

## Worksites

### Tokuyama Plant

#### Introduction to the Tokuyama Plant

The Tokuyama Plant, which started operating in 1965, is located in the Shunan Industrial Complex of Yamaguchi Prefecture. The plant manufactures butadiene with the GPB process, an extraction distillation technology developed by ZEON, and then uses the butadiene to produce synthetic rubber, a raw material in fuel-efficient tires; synthetic latex, a raw material in gloves for medical and testing use; and polymerized toner for printers, a product that ZEON was first in the world to produce on an industrial scale. The Tokuyama Plant operates on a global level as ZEON Corporation's key synthetic rubber producer, exporting many of these products to overseas markets.

The Shunan Industrial Complex is said to have had its start when Kodama Gentaro, general of the Japanese Imperial Army and native of Tokuyama (currently Shunan City), recognized the advantages of Tokuyama as a port location and, responding to military demand created by the Russo-Japanese War, decided to construct a coal briquette manufacturing plant there for the navy in 1905. Shunan has since become a manufacturing hub for the petrochemical industry and many other industries.

Wander around the Tokuyama Plant today and you will find various remnants from olden days when the site was used as a naval fueling station. Most symbolic of this history is ZEON Shrine, built in 1966 in dedication to the divided portions (*bunshin*) of the three *kami* of Nachi Gongen, Sumiyoshi Myojin, Toishi Hachiman and to pray for safe operations, employee health, and business growth. To the west of the shrine is the "monument of martyrs," erected in 1924 to commemorate martyrs from the Tokuyama area, along with other artifacts.

While basing its operations on the principle of safety and stability first, the Tokuyama Plant tries to build rapport with its local community in various ways. For example, the plant hosts the annual Waraku Odori Dance Festival and has also invited local residents to observe its emergency-response drills.



Aerial view of the Tokuyama Plant

#### CSR Efforts at the Tokuyama Plant

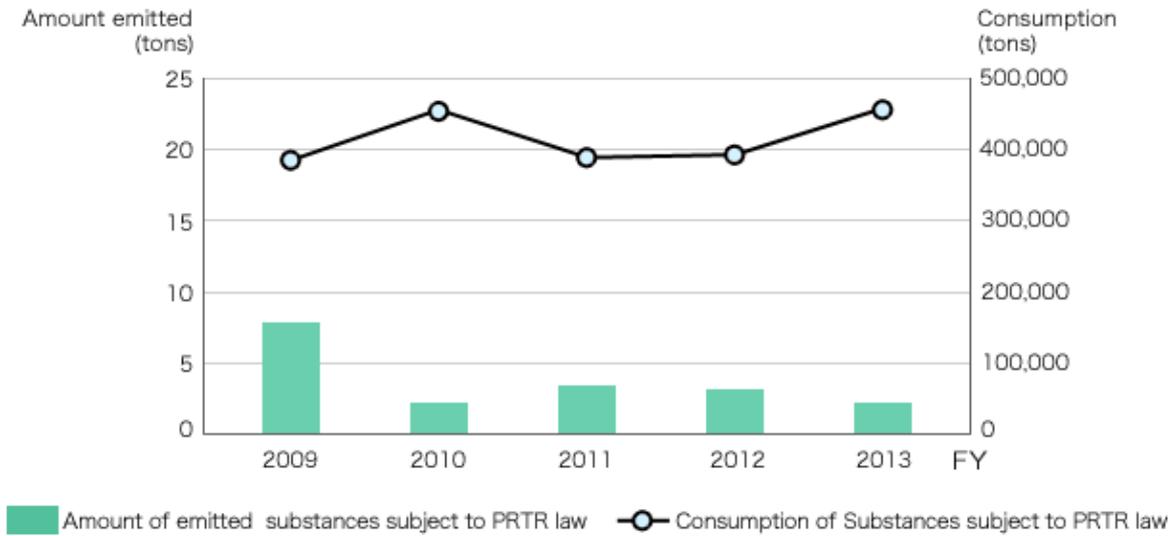
The Tokuyama Plant is located adjacent to the city center and residential areas around Tokuyama Station. To support the sustainable growth of society and earn the trust of the local community based on safe, stable operations, we are creating a dynamic and productive plant. To do this we introduce production innovations with the full participation of all employees under the banner, "Greetings and 3Ss (*seiri*, *seiton*, and *seisou*, or neatness, orderliness, and cleanliness) are the Foundation of Everything We Do." Employees at the plant actively collaborate with the local community to tackle various public issues, including collecting bottle caps and can tabs and cleaning nearby streets and the Higashi River, which flows alongside the plant.

