< Reference >

November 12, 2011

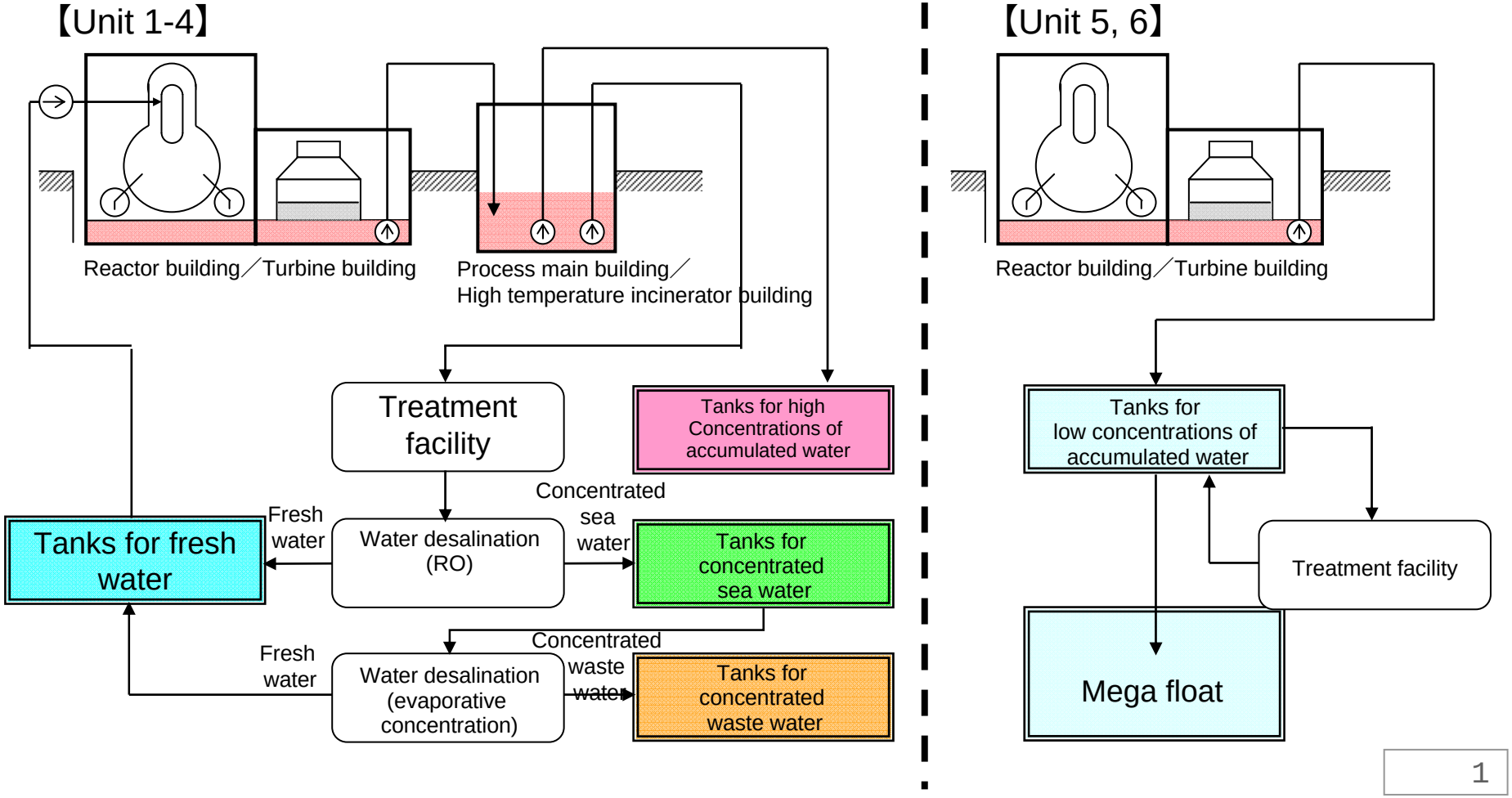
Tokyo Electric Power Company

Recovery and processing of radioactive accumulated water at Fukushima Daiichi Nuclear Power Station

～Individual Tank Water Amounts and Water Storage Plan/Water treatment Facility to Bolster its Reliability～

Composition of the system of the tanks in water treatment facility

- There is approx. 90million m³ of highly concentrated accumulated water (as of Nov. 8, 2011) at the Unit 1 to 4 reactor buildings and turbine buildings. We are partially utilizing the water for cooling the reactor etc. after removing radioactive and salt content via the water treatment facilities.
- High concentration of accumulated water (fresh water, waste water) at Units 1 to 4 and low concentration of accumulated water at Units 5, 6 are stored in the tanks and managed.



