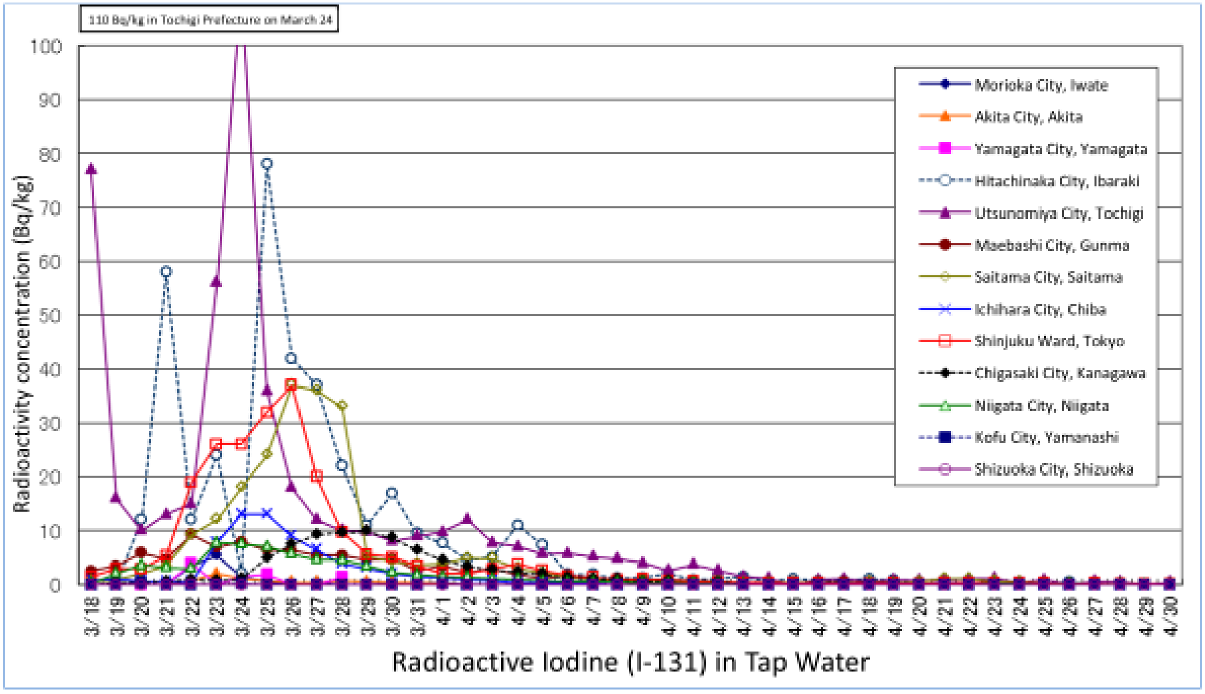
Radiation Monitoring of Clean Water

Radioactive Iodine (I-131) (the Tokyo Metropolis and 12 Prefectures)



Bq/kg: becquerels per kilogram

* In the figure above, values below the detection lower limit are treated as 0 for convenience.
* Only prefectures where radioactive iodine was detected in the measurement are indicated in the figure.

