Important Stories on Decommissioning 2018

Fukushima Daiichi Nuclear Power Station, now and in the future

Agency for Natural
Resources and Energy,
Ministry of Economy,
Trade and Industry

Introduction

At present, the decommissioning process, including fuel removal from reactor buildings, is underway at TEPCO's Fukushima Daiichi Nuclear Power Station in order to continuously reduce risks as early as possible.

Thanks to the daily efforts of all personnel, the work is being steadily carried out with safety as the top priority.
We are fully committed to rebuilding Fukushima, the whole process of which is expected to take 30 to 40 years, and the success of reconstruction efforts will require both domestic and global forces.

This booklet provides accessible answers to your questions regarding Fukushima, as well as information about the current status and future actions regarding the decommissioning process, together with recent topics.

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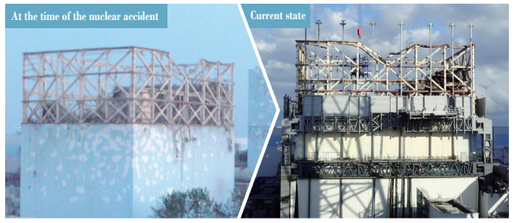
Current status and working conditions at the Fukushima Daiichi Nuclear Power Station

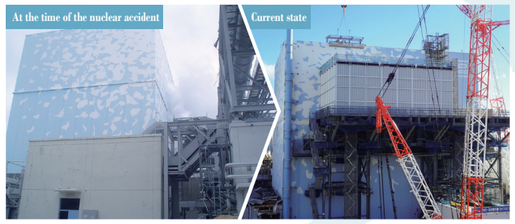
All units at the Fukushima Daiichi Nuclear Power Station are being kept stable as a result of continuous water injection. The working environment has been improved to the extent that workers can now wear general working apparel to carry out their duties in wider areas at the site, and infrastructure has been developed as necessary. The decommissioning work is thus progressing steadily.

Unit 1



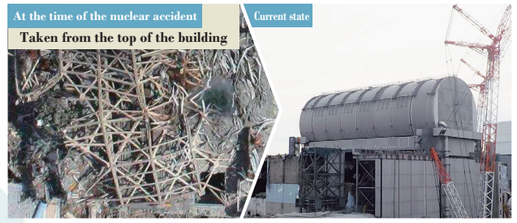
The removal of rubble has been commenced with thorough measures to prevent scattering in preparation for the removal of fuel from the spent fuel pool (SFP).

Unit 2



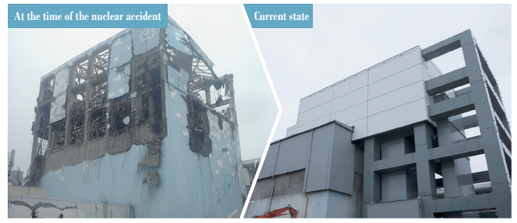
The top of the building is scheduled to be dismantled for starting the removal of fuel, etc. In preparation, a survey of the inside from the side of the building will be carried out.

Unit 3



The removal of rubble, decontamination and shielding were all completed and the construction of the dome roof and other fuel removal equipment is underway.

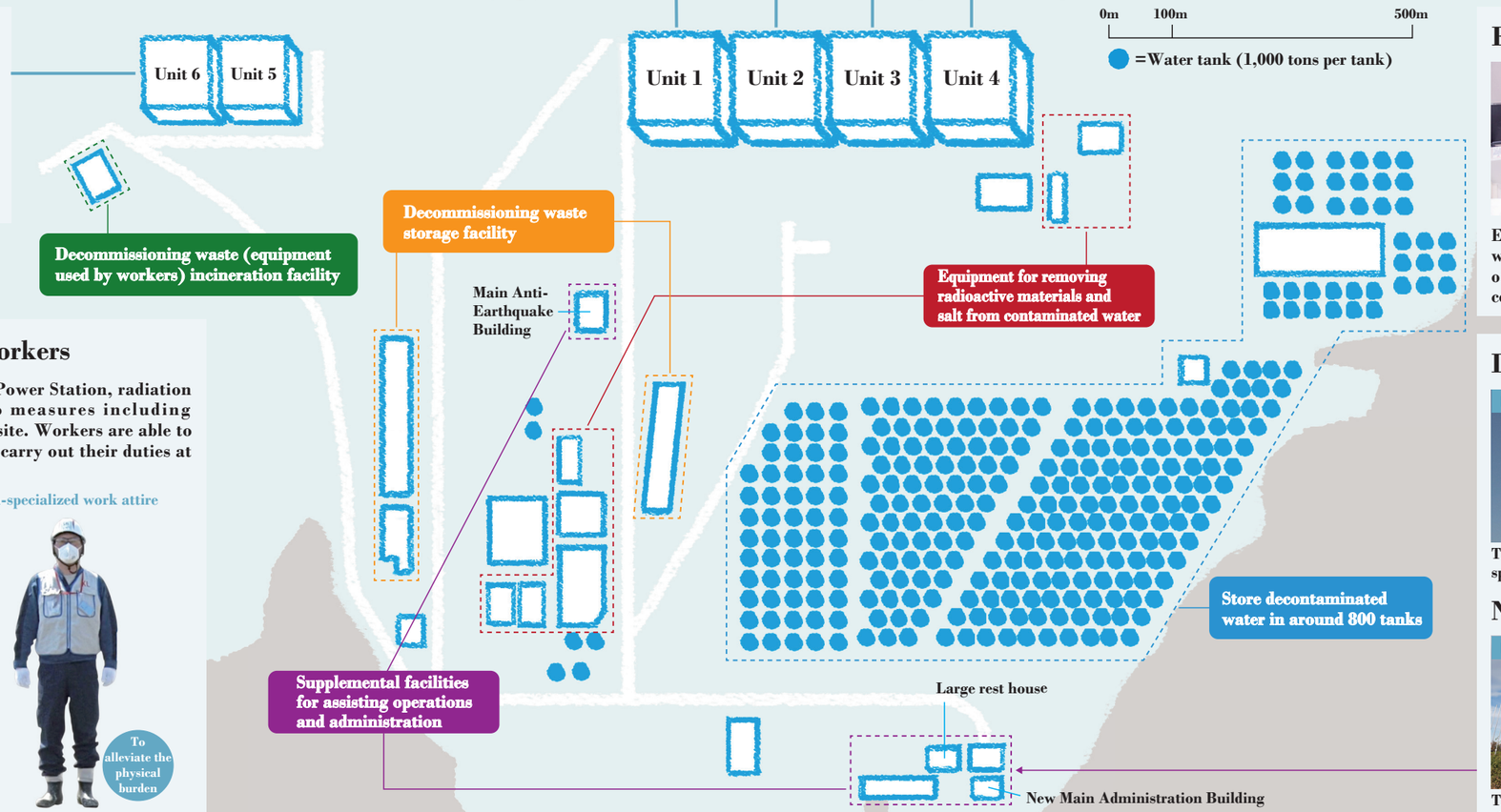
Unit 4



Fuel has been moved to the shared pool or other places and is being stored and managed safely.

Unit 5 and 6

The reactor cores at Units 5 and 6 were not damaged because their emergency power supplies did not shut down when the accident occurred. Currently, the fuel is being transferred to the SFPs and is being safely stored and managed.



Lighter equipment for workers

At the Fukushima Daiichi Nuclear Power Station, radiation doses have decreased thanks to measures including decontamination and paving of the site. Workers are able to wear non-specialized work attire to carry out their duties at around 95% of the site.

Enhancement of the medical system

Emergency physicians are on duty around the clock, so that workers can receive immediate medical attention in the event of any health-related problems or accidents. A newly constructed heliport for emergency transportation was opened.

Large rest house

The rest house includes a fully equipped restaurant and resting space for 1,200 people.

