwate.

Matters related to environmental conservation are deliberated at the Global Environment Meeting, which the president attends.

Matters deliberated at the Global Environment Meeting are shared with all employees, including partner companies, to facilitate clear environmental conservation efforts.

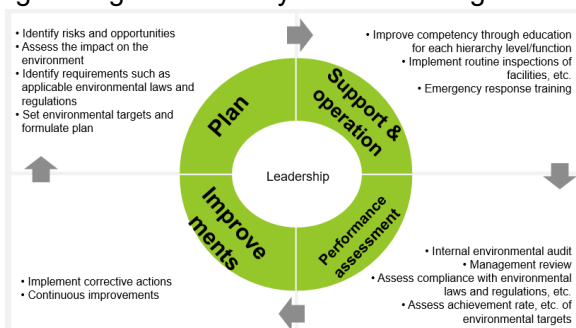


Environmental Conservation Team Structure

## Environmental Management System (ISO 14001)

KIOXIA Iwate is run in accordance with our environmental management system (EMS\*). The EMS is a system to address environmental conservation by clarifying the environmental impact (environmental risks) caused by business activities such as products and services.

The KIOXIA Group's EMS complies with the ISO 14001 international standard and undergoes regular audits by an external organization.



Environmental Management System Operation



ISO 14001-Certification

\*EMS: Acronym for Environmental Management System



## Initiatives to Reduce Environmental Impact

### Environmental Target

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KIOXIA Iwate has set target values based on the long-term environmental goals of the KIOXIA Group, which were discussed at the Global Environment Meeting.

By implementing routine reduction efforts and new improvement efforts, we achieved our environmental target values for FY2022 in all categories.

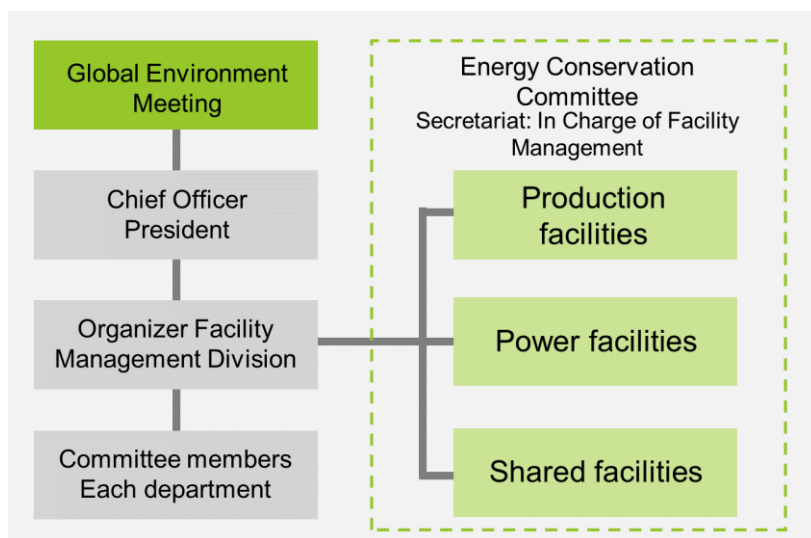
Environmental Target	Target Value (compared to FY2022 target)	Result Value	Assessment
Improve energy-derived CO <sub>2</sub> emissions intensity*	100% or below	84%	○
Improve greenhouse gas (PFCs) emission intensity*	100% or below	58%	○
Improve total waste intensity (including valuable resources)*	100% or below	71%	○
Improve total waste intensity*	100% or below	76%	○
Improve water withdrawal intensity*	100% or below	96%	○
Improve intensity* of chemical substance emissions	100% or below	52%	○

### Results of Environmental Targets in FY2022

\*Intensity: For the intensity target, KIOXIA Iwate's production memory capacity intensity is used as an indicator to be able to assess efforts.

