

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 surgical rubber gloves; 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.



Aerial view of the Tokuyama Plant

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 for the manufacture of coal briquettes. 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.

CSR Efforts at the Tokuyama Plant

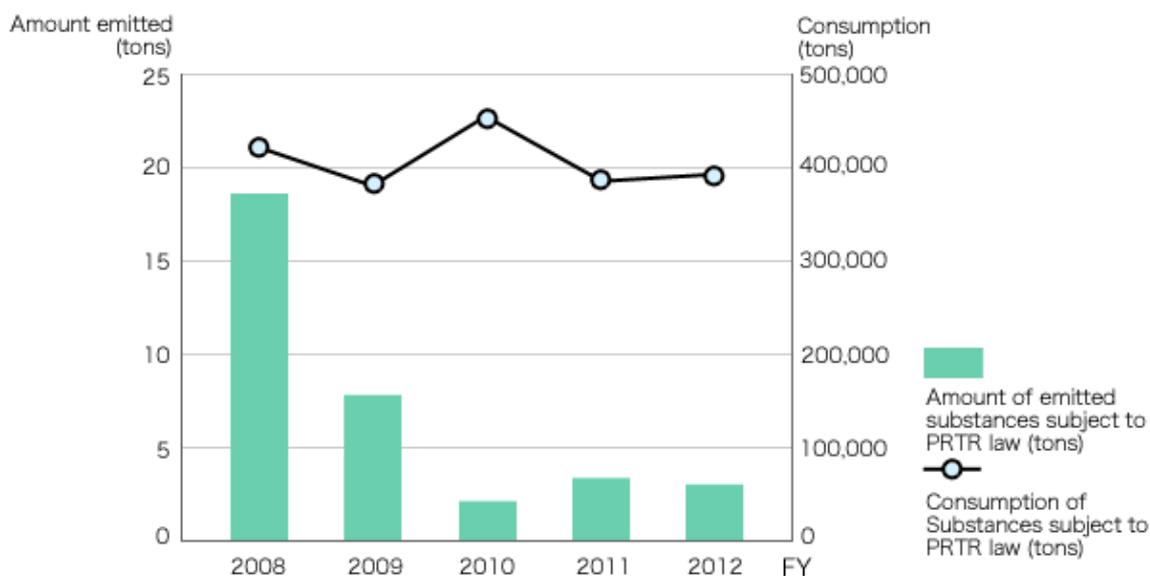
The Tokuyama Plant is located adjacent to the city center and residential areas around Tokuyama Station. To support the sustainable growth of society and earn the trust of the local community based on safe, stable operations, we are creating a dynamic and productive plant. To do this we introduce production 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 further reduce emissions of substances subject to PRTR regulations. PRTR emissions in fiscal 2012 were 2.7 tons. Moving closer to zero emissions, our future target is 2.2 tons of emissions or less.