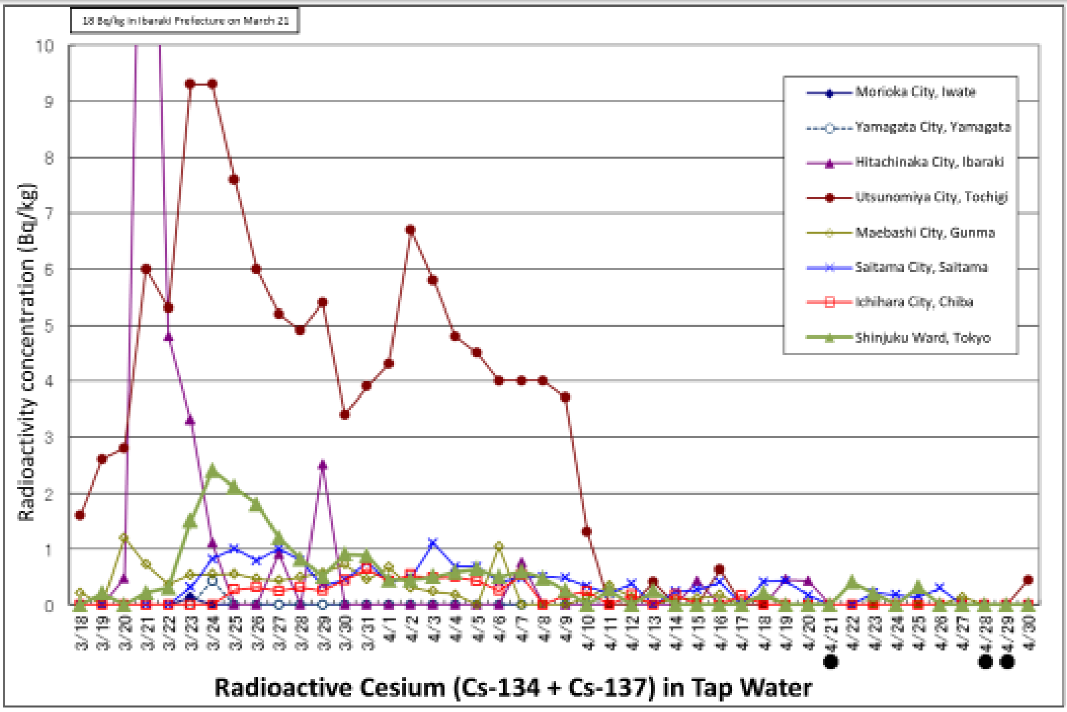
Interim Report on Measures for Radioactive Materials in Tap Water
Prepared based on the reference material for the Ministry of Health, Labour and Welfare (MHLW)'s Study Meeting on Measures for Radioactive Materials in Tap Water (June 2011)

As a result of the inspection of radioactive materials in tap water conducted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), radioactive iodine was detected in the Tokyo Metropolis and 12 prefectures out of 47 prefectures nationwide. Highest concentrations were detected at the respective locations from March 18 to 29, 2011, but I-131 concentrations turned to decrease in many locations in the latter half of March 2011. In and after April 2011, only small amounts of I-131 were detected at some of these locations.

Included in this reference material on March 31, 2013
Updated on March 31, 2024

Radiation Monitoring of Clean Water

Radioactive Cesium (Cs-134 + Cs-137) (the Tokyo Metropolis and 7 Prefectures)



* In the figure above, values below the detection lower limit are treated as 0 for convenience.
* Only prefectures where radioactive cesium was detected in the measurement are indicated in the figure.
* ● is marked on dates when the readings were ND (not detected; below the detection lower limit).

Bq/kg: becquerels per kilogram

Interim Report on Measures for Radioactive Materials in Tap Water
Prepared based on the reference material for the Ministry of Health, Labour and Welfare (MHLW)'s Study Meeting on Measures for Radioactive Materials in Tap Water (June 2011)

As a result of the inspection of radioactive materials in tap water conducted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), radioactive cesium was detected in the Tokyo Metropolis and 7 prefectures out of 47 prefectures nationwide. Highest concentrations were detected at the respective locations from March 20 to early April 2011, but radioactive cesium concentrations were relatively smaller than radioactive iodine concentrations. In and after April 2011, only small amounts of radioactive cesium were detected at some of these locations.

