

## Worksites

### Mizushima Plant

#### Introduction to the Mizushima Plant

Kurashiki City is not only a tourist spot famous for its traditional white-walled storehouses, it is also one of the top industrial cities in western Japan, shipping products worth a total of 4 trillion yen. Most of these products are manufactured at the Mizushima industrial complex, an area packed with corporations that produce a wide variety of products ranging from iron and steel, ships, electricity, cars, food, and chemical products. The view of the complex from Mt. Washu is a sight to behold.



Aerial view of the Mizushima Plant

Zeon Corporation's Mizushima Plant is situated in one corner of this complex. The plant is the largest diversified user of C5 fractions\* in the world, utilizing the characteristics of the various compounds extracted from raw materials to change them into adhesive tape, diapers, tires, paint, fragrances, optical film, and lenses. The plant supports the lifestyles of consumers by providing familiar items crucial for society and to everyday life. The measures related to stability and safety implemented during production at this plant were introduced in the NHK program *Today's Close-Up* on January 16, 2013. The program's theme was the "crisis of the complex," and Zeon received high acclaim for its efforts to create a digital record of the experience and knowledge of veteran technicians, and integrate this into the production system to ensure a level of safety equal to that maintained by such veterans. However, Zeon also realizes that there are still plenty of issues and room for improvement, and will continue to implement further measures in the future. Our mission is to be an environmentally friendly plant that is appreciated by the local community and meets the diverse needs of customers by safely producing consistently high-quality products.

\* C5 fractions

Hydrocarbon molecules containing five carbon atoms. They are the byproduct of thermal cracking, or breaking down, of naphtha, and also include ingredients for raw materials of synthetic rubber and resin.

#### CSR Efforts at the Mizushima Plant

The slogan of the Mizushima Plant is "Visualize operations based on ABC, continually improve, and standardize these efforts." The plant strives to firmly root ABC culture (*atarimae*, *bakashoujiki*, and *chanto*, or in English: to earnestly and properly perform all of the routine but necessary tasks) and to our "3 Innovations."

We take these steps because we believe that we can uphold safety as our highest priority and continuously provide society with products of consistent quality only when every employee takes great care to abide by the law and follow Zeon's operational rules and procedures.

We are working to ensure that the Mizushima Plant meets the expectations of the local community and society at large in its pursuit of safety and stability, achieved by firmly rooting ABC culture and through production innovation.

#### Environmental and Safety Activities

##### 1. Reducing toxic chemical emissions

Our plant has been butadiene-emission-free since fiscal 2002, when we adopted a closed recovery and processing system. By measuring and reducing our VOC<sup>\*1</sup> emissions through PRTR<sup>\*2</sup> activities, we will continue to help conserve the environment.

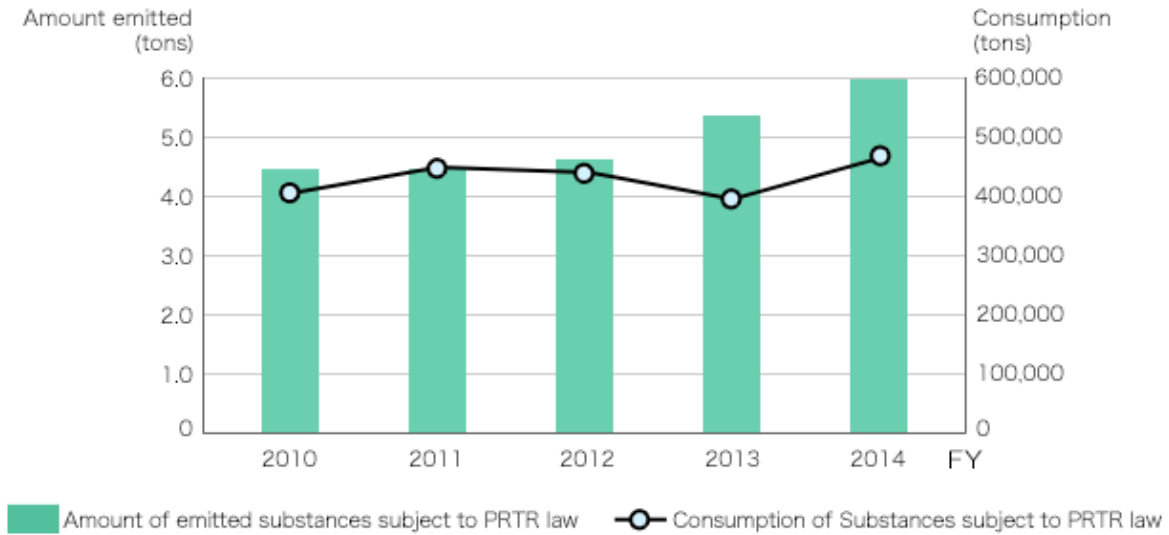
\*1 Volatile Organic Compounds

Organic compounds that change easily to a gas phase and enter the air.