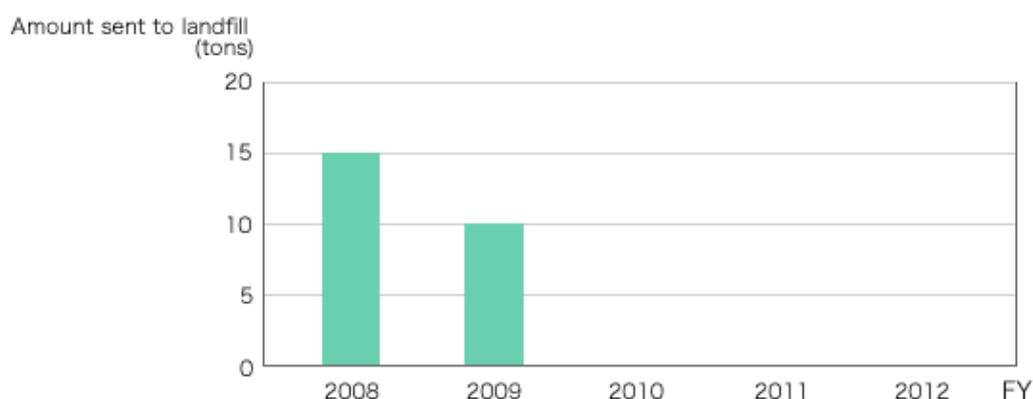
Substances subject to PRTR law



2. Reducing industrial waste

In fiscal 2008, we set a zero emissions plan for industrial waste sent to landfills. We achieved zero tons per year in fiscal 2010 and have maintained this standard by meticulously separating waste generated at the plant and through recycling and reuse efforts. Going forward, we intend to maintain our zero-landfill-waste performance and further promote and manage 3R (reduce, reuse, and recycle) activities to contribute to a more sustainable society.

Amount of Waste to Landfill

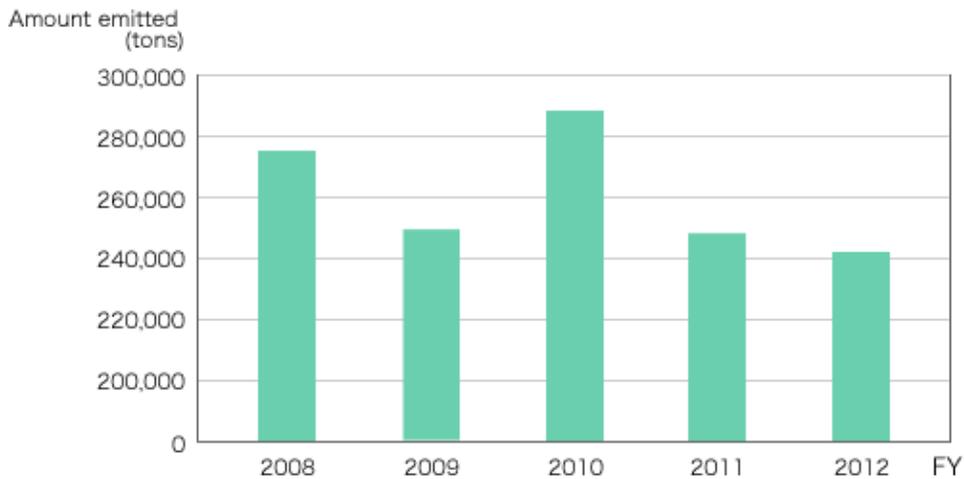


3. Reducing air and water pollution

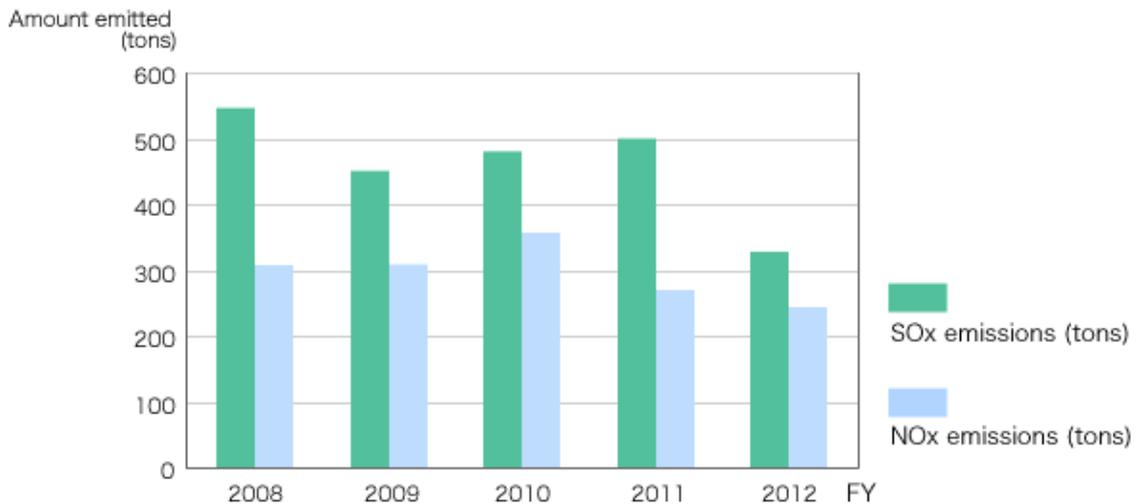
We were able to steadily reduce NOx emissions into the air through energy conservation and improved combustion by installing dry air emission processing equipment and optimizing the amount of combustible air of the boilers. We also switched to lower sulfur fuel in an aim to slash SOx emissions. For water 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 2013 we plan to maintain our current performance.

