

city is improving the system and organization of experiment sufficiently in order to catch up with the revision. The city also provides well-planned and highly-reliable water quality management system such as formulation and announcement of water quality inspection plan and acquisition of certification for an excellent laboratory for tap water inspection (Good Laboratory Practice) in order to supply safe and tasty water which the users can drink at ease.

1. Water quality monitoring in water resources

(1) Water quality monitoring in rivers

The annual total flow volume of the Onga River is about 1 billion m³, and Kitakyushu City takes about 150 million m³ from the river. Since this river has one of the highest water utilization rates for clean water, agricultural water, etc. in Japan, the water in the estuary weir is likely to stagnate, the concentration of mold odor substances tend to increase due to proliferation of algae, etc. in summer seasons. We have been conducting a periodical water quality survey once a month at 1 point in the middle reach and 4 or more times a month at 2 intake points in the estuary weir and an occasional water quality survey in case of deterioration of water quality or water quality accidents.

Concerning the countermeasures for water quality conservation and against water quality accidents in the Onga River, we participated in the Onga River Water Environment Preservation and Renovation Promotion Council and the Waterworks Council for Onga River, and have been making efforts to reinforce the emergency transmission system in case of a water quality accident, as well as exchanging information about water quality and water treatment technologies, and making requests to related organizations for water quality conservation, etc.

For Murasaki River water system, a periodical water quality survey has been conducted once a month, under the Shinozaki Bridge in the lower reach of the river.

For Yamakuni River water system which draws effluent water from Yabakei Dam at Heisei weir located in the lower reach, a periodical water quality survey has been conducted 4 times a year in Yabakei Dam, and once a month in Heisei weir as an intake point.

In addition, we participated in Water Quality Conservation Council for Yamakuni River, and have been working on the reinforcement of the countermeasures against water quality accidents.

(2) Water quality monitoring in reservoirs

For Tonda reservoir which pumps up and retains the surface stream water of the Onga River, a depth-classified water quality survey has been conducted once a month, and for other reservoirs, a surface water quality survey has been conducted once a month, and a depth-classified water quality survey has been conducted once in 2 months.

In principle, the reservoirs taking water directly from an intake tower for waterworks take water from the deepest gate of the intake tower throughout the year, which has achieved the effects, including the prevention of anaerobic condition of low-layer water in the stratified period, reduction of internal load generated from phosphorus, etc. and avoidance of the impacts from algae, etc. proliferating in the surface layer, etc.

2. Water quality management in water purification plants

In water purification plants, a periodical water quality survey has been conducted once a month for each process of raw water, water sedimentation, water filtration and water purification treatments in order to assess the conditions of such treatments. An examination of raw water and water purification has been conducted 4 times a year for all the items to be examined. In addition, the quality of the chemicals for water purification treatment has been confirmed 4 times a year by a sampling inspection.

Furthermore, we have been working on daily water quality management, while establishing the managerial objectives for water purification so that the tap water quality could sufficiently conform to the water quality standards for the purpose of ensuring a more appropriate water purification treatment.

3. Water quality monitoring at tap

A daily inspection of residual chlorine etc. as stipulated in Article 20 of the Water Supply Act has been conducted for the water taps installed in 46 places (including the monitoring stations for water quality), and a periodic water quality survey of the water taps has also been conducted once a month at each of these 46 places.

Inquiries from customers about water quality have been handled in cooperation with the Construction Offices and Customer Center as the contact points to the customers.

4. Activities to keep safer and toward better quality

In order to address the water quality of the Onga River which would be deteriorated in the dry season, the powdered activated carbon injection equipment was installed in Isaza intake treatment plant in FY 1991, and an aerohydraulic gun was installed in Tonda reservoir in FY 1993.

In addition, advanced water purification facilities were developed in order to reduce (1) mold odor substances, (2) ammonium nitrogen, (3) dissolved manganese, (4) anionic surface active agent and (5) organic matters that are the precursor substances of trihalomethane. These facilities, which have adopted an upward flow biological contact filtration system (U-BCF), started the operation at Honjo Water Purification Plant in August 2000 and at Ano Water Purification Plant in June 2003.

order to secure a stable water supply even in case of the occurrence of an earthquake.

