Appendix 1-2

"Roadmap towards Settlement of the Accident at Fukushima Daiichi Nuclear Power Station, TEPCO" Step 2 Completion Report

- Tentative translation -

December 16th, 2011

Nuclear Emergency Response Headquarters
Government-TEPCO Integrated Response Office

Introduction

Following the March 11th, 2011 accident at TEPCO's Fukushima Daiichi Nuclear Power Station, the government and TEPCO were focused on the implementation of emergency response measures such as the injection of cooling water into the reactors and spent fuel pools as well as the settlement of the power source.

TEPCO released the "Roadmap towards Settlement of the Accident at Fukushima Daiichi Nuclear Power Station, TEPCO" (hereafter Roadmap) on April 17th in order to implement the settlement work in an organized manner in accordance with the directives issued by the former Prime Minister Kan on April 12th. The Roadmap affirmed basic policy of "By bringing the reactors and the spent fuel pools to a stable cooling condition and suppressing the release of radioactive materials, we will make every effort to enable evacuees to return to their homes and for all citizens to be able to secure a sound life." The following targets have been set with respect to each Step.

<Target and achievement date at each step>

- Step 1 (Achievement date: around 3 months);
  Radiation dose is in steady decline.
- Step 2 (Achievement date: around 3 to 6 months after achieving Step 1)
  The release of radioactive materials is under control and the radiation dose is being significantly held down.

On July 19th, the Nuclear Emergency Response Headquarters Government-TEPCO Integrated Response Office released its first announcement concerning the transition of the Roadmap stating that Step 1's target had been achieved and that progress on Step 2 was underway.

The achievement of Step 1 was confirmed by verifying the monitoring post and other measuring equipment which showed that the release of radioactive materials since the time of the accident had steadily declined.

In addition, issues concerning Step 2 were broken down into 10 categories (this includes categories added during the implementation of Step 2) and targets and countermeasures were individually set for each issue. Furthermore, the government and TEPCO have agreed to cooperate to achieve settlement.

<Issues and their Main Targets in Step 2>

Issue (1) Reactor: Target "A condition equivalent to cold shutdown"

- Continue circulating water cooling, monitor the parameters such as the RPV bottom temperatures, and bring the reactors to "a condition equivalent to cold shutdown". A condition equivalent to cold shutdown is defined as follows;

- The RPV bottom temperature is, in general, below 100 degrees centigrade.
- The release of radioactive materials from the PCV is under control and public radiation exposure from additional releases is being significantly held down (The target is to keep the doses below 1 mSv/year at the site boundaries.)

- In order to satisfy the above two conditions, the mid-term safety of the circulating water cooling system is being secured.

Issue (2) Spent fuel pool: “more stable cooling”

- Do installation work for the circulating water cooling system at Units 1 and 4 in the same way as was done at Units 2 and 3 in Step 1.

Issue (3) Accumulated radioactive water: Target “Reduction of total amount of accumulated radioactive water”

- Strive to maintain stable operations of the processing facilities, thus aiming to reduce the total amount of accumulated radioactive water.

Issue (4) Groundwater: Target “Prevent contamination in the ocean”

- Control accumulated radioactive water leakage into the groundwater, thus preventing groundwater contamination resulting in the prevention of ocean contamination.

Issue (5) Atmosphere/soil: Target “Prevent scattering of radioactive materials”

- Reduce the scattering of radioactive materials accumulated within the site, thus preventing the rise of radiation dosage in the surrounding area.

Issue (6) Measurement, Reduction and Disclosure: Target” Sufficient reduction of radiation dose”

- The Government, Prefecture, Municipalities and TEPCO will start monitoring and full fledged decontamination work.

Issue (7) Tsunami and reinforcement, etc.: Target “Prevent further disasters”

- Prepare for extraordinary events (earthquakes, tsunamis, etc.) to prevent the impact of disasters so that the situation will not worsen.

Issue (8) Living/working environment: Target” Enhancement of Environment Improvement”

- Improve the living/working environment that was harsh in the immediate aftermath of the accident to maintain worker motivation.

Issue (9) Radiation control/medical care: Target “Enhancement of healthcare”

- Ensure exposure protection and implement countermeasures against heat strokes and influenza, etc.