## Reduce energy-derived CO<sub>2</sub>

KIOXIA Iwate has organized an “Energy Conservation Committee” to promote company-wide efforts to reduce energy-derived CO<sub>2</sub>\*, and is working to reduce the energy used in manufacturing, power, and shared facilities. The Energy Conservation Committee sets annual energy-derived CO<sub>2</sub> reduction targets for KIOXIA Iwate and formulates and rolls out CO<sub>2</sub> reduction measures. In FY2022, the reduction of energy-derived CO<sub>2</sub> emissions was 8,665 t/year.



Energy Conservation Committee Structure

Classification	Main Measures
Production facilities	Productivity improvements of production equipment, pump model change, etc.
Power facilities	Optimizing the operation of power facilities, etc.

Measures to Reduce Energy-Derived CO<sub>2</sub>

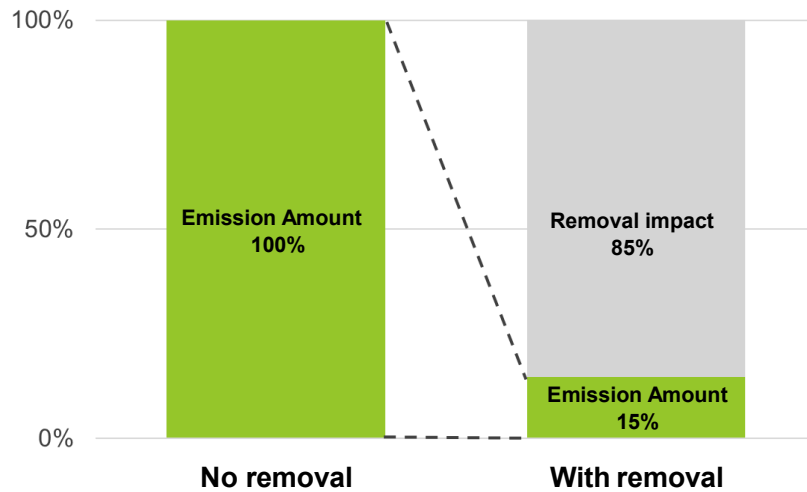
\*Energy-derived CO<sub>2</sub>: CO<sub>2</sub> emitted from the combustion of fuels and the use of supplied electricity and heat

## Reducing Greenhouse Gases (PFCs\*)

KIOXIA Iwate deals with a wide variety of greenhouse gases in order to manufacture semiconductors.

In particular, PFCs are essential for manufacturing semiconductors. However, they have a very large impact on global warming, and if discharged directly, they will cause environmental destruction. Therefore, KIOXIA Iwate is actively reducing PFCs emissions.

The main measure to reduce emissions is the installation of PFCs abatement equipment. Emissions are greatly reduced by combustion decomposition of PFCs in the equipment. KIOXIA Iwate has installed them in all targeted manufacturing facilities that uses PFCs. At the same time, we are curbing the use of PFCs by optimizing their use in the manufacturing process.