Overview of the tanks for water treatment facilities in the power station(1/2)

- Tanks at the power station are classified as listed below
  - Tanks for highly concentrated accumulated water

    ･･･Tanks for storing accumulated water at Units 1-4 in the case of emergency
  - Tanks for fresh water

    ･･･ Tanks for storing fresh water whose radioactive and salt content was removed from the accumulated water.
  - Tanks for concentrated sea water

    ･･･Tanks for storing concentrated water from the desalination facility (Reverse Osmosis Membrane type)

Tanks for highly concentrated accumulated water
(Placed underground due to the shielding)

Tanks for fresh water and concentrated sea water

Overview of water treatment facilities in the power station(2/2)

- Tanks for concentrated waste water

  ･･･Storing concentrated water from the water desalination facility (evaporative concentration type) and

- Tanks for low concentrated accumulated water

  ･･･Storing low concentrated accumulated water (including mega-float)

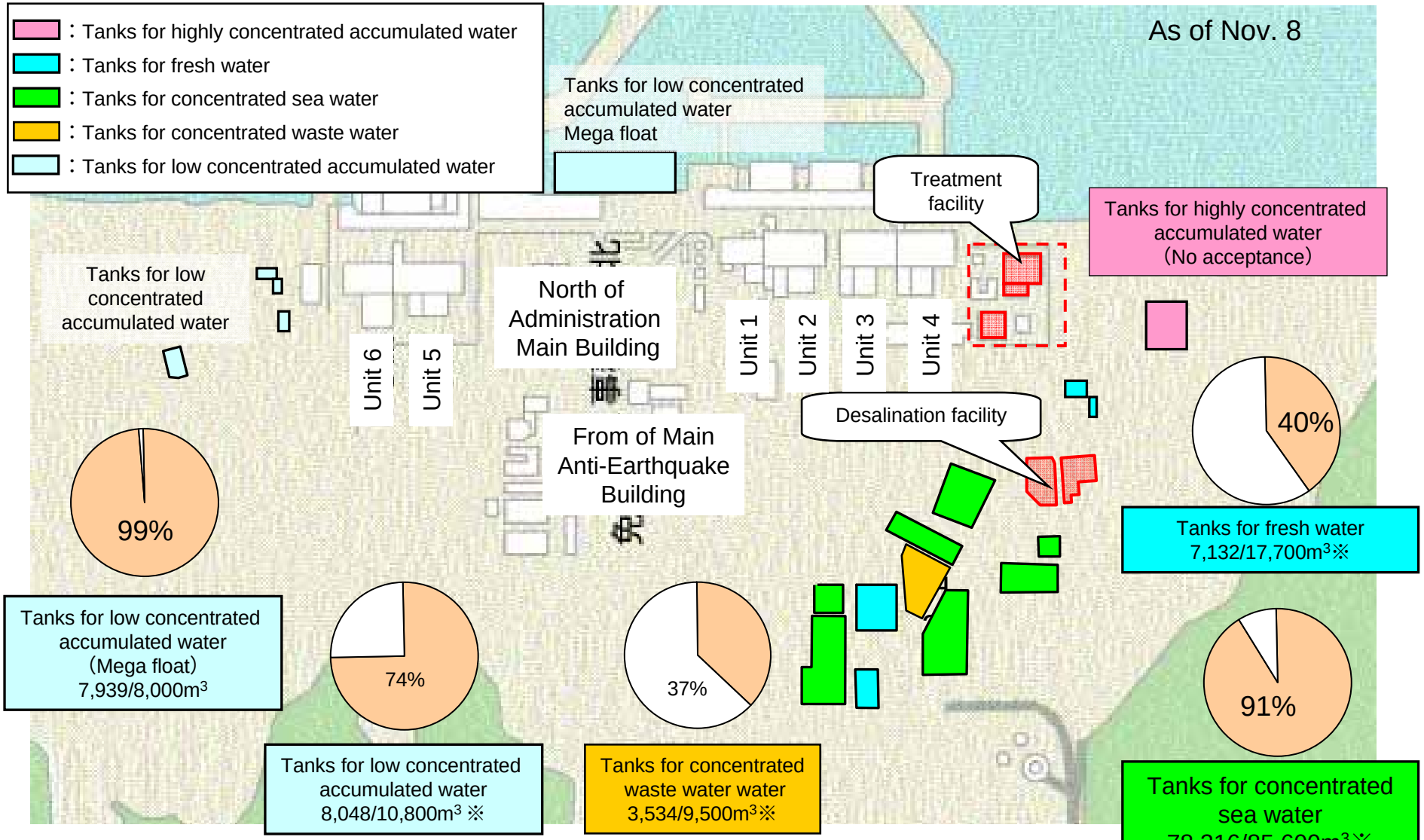
Tanks for concentrated waste water (also Utilize for concentrated sea water)