Issue (10) Staff training/personnel allocation: Target “Exhaustive radiation exposure dose control”

- Under a government-TEPCO collaboration, promote staff training etc. to systematically train and allocate staff.

The “Roadmap towards Settlement from the Accident at Fukushima Daiichi Nuclear Power Station, TEPCO Step 2 Completion Report” (hereafter Report) is a compilation of the work implemented by the Government-TEPCO Integrated Response Office in order to achieve issues and target in Step 2.

Eight months after the release of the Roadmap on April 17, we are submitting this Report to the Nuclear Emergency Response Headquarters. This report shows that the reactors were brought to a condition equivalent to “cold shutdown”, and in case an accident occurs, we will be able to keep the radiation dose at the site boundaries at a sufficiently low level and we have confirmed the reactors are stabilized and the accident in the station was settled.

I. Cooling

(1) Reactor

1. Achievement of the Step 2 Target: "A condition equivalent to cold shutdown"

- According to the following conditions, it has been confirmed that "A condition equivalent to cold shutdown" has been achieved.

・Temperatures of the RPV bottom and inside the PCV are, in general, below 100 degrees centigrade.

・Steam generation inside the PCV is being suppressed via controlling water injection. Hence, the release of radioactive materials from the PCV is being kept under control.

・The radioactive exposure at the site boundaries due to the current release of radioactive materials from the PCV is 0.1 mSv/year, which is below the 1 mSv/year target.

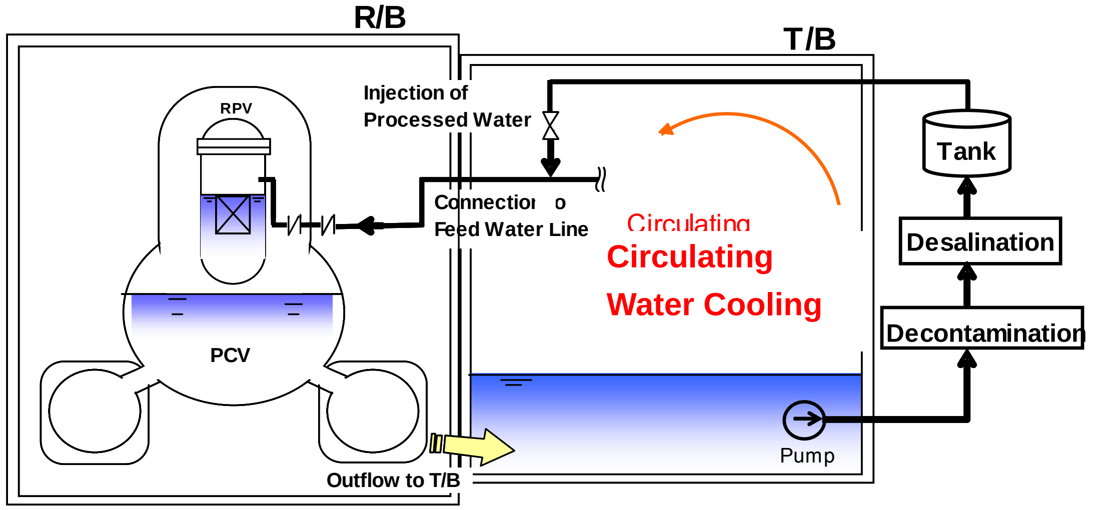
・The mid-term safety of the circulating water cooling system (reliability of facilities (redundancy and independency), detection of failure and trouble, confirmation of settlement measures and recovery time, safety assessment of accidents situation, etc.) has been secured.