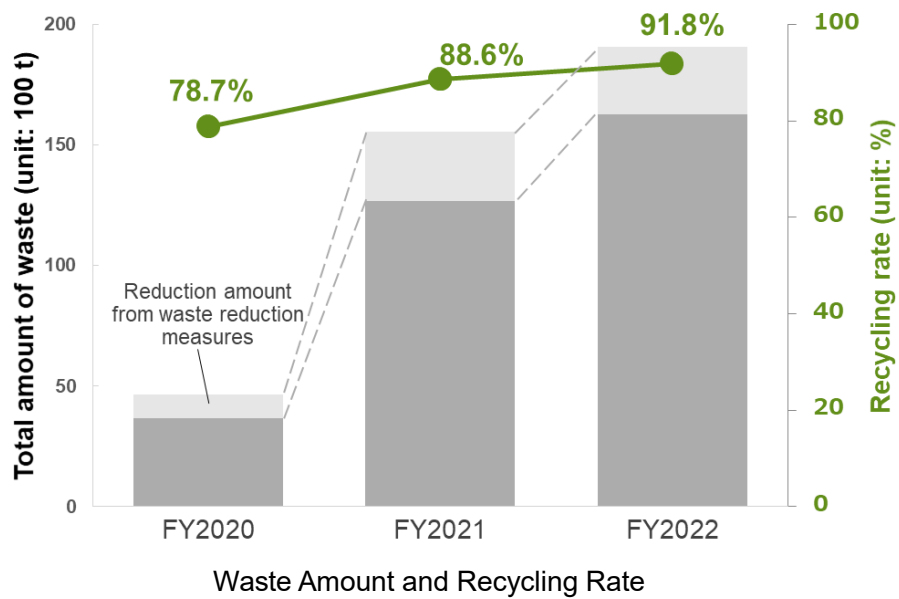


FY2022 Effect of PFCs Abatement removal system

\*PFC: Abbreviation for Perfluorocarbon

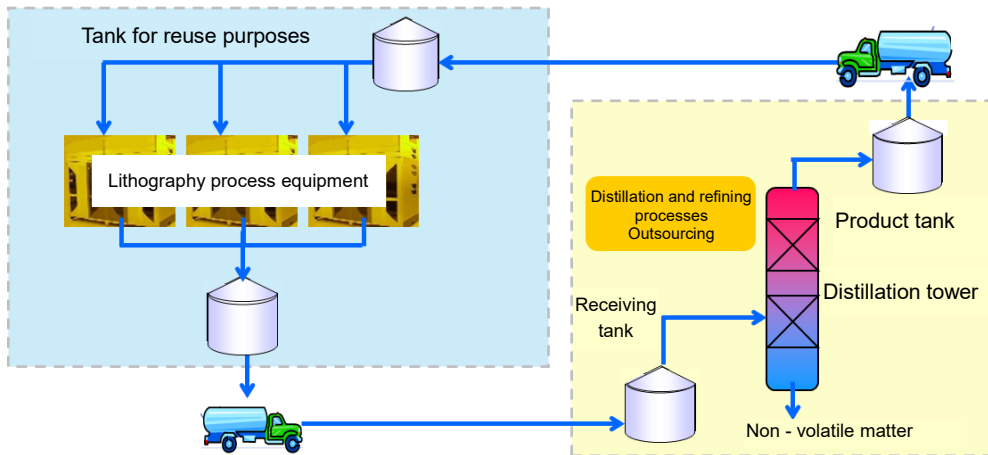
## Reducing Waste

Semiconductor manufacturing generates a large amount of waste, including waste liquid from the manufacturing process and sludge from wastewater treatment. In order to reduce waste generation, KIOXIA Iwate has been working to reduce chemical and gas usage and improve wastewater treatment processes since production began in 2019. We also promote the expansion of the recycling rate by thoroughly separating waste and examining methods of recycling.



■ Case study of reducing waste - Reusing waste liquid -

In semiconductor manufacturing, the process of forming circuits on wafers (lithography process) involves the use of solvents, which generate a large amount of waste liquid. KIOXIA Iwate reduces the amount of waste generation by distilling and refining waste liquids for reuse instead of disposing of them.



Reusing Waste Liquid

■ Recycling case study

KIOXIA Iwate recycles sludge and waste liquids that would otherwise be disposed of as waste into raw materials for cement or recycled chemicals.

