Country Report of Japan

The 21st FNCA Ministerial Level Meeting

December 10, 2020

Mr. SANO Toshio, Vice Chairman

Atomic Energy Commission of Japan

Contents

1-1 Restarting Status of the Nuclear Power Plants in Japan

As of 4th, November, 2020

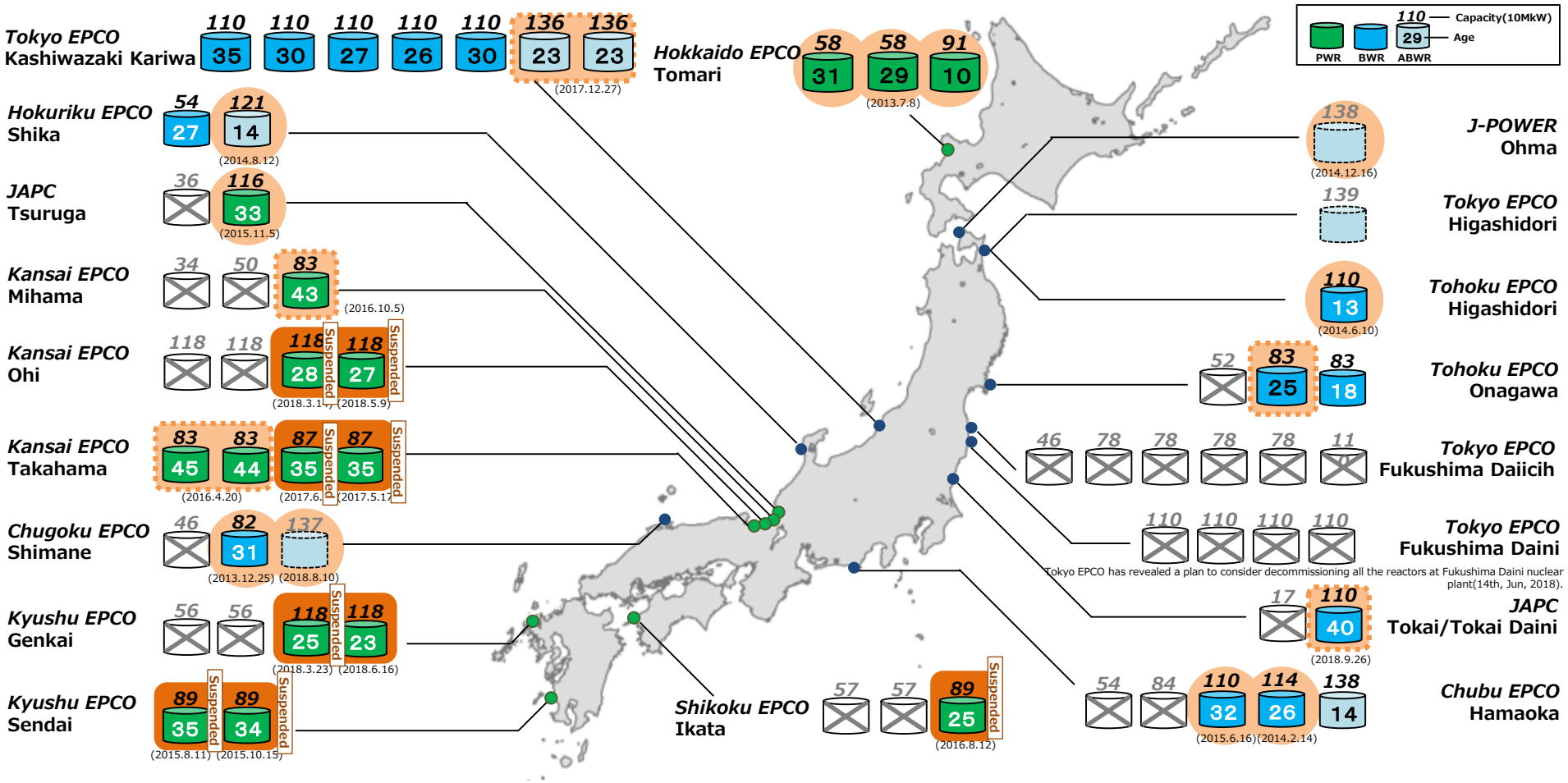
Restarted
9 reactors
In Operation : 1 reactors
Suspended : 8 reactors
(Date of Restart)