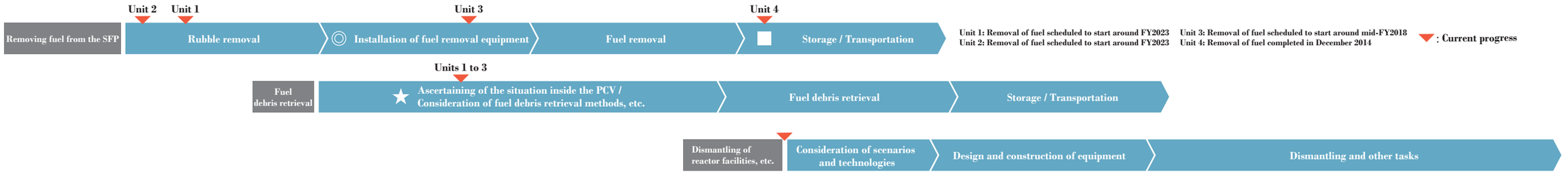
New Main Administration Building

The new building has offices and meeting rooms and functions as the base of the decommissioning work.

In the process of decommissioning

The project is steadily underway toward decommissioning, with safety as the top priority.

Schedule for decommissioning



Efforts made so far and activities in surrounding areas

Great East Japan Earthquake occurred

Mar. 11, 2011

2011 All units under cold shut-down

Jul. 31, 2011

Full-fledged operation of the SFP cooling system commenced at Unit 4

Construction of sea-side impermeable wall commenced

Apr. 25, 2012

2012 Management of contaminated water commenced in earnest

Mar. 30, 2013

Testing of the multi-nuclide removal equipment for purifying contaminated water commenced

2013 Struggled to deal with various problems

■ Removal of spent fuel from Unit 4 completed

May 21, 2014
Discharge of water pumped out through the groundwater bypass commenced

Dec. 22, 2014

2014 Removal of fuel from the SFP of Unit 4 completed

Oct. 19, 2013

Futaba World resumed

February 12, 2015
Fluoroscopic survey using cosmic-ray muons commenced

★Surveys of the inside using robots

Apr. 10 to 20, 2015

2015 Impermeable wall completed

Mar. 1, 2015

Johan Expressway (section between Joban-Tomioka IC and Namie IC) opened

Freezing of land-side impermeable wall commenced

Mar. 31, 2016

2016 Full-fledged surveys commenced toward the retrieval of fuel debris

Soma Nomaoi held (annual event; also restarted in the Odaka District since 2017)

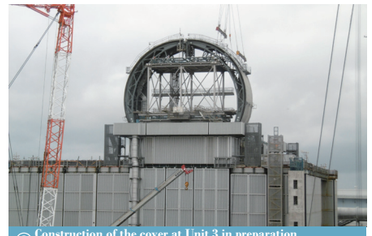
June 20, 2017
Landing drills of an emergency medical helicopter

Jul. 31, 2017

2017 Examination and decision of Fuel debris retrieval principles for each unit

Jul. 29, 2017

Oct. 21, 2017



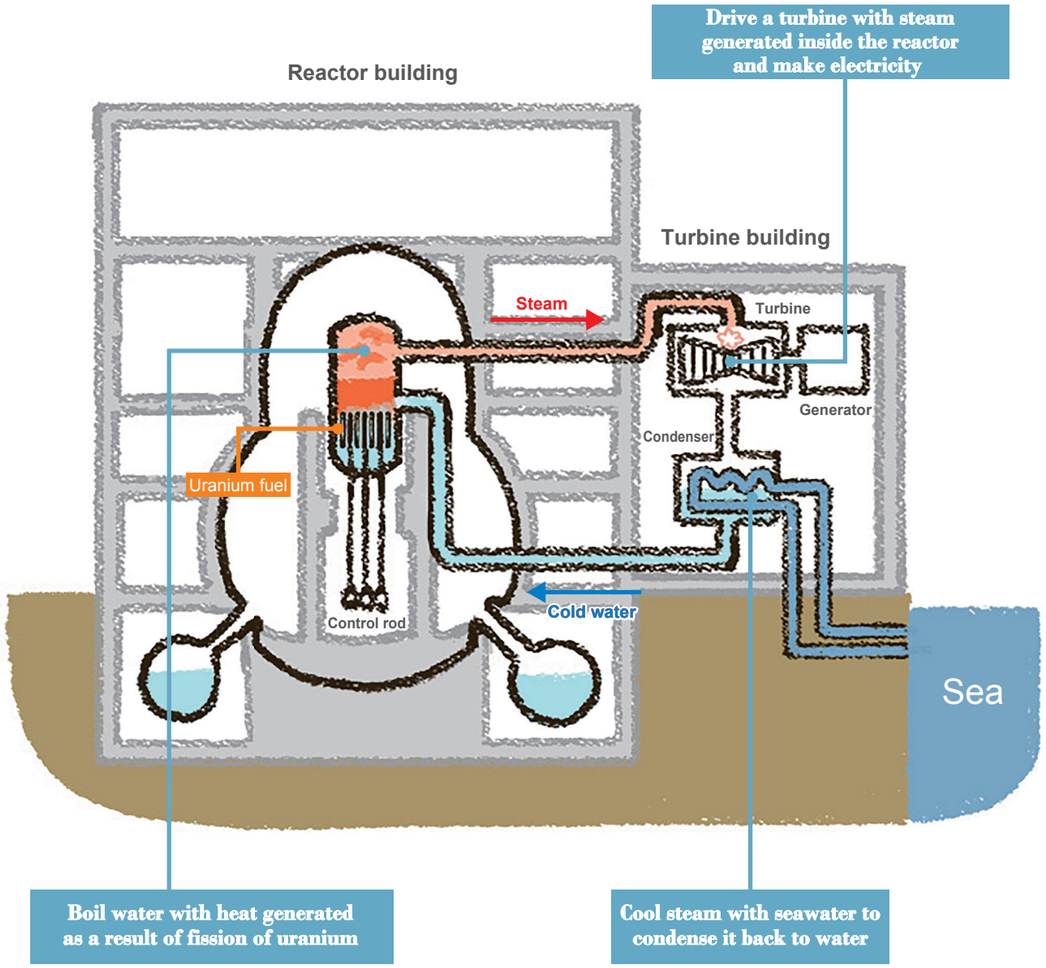
◎Construction of the cover at Unit 3 in preparation for fuel removal commenced

Operations for the section between Tatsuta and Tomioka of the Joban Line resumed

2018 Survey of situation inside the reactor Fuel removal from Unit 3 scheduled

Let's learn about a nuclear power station.

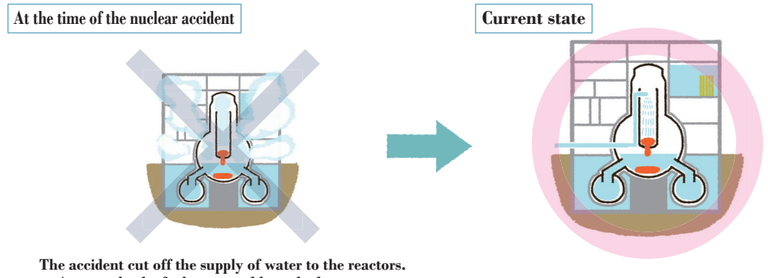
The mechanism of nuclear power generation is basically the same as that of thermal power generation wherein fuel, such as natural gas or coal, is burned to boil water and electricity is made using the steam power. In the case of nuclear power generation, heat energy obtained through fission of fuel (uranium) is used for boiling water and electricity is made by the use of the steam power.
While generating power, a nuclear reactor maintains criticality where a chain reaction of uranium continues, and the temperature in the reactor core reaches as high as several hundred degrees Celsius. Nuclear reactors are controlled safely by injecting cooling water and using control rods, etc.



Decommissioning
Q & A

1. Isn't there a risk of recriticality (another accident)?

The affected reactors have lost their function to control criticality. It is crucial to keep the situation under strict control in order to avoid recriticality of the fuel, etc. still left in the power station.
Should a reactor go critical, the production of so-called noble gases increases.
Accordingly, the production of noble gases inside the containment vessels is monitored around the clock. The volume of noble gases being produced is stable, which means that the reactors have not reached recriticality.
As the reactors are under control and remain stable, the possibility of recriticality is considered to be quite low. Additionally, measures to suppress nuclear fission, including a boric acid injection system, have been put in place in preparation for the unlikely event of criticality.



The accident cut off the supply of water to the reactors. As a result, the fuel generated heat, hydrogen was produced, and explosions occurred.

The reactors are being kept stable.