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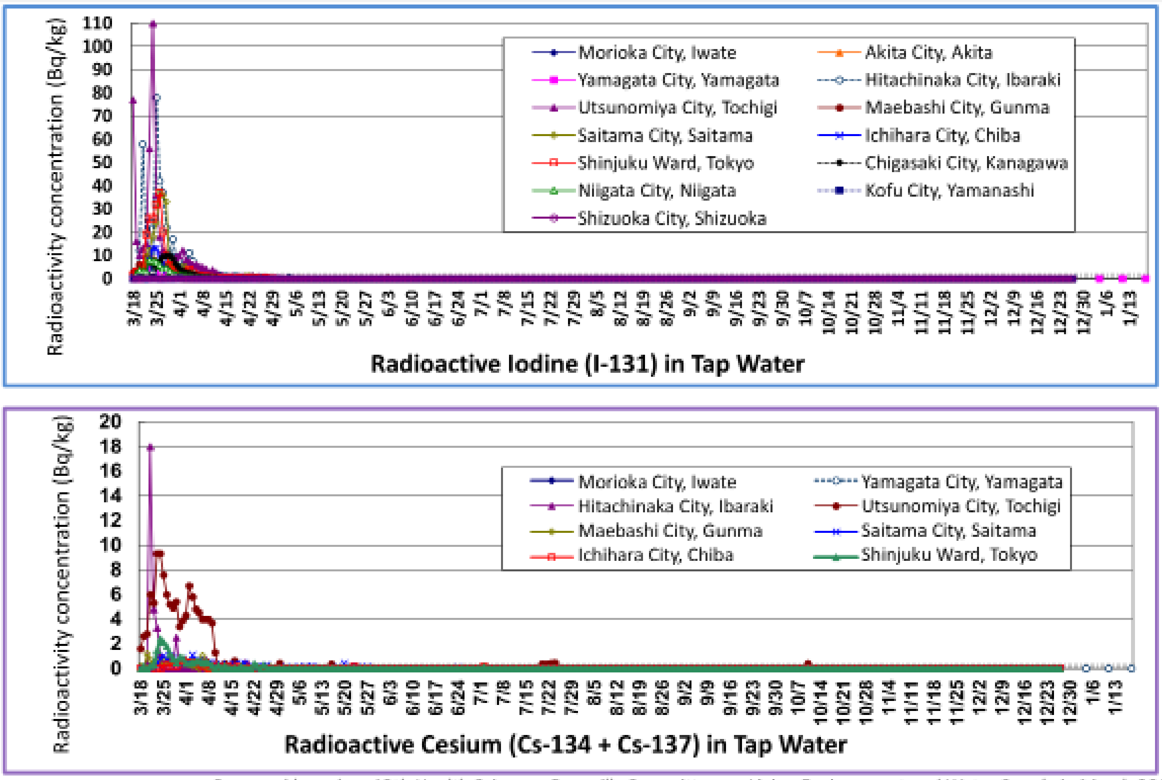
Radiation Monitoring of Clean Water

Results of Radiation Monitoring of Tap Water (until Jan. 2012)



Prepared based on 12th Health Sciences Council's Committee on Living Environment and Water Supply in March 2012

The tap water monitoring showed that radioactive cesium has seldom been detected since May 2011, not to mention short-half-life radioactive iodine.

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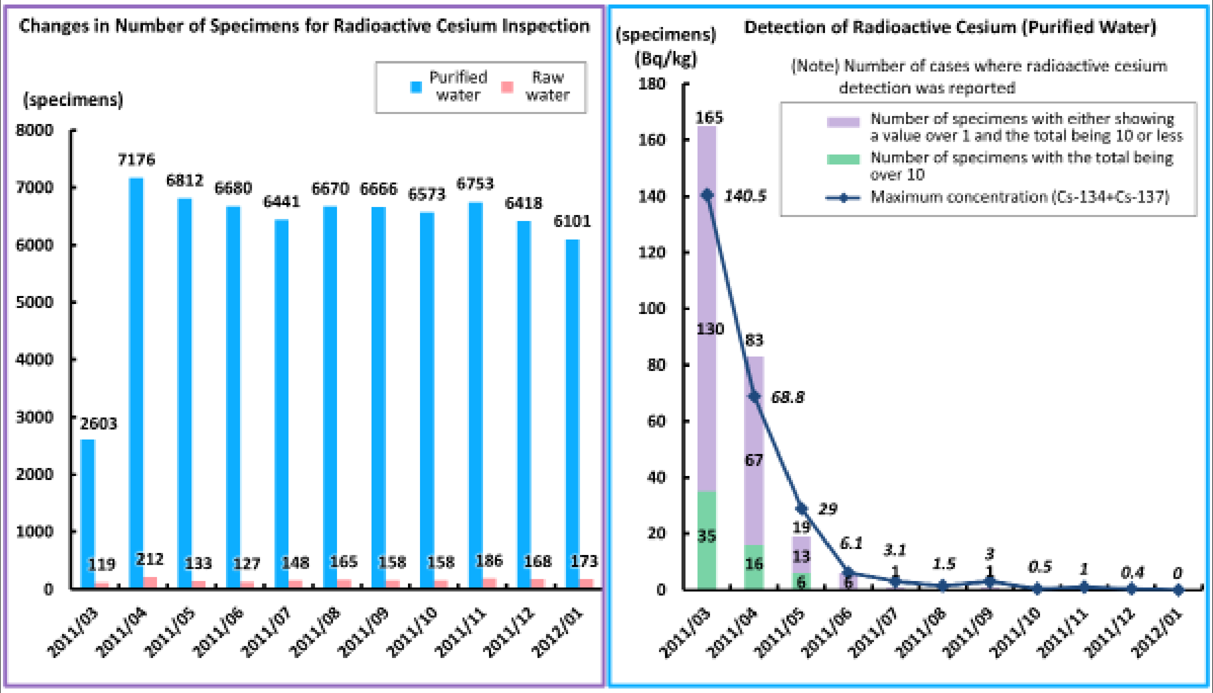
Radiation Monitoring of Clean Water