\*2 Pollutant Release and Transfer Register

A database of hazardous chemical substances released into the environment and transferred off-site in waste. It provides the public with important information such as where and how much pollutants are being released and transferred.

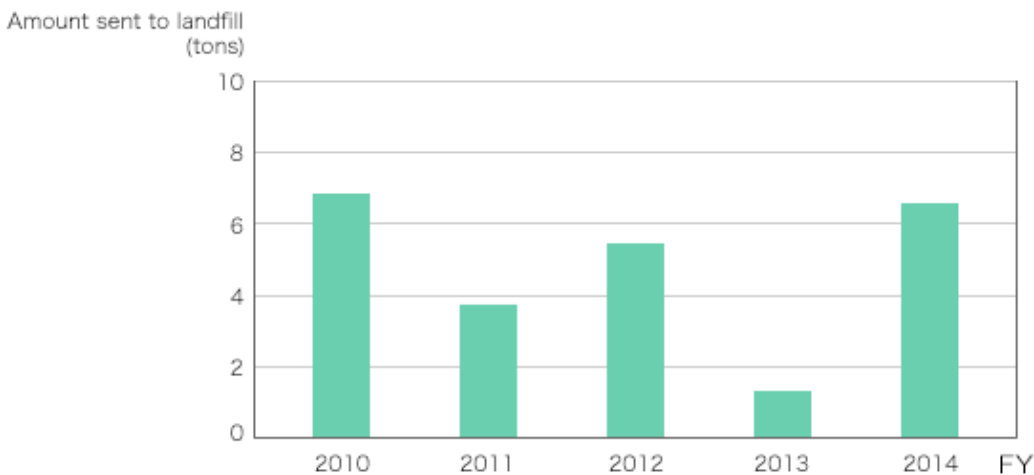
**Substances subject to PRTR law**



**2. Reducing industrial waste**

Starting in fiscal 2011, we set a target of 5 tons or less for waste sent to the landfill. In fiscal 2014, we were unable to achieve the target at 6.5 tons. This was due to the impact of gasket disposals generated as a result of a periodic inspection. We will reduce the amount by implementing efforts including reducing waste, reusing beverage bottles, and recycling plastics as solid fuels (the “three Rs”), which will lead to reducing final waste amounts.

**Amount of Waste to Landfill**



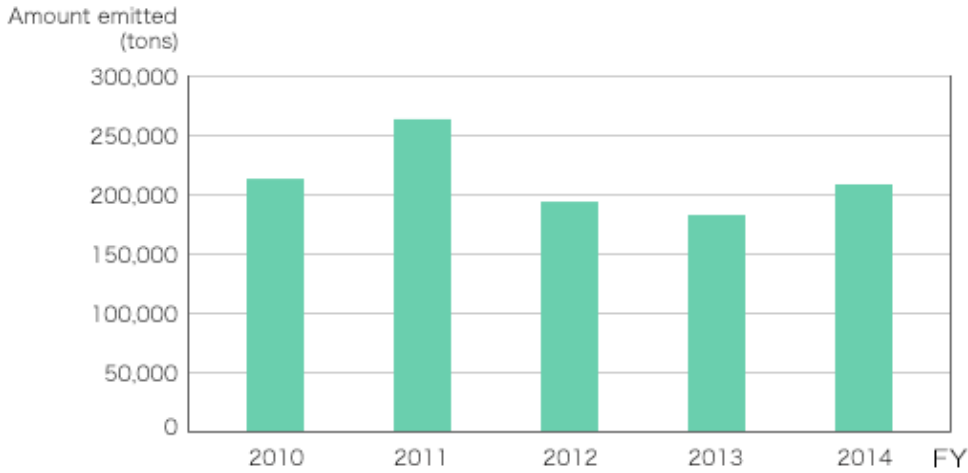
**3. Reducing air and water pollution**

We work to comply with standards for soot, smoke and wastewater output through daily monitoring and regular third-party assessments. We also implement checks on whether we are having a detrimental impact on the local area by monitoring hazardous air pollutants and noise levels at the boundaries of the plant.