Passed NRA Review
for the Permission for Changes in Reactor Installation
7 reactors
(Date of Approval)

Under NRA Review
11 reactors
(Date of Application)

Not yet Applied
9 reactors

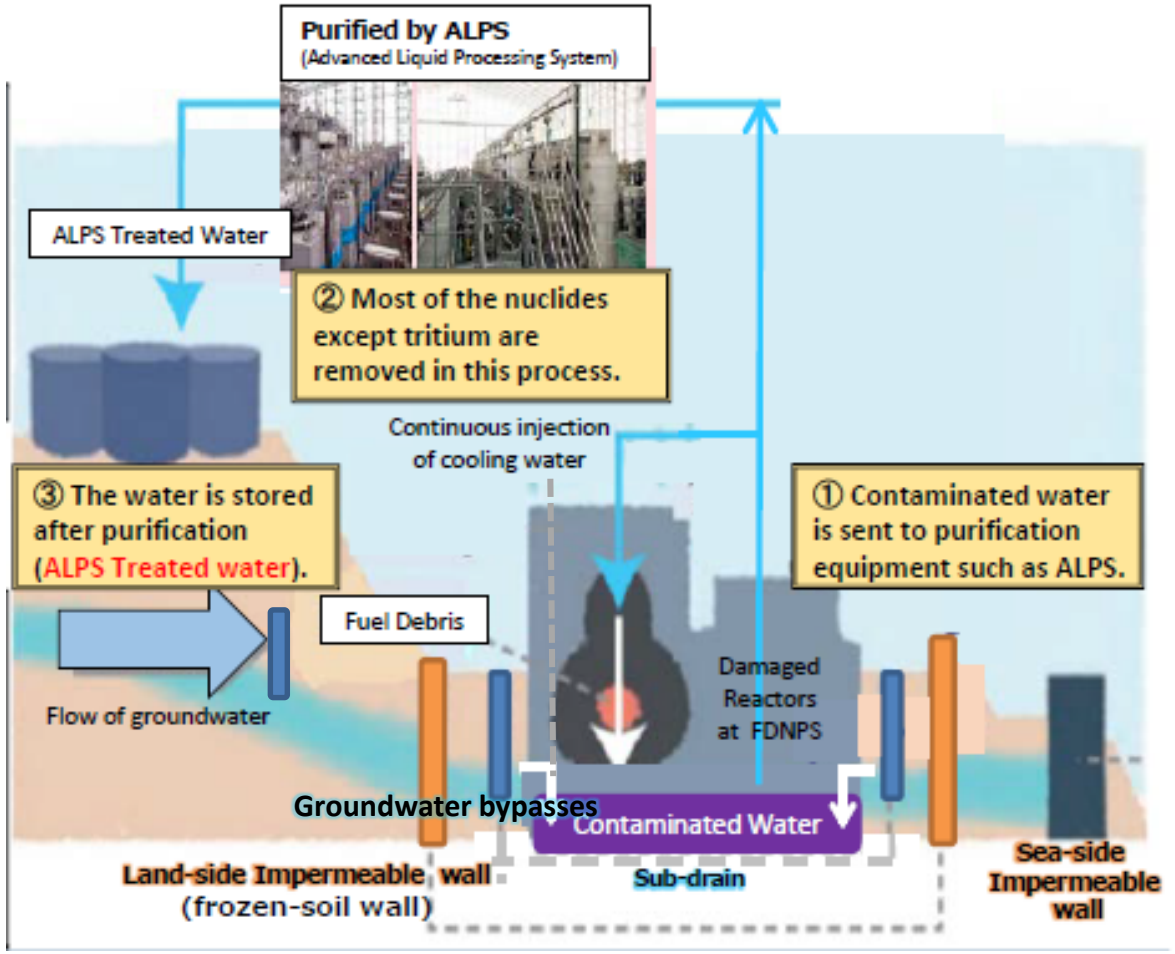
already decided/predicted to **Decommission**
24 reactors



1-2 Current status of ALPS (Advanced Liquid Treatment System) treated water

◇The water for cooling fuel debris gets contaminated and stagnates in the buildings.