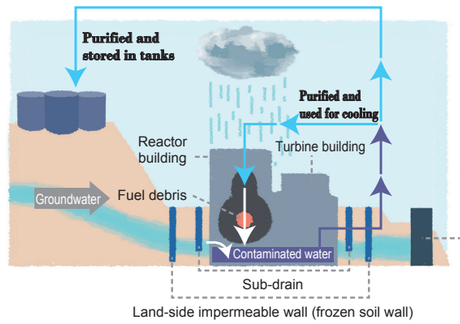
TEPCO's website publishes information about the situation inside the reactors, such as temperature, pressure, and the concentration of noble gases being produced inside the PCVs.

TEPCO, decommissioning Search

2. What is being done with contaminated water?

Measures to "isolate groundwater from contamination sources" have been taken to reduce the increase of contaminated water. Measures include pumping up groundwater before being contaminated from a well and installing a wall to prevent permeation of groundwater. Contaminated water is purified at multiple facilities and is properly managed and stored in a state where "contamination sources are removed." Furthermore, measures to "prevent leakage of contaminated water," such as the installation of an impermeable wall, have also been taken. As a result of various measures based on the three principles, i.e., "isolation," "prevention of leakage" and "removal," the environment within the port has been improved significantly.

▶ For details, see the Chapter concerning the management of contaminated water on p.15.

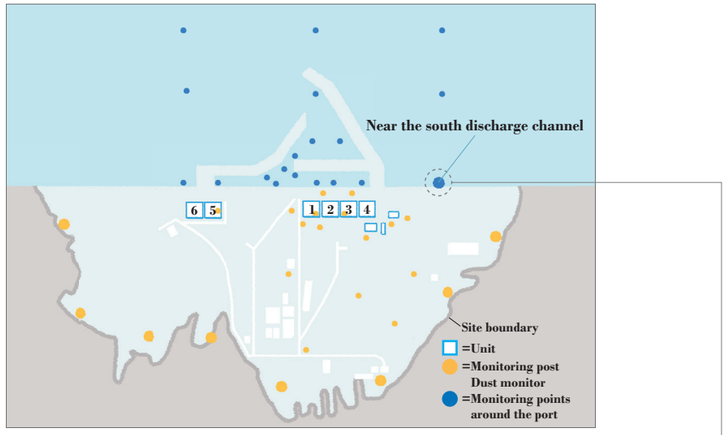


What is the contaminated water?
Groundwater that flows into reactor buildings and is contaminated as a result of coming into contact with fuel debris, etc.

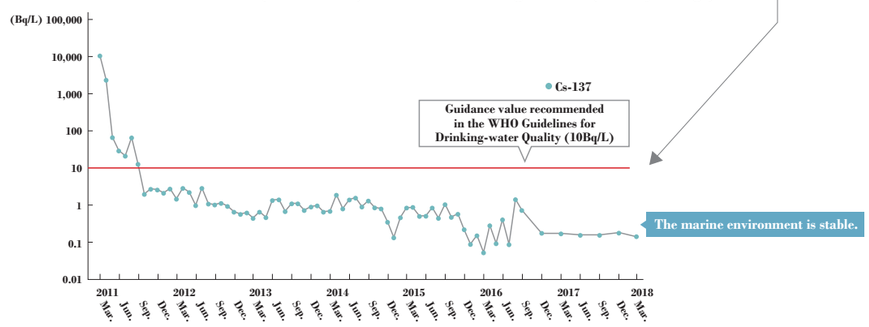
3. Is the nuclear station still affecting the surrounding environment?

Monitoring posts and dust monitors have been installed around the boundaries of the power station, which monitor levels around the clock. The removal of rubble from the tops of the reactor buildings has been carried out carefully while preventing scattering of radioactive materials. The concentration of radioactive materials is strictly monitored in workplaces. In this way, a system has been put in place to ensure immediate notification and response in the unlikely event of an unusual rise in the air dose rate or the concentration of radioactive materials in dust.

Positions of monitoring posts and dust monitors around the power station boundary and the surrounding sea area



Concentration of radioactive materials (cesiumCs-137) near the south discharge channel (monthly average)



In Fukushima Prefecture, TV channels broadcast figures every day for the dose measured in each part of the prefecture and the concentration of radioactive materials in surrounding sea areas.

The concentration of radioactive materials in the surrounding seawater close to the power station (outside the port) is low enough to ensure public safety, even when compared to the World Health Organization (WHO) Guidelines for Drinking-water Quality,* which set out international standards for drinking water. The International Atomic Energy Agency (IAEA) assessment concluded that the marine environment is stable.

***The level that the annual exposure dose caused by intake of drinking water is 0.1 mSv/y.**

Readings of radioactivity level in the air and seawater at present are available on the website (fukushima-radioactivity.jp/).

Fukushima prefecture radioactivity measurement map Search

4. Have any preparations been made for another earthquake or tsunami?

With regard to the reactor buildings and other critical buildings, a computer analysis has confirmed the robustness to withstand an earthquake or tsunami equivalent to or even larger than the Great East Japan Earthquake and subsequent tsunami.
To guard against a tsunami, a temporary seawall has been installed and work is underway to close off all openings into the buildings, to ensure that a tsunami can not penetrate them. In addition, a back-up power supply has been put in place, in the form of vehicle-mounted generators located on the hill, out of reach of a tsunami, while the site's fire trucks would be able to inject water into the buildings if needed. Additionally, drills to remove rubble (heavy equipment operation) and other training have been conducted in preparation for a tsunami, etc. Multilayered measures have been taken in this way.

Measures against flood due to a tsunami

Makeshift seawall (2.4 to 4.2m)

Before taking measures

After taking measures

Construction of watertight doors

Securing power resources in case of emergency

We have secured multiple power resources including power supply vehicles and gas turbine vehicles in preparation for the loss of electric power.
These vehicles supply water injection equipment with electricity in cases of emergency. Drills are repeatedly carried out to ensure that cooling of the reactors could continue, even in the unlikely event of an emergency.

A drill for injecting water

A power supply vehicle

Fire engines

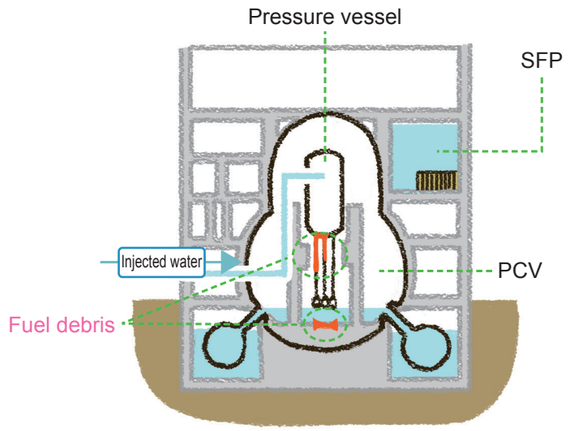
To be prepared in case of an emergency, Fukushima Prefecture has formulated a Region-wide Evacuation Plan covering 13 municipalities around Fukushima Daiichi Nuclear Power Station, which details the methods of communicating evacuation information and the evacuation sites and routes to be used by each municipality. Each municipality is using the prefecture's plan as the basis for their own evacuation plans, which describe the municipalities to which each district is to evacuate, as well as providing information about evacuation facilities, methods, and routes, thereby putting in place a multilayered system.
Fukushima Prefecture and the 13 municipalities* have concluded an agreement with TEPCO, so that they will be notified immediately in the event of any anomalies at the power station.

*** Iitate Village, Iwaki City, Okuma Town, Katsurao Village, Kawauchi Village, Kawamata Town, Tamura City, Tomioka Town, Namie Town, Naraha Town, Hirono Town, Futaba Town, Minamisoma City (alphabetical order)**

5. What has happened to the fuel debris (fuel that has melted and then solidified)? Hasn't the fuel melted through the floor into the ground?

Fuel debris is nuclear fuel that melted due to heat caused by a failure to cool down a nuclear reactor and then solidified together with surrounding metals, etc. The fuel debris in Units 1 to 3 is kept stable by means of a continuous stream of water injected into these units. As a result of analyses of the accident and surveys of the inside, it was found that the fuel debris has not penetrated the bottoms of the reactor buildings nor has it leaked into the ground.