## Environmental and Safety Activities

### 1. Reducing toxic chemical substances

In fiscal 2011, we introduced an exhaust gas purification system, which has allowed us to stably reduce emissions of substances subject to PRTR regulations. PRTR emissions in fiscal 2013 were 2.0 tons, which is a 26% reduction on the previous year. Moving closer to zero emissions, our future target is 1.9 tons of emissions or less.

#### Substances subject to PRTR law



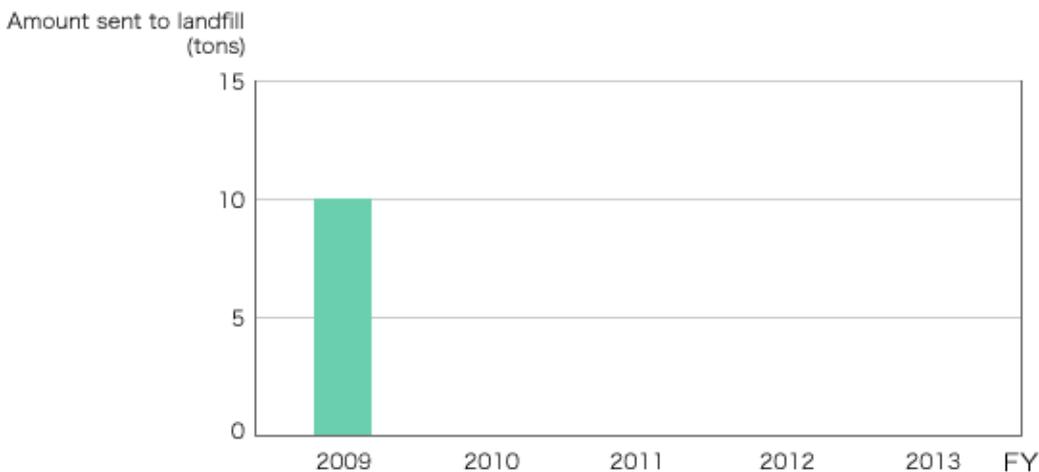
### 2. Reducing industrial waste

We have continually achieved zero waste since fiscal 2010.

We are developing activities in connection to industrial waste with the goal of further implementing 3R\* and reducing the amount of waste produced.

\* 3R  
Reduce, reuse, and recycle.

#### Amount of Waste to Landfill



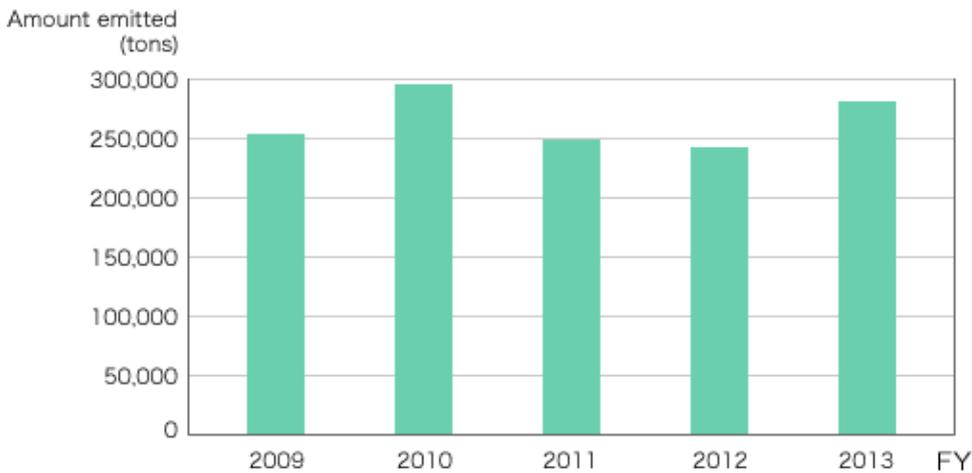
**3. Reducing air and water pollution**

We were able to steadily reduce NOx emissions into the air through energy conservation and improved combustion by installing dry air emission processing equipment and optimizing the amount of combustible air of the boilers. However, in fiscal 2013, we were unable to switch to lower sulfur fuel and SOx emissions therefore increased. In the second half of fiscal 2014, we will be able to stably reduce SOx emissions due to the completion of new boilers, which are currently under construction.