(1) Earthquake-resistant measures for structures

- Seismic diagnosis for concrete structures and buildings
- Construction for reinforcement of earthquake resistance on the basis of seismic diagnosis

(2) Earthquake-resistant measures for conduits

We have been promoting constructions for earthquake resistance for water conveyance pipes, transmission pipes and distribution main (Radius 400mm or more), and distribution pipes leading to the disaster prevention bases and emergency medical institutions designated in the "Kitakyushu City Regional Disaster Prevention Plan."

In addition, we have been implementing the projects to promote mutual accommodation of tap water in the facilities by Northern Fukuoka Emergency Connecting Pipe and the Waterworks Triangle Connection Concept, etc.



Earthquake-resistant joint for conduit

2. Various measures relating to emergency water supply

We have been implementing various measures relating to emergency water supply so as to secure drinking water for 7 days (46 liters per person) in case of the occurrence of a suspension of water supply covering a wide range of areas.

• Facilities to secure drinking water in case of a disaster

We intend to secure 46,000m³ in total of drinking water at 14 places in the city even in the event of a disaster.

[4 water purification plants]

Ideura Water Purification Plant, Ano Water Purification Plant, Hata Water Purification Plant, and Honjo Water Purification Plant.

[East-west transmission pipe] (3 places)

[7 water service reservoirs]

An emergency shutoff valve is equipped in the following distribution reservoirs to secure drinking water required for emergency water supply.

Komorie Water Service Reservoir, Takami Water Service Reservoir, Numa Water Service Reservoir, Otani Water Service Reservoir, Yamanokami Water Service Reservoir, Hinomine Water Service Reservoir, and Fujinoki Water Service Reservoir.

Emergency shutoff valve



This emergency shutoff valve can functionally be fully-closed automatically by detecting a certain amount of seismic intensity and flow rate, and this function makes it possible to secure half of the water capacity of each water service reservoir as drinking water.

For emergency water supply in evacuation sites, drinking water will be transported by polyethylene tanks with a capacity of 1m³, and evacuees will be supplied with temporary water tanks, temporary water supply taps and emergency water supply bags.

Further, for medical institutions requiring purified water for medical care, emergency water supply will be carried out by water supply trucks with pumps.

- Polyethylene tanks with a capacity of 1m³ (storage of 53 tanks)
- Temporary water tanks with a capacity of 1m³ (storage of 40 tanks)
- Preparation of emergency water supply bags (storage of 43,000 bags)
- Temporary water supply taps (94 taps are secured)
- Water supply trucks with pumps (4 vehicles)
- Water tank truck equipped with pressure device (1 vehicle)



Polyethylene tank with a capacity of 1m³



Emergency water supply bag (6L)



Water tank truck equipped with pump

4 | Earthquake disaster countermeasures

On the basis of the Regional Disaster Prevention Plan of Kitakyushu City, we have been promoting the earthquake resistance for waterworks facilities (water service reservoirs and main water service pipes). Further, we have been taking various measures relating to emergent water supply against wide-area water stoppage.

1. Earthquake-resistant measures for waterworks facilities

We have been carrying out seismic diagnoses and constructions for earthquake resistance for the main waterworks facilities (3 water purification plants, 7 water service reservoirs) in

Seismic diagnosis for concrete structure

3. Project for North Fukuoka emergency transmission pipe

Along with the opportunity of the Fukuoka West Offshore Earthquake (on Mar. 20, 2005), the early commercialization of the project was determined under the agreement of 3 persons, such as, the Governor of Fukuoka Prefecture, the Mayor of Fukuoka City, and the Mayor of Kitakyushu City.

As one of risk management measures against emergent situations, such as natural disasters, including earthquakes, and accidents in waterworks facilities, etc., the project connects Kitakyushu City with Fukuoka Urban Area with a distance of about 47km by the transmission pipe withstanding M7 class inland earthquake whose epicenter is directly below the area,

and Kitakyushu City in cooperation of Fukuoka Prefecture started the project in FY 2006.

Works within Kitakyushu City were carried out by the city, and those out of Kitakyushu City were constructed by Fukuoka Prefecture administrating the roads and rivers where the transmission pipe would be installed.

Thanks to the Emergency Transmission Pipe, it has become possible to exchange tap water of 50,000 m³ a day at a maximum mutually between Kitakyushu City and Fukuoka Urban Area in case of an emergency, and the most basic life line was secured even in case of emergency.