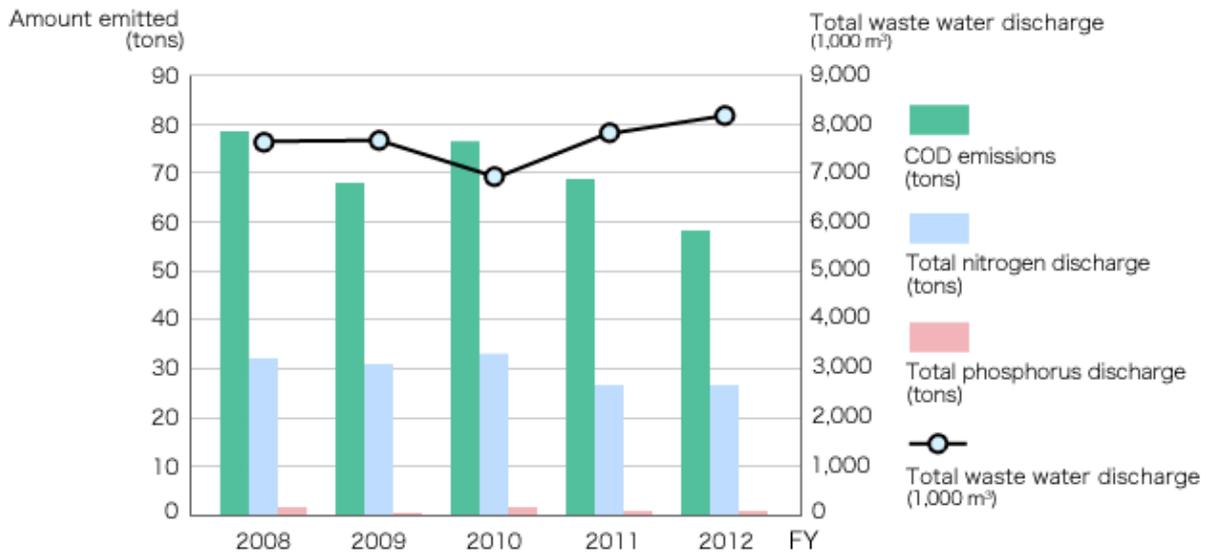
CO₂ emissions



SO_x and NO_x emissions



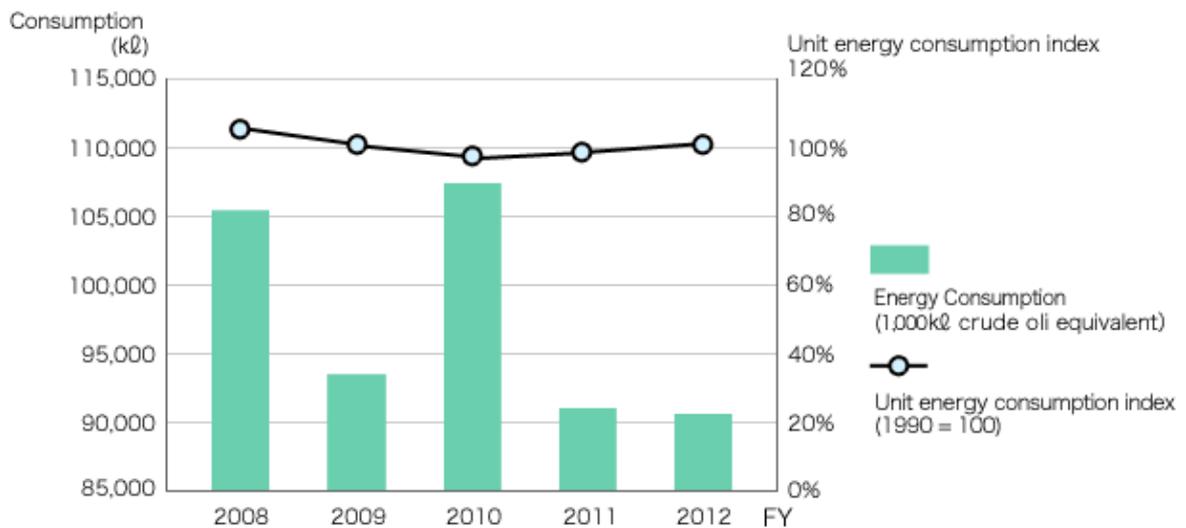
Overall wastewater, COD, total nitrogen (TN) and total phosphorus (TP) discharge