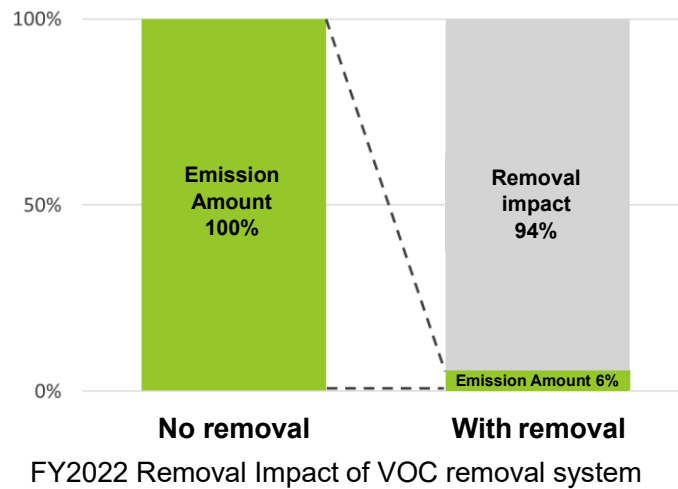
Waste		Example of Reuse through Recycling
Main category	Sub category	
Sludge	Sludge	Raw materials for cement
Waste acid	Hydrofluoric acid	Acid cleaning chemicals, etc.
	Phosphoric acid	Raw materials for fertilizer, etc.
	Sulfuric acid	Raw materials for sulfuric acid, etc.
Waste alkaline	Ammonia water	Denitration agent for exhaust gas from boilers, etc.
	TMAH (Tetramethyl ammonium hydroxide)	Materials to accelerate combustion, etc.

Recycling Case Study

## Reducing Chemical Substance Emissions

KIOXIA Iwate assesses chemical substances used in the manufacturing process, whether or not they are regulated by law, and the risk of leakage, etc., and works to reduce chemical substance emissions and substitute for these substances.

One example of our efforts is the elimination of volatile organic compounds (VOC\*). Since VOCs cause photochemical smog, their emissions are curbed by combustion decomposition with removal system. It also eliminates odors characteristic of VOCs.



VOC removal system

\*VOC: Acronym for Volatile Organic Compounds

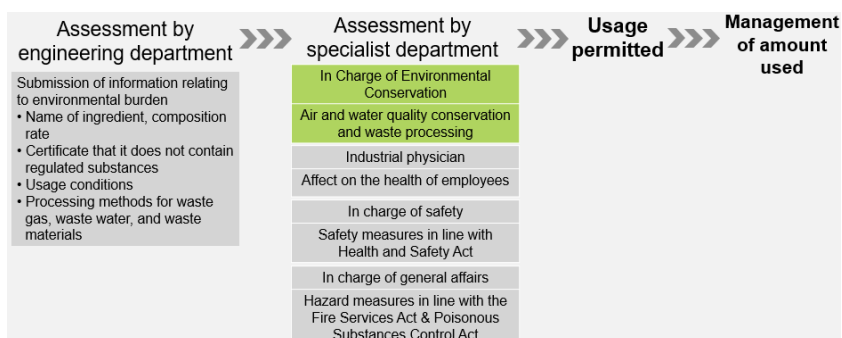
# Substance Management in Product Manufacturing

## Preliminary Assessment of Chemical Substances

The KIOXIA Group conducts preliminary assessments of chemical substances under the fundamental thinking of “do our utmost not to use chemical substances,” “strive to find replacement chemical substances that have minimal burden on the environment,” and “if using chemical substances, manage their use appropriately.”

Preliminary assessment of chemical substances is to check whether there are any regulated substances contained in the chemical substances and how to dispose of them after use. This ensures that the chemical substances are properly managed.

At the same time, we track and manage the status of chemical substances use even after the substances have been used.



Flowchart of Preliminary Assessment of Chemical Substances

## Management of Chemical Substances Included in Products

Regulations on product-related chemical substances are being tightened year by year in countries around the world. Behind the tightening of regulations is the problem of human health effects and environmental pollution caused by chemical substances. Major regulations include the POPs Convention, the EU REACH Regulation, and the EU RoHS Directive.

To address these environmental issues and regulations, the KIOXIA Group has selected “Procurement-Prohibited Substances,” which must not be contained in products, and “Procurement-Controlled Substances,” which are substances whose inclusion must be controlled. Through such management of chemical substances included in products, we aim to reduce the use of hazardous substances as much as possible, thereby reducing our environmental impact.