2. Current status and work implemented to achieve "A condition equivalent to cold shutdown"

1) Commencement and continuation of circulating water cooling

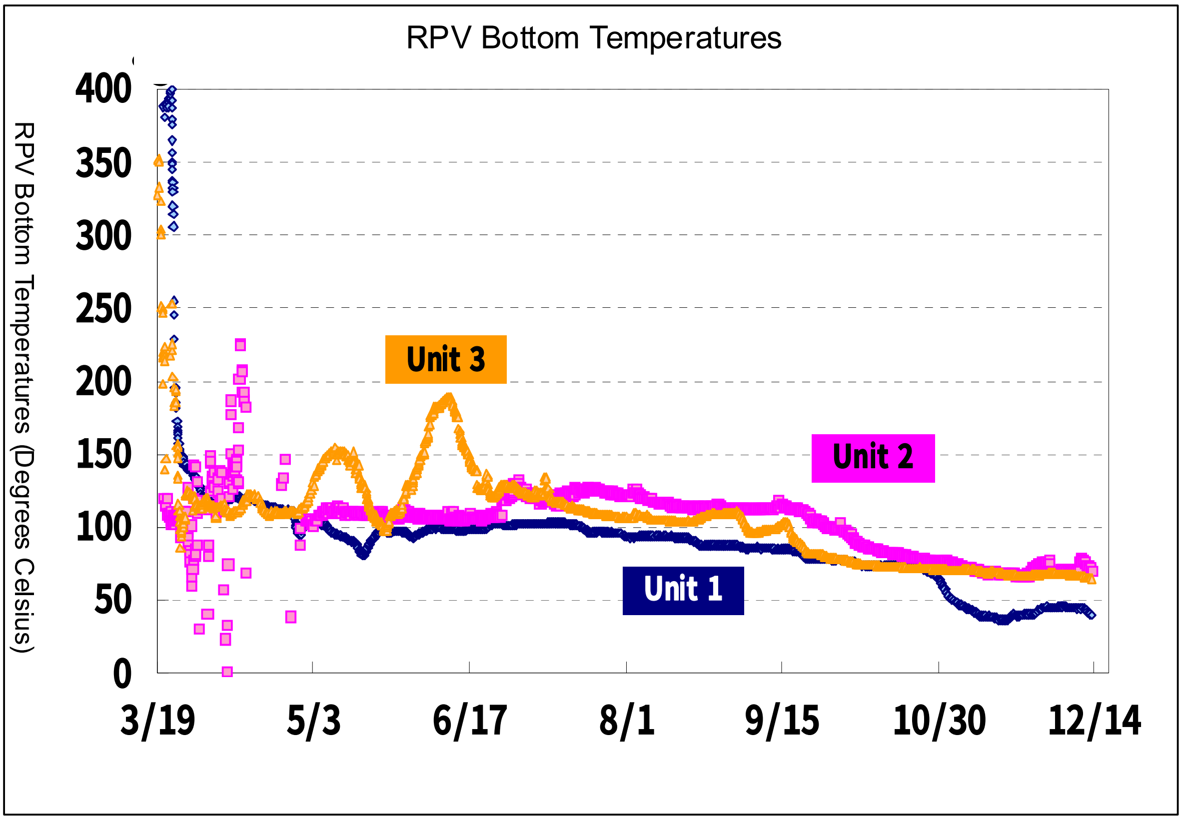
- At Step 1, commenced from June 27 by reusing accumulated contaminated water (accumulated radioactive water) inside buildings and other locations after processing for injection into the reactors.
- NISA confirms the operating status.