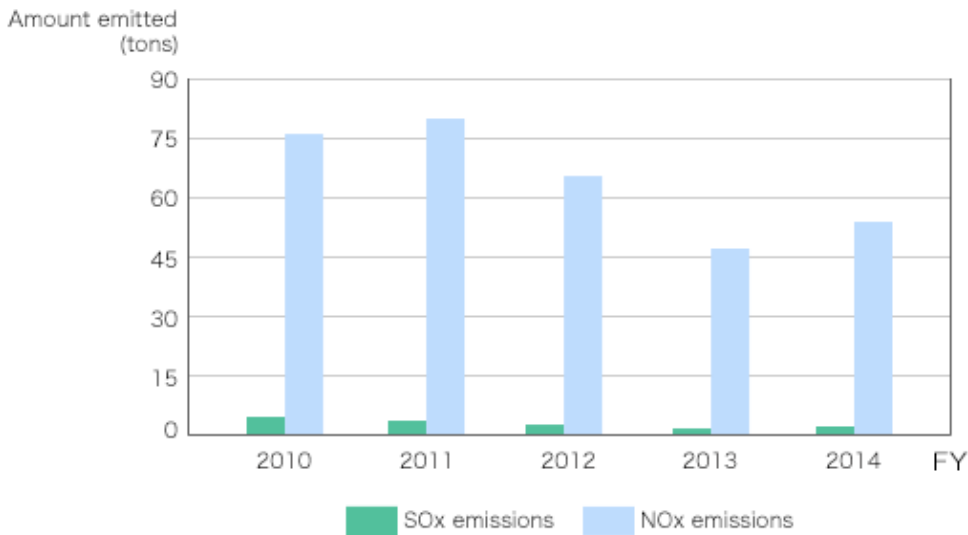
Wastewater from the Mizushima Plant flows into the Seto Island Sea, a semi-enclosed body of water. Due to the fact that in an emergency situation this could impact a large number of people’s lives, we are constantly conscious of wastewater and manage levels on a daily basis. We know that complying with environmental standards is only the bare minimum level of conduct a

corporation should exhibit, and will thus continue to strive to implement environmental protection.