- ✓ **The level of groundwater outside is controlled to be higher** than that of water inside the buildings, to prevent the contaminated water from flowing out.
- ✓ As a result, **groundwater keeps flowing into the buildings** and **contaminated water keeps generated in the buildings** every day.



- ***Sub-drains*** *are wells located near the buildings, from which groundwater is pumped up to reduce the level of groundwater.*
- ***Frozen-soil walls*** *surround the buildings to redirect the groundwater's flow.*

1-2 Characteristics of ALPS treated water

◇Regarding **about 30 %** of the treated water stored in tanks, the concentration of radionuclides other than tritium meets the regulatory standards for discharge.

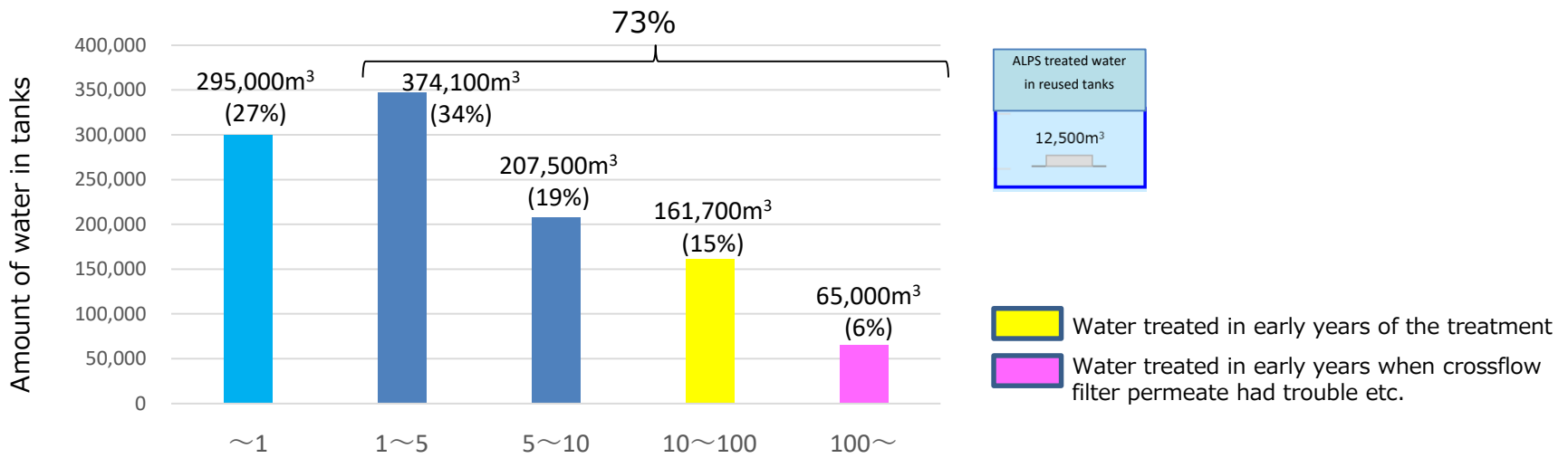
◇Regarding **about 70 %** of the water, the concentration of radionuclides exceeds the regulatory standards. It will be **re-purified** to meet the regulatory standards with an exception of tritium.

* In early years, the ALPS treatment has been carried out by prioritizing the volume of water treatment to quickly reduce the radiation impact to outside the site. There were also cross filter permeate troubles and other troubles.

