

(2) Maintenance and management of the sewer system

Sewage sometimes overflows when a sewer pipe is clogged with sand and mud deposited in the pipe. Also, a sewer pipe may be damaged by the vibration of vehicles and construction work for electricity, gas and water. Therefore, it is effective to make an investigation of the sewer system not only for maintenance, but also for prevention of accidents concerning the sewer system. Damaged places found in the investigation are repaired, and those clogged with waste and dirt are cleaned with a high-pressure cleaning truck.

(3) Pump stations and water purification plants

As of the end of FY2018, 34 pump stations are in operation. In Kitakyushu City, 5 sewage treatment plants (final sewage treatment plants) are currently in operation and the total volume of sewage being treated a day is about 410,000m³, which is about 5 times the volume of the city hall building.



A scene from sewer pipe cleaning Kitaminato Water Purification Plant (Wakamatsu Ward) Shinmachi Water Purification Plant (Moji Ward)

• Treatment method

In the water purification plants, sewage is treated by the "activated sludge method", in which sewage is purified in contact with activated sludge (aerobic micro-organisms).

• Mechanism of water purification plant

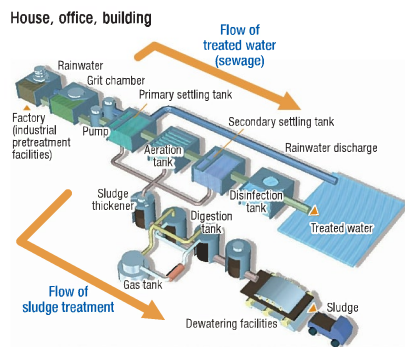
Sewage conveyed to the water purification plant first goes to the grit chamber, where sand, waste, etc. are removed. In the primary settling tank, the sewage from the grit chamber runs slowly, while solid matters easy to precipitate settle down to the bottom before being removed.

Then, the sewage is conveyed to the aeration tank, where the sewage is mixed with activated sludge and aerated. During this period, fine suspended matter and organic matter are decomposed by microorganisms.

Solid-liquid separation is conducted in the secondary settling tank, where activated sludge settles and supernatant water turns to clear purified water. Purified water is sterilized in the disinfection tank and discharged to the sea and the river.

• Measures against odor from water purification plant

As measures against odor generated from the water purification plants, the cover lids on the grid chambers and sedimentation basins, and further soil deodorization equipment and biological deodorization equipment are installed to prevent odor from dispersing.



[Activated sludge utilized in the purification process]

• Vorticella

Vorticella has a cell size of 35 to 150µm, and preys on bacteria (microbes) by making water flow by using its cilia. It moves around actively by expanding and shrinking the stalk on its tail like a spiral. The bell-shaped cell works effectively as a filter for purifying water. This species appears in large quantity in good activated sludge conditions.



Vorticella

• Rotaria

Rotaria has a cell size of 300 to 500µm, and moves in activated sludge while expanding and shrinking itself like a leech. It preys on bacteria or microbes by using the cilia on its head. This species appears in large quantity when nitrification is advanced with much dissolved oxygen content. In many cases under this condition, flocs of activated sludge are likely to settle down and the degree of transparency is high.



Rotaria

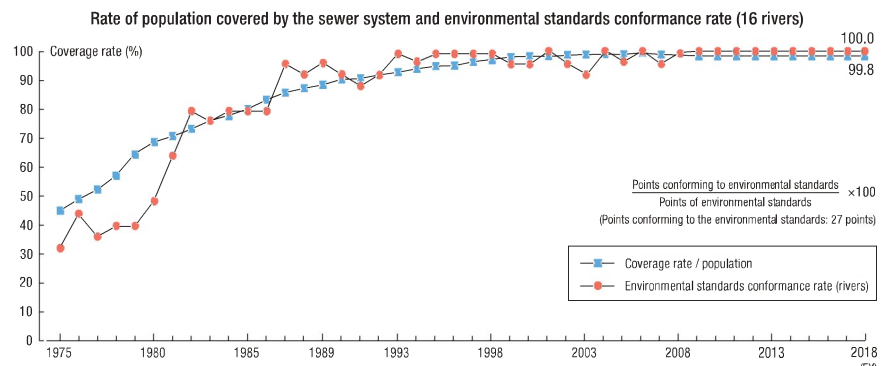
(4) Water quality control

• Water quality conditions

Along with the spread of the sewer system, untreated polluted water from households, etc., which had been directly discharged into rivers and sea, has been increasingly treated in the water purification plants before being discharged. Consequently, the water quality in the public water area has been improved.

The graph of the transition of the spread of sewer system and water quality in rivers shows that the more sewage is treated in the purification plants, the better the water quality in rivers and the sea will become. As stated above, the water purification plants play an important role in the conservation of water quality.

The water treatment in each water purification plant had excellent results in FY2018, and all the discharged water conformed to the effluent standards stipulated in the laws.



* Environmental standards conformance rate: A ratio of points where water contamination conditions conform to the environmental standards.

• Conditions of monitoring and guidance on drainage from factories

In order to prevent hazardous substances from flowing into the water purification plants, monitoring and guidance has been undertaken for the specified business establishments and other selected establishments. As of the end of FY2018, the number of facilities designated as the specified business establishment has reached 773 and 488 facilities were selected from among such specified business establishments and other business establishments as the objects of monitoring, where 787 times of on-site inspections including sampling of water were conducted. Water quality inspections were carried out for 520 facilities in total and the business establishments violating the standards were given administrative guidance (to 18 cases) for correction.

A scene from water quality inspection.