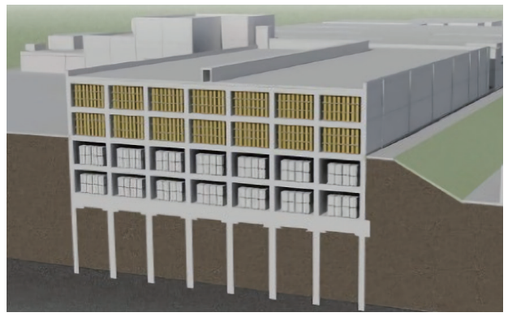
▶ For details, see p.21.



Reactor building (schematic)

6. How is the waste from the decommissioning work being treated?

A storage and management plan for the waste from the decommissioning work is made and updated based on estimated amounts thereof to ensure their appropriate storage in solid waste storage buildings or other facilities.



No.9 solid waste storage building

Decommissioning
Q & A

7. What does the future look like for the Fukushima Daiichi Nuclear Power Station?

Decommissioning is expected to take 30 to 40 years to complete, but efforts are to be continued to reduce risks continuously as early as possible by way of fuel debris removal and other means, with safety as the top priority. A concrete schedule cannot be made available at present as there remain many uncertain factors such as the detailed circumstances within the reactors and possible advancement in waste treatment technologies. Examinations will continue, while carrying out further surveys and studies and hearing opinions of local residents.

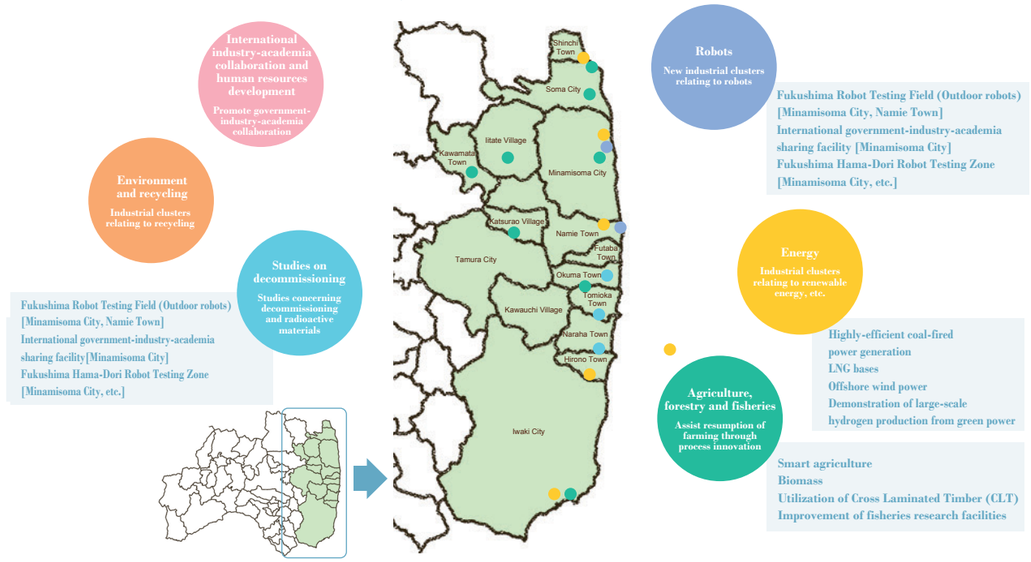
8. What will people's daily living and industry in Fukushima be like in the future?

By April 2017, evacuation orders were lifted for almost all areas except for zones where residents cannot return for a long time. Residents are returning and the reconstruction of communities is progressing, with schools and medical institutions re-opening along with new commercial facilities. For zones where residents cannot return for a long time, a planning system was established to develop zones designated for reconstruction and recovery, aiming to lift evaluation orders and enable residents to return home as early as possible. Futaba Town and other municipalities have obtained approval for their formulated plans and have started concrete measures for reconstruction.
In addition, the government has been proceeding with the Fukushima Innovation Coast Scheme to develop industrial infrastructure leading the new era, with the aim of facilitating self-reliant reconstruction of the industry broadly in the Hama-Dori and other districts. Specifically, the government is working to materialize projects in the fields of decommissioning, robotics, energy, agriculture, forestry and fisheries, and is also making efforts to develop industrial clusters, foster human resources, and increase tourists and visitors.

Fukushima Innovation Coast Scheme

Reconstruction of Hama-Dori that attracts the attention of the whole world

Priority initiatives toward realization



Three initiatives in the decommissioning process

PHOTO **November 7, 2014**

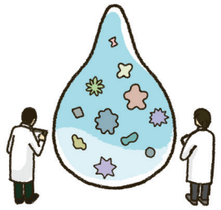
"Hoping for a swift resolution to the nuclear accident" This wish, shared by so many people, provides daily inspiration for those working at the site.

Efforts toward decommissioning are being made, with the highest priority on safety, so that residents around the site can live with peace of mind.

Urgent Measures to be taken at the Fukushima Daiichi Nuclear Power Station

Initiative 1

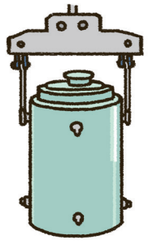
Management of contaminated water



The current concentration of radioactive materials in the seawater around the site is sufficiently low. Various measures are being taken in order to further reduce risk.

Initiative 2

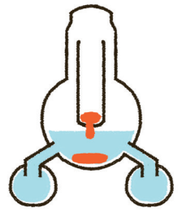
Removing fuel from the SFP



Preparatory works for the removal of fuel from the SFP, such as the removal of rubble and construction of related facilities, are underway.

Initiative 3

Retrieval of fuel debris



The reactors in Units 1 to 3 are being kept stable. The situation inside each unit is being surveyed in order to retrieve fuel debris.

Comment from working site (1)

Engineers engaging in decommissioning are highly motivated.

Responsible for the development of equipment for handling nuclear fuel and operational training

Chief, Second Machine Systems Design Division,
Nuclear Machine Systems Design Department,
Toshiba Energy Systems & Solutions Corporation

Fumihito Shinozaki

We have developed a system to remotely carry out a series of works, from the removal of rubble to fuel removal from the SFP. After an operation check at the Toshiba Keihin Product Operations, we have installed equipment including a crane at Unit 3 of the Fukushima Daiichi Nuclear Power Station, as planned. Fuel removal is scheduled to be commenced in the middle of FY2018. Engineers respectively specialized in designing, construction, testing, etc. worked together to achieve a shared goal, and the outcome will benefit society. We find our job rewarding.

Initiative 1

Management of contaminated water for the recovery of the clean sea of Fukushima

PHOTO **February 14, 2017**

Sea-side impermeable wall to prevent the outflow of radioactive materials into the sea

The concentration of radioactive materials in the seawater near the site is now sufficiently low. Nonetheless, to further reduce risk, various measures are being implemented based on the following three uncompromising basic principles.

Three principles concerning management of contaminated water

1 *Isolating* groundwater from contamination sources

The groundwater inflow into the reactor buildings has been reduced in order to reduce further generation of contaminated water. Groundwater around the site is being pumped away before contact, and frozen soil walls are being installed around the buildings.

2 *Preventing leakage* of contaminated water

To prevent the leakage of contaminated water, an impermeable steel wall has been constructed on the sea side of the buildings (completed in October 2015). The concentration of radioactive materials in the sea has fallen considerably.

3 *Removing* contamination sources

Multi-nuclide removal equipment (ALPS) and a number of other systems are used to treat the contaminated water that has accumulated inside the reactor buildings.

Comment of an employee from working site (2)

A challenge to construct an unprecedented frozen-soil impermeable wall by mobilizing specialized workers and machinery nationwide

Head of the local office responsible for the construction of the frozen-soil walls and decommissioning work

Fukushima Daiichi Frozen-soil Impermeable Wall Construction Office, No. 5 Work Group, Tokyo Civil Engineering Branch, Kajima Corporation

Isao Abe

The freezing method is a proven technique, as adopted for the construction of the undersea shield tunnel of the Tokyo Bay Aqua Line. However, this impermeable wall was an unprecedentedly large one with a total length of 1,500m and a depth of 30m, and it was the first undertaking to maintain a frozen-soil wall over the long term. We were given a short construction period and daily working hours for each worker were strictly managed and limited for radiation exposure control. As many as 985 specialized workers from around the country engaged in work each day at the peak period. Despite having faced various difficulties, workers are fulfilling their duties with the pride of knowing that the frozen soil wall is having a proven effect on management of contaminated water and that they are contributing to the decommissioning and the reconstruction of Fukushima.