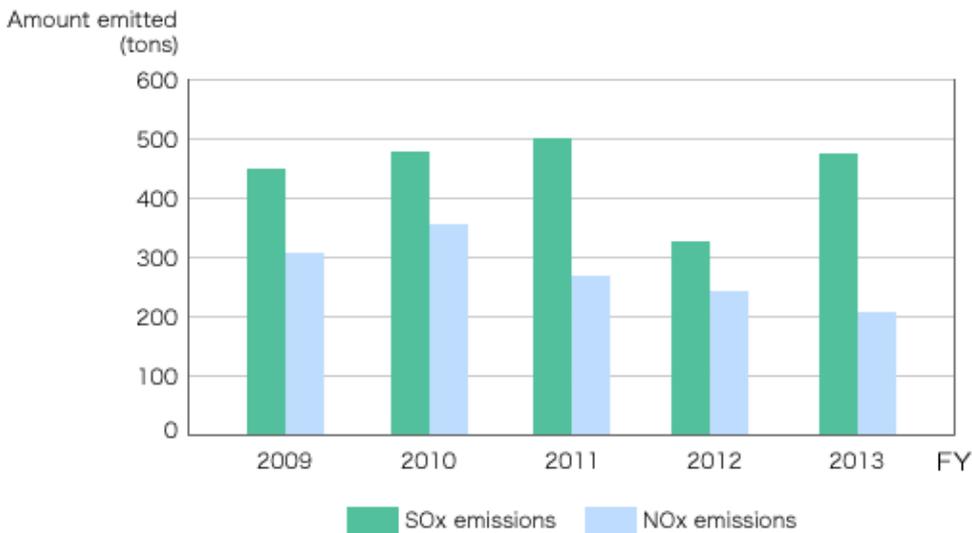
For water pollution, we are reducing COD and total nitrogen discharge every year by upgrading our wastewater treatment facilities and improving our treatment methods.

Based on these efforts we were able to clear all our environmental standards, and in fiscal 2014 we plan to maintain our current performance.