Image of Circulating Water Cooling



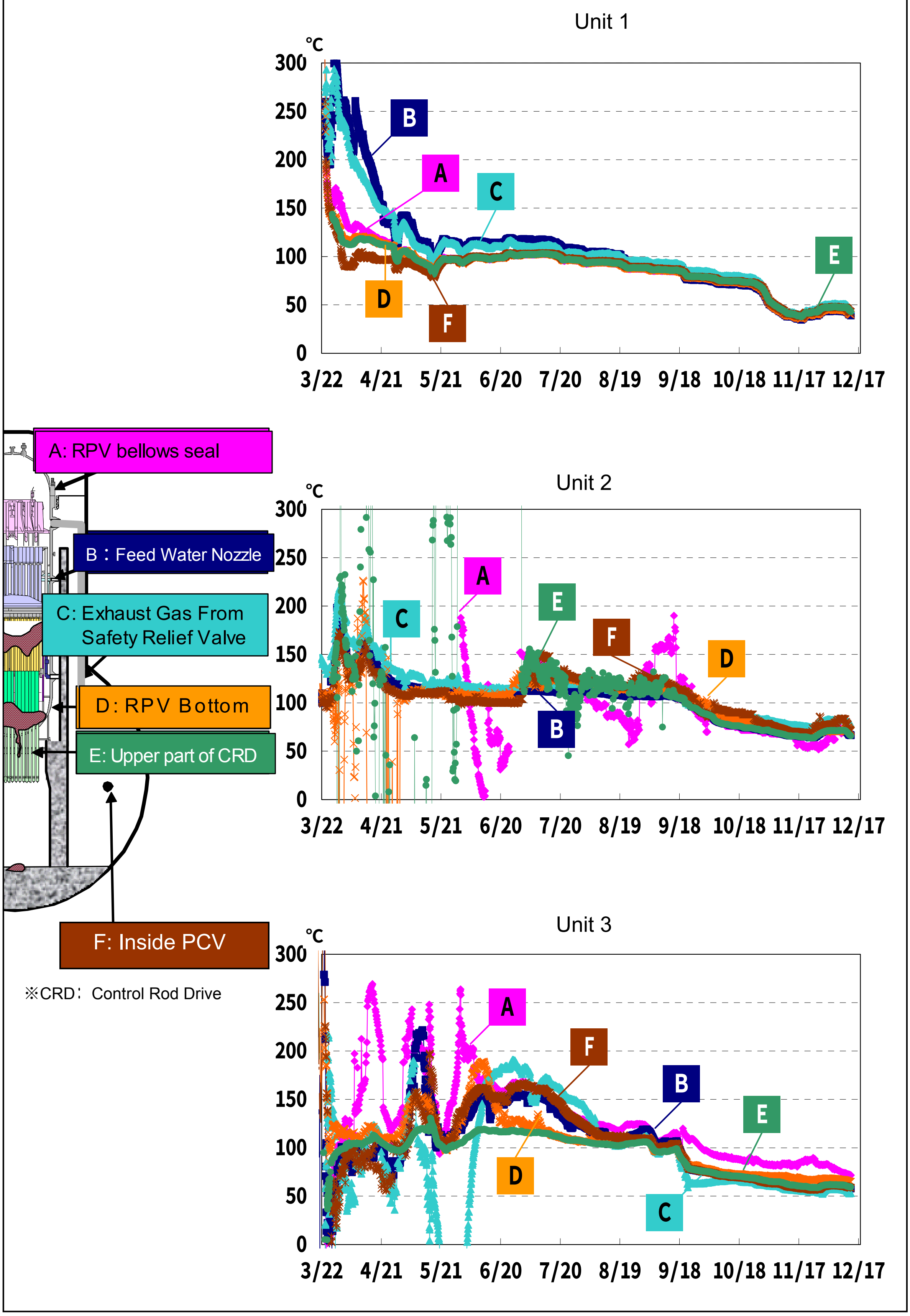
2) Circulating Water Cooling and Release Control /Suppression of Radioactive Materials from the PCV

- RPV bottom temperature was 38 degrees centigrade at Unit 1, 68 degrees centigrade at Unit 2 and 64 degrees centigrade at Unit 3 (as of Dec. 15), having stabilized below 100 degrees centigrade via circulating water cooling.
- Steam generation is suppressed via controlling water injection, so that the release of radioactive materials from the PCV is kept under control.



- Because it is difficult to decide where damaged fuels are located exactly in each RPV and/or PCV, we need to confirm cooling status of the damaged fuels for their possible leakage into the PCV.
- We measure temperatures at many points from lower to upper level in each PCV, and the temperature in each PCV was 40 degrees centigrade at Unit 1, 68 degrees centigrade at Unit 2 and 58 degrees centigrade at Unit 3 (as of Dec.15), having stabilized below 100 degrees centigrade in the same way of RPV bottom temperatures.
- In addition, other temperature measuring points are showing a similar tendency. Hence, if damaged fuels have leaked into the PCVs, generated steam would be suppressed via sufficient cooling efforts, thus the release of radioactive materials from the PCVs is being kept under control.