Inspections by Water Suppliers



Bq/kg: becquerels per kilogram

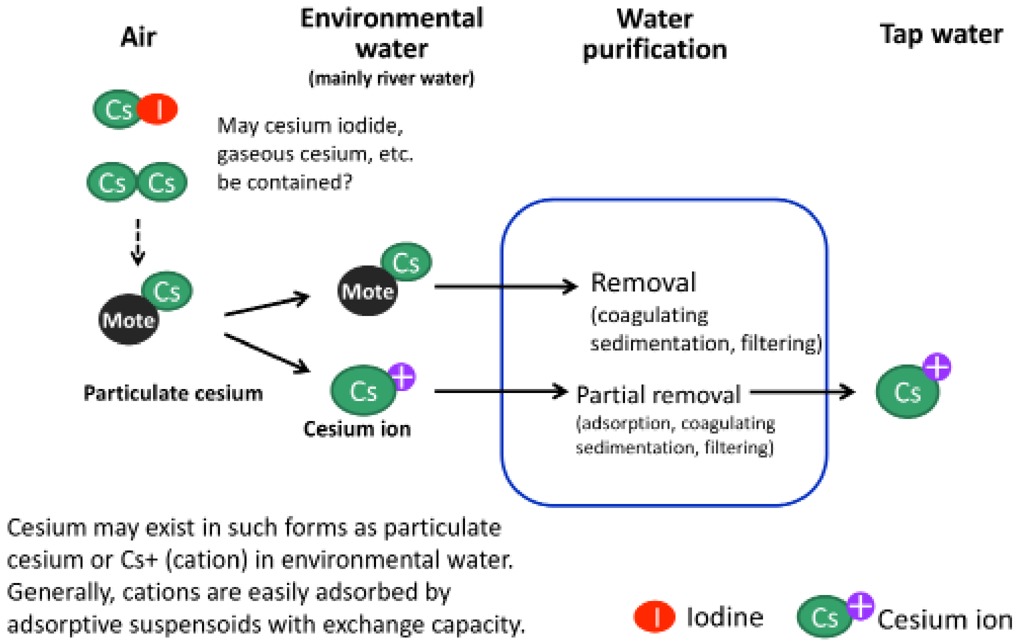
Prepared based on 12th Health Sciences Council's Committee on Living Environment and Water Supply in March 2012

Water suppliers conduct inspections of radioactive cesium for approx. 6,000 to 7,000 specimens of purified water and over 100 specimens of raw water per month. The maximum monthly value of radioactive cesium concentration was 140.5 Bq/kg detected in March 2011, but the value declined gradually thereafter and there has been no report of radioactive cesium detection at a level exceeding 10 Bq/kg since June 2011.

Included in this reference material on March 31, 2013

Behavior of Radioactive Cesium

Conceptual Diagram of Behavior of Radioactive Cesium



Prepared based on the reference material for the 12th Health Sciences Council's Committee on Living Environment and Water Supply in March 2012

Radioactive cesium discharged due to the accident at Tokyo Electric Power Company (TEPCO)'s Fukushima Daiichi NPS consists of Cs-134 and Cs-137 in equal proportion (1:1) and has also been detected at the same rate in the environment immediately after the accident. Radioactive cesium was in the form of particles or gas immediately after discharge from the NPS, but it is considered to have fallen down onto the ground surface and to have been adsorbed into soil and dust, etc. In water, radioactive cesium is adsorbed into dust and tends to behave in the same manner as soil or other suspensoids, and therefore, is highly likely to be reduced by removing suspensoids in water.