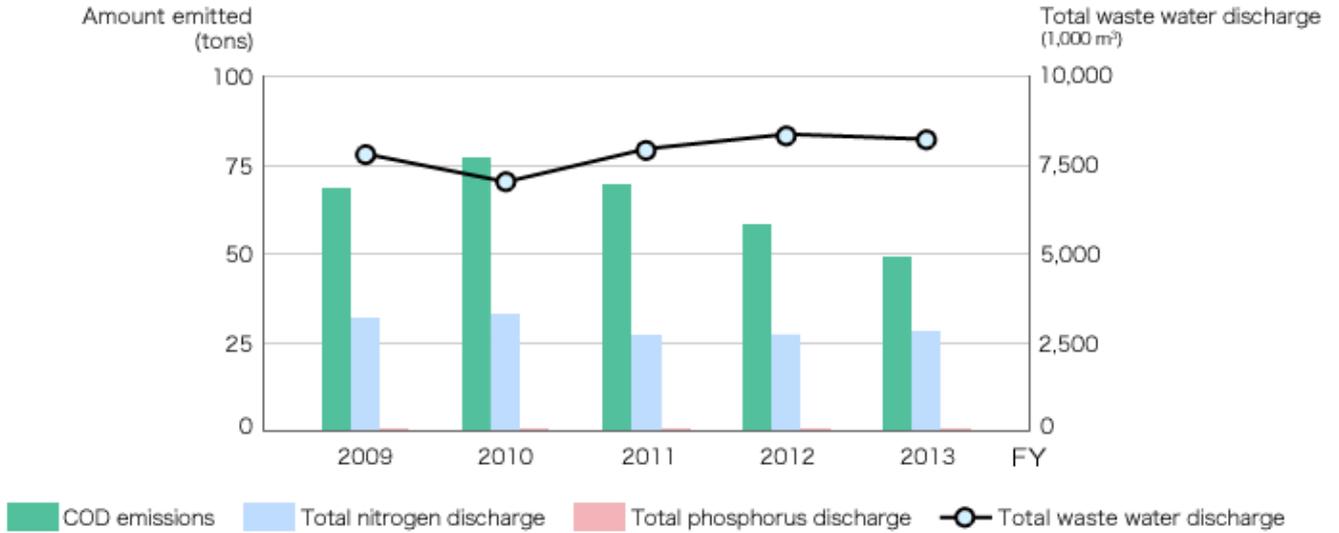
**CO<sub>2</sub> emissions**



**SOx and NOx emissions**



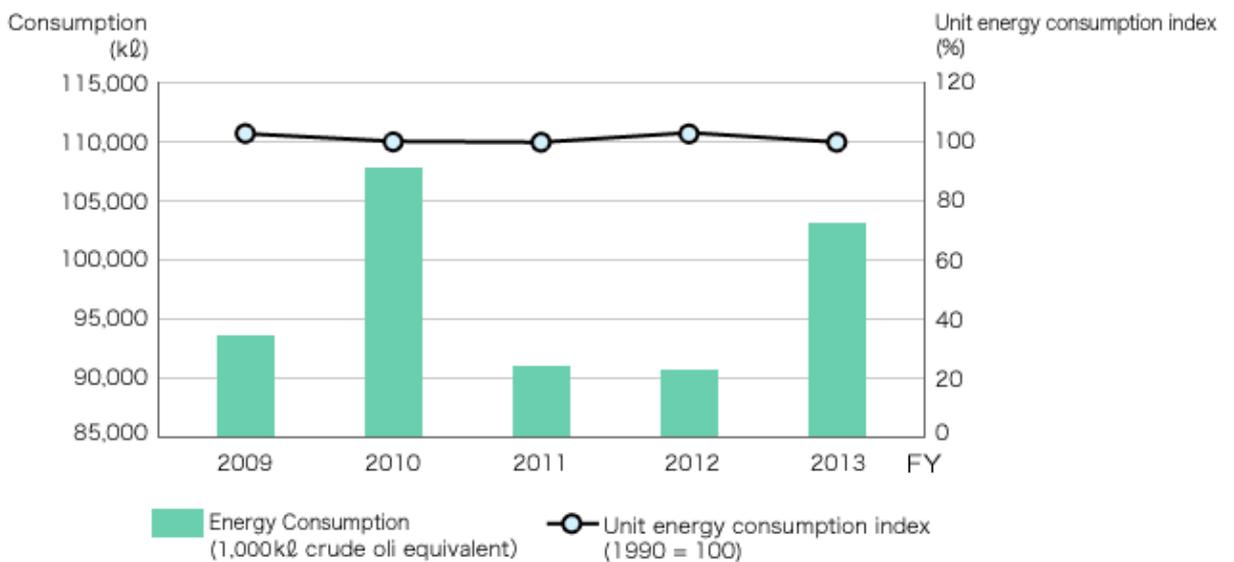
**Overall wastewater, COD, total nitrogen (TN) and total phosphorus (TP) discharge**



**4. Saving resources and energy**

We organized an energy conservation work group and promotion committee at the plant, and we have concluded a mid-term plan to promote improvements in connection to technical issues associated with energy-hungry facilities. We are also mobilizing the collective knowledge of all employees to achieve our target for reducing unit energy consumption to less than 90% of 1990 levels through day-to-day operational management. While progress in solving this extremely difficult problem has been unremarkable so far, we are steadfastly seeking improvements by reviewing actions from every perspective and introducing innovative technologies.