Initiative 1

Management of contaminated water / Efforts made regarding contaminated water

The management of contaminated water has progressed significantly through the efforts to date and the water quality in the surrounding sea area has been further improved. Contaminated water management continues in order to reduce contaminated water

Principle 1 *Isolating* groundwater from contamination sources

Impermeable walls of frozen soil (land side)

Groundwater flows into the buildings are prevented by using ice walls created by freezing soil in the ground around the buildings.

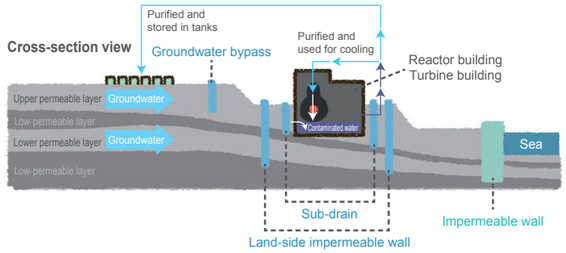
Conceptual drawing of the frozen soil wall

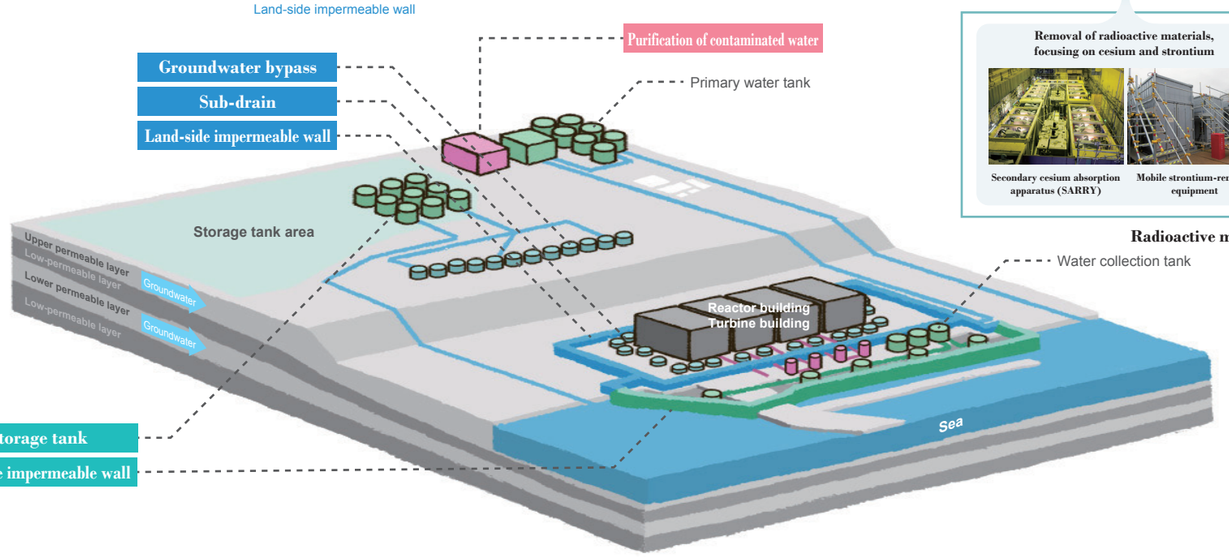
Freezing ducts

Pumping up groundwater (sub-drains and groundwater bypass)

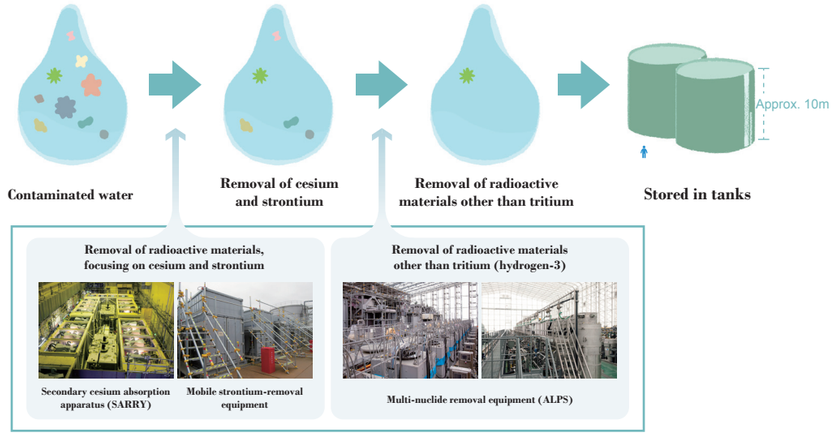
Sub-drain near the buildings

Wells (sub-drains) near the buildings and wells installed on the hills (groundwater bypass) pump up groundwater, lowering the groundwater level around the building and thereby minimizing inflows of groundwater into the buildings.





Principle 3 *Removing* contamination sources



Radioactive material removal equipment

Water stored in tanks

Tap water 1 (Bq/L)

Natural levels within the human body Several tens (Bq/L)

The tritium (hydrogen-3) in the water stored in the tanks is also found in the natural world, including in the tap water we drink and even in our own bodies.
The water stored in the tanks has been treated to purification. The question of how to handle the purification treatment water in the tanks is being considered in close consultation with local communities and experts.

Principle 2 *Preventing leakage* of contaminated water

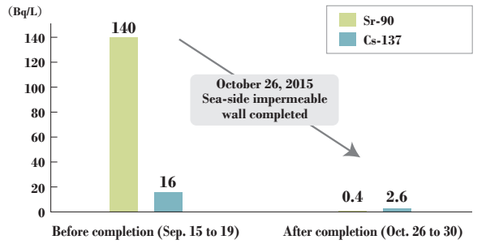
Impermeable steel wall (sea side)

A 780-meter-long wall of 30-meter-tall steel pipes was constructed on the sea side of Units 1 through 4, which has been gradually improving the water quality in the surrounding sea area.

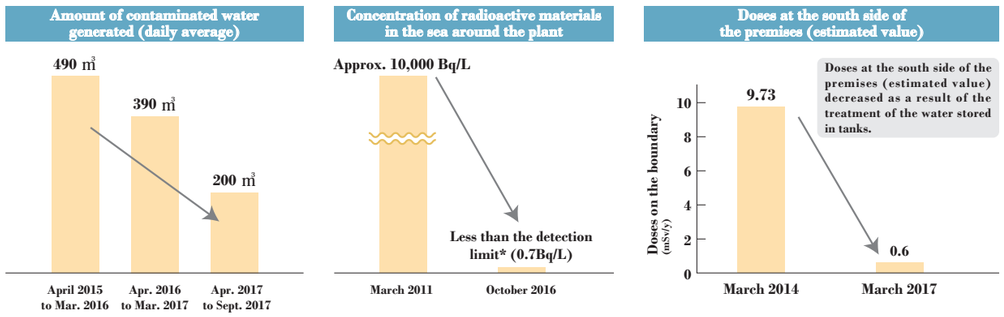
Installation of additional water tanks

Water tanks for storing purified water treated by ALPS are being systematically installed to ensure adequate storage capacity.