Classification	Substance Name
Procurement-Prohibited Substances	65 classes of substances identified by the KIOXIA Group such as lead and its compounds, mercury and its compounds, cadmium and its compounds, hexavalent chromium compounds, polybrominated biphenyls (PBBs), polybrominated biphenyl ethers (including PBDEs and DecaBDE).
Procurement-Controlled Substances	28 classes of substances identified by the KIOXIA Group such as antimony and its compounds, arsenic and its compounds, beryllium and its compounds, bismuth and its compounds, polycyclic aromatic hydrocarbons (PAHs), bromine and its compounds, etc.

Classification of Chemical Substances Included in Products

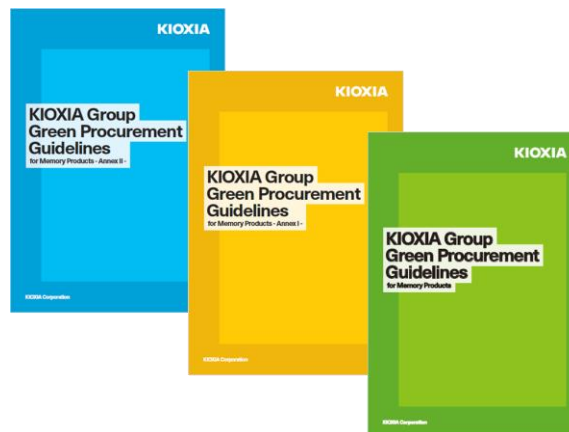
## Green Procurement

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Based on the KIOXIA Group Environmental Policy, we have established the KIOXIA Group's Green Procurement Guidelines, which reflect the laws and regulations of each country as well as customer requirements in order to achieve a sustainable society.

These guidelines include our approach to reducing the environmental impact of resource procurement and our requests for management of hazardous chemical substances. We share these guidelines with our suppliers. Green procurement refers to actively promoting environmental conservation at our suppliers by procuring products, parts, materials, etc. with a smaller burden on the environment.

In order to promote our business endeavors, it is important to reduce Environmental Impacts and risks caused by hazardous chemical substances throughout the supply chain. The cooperation of our suppliers, which are key business partners, is essential. By promoting green procurement efforts, the KIOXIA Group strives to manage chemical substances appropriately to contribute to realizing a better global environment.



Cover of the KIOXIA Group's Green Procurement Guidelines



## Countermeasures against Environmental Risks

### Compliance with Environmental Laws and Regulations

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In order to ensure compliance with environmental laws and regulations, KIOXIA Iwate clarifies the laws, regulations, and other requirements applicable to our company and checks for the applicability of laws and regulations in the procurement of manufacturing and power facilities.

#### ■ Centralized management of laws and regulations

To ensure complete compliance with environmental laws and regulations that are updated every now and then, we regularly check the details of the revisions. The details of revisions that apply to KIOXIA Iwate are reflected and centrally managed in the “List of Laws and Regulations Registration and Assessment of Compliance.”

#### ■ Compliance assessment

Every year we assess the status of our compliance with environmental laws and regulations that apply to KIOXIA Iwate. There were no problems with all legal requirements in FY2022.

#### ■ Checking compliance with laws when investing in and installing equipment

When making capital investments and procuring materials, we determine whether environmental laws and regulations such as the Water Pollution Prevention Act and prefectural ordinances are applicable or not, and for facilities to which they apply, we take action such as submitting notifications as necessary.

### Environmental Measurements

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KIOXIA Iwate has signed an environmental conservation agreement with Kitakami City to protect the environment of the surrounding area. Under the environmental conservation agreement, we have established voluntary control standards that are stricter than legal requirements, and we measure and monitor exhaust, groundwater, etc.

#### ■ Measurement items

##### 1. Items of environmental conservation agreement with Kitakami City

We measure groundwater (fluorine) and exhaust (nitrogen oxides, etc.) for preventing soil and air pollution.