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



5. Environmental Data

Tokuyama Plant		FY2009	FY2010	FY2011	FY2012	FY2013
<b>Toxic substances</b>	Butadiene consumption (tons)	188,743	217,074	186,784	181,275	206,710
	Butadiene emissions (tons)	2.8	0.7	1.4	1.2	0.8
	Acrylonitrile consumption (tons)	14,366	16,916	13,697	13,600	17,464
	Acrylonitrile emissions (tons)	0.7	0.6	0.6	0.6	0.6
<b>Substances subject to PRTR law</b>	Consumption (tons)	386,572	464,767	388,603	391,766	453,075
	Amount emitted (tons)	7.6	2.2	3.1	2.7	2.0
<b>Industrial waste</b>	Amount generated (before volume reduction) (tons)	19,845	21,516	18,718	16,939	19,201
	Amount generated (after volume reduction) (tons)	3,857	3,756	3,762	3,505	3,377
	Amount sent to landfill (tons)	10	0.0	0.0	0.0	0.0
<b>Atmospheric emissions</b>	CO <sub>2</sub> emissions (tons)	252,091	294,112	248,294	239,609	279,750
	SO <sub>x</sub> emissions (tons)	447	483	502	322	471
	NO <sub>x</sub> emissions (tons)	308	358	272	243	205
	Soot emissions (tons)	7.5	12.1	7.7	5.7	3.5
<b>Water resources (Industrial water + Ground water + Waterworks) consumption (1,000 m<sup>3</sup>)</b>		8,630	7,824	9,482	8,788	8,927
<b>Waste water</b>	Total waste water discharge (1,000 m <sup>3</sup> )	7,713	6,942	7,884	8,288	8,165
	COD emissions (tons)	68	77	69	58	49
	Total phosphorus discharge (tons)	0.5	0.7	0.6	0.6	0.7
	Total nitrogen discharge (tons)	31	33	27	27	28
<b>Energy</b>	Total consumption (crude oil equivalent, kL)	93,485	107,497	90,955	90,648	103,000
	Unit consumption index (1990 = 100)	102%	98%	99%	102%	99%
<b>Production of PDR equivalent (tons)</b>		503,567	599,400	498,167	487,782	573,961

## Quality Assurance Initiatives

In line with ZEON's Mid-Term Management Plan, including the Enterprise Blueprint for 2020: "ZEON creates the future today through the power of chemistry," the Tokuyama Plant continuously improves and innovates its production technologies to achieve a 100% yield rate\* and build certifiable quality into all of its products. We aim to be a plant that consistently delivers high-quality products that satisfy our customers.

\* 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.

### VOICE For Safer, More Reliable, More Socially Responsible Products

Our mission at the Tokuyama Plant is not just to produce products that satisfy standards. Our products should have a greater purpose: to contribute to society's sustainable growth, to help improve the global environment, and to fulfill ZEON's CSR Policy. To achieve this, zero accidents, zero injuries, and zero pollution are obviously important. But we also need to achieve zero PRTR emissions, reduce CO<sub>2</sub> emissions, and by stabilizing manufacturing operations, develop a cost structure by which we can secure a profit even at low capacity utilization.

As the parent plant\* of a plant currently under construction in Singapore that will produce synthetic rubber for fuel-efficient tires, the Tokuyama Plant also needs to support its overseas production centers, not only technically but by developing human resources that can drive reforms and improvements from a global perspective. I hope to draw on the knowledge of all our employees in our quest for greater innovation in production.

\* Parent plant

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



Shinichi Hirakawa, Tokuyama Plant Manager  
(as of April 2014)

## Living Together with the Local Community

### 1. Interaction with the local community (39th ZEON Waraku Odori Dance Festival)

ZEON's Waraku Odori Dance Festival is one of Shunan district's annual summer evening events and is organized by Tokuyama Plant employees. Since 1974, this old-fashioned summer festival has fostered connections among our most valued stakeholders, including local residents and plant employees and their families. The event is a popular attraction every year, and in 2013 the festival saw an attendance of more than 2,000 people, making it a great success. Employees talked with local residents as they served up foods such as *yakitori* and *oden*. The Waraku Odori, a simple dance that encourages everyone to join, topped off the evening.

The Tokuyama Plant will forever cherish its relationship with local residents and contribute to environmental protection and social welfare.

### 2. Local Public Relations (RC regional informational meeting and plant tour)

In fiscal 2013, we again invited the chairpersons and vice chairpersons of five neighborhood associations in the vicinity of our plant to the RC regional informational meeting and plant tour, held for the ninth time.

During the summer vacation, we held two Parent-And-Child Classrooms, sponsored by the Chamber of Commerce and Industry, which included making super balls in the laboratories, and taking a tour of the plant by bus.

Our goal now and in the future is to realize a safe and secure plant that allows all local residents to have peace of mind.



ZEON Waraku Odori Dance Festival



Plant report meeting



Laboratory