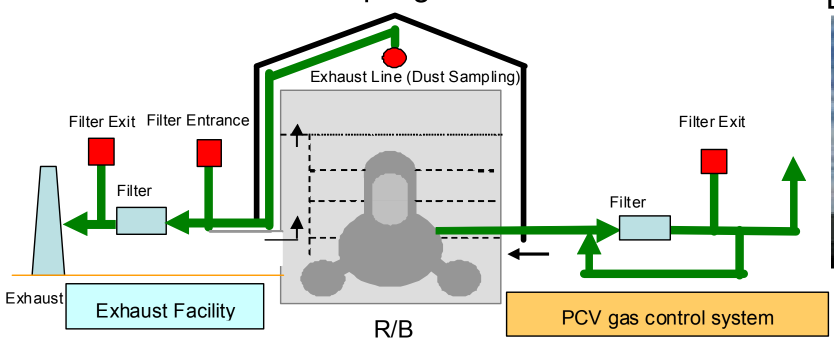
Temperatures inside PCV of Units 1 to 3



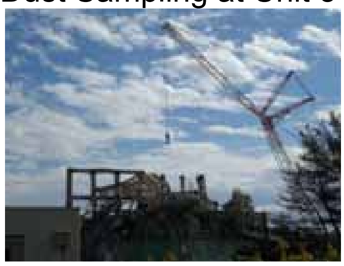
3) Public Radiation Exposure Dose due to Additional Release from the PCVs

- Evaluated the current release rate for Cesium from PCVs of Units 1 to 3 utilizing the airborne radioactivity concentration (dust concentration) at the upper parts of the reactor buildings etc.
  - The current release rate for each Unit is estimated as follows: Unit 1: approx. 0.01 billion Bq/h, Unit 2: approx. 0.01 billion Bq/h and Unit 3: approx. 0.04 billion Bq/h, based on the dust concentration at the upper parts of the reactor buildings etc.
  - The current total release rate from Units 1-3 based on the assessment this time is estimated to be approx. 0.06 billion Bq/h at the maximum, which is 1/13,000,000 of the release rate at the time of the accident.
- For reference, the current release rate for Cesium from the PCV of Units 1-3 utilizing the airborne radioactivity concentration (dust concentration) at sea was evaluated. The result was approx. 0.02 billion Bq/h (The previous month: 0.02 billion Bq/h.)