Tanks for low concentrated accumulated water

Tank for low concentrated accumulated water (Mega float)

Layout of tanks and storage capacity

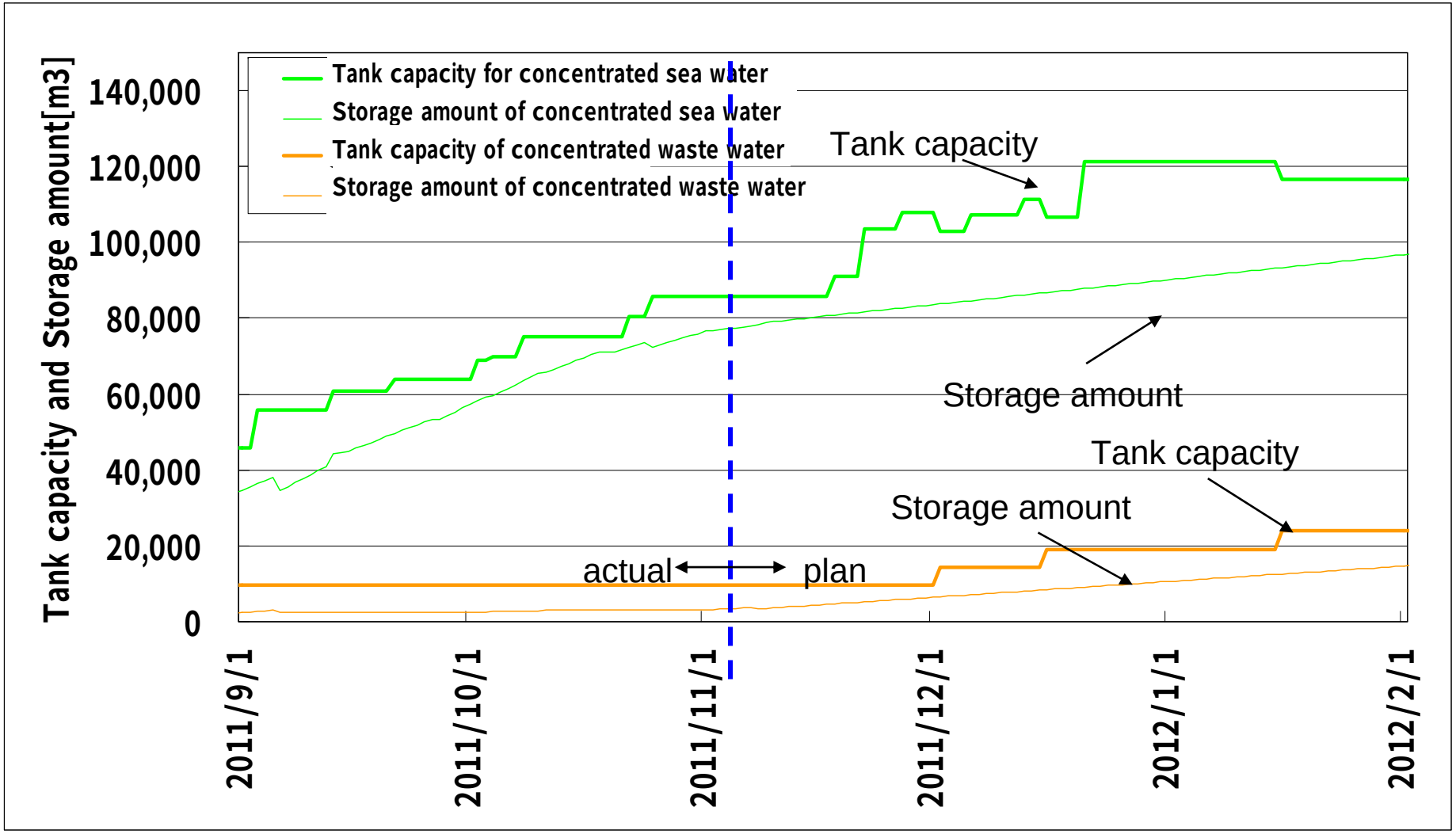
■Wide dispersion of Installed Tanks



※：As water level is not statically determinate due to the facility is under operation, treat this value as reference