◇**Re-purification test** implemented by TEPCO shows that the **ALPS has the capability to remove the radionuclides sufficiently.**

◇In the case of releasing it to the environment, the treated water will be **sufficiently diluted also to meet the regulatory standard for tritium.**

Sum of the ratios of actual concentrations to regulatory standards for radionuclides other than tritium (as of August, 2020)

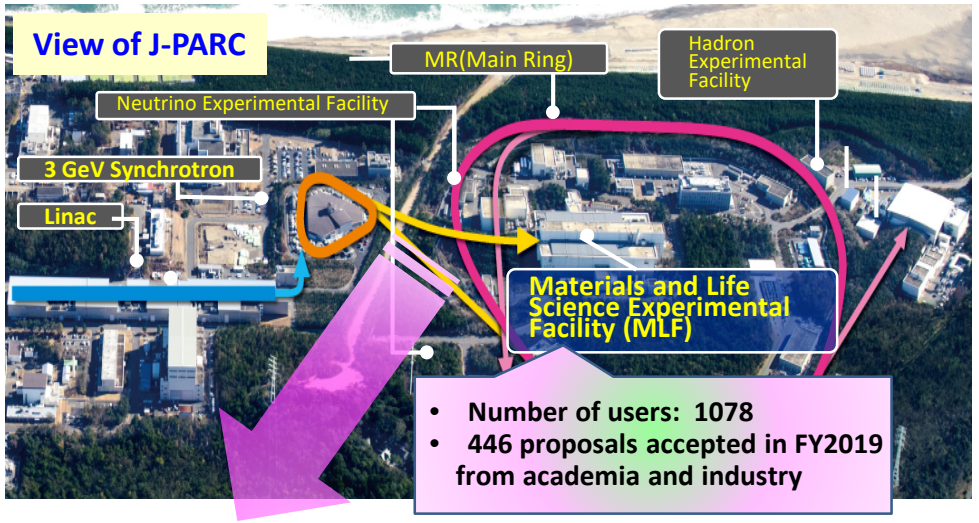


**** "less than 1" means that the water concentration meets the regulatory standards for discharge***

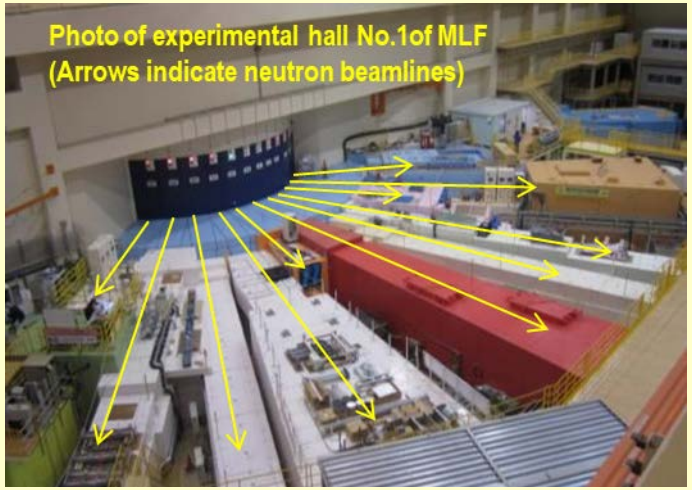
2-1. Action taken to sustain the activities under the Pandemic (JAEA)
Action taken at J-PARC