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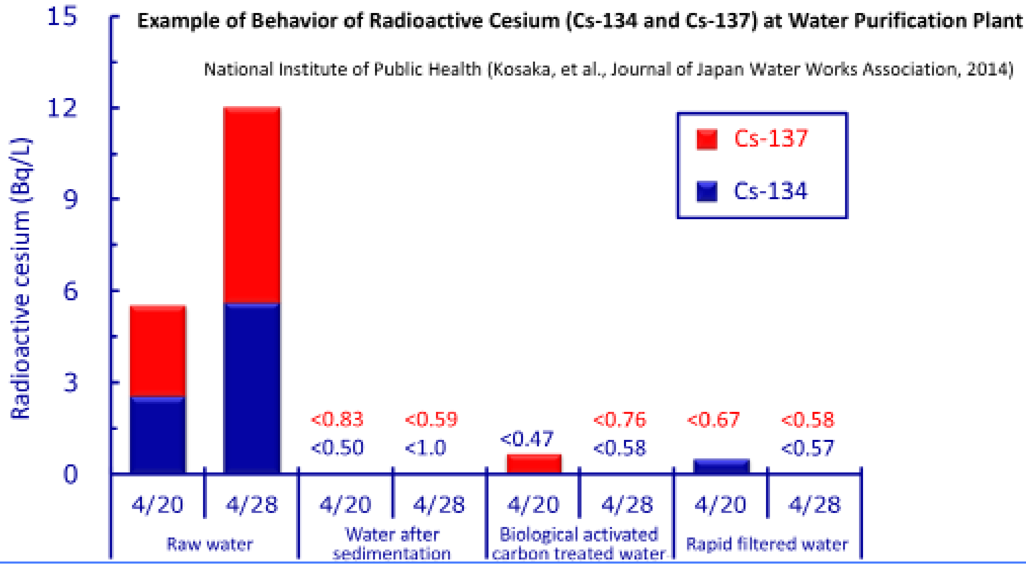
Updated on March 31, 2019

Control of Radioactive Cesium

Most of the radioactive cesium that reaches sources of tap water is adsorbed into suspensoids such as soil and flows out. Therefore, radioactive cesium can be controlled through strict turbidity management.



Zeolite, ion exchangers, nanofiltration membranes and reverse osmosis membranes are professionally used for removing radioactive materials, but these cannot be used for ordinary water purification due to high cost, required facilities and inefficiency (in particular, the use of nanofiltration membranes and reverse osmosis membranes is power consuming).

Bq/L: becquerels per liter

Prepared based on the reference material for the 12th Health Sciences Council's Committee on Living Environment and Water Supply in March 2012