Expansion plan and amount of storing water

- In light of the treatment of accumulated water, we plan to expand tanks in series



Utilization of low-level contaminated accumulated water within the site

- Fresh water used within the site are taken from water resources such as rivers and dams.
- Accumulated water at Units 5 and 6 is mostly ground water mixed with tsunami-water and rainwater, so they hardly contain radioactive materials. Thus, after the decontamination of radioactive materials and desalination, the site was sprayed down from October 7.
- The water used for spraying meets the standards of “Guidelines on Radioactive Materials of the Bathing Area ”

Radioactivity Density of Water Sprinkled (sample case)

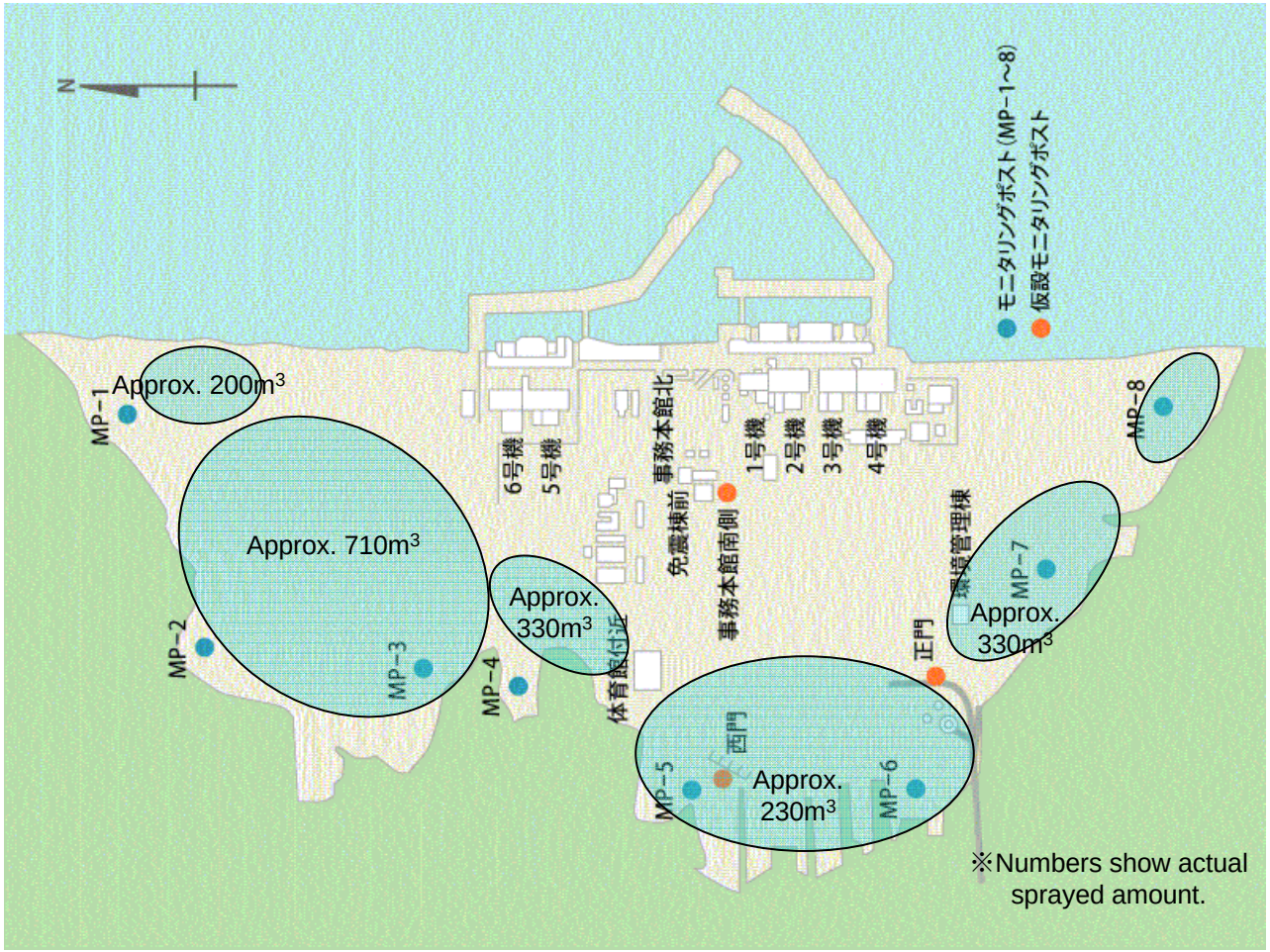
(Bq/cm^3)