Changes in the concentration of radioactive materials in seawater within the harbor (before and after completion of the sea-side impermeable wall)



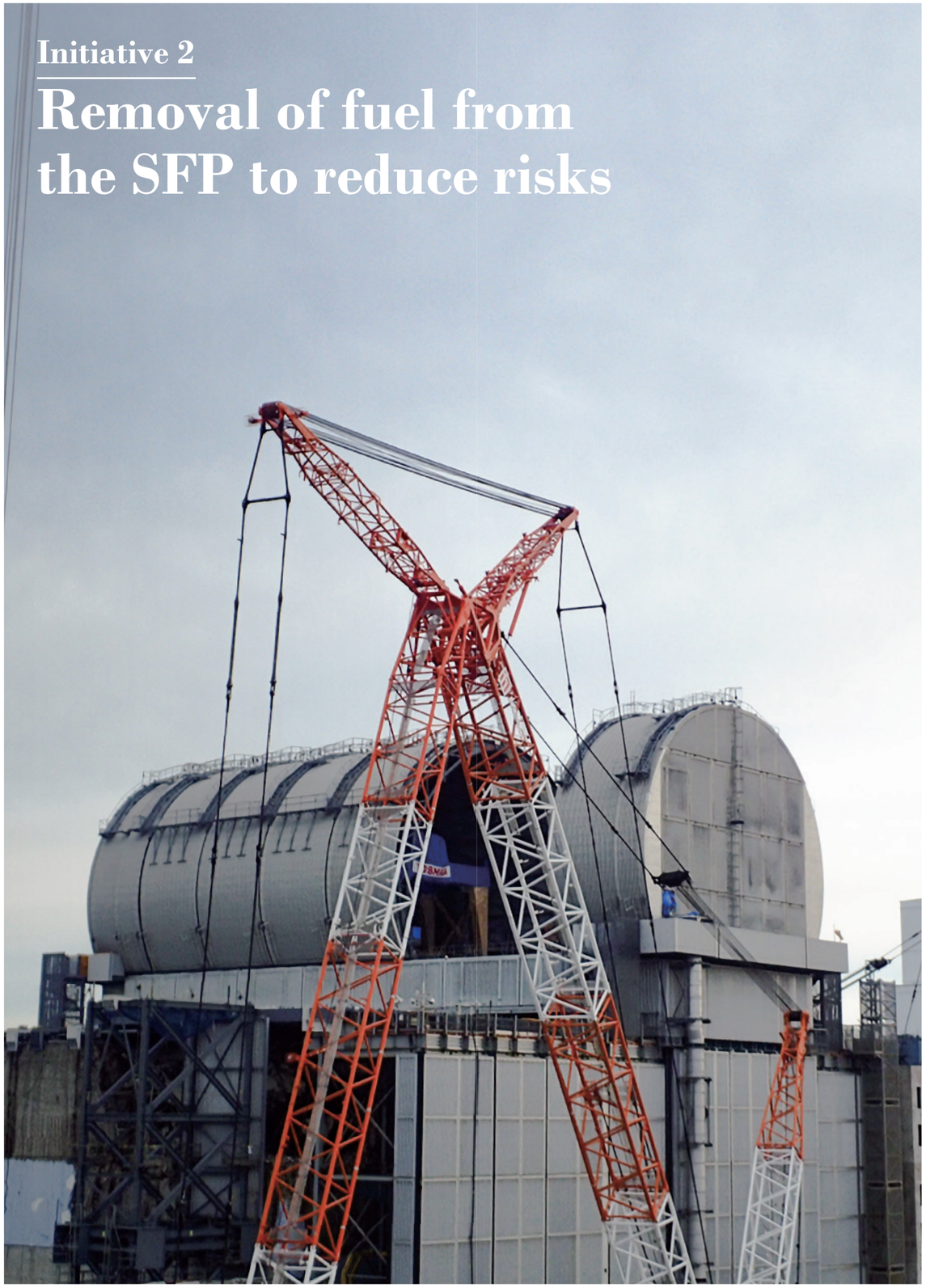
Effects of measures to date



*The concentration of radioactive materials in the sea around the plant refers to Cs-137 level near the south discharge channel (Oct. 25 to 31, 2016)

Initiative 2

Removal of fuel from the SFP to reduce risks



PHOTO

January 5, 2018

Construction of the cover at Unit 3 in preparation for fuel removal

Removing fuel from the SFP

Preparatory works for the removal of fuel from the SFP, such as the removal of rubble and construction of related facilities, are underway.

Progress at each unit

Unit 1

Number of fuel assemblies: 392

A large amount of rubble left on the operating floor will be removed carefully. The removal of the cover over the whole building, which was installed after the accident, revealed gaps in the well plugs. How to deal with those gaps and how to prevent the roof crane from falling also need to be resolved.

Progress at Unit 1

Survey of situation inside → Rubble removal → Installation of fuel removal equipment → Spent fuel removal

Unit 2

Number of fuel assemblies: 615

No hydrogen explosion has occurred and the building is sound. However, radioactive materials are still accumulated within the building, such as on the operating floor. The top of the building needs to be dismantled after conducting a detailed survey of the operating floor and taking measures to prevent scattering.

Progress at Unit 2

Survey of situation inside → Dismantling of the top of the building → Installation of fuel removal equipment → Spent fuel removal

Unit 3

Number of fuel assemblies: 566

The roof was blown off due to a hydrogen explosion and a large amount of rubble fell onto the operating floor and the SFP and has remained there. The removal of rubble, decontamination and shielding were all completed and the construction of fuel removal equipment is underway.

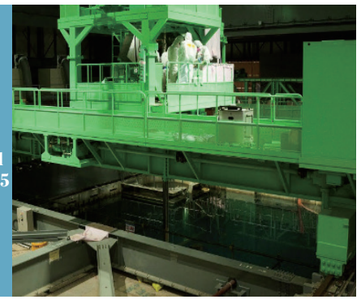
Progress at Unit 3

Survey of situation inside → Rubble removal → Installation of fuel removal equipment → Spent fuel removal

Unit 4

Number of fuel assemblies: 1535

Removal completed (December 2014)



The removal of spent fuel was completed in December 2014.

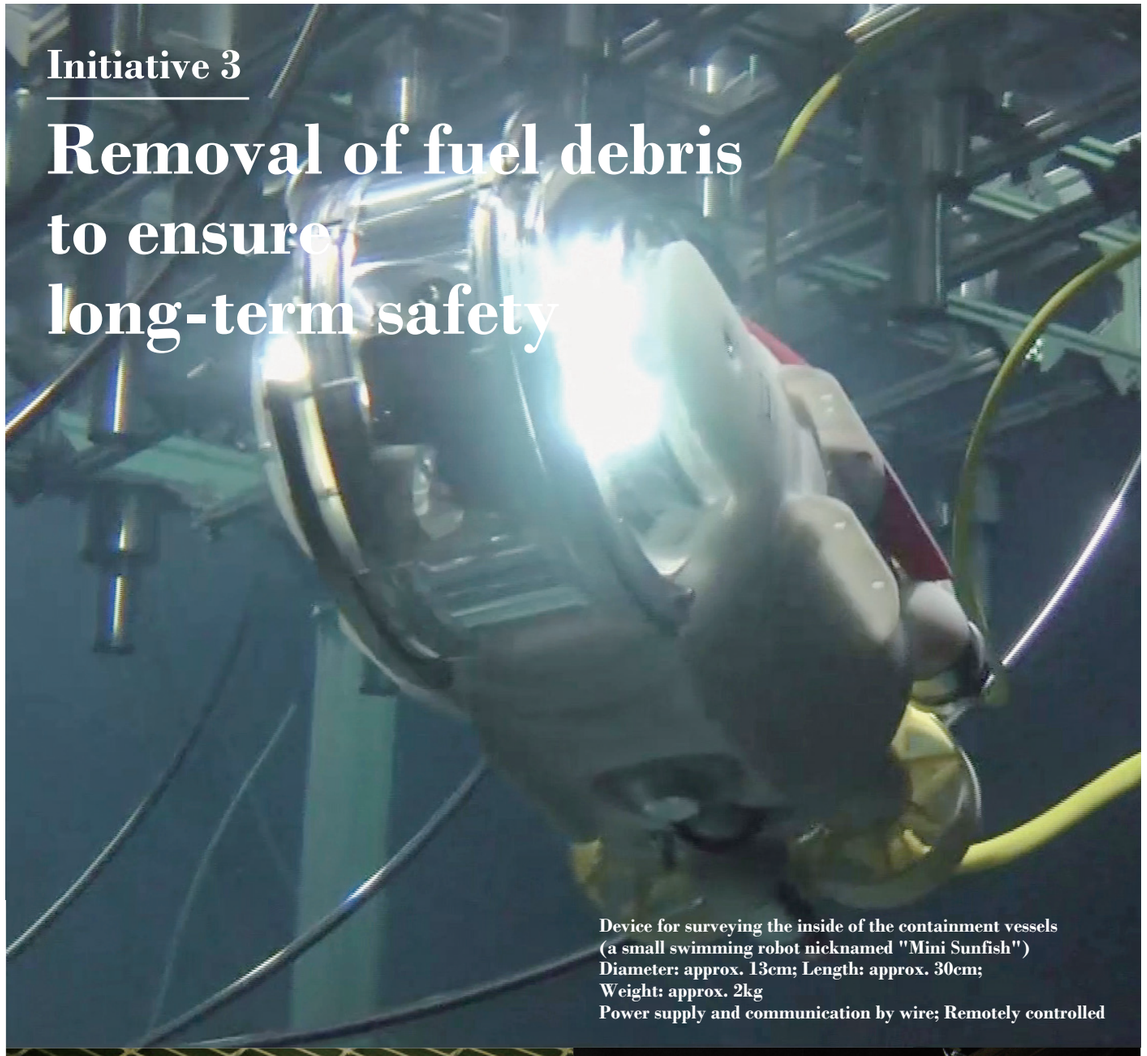
Progress at Unit 4

Survey of situation inside → Rubble removal → Installation of fuel removal equipment → Spent fuel removal

Decay heat from the spent fuel in the pool has decreased significantly after the lapse of nearly seven years from the earthquake. At Unit 2, where the decay heat level is the highest among Units 1 through 3, the water temperature was checked after suspending the cooling of the pool for one month under severe conditions in midsummer, and it was confirmed that the water temperature remains below the limit (65°C) due to natural heat release.