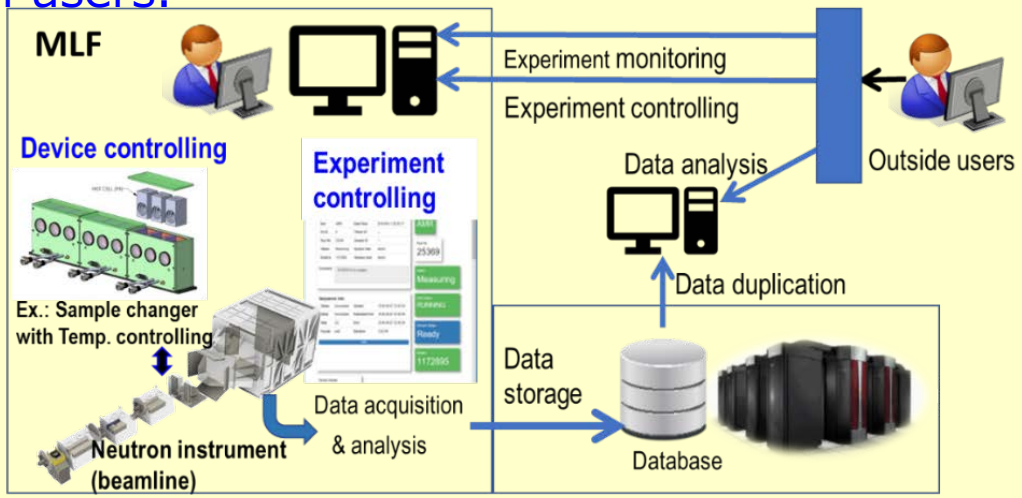
KEK 高エネルギー加速器研究機構 J-PARC

- **J-PARC (Japan Proton Accelerator Research Complex)**
  - ✓World's best research environment providing a variety of high intensity beams for materials & life science and particle and nuclear physics.
  - ✓Materials and Life Science Experimental Facility (MLF) is open for neutron and muon users to promote Japan's Science & Technology.
- **Preparation for remote access experiments at MLF**
  - ✓Alterative facility use method under COVID-19 pandemic
  - ✓Under way at several neutron beamlines



Remote access experiments with automated device controlling will ensure research opportunity and increase available beam time for outside neutron users.





2-2. Action taken to sustain the activities under the Pandemic (QST)
-1) What's QST?

Life

Quantum Medical Science

5th generation cancer treatment system "Quantum Scalpel"

Quantum Life Science

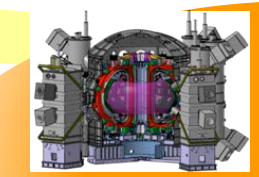
Understanding of life

Zero cancer deaths and a healthy, long-living society

Approaching for life science with quantum eyes and hands

Energy

Fusion Energy Science and Technology



JT-60SA under commissioning by EU and Japan

ITER under construction at France/ Japan, EU, USA, Russia, China, Korea, India

Creating a sun on the earth
- Realizing the ultimate energy for future -

Radiation safety

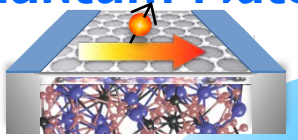
Response to radiation accidents and disasters

Research on radiation effects

Protecting life and lifestyle with science

Safety

Quantum Materials Science



Development of novel materials for innovative devices

3GeV synchrotron radiation facility

Creating innovation with quantum beams and materials science

Quantum Optics

Advanced scientific research on laser and its applications to everyday life

The quest for future by lasers

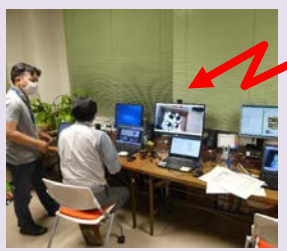
Everyday Life

2-2. Action taken to sustain the activities under the Pandemic (QST)
-2) Action taken at QST and possible research areas

QST has responded to the COVID-19 pandemic recognizing that
- **2-3 years are necessary for the end of the pandemic,**
- **The COVID-19 pandemic is one of the new pandemics emerging in the 21st century.**

Sustainment of research activities

- Hand disinfection, wearing a mask, avoid the "3Cs" (closed spaces, crowded places, close-contact settings)
- Remote work and web meeting
- Install of the contact confirming application "COCOA"
- Telephone re-examination in QST Hospital, which is treating cancer with carbon ion radiotherapy
- Approaching introduction of smart, remote and automated systems



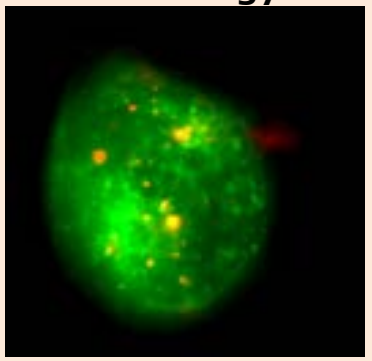

remote supervision to Italy


high-speed & highly-secure data transfer to EU for remote experiment

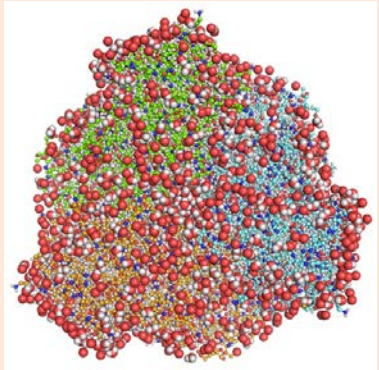
application of remote technologies in international projects