		Iodine 131	Cesium 134	Cesium 137	Tritium	All α nuclides	All β nuclides	Strontium 89,90
Measurement Date		11/10	11/10	11/10	10/14	10/14	10/14	9/27
Treated water	Radioactivity density (Detection limit)	ND (8.6×10^{-4})	ND (1.4×10^{-3})	ND (1.5×10^{-3})	2.6×10^{0}	ND (3.2×10^{-3})	ND (2.1×10^{-2})	ND (89：8.4×10^{-5}, 90：4.8×10^{-5})
Bathing area standards		3.0×10^{-2}	5.0×10^{-2} (sum of two (2) nuclides)					
(Reference) WHO standards		1.0×10^{-2}	1.0×10^{-2}	1.0×10^{-2}	1.0×10^{1}	5.0×10^{-4}	1.0×10^{-3}	89：1.0×10^{-1}, 90：1.0×10^{-2}

ND：Not Detectable

Area and situation of water sprinkling

- There are plans to sprinkle water over the woods and yards containing chopped down trees within the site which are approximately 1.2 million m^2
- Approximately 1,800m^3 of water was sprayed by November 8.



Sprinkling Water

Radioactive Density of Water in Each Tank (sample case)

(Bq/cm^3)

		Iodine 131	Cesium 134	Cesium 137	All β nuclides
Low-level accumulated water tank	Sampling date	11/3			-
	Radioactivity density (Detection limit)	ND (2.3×10^{-2})	8.8×10^{-2}	6.9×10^{-2}	-
Fresh water Tank *1	Sampling date	10/17			9/20
	Radioactivity density (Detection limit)	ND (1.6×10^{-2})	ND (3.6×10^{-2})	ND (3.8×10^{-2})	$1.0\times10^{+2}$
Concentrated seawater tank *2	Sampling date	10/17			9/20
	Radioactivity density (Detection limit)	ND ($3.4\times10^{+0}$)	$1.1\times10^{+1}$	$1.1\times10^{+1}$	$3.9\times10^{+5}$
Concentrated waste liquid tank *3	Sampling date	11/3			10/4
	Radioactivity density (Detection limit)	ND ($2.1\times10^{+0}$)	$4.4\times10^{+1}$	$5.4\times10^{+1}$	$4.8\times10^{+5}$

ND：Not Detectable

*1：Desalination apparatus (Reverse osmosis membrane method) outlet side of fresh water

*2：Desalination apparatus (Reverse osmosis membrane method) outlet side of concentrated seawater

*3：Desalination apparatus (Evaporative concentration method) outlet side of concentrated waste liquid

Bolstering the Reliability of the Water Treatment Facility

- There have been several problems with the Water treatment facility such as troubles at the beginning of operation. This is because the period from planning to implementation was short and this is our first experience.

→We have been trying to achieve improvements by implementing recurrence prevention measures against all outbreaks of trouble and trying to achieve improvements.