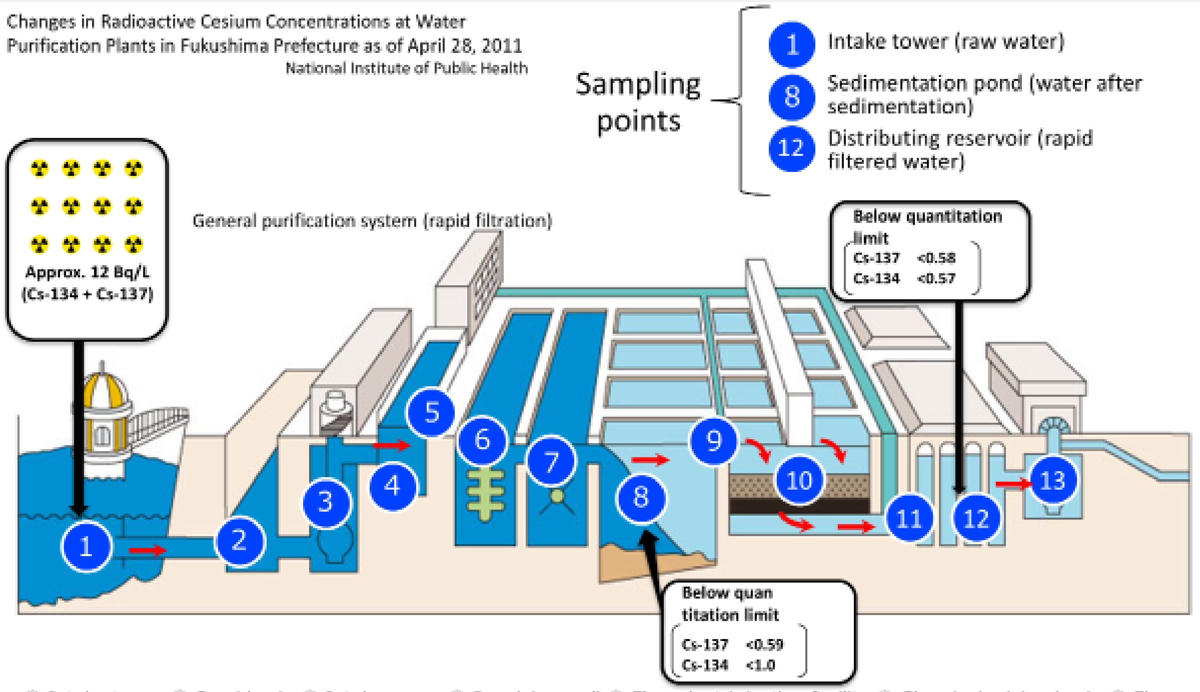
As of April 2011, radioactive cesium concentrations in raw water, water after sedimentation, biological activated carbon treated water, and rapid filtered water were measured at water purification plants in Fukushima Prefecture. As a result, it was confirmed that low-concentrated radioactive cesium detected in raw water had decreased through adsorption into soil in the process of sedimentation.

A survey of water purification processes revealed that radioactive cesium had been almost entirely removed together with suspensoids through coagulating sedimentation, sand filtration and the use of powdered activated carbon. At present, radioactive cesium is not detected in almost all purified water. These results showed that radioactive cesium can be controlled through strict turbidity management.

Included in this reference material on March 31, 2013

Radiation Monitoring of Clean Water

Waterworks System



① Intake tower ② Sand basin ③ Intake pump ④ Receiving well ⑤ Flocculant injection facility ⑥ Chemical mixing basin ⑦ Floc forming basin ⑧ Sedimentation pond ⑨, ⑪ Chlorine injection facility ⑩ Filter basin ⑫ Distributing reservoir ⑬ Water pump

Bq/L: becquerels per liter

Prepared based on the reference material for the 12th Health Sciences Council's Committee on Living Environment and Water Supply in March 2012

This figure shows the rapid filtration method, which is generally used in Japan. In this method, chemicals are injected into raw water taken from a river or dam to cause sedimentation of mud and small particles and make them into big chunks called “floc.” Tap water is created by filtering the clear upper portion of such water.

Cesium has the property to be easily adsorbed into soil and mud (p.40 of Vol. 2, “Behavior of Radioactive Cesium”). Therefore, when water is separated from floc, cesium tends to gather around the floc, which is a chunk of soil and mud. Additionally, tap water is created using the clear upper portion of the water in plant basins. Therefore, this mechanism leaves little chance for cesium to be mixed into tap water.

In the pattern diagram above, radioactive cesium concentrations (Bq/L) actually measured at a water purification plant in Fukushima Prefecture as of April 28, 2011, are indicated at points where measurement was conducted. Radioactive cesium concentration, which was initially approx. 12 Bq/L at the intake tower, decreased to below the quantitation limit in the end when being pumped out from the distribution reservoir. As 1 liter of water weighs approx. 1 kg, it can be found that the concentration was far below 200 Bq/kg, which was the allowable limit for radioactive cesium in tap water publicized by the Ministry of Health, Labour and Welfare (MHLW) in March 2011, and also far below 10 Bq/kg, which is specified in the new standards for radioactive materials in tap water publicized in March 2012 (p.55 of Vol. 2, “Standard Limits Applied from April 2012”).

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