##### 2. Other items

We regularly take samples and monitor wastewater, odorous substances, noise, vibrations, etc. Although wastewater is discharged into sewers, we have established voluntary standards that are stricter than the legal standards in order to minimize the impact on rivers after sewage treatment.



Groundwater measurements



Noise measurements

■ Analysis center

KIOXIA Iwate has set up an internal analysis center and established a system in which we can carry out analysis work swiftly from the samples we take.



KIOXIA Iwate Analysis Center



COD Analysis

Environmental Facilities

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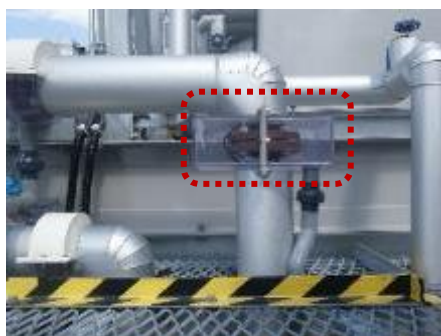
KIOXIA Iwate's environmental facilities are installed in accordance with the KIOXIA Group's own structural guidelines. Target environmental facilities include wastewater and exhaust treatment facilities. For our structural guidelines, we established standards for preventing pollution and reducing risks stemming from chemical substances.



System for Cleaning Exhaust Gas



Dike (Waste Water Relay Tank)



Double Pipeline for Joint



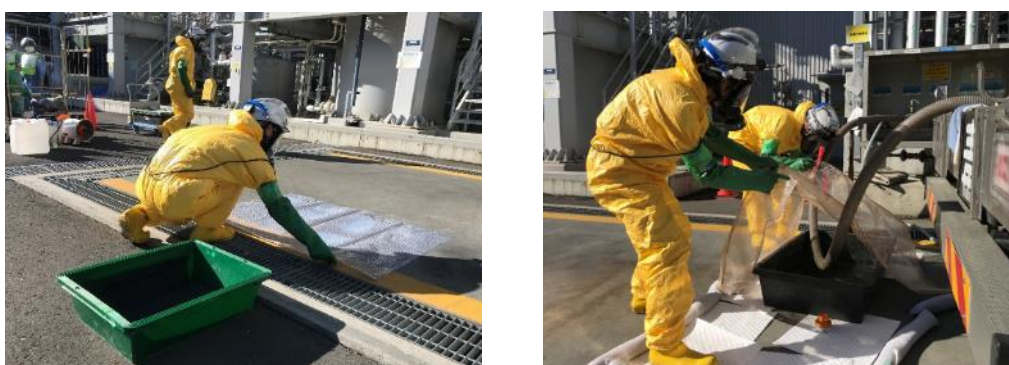
Pit to Prevent Leakage

## Accident and Emergency Response Training

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KIOXIA Iwate regards accidents and natural disasters caused by the chemicals as environmental risks, and conducts “Accident and Emergency Response Training” to ensure that we are prepared to deal with them.

Accident and Emergency Response Training is conducted together with partner companies to exchange ideas on actual work scenarios, communication systems, and other issues. This training has stimulated communication regarding environmental accidents throughout the company, and has also played a role in accident prevention.



Scenario-Based Training Assuming the Leaking of Chemicals

## Environmental Communication

### Environmental Communication Efforts with Local Community

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#### ■ Project to protect cherry blossom trees

In Kitakami City, we are engaged in a project to protect cherry blossom trees to ensure the fantastic cherry blossoms of Tenshochi, a popular viewing spot, are around for the next 100 years.

KIOXIA Iwate has participated in the Cherry Blossom Protection Workshop of this project since 2021, helping to prune and fertilize young cherry trees in Tenshochi Park.



Participation in Cherry Blossom Protection Workshop

#### ■ Contact lens case collecting activity

Since FY2023, KIOXIA Iwate has been supporting the “Eye City Eco Project,” a recycling activity conducted by HOYA Corporation, which operates “Eye City” contact lens specialty stores, as part of its SDGs activities.