4. Saving resources and energy

To aggressively address technical issues associated with energy-hungry facilities, we organized an energy conservation work group and promotion committee at the plant that draws upon the expertise of a professional consultant. 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 | | FY2008 | FY2009 | FY2010 | FY2011 | FY2012 |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------|---------|---------|---------|---------|
| Toxic substances | Butadiene consumption (tons) | 191,364 | 188,743 | 217,074 | 186,784 | 181,275 |
| | Butadiene emissions (tons) | 15 | 2.8 | 0.7 | 1.4 | 1.2 |
| | Acrylonitrile consumption (tons) | 12,263 | 14,366 | 16,916 | 13,697 | 13,600 |
| | Acrylonitrile emissions (tons) | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 |
| Substances subject to PRTR law | Consumption (tons) | 417,519 | 386,572 | 464,767 | 388,603 | 391,766 |
| | Amount emitted (tons) | 18 | 7.6 | 2.2 | 3.1 | 2.7 |
| Industrial waste | Amount generated (before volume reduction) (tons) | 25,881 | 19,845 | 21,516 | 18,718 | 16,939 |
| | Amount generated (after volume reduction) (tons) | 4,512 | 3,857 | 3,756 | 3,762 | 3,505 |
| | Amount sent to landfill (tons) | 15 | 10 | 0.0 | 0.0 | 0.0 |
| Atmospheric emissions | CO ₂ emissions (tons) | 275,000 | 252,091 | 294,112 | 248,294 | 241,974 |
| | SO _x emissions (tons) | 547 | 446.9 | 483.0 | 502.3 | 321.5 |
| | NO _x emissions (tons) | 311 | 308 | 358 | 272 | 243 |
| Water resources (Industrial water + Ground water + Waterworks) consumption (1,000 m ³) | | 8,455 | 8,630 | 7,824 | 9,482 | 8,788 |
| Waste water | Total waste water discharge (1,000 m ³) | 7,704 | 7,713 | 6,942 | 7,884 | 8,288 |
| | COD emissions (tons) | 79 | 68 | 77 | 69 | 58 |
| | Total phosphorus discharge (tons) | 0.8 | 0.5 | 0.7 | 0.6 | 0.6 |
| | Total nitrogen discharge (tons) | 32 | 31 | 33 | 27 | 27 |
| Energy | Total consumption (crude oil equivalent, kL) | 100,502 | 93,485 | 107,497 | 90,955 | 90,469 |
| | Unit consumption index (1990 = 100) | 106% | 102% | 98% | 99% | 102% |
| Production of PDR equivalent (tons) | | 518,702 | 503,567 | 599,400 | 498,167 | 487,782 |

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 CO₂ 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



Shinichi Hirakawa,
Tokuyama Plant Manager

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.

Living Together with the Local Community

1. Interaction with the local community (38th 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 2012 the festival saw an attendance of more than 2,500 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.



ZEON Waraku Odori Dance Festival

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 2012, 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 eighth time.

In addition to reporting our business activities, we also explained our activities to prevent accidents, disasters, and troubles as well as minimize harm in the event of an incident and our environmental preservation activities while including actual examples. Afterward, participants took a tour of the plant by bus.



Reporting our business activities

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.



Plant tour