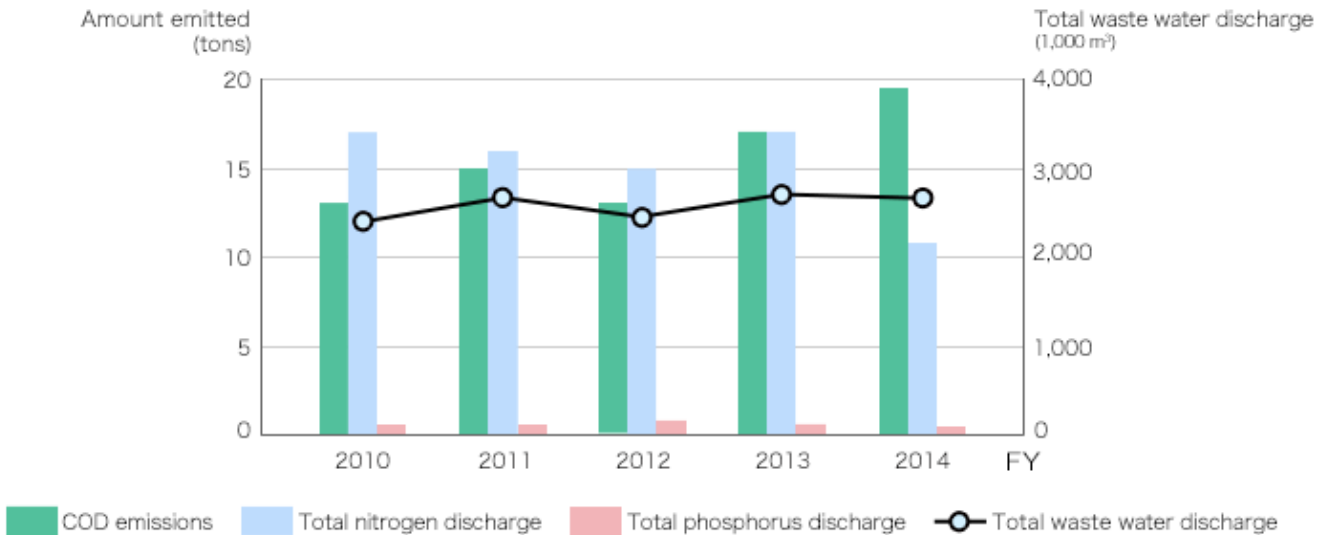
**CO<sub>2</sub> emissions**



**SOx and NOx emissions**



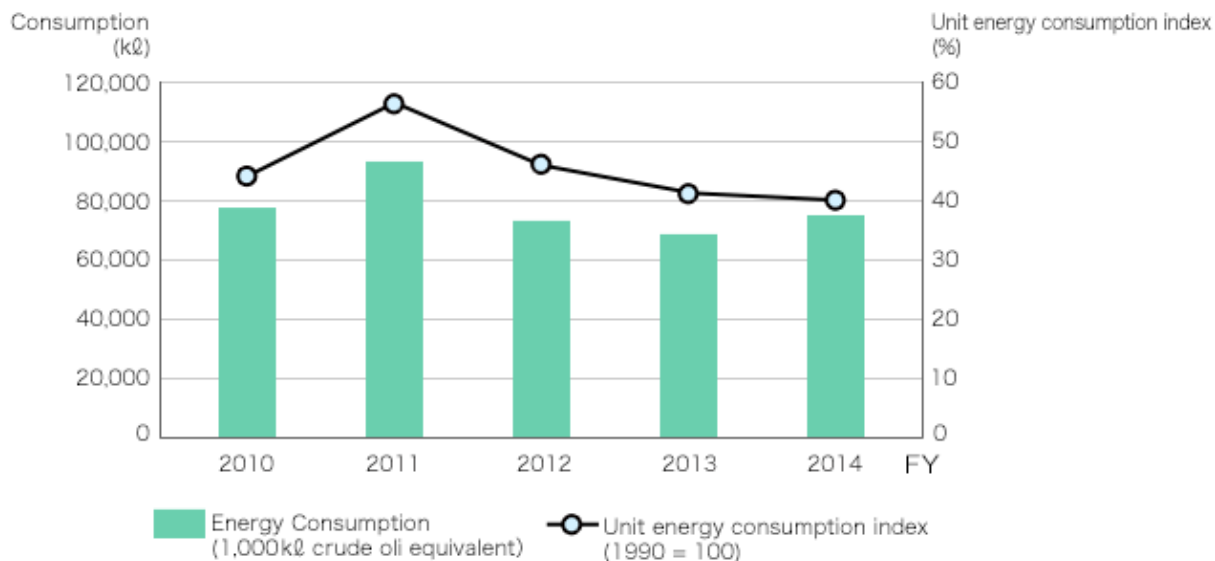
**Overall wastewater, COD, total nitrogen (TN) and total phosphorus (TP) discharge**



#### 4. Saving resources and energy

While energy consumption increased accompanying an expansion of production volume, we are reducing the intensity index. Continuing on from the previous year, in fiscal 2014 also we stabilized our processes, we conducted a diagnosis of steam traps throughout the plant in order to plan improvements for defective areas. In addition, our new and efficient combustion and heat recovery boilers began operating from August 2015, and are expected to make ongoing incremental resource and energy conservations.