This activity involves collecting empty cases of used contact lenses, which are recycled as polypropylene and a portion of the proceeds from the sale is donated to the Eye Bank Association.



Contact Lens Case Collection Boxes Installed at KIOXIA Iwate



## Efforts to Increase Understanding and Widespread Adoption In-House

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### ■ Monthly events

KIOXIA Iwate conducts month-long events to raise environmental awareness among employees : June: Environment Month, October: 3R Promotion Month, and February: Energy Conservation Month. Activities include cleaning up the area around the plant, tours of environment-related facilities, and other activities.



Cleaning around the Plant



Tour (Kitakami Sewage Treatment Center)

## Various Data

### Environmental Measurement Data

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KIOXIA Iwate takes environmental measurements based on the environmental conservation agreement with Kitakami City.

#### 1. Results of boiler and exhaust gas measurements

Item	Regulation Value*	KIOXIA Management Value	Measured Value*	Measurement Frequency
NO <sub>x</sub> (ppm)	150	120	24	Twice a year
Dust(g/m <sup>3</sup> )	0.1	0.08	0.002	Twice a year

#### 2. Results of groundwater measurements

Item	Regulation Value*	KIOXIA Management Value	Measured Value*	Measurement Frequency
Fluorine (mg/l)	0.8	0.7	< 0.2	Twice a year

\*Regulation Value: Value specified in the environmental conservation agreement with Kitakami City. See p.16 “Environmental Measurements”.

\*Measured Value: The measured value is the mean value from fiscal 2022.

### PRTR (Ascertain the Emission and Transfer Amounts of Chemical Substances)

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PRTR\* is a system to ascertain, aggregate, and publish what chemical substances were emitted into the environment (air, public water supplies, soil, etc.) from where and in what volume, and whether they were transferred (transfer amount) as waste, etc.

Based on the “Act on the Assessment of Releases of Specified Chemical Substances in the Environment and the Promotion of Management Improvement” (PRTR Act), it is obligatory to report the amount released or transferred into the environment (air, water, soil) if the annual handling amount of class I designated chemical substances is 1 t or more (0.5 t or more in the case of a specified class I chemical substance). This information is disclosed by the Ministry of Economy, Trade and Industry and the Ministry of the Environment.

PRTR\* Pollutant Release and Transfer Register

Substance No.	Chemical Substance Name	Emission Amount*				Transfer Amount*	
		Emissions to the atmosphere	Discharge to public water	Discharge to soil at the site*	Landfill disposal at the site	Transfer to sewers	Transfer off of the relevant site*
374	Hydrogen fluoride and its water-soluble salts	0.16	0	0	0	0	68
395	Water-soluble salts of peroxydisulfuric acid	0	0	0	0	0	0.18

PRTR data\* for 2022 (unit: tons/year)

\*Discharge/Transfer Amount: Two significant digits

\*Discharge to soil at the site: Discharges other than landfill disposal at the site

\*Transfer off of the relevant site: Amount transported off of the site other than to the sewers

## Material Balance

### 1. Input amount

		Usage			
Item	Fiscal year	2019	2020	2021	2022
Chemical substance (t/year)		875	2,593	8,350	10,986
Public water (thousand m <sup>3</sup> /year)		3.3	1.3	1.3	1.3
Industrial water (thousand m <sup>3</sup> /year)		1,037	1,688	2,904	3,580

### 2. Emission amount

		Emissions			
Item	Fiscal year	2019	2020	2021	2022
Greenhouse gas (thousand t-CO <sub>2</sub> /year)		45	151	376	553
Chemical substances (t/year)		15	53	63	58
Waste* (t/year)		1,004	3,657	11,909	16,266
Water discharge* (thousand m <sup>3</sup> /year)		912	1,416	2,213	2,683
NO <sub>x</sub> (t/year)		1.9	3.7	3.3	3.7

\*Waste: Amount of waste generated, including recycled and valuable materials

\*Discharged water: Discharged into sewage

Contact information

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