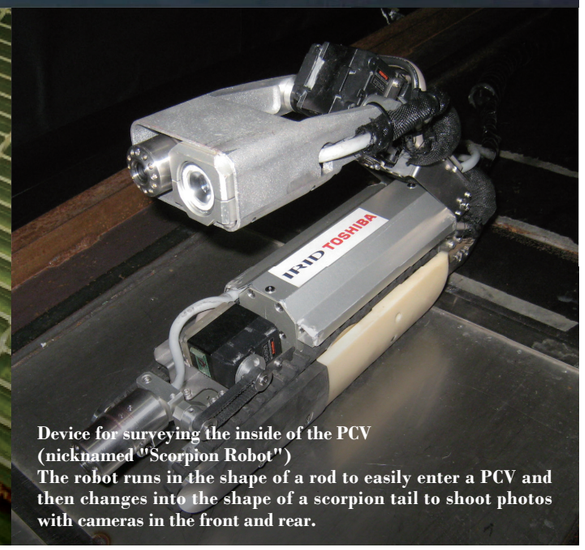
Initiative 3

Removal of fuel debris to ensure long-term safety



Device for surveying the inside of the containment vessels
(a small swimming robot nicknamed "Mini Sunfish")
Diameter: approx. 13cm; Length: approx. 30cm;
Weight: approx. 2kg
Power supply and communication by wire; Remotely controlled

Device for surveying the inside of the PCV
(a shape changing robot nicknamed "Snake robot")
The robot runs in the shape of a rod to easily enter a PCV and then changes into a U shape for stable movement within the vessel.



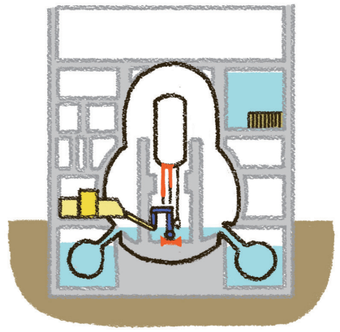
Device for surveying the inside of the PCV
(nicknamed "Scorpion Robot")
The robot runs in the shape of a rod to easily enter a PCV and then changes into the shape of a scorpion tail to shoot photos with cameras in the front and rear.

PHOTO Various robots are being developed to survey the situation inside the PCV

Progress towards the retrieval of fuel debris

It will be kept safe in the long term by retrieving the fuel debris left in the reactors in Units 1 to 3 in due course and reducing the risk posed by radioactive materials. Surveys using remote-controlled robots are being conducted to ascertain the situation inside the reactors where doses are high, in preparation for the fuel debris retrieval.

*There is no fuel debris in Unit 4, as it was shut down for periodic inspection at the time of the accident.



Debris retrieval principles

1. A step-by-step approach should be adopted, beginning with minor work and proceeding on to larger-scale work in a staged manner while confirming the situation and flexibly reviewing methods based on obtained information.
2. A flooding method to completely fill the PCV with water is technologically difficult. Therefore, an aerial method without the need for water filling should be adopted as the primary method.
3. Firstly, the focus should be placed on retrieving fuel debris at the vessel bottom from the vessel side.

Comment from working site (3)

To ensure sufficient driving force while achieving downsizing was most difficult in developing the "Mini Sunfish."

Responsible for robot development, familiarization training and supervision of on-site surveys

Plant Services and Applied Technology Development Department,
Toshiba Energy Systems & Solutions Corporation

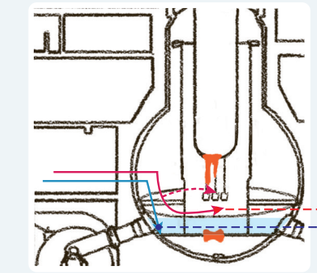
Kenji Matsuzaki

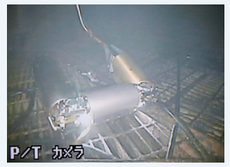
It took time to ensure sufficient driving force to enable the robot to move with a cable, while achieving downsizing, so that the robot can operate even under the condition where detailed circumstances and the level of damage are unclear. The task was challenging but rewarding for robot engineers as there are many things that only robots can handle. It has been seven years since the accident and we have reached the stage of being able to ascertain the situation near the reactor with robots. We will further develop technologies to make robots that can carry out more complicated work under more severe environments to achieve the goal of retrieving fuel debris.

Situation inside the reactor

Unit 1

Surveys using an endoscope and remote-controlled snake-like robot have revealed no major damage inside the PCV.



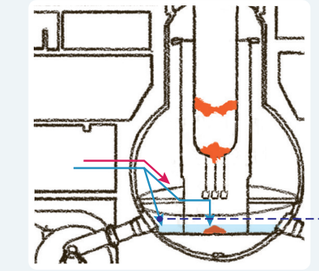


(1) Interior of the PCV
(March 18, 2017:
remote-controlled robot)

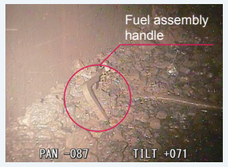
(2) Interior of the PCV
(March 22, 2017)

Unit 2

Surveys using remote-controlled cameras, etc. revealed a hole in the scaffolding underneath the PCV and the existence of deposited materials suspected to be fuel debris.



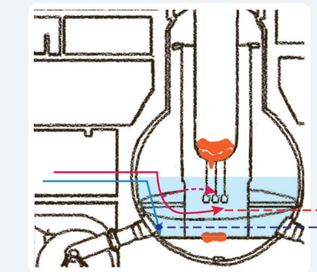
(1) Interior of the PCV
(January 2017: guide pipe)

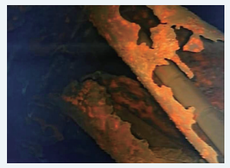


(2) Bottom of the pedestal
(January 19, 2018)

Unit 3

In July 2017, as a result of a survey using an underwater robot, the fall of a structure that should be located in the reactor core was confirmed and fused materials suspected to be fuel debris were found at the bottom of the PCV.





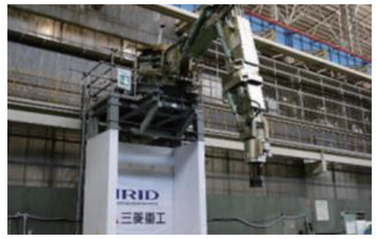
(1) Floor of the PCV
Fallen structure
(July 19, 2017:
Remote-controlled robot)

(2) In the bottom of the PCV
Solidified fused materials
(July 21, 2017)

Development of technology for retrieving fuel debris

Remote control technologies and cutting technologies to facilitate the safe retrieval of fuel debris are being developed in parallel with efforts to survey the situation inside the reactors.