Possible research area

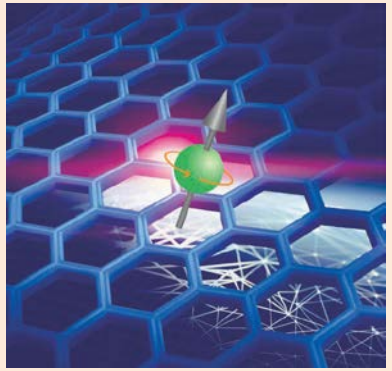
- **Quantum Life Science**
  Drug discovery and understanding of aggravation mechanism utilizing quantum technologies such as "quantum sensors", "hyperpolarized MRI" and "structural analysis at the quantum level in enzymatic reactions"
- **Quantum Materials Science**
  Development of novel devices for new normal based on "spin photonics" utilizing quantum beam irradiation technology



quantum sensors



structural analysis



spin photonics

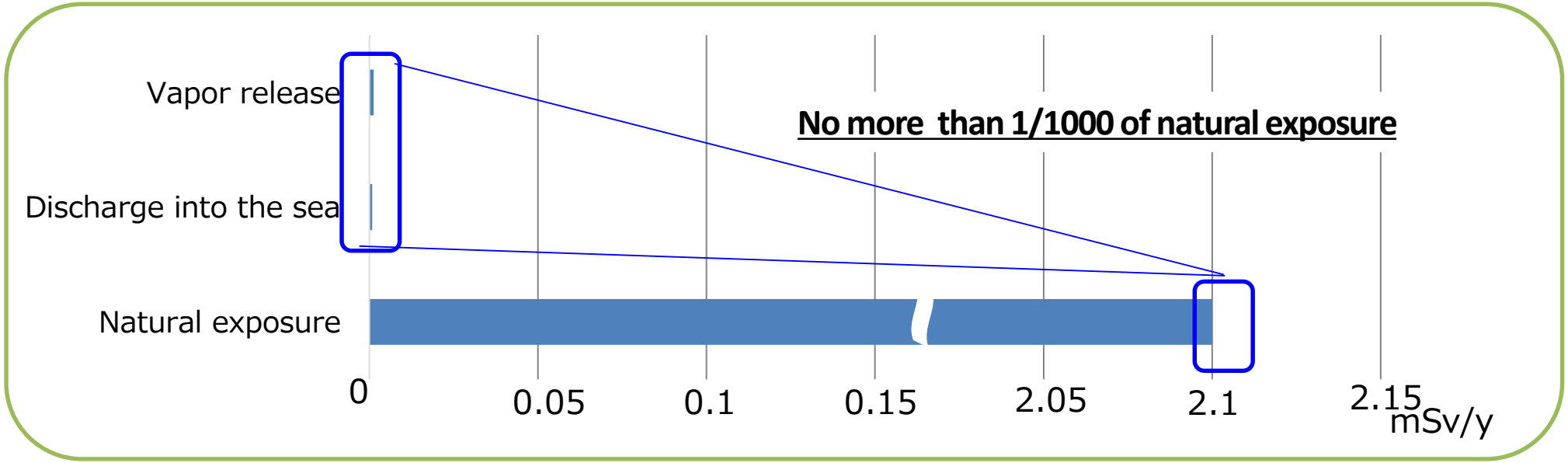
Thank you

1-2 (Ref) The radiological impact of the treated water release

◇**<u>The impact of the radiation to human health as a result of the discharge is considerably small.</u>**

✓ Even if the entire amount of the ALPS treated water containing tritium and other radioactive material were to be disposed of in one year*, the impact would be **<u>no more than 1/1000 of the exposure impact of natural radiation</u>** in Japan.

Comparison of radiation impacts from natural exposure and discharge of whole treated water in one year*



- Based on a UNSCEAR-specified method.
- All volume of the ALPS treated water stored in tanks is discharged in one year, and similar amounts are discharged during following 100 years.
- The treated water contains 860 trillion Bq of tritium and the other radionuclides