#### Total amount of energy and Unit energy consumption index



#### 5. Environmental Data

Mizushima Plant		FY2010	FY2011	FY2012	FY2013	FY2014
<b>Toxic substances</b>	Butadiene consumption (tons)	144,820	136,385	130,154	110,704	141,100
	Butadiene emissions (tons)	0.0	0.0	0.0	0.0	0.0
<b>Substances subject to PRTR law</b>	Consumption (tons)	405,671	442,900	431,800	393,777	478,178
	Amount emitted (tons)	4.4	4.4	4.6	5.3	6.0
<b>Industrial waste</b>	Amount generated (before volume reduction) (tons)	60,045	60,400	56,270	59,253	70,584
	Amount generated (after volume reduction) (tons)	5,374	5,935	4,830	5,999	6,956
	Amount sent to landfill (tons)	6.8	3.7	5.4	1.3	6.5
<b>Atmospheric emissions</b>	CO <sub>2</sub> emissions (tons)	217,000	259,651	197,855	182,800	211,420
	SO <sub>x</sub> emissions (tons)	4.6	3.8	2.7	1.2	1.4
	NO <sub>x</sub> emissions (tons)	77	80	66	47	54
	Soot emissions (tons)	0.0	0.0	0.0	0.0	0.0
<b>Water resources (Industrial water + Ground water + Waterworks) consumption (1,000m<sup>3</sup>)</b>		2,378	2,481	2,351	2,665	2,713
<b>Waste water</b>	Total waste water discharge (1,000m <sup>3</sup> )	2,382	2,640	2,429	2,674	2,602
	COD emissions (tons)	13	15	13	17	20
	Total phosphorus discharge (tons)	0.6	0.6	0.7	0.6	0.5
	Total nitrogen discharge (tons)	17	16	15	17	12
<b>Energy</b>	Total consumption (crude oil equivalent, kL)	77,852	91,566	73,148	67,850	77,517
	Unit consumption index (1990 = 100)	44%	56%	46%	41%	40%
<b>Production of PDR equivalent (tons)</b>		760,900	731,500	705,400	714,800	840,400

## Quality Assurance Initiatives

In line with Zeon's Mid-Term Management Plan, SZ20, including the Enterprise Blueprint for 2020: "Zeon creates the future today through the power of chemistry," the Mizushima Plant aims to realize global production technologies that, through appropriate management of what we call the 4Ms—Material, Machine, Method, and Man—enable anyone anywhere in the world to produce great products with consistent quality. We hope to realize the Enterprise Blueprint by using our quality management systems to improve the technologies we develop.

### VOICE In Preparation for 2020

In fiscal 2014 we continued efforts aimed at achieving 100% yield rates<sup>\*1</sup>. First, in an effort to stabilize product quality, we created CAPD action sheets to visualize the management of this process. CAPD is our version of the PDCA cycle that starts with "checking" to see that existing systems have no problems or inadequacies, and then taking "action." By positioning this as a key theme, our process capability indexes<sup>\*2</sup> improved. However, we are continuing forward with these efforts, as we have yet to achieve 100% yield rates.

Another task we need to accomplish by fiscal 2020 is standardizing technologies so that overseas plants can manufacture products with the same level of quality. This is our responsibility as a parent plant<sup>\*3</sup>. In fiscal 2014, we worked to improve proprietary technologies using project structuring and standardize our management by stationing employees from Head Office and laboratories at plants. As a result, while we achieved significant improvements in process stabilization some issues remain and we will move forward with these efforts in order to resolve these remaining issues in fiscal 2015

<sup>\*1</sup> Yield rate

The percentage of products rolling off the production line that pass quality inspections. A 100% yield rate means that no defective products were produced.

<sup>\*2</sup> Process capability index

An indicator that quantitatively assesses the ability of a given process to meet certain quality standards.

<sup>\*3</sup> Parent plant

A plant that applies new technologies developed in Japan before they are adopted at overseas subsidiary plants.



Tomoyuki Kose  
Corporate Officer and  
Mizushima Plant Manager

## Living Together with the Local Community

### 1. Engaging the Local Community

In an effort to proactively interact with the region, we participated in community-organized events, such as the summer festival and rice-cake making.



Participated in  
community-organized  
rice-cake making

### 2. Comprehensive emergency drill

On November 21, we conducted comprehensive emergency-response training assuming a petrochemical complex disaster caused by a large-scale earthquake at Mizushima Plant. In assumption of a dangerous materials fire escaping from our tanks due to an earthquake caused by the Nankai Trough epicenter, we verified information from our disaster countermeasures office set up by our plant organization and the collaboration and function of the relative organizations, such as the fire and ambulance services. This training exercise was staged by the Disaster Prevention Office at Petrochemical Complex in Okayama prefecture, and was covered in newspapers and on television.



Comprehensive emergency response drill

### 3. Local volunteering

In an effort to support and cheer up local residents, the Mizushima Plant commenced voluntary neighborhood cleanups in 2006. In fiscal 2014, we continued activities to clean up areas together with local residents. Going forward we will continue in our endeavors, while remembering the novice spirit.



Volunteering to cleanup areas together with local residents