Debris cutting tool

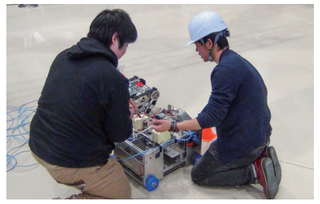


Remote-controlled robotic arm

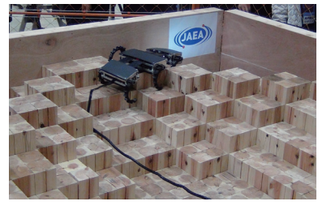
Next generation initiatives to develop new technologies

Second Creative Robot Contest for Decommissioning
December 16, 2017 (Sat.)
[Organizers] Ministry of Education, Culture, Sports, Science and Technology, Decommissioning Human Resource Development Consortium
[Venue] Naraha Remote Technology Development Center

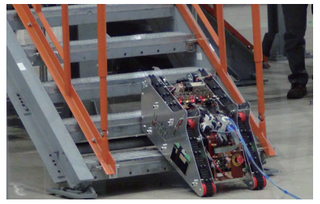
The younger generation will also have a vital role to play in decommissioning, which will take 30 to 40 years.
Following the first contest held in 2016, the Second Creative Robot Contest for Decommissioning was held at the Naraha Remote Technology Development Center in 2017. 16 teams from 15 technical colleges across Japan competed against each other in demonstrating how their robots would perform under the demanding conditions envisaged in decommissioning work.
The contest aims to naturally enhance students' creativity through manufacturing of robots and to cultivate their problem-identifying abilities not limited to problem-solving abilities. It is hoped that more and more young people will take an interest in decommissioning and become engineers who will play a central role in this field.



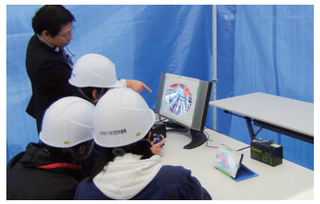
Meticulous adjustments of a robot



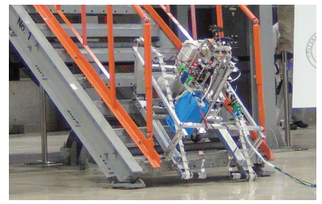
Operating in rough terrain



Traveling on stairs



Remotely controlling a robot while looking at camera images



Robot which won the first prize

Awards ceremony

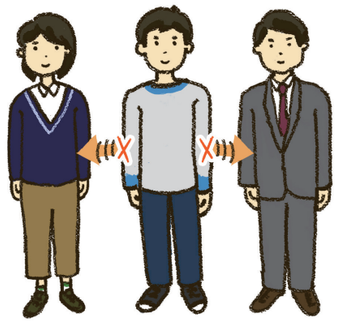
Basic knowledge about radiation

Radiation in daily life

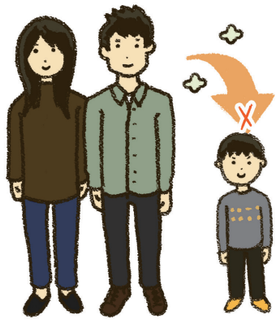
Source: website of the National Institute of Radiological Sciences

In our daily lives, we receive various types of radiation. Not only does radiation exist in specific places such as nuclear power stations and hospitals but it also exists in nature. Health effects of radiation depend not on the existence of radiation itself but on the amount of radiation.

Radiation is not infectious.

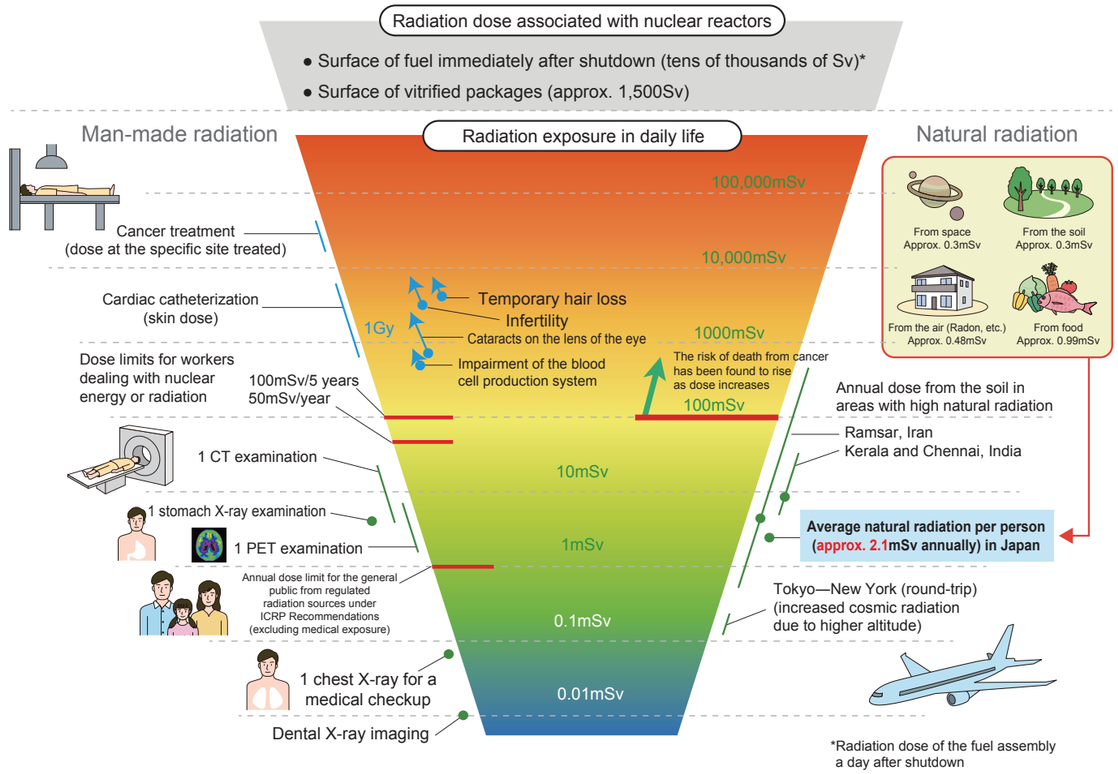


Radiation exposure causes no genetic effects on future offspring.



Quick reference chart for radiation exposure

Source: Prepared by the Agency for Natural Resources and Energy, based on data from the National Institute of Radiological Sciences



*Radiation dose of the fuel assembly a day after shutdown

What's the difference between radioactive materials, radioactivity, and radiation? What are becquerels and sieverts?

What's a becquerel (Bq)?

It is a unit that shows the amount of radioactivity, which is the ability to emit radiation.

What's a sievert (Sv)?

It is a unit that shows the degree of impact of radiation on the human body.

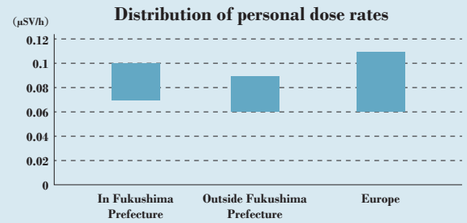
Current Situation of Fukushima

Safety of food from Fukushima Prefecture

Food and drinking water from Fukushima Prefecture are inspected based on the strictest standards in the world and their safety is ensured. Food and drinking water that exceed those strict standards are no longer found in Fukushima at present. No rice from Fukushima has exceeded the standards since 2015, no livestock products since December 2012 and no marine products since April 2015. Proper measures to prevent marketing any food or drinking water exceeding the standards have been put in place.

Air dose rates in Fukushima

Air dose rates in Fukushima are almost at the same level as those in major cities and at representative sightseeing spots in and outside Japan. There is no risk of health problems due to radiation caused by staying in Fukushima.



* Prepared by the Ministry of Economy, Trade and Industry based on the "Measurement and Comparison of Individual Doses of High School Students Inside and Outside of Fukushima Prefecture" (by Super Science Club , Fukushima High School)

Video on decommissioning is available

The current status of the decommissioning work at the Fukushima Daiichi Nuclear Power Station is compiled in an easy-to-understand manner into a several-minute video ("Decommissioning at Present"), together with evaluations of overseas intellectuals regarding various efforts made so far, interviews with workers, and CG illustrations.

- Management of contaminated water
- Improvement of the Working Environment
- Removal of fuel from the SFP
- Fuel debris retrieval

Ministry of Economy, Trade and Industry current process of decommissioning Search

Please use the QR code to access it

Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry

Nuclear Accident Response Office, Agency for Natural Resources and Energy , Ministry of Economy, Trade and Industry

TEL:03-3501-1511 (Switchboard Tel.)

FAX:03-3580-0879

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