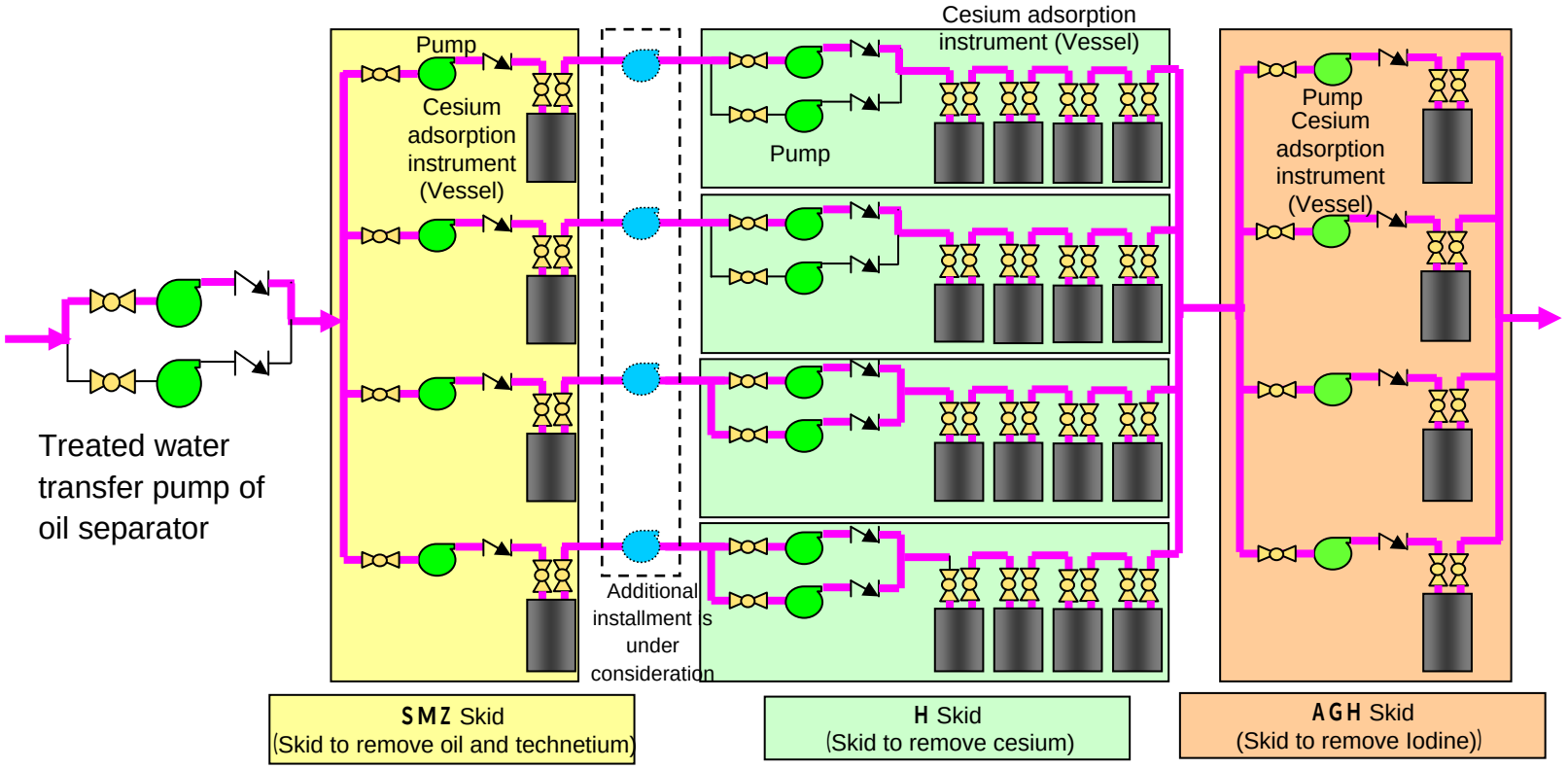
- In order to enhance the reliability of the water treatment facilities, we have been considering improvement measures in the following areas
  - Designating items to be improved on based on operations experience
  - Assessment of causes and the impact of failures of each component of the water treatment facility, and improvement measures

- We will try to bolster reliability by implementing the necessary improvement measures based on the results of the considerations
  - Avoiding the operational shutdown of the water treatment facility due to equipment failure
  - Avoidance of prolonged shutdowns during failures by securing components that breakdown frequently, securing long lead spare components etc.
  - Minimizing leakage risks

Bolstering the Reliability of the Water Treatment Facility –Sample Case of Consideration-

≪Sample case of consideration≫

- Some (or a) pump (s) installed in the skids of the cesium adsorption facility (KURION) broken down. However, maintenance is difficult due to high radiation.
  →Measures to install additional pumps outside of the skids for maintenance is under consideration .



※Even in the event of a shutdown of the pumps in the skids, the facility can operate via the treated water transfer pump of the oil separator, although the amount that could be treatment would be lower.