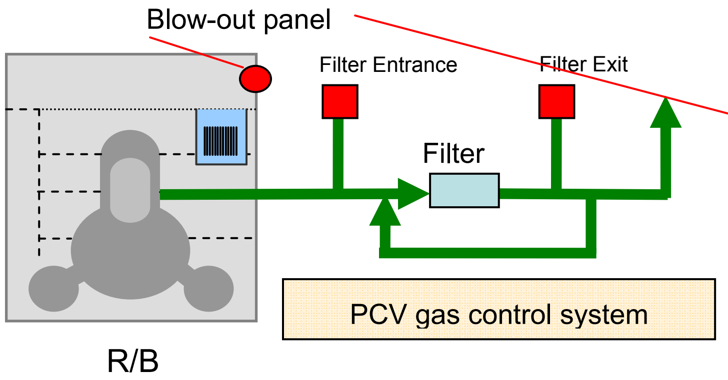
Overview of Sampling at Unit 1

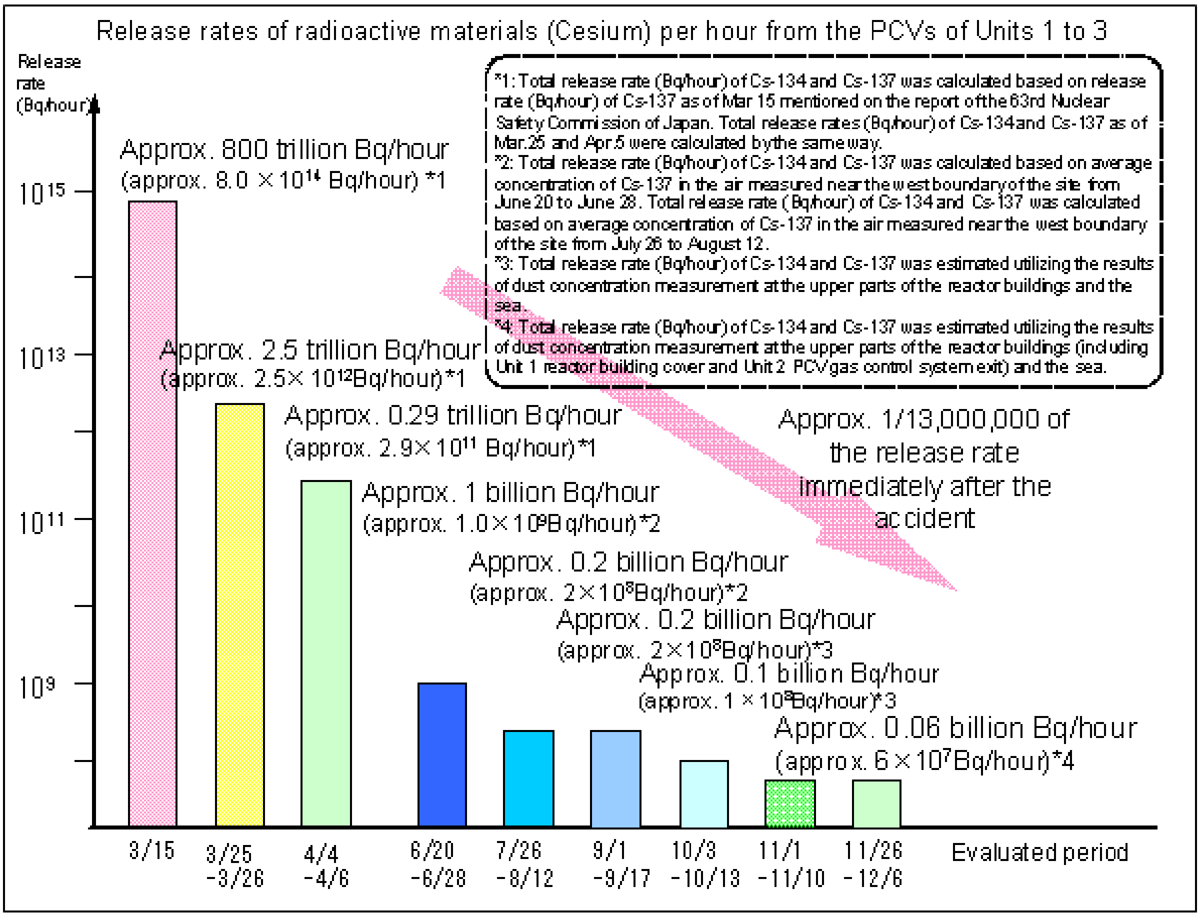


Dust Sampling at Unit 3



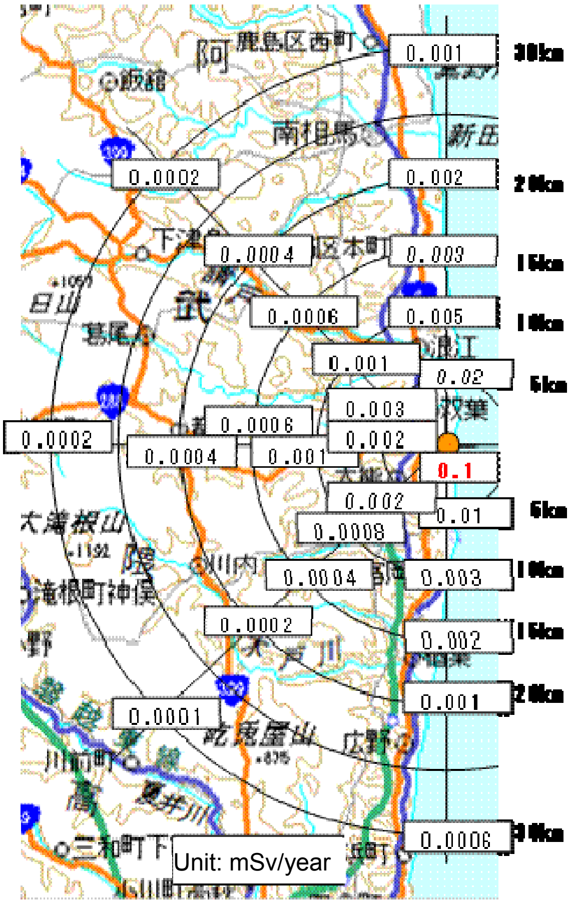
Overview of Sampling at Unit 2





- The radiation exposure per year at the site boundaries has been assessed at approx. 0.1 mSv/year at the maximum based on the aforementioned release rate (The target is 1 mSv/year, excluding the effect of already released radioactive materials.)

Exposure doses in cases where the current release rate from the PCVs of Units 1 to 3 continues for one year (mSv/year) (Excluding the effect of already released radioactive materials)



(Overview of the estimated figures)

Site Boundary: Less than or equal to approx. 0.1 mSv/year

5km radius: Less than or equal to approx. 0.02 mSv/year

10km radius: Less than or equal to approx. 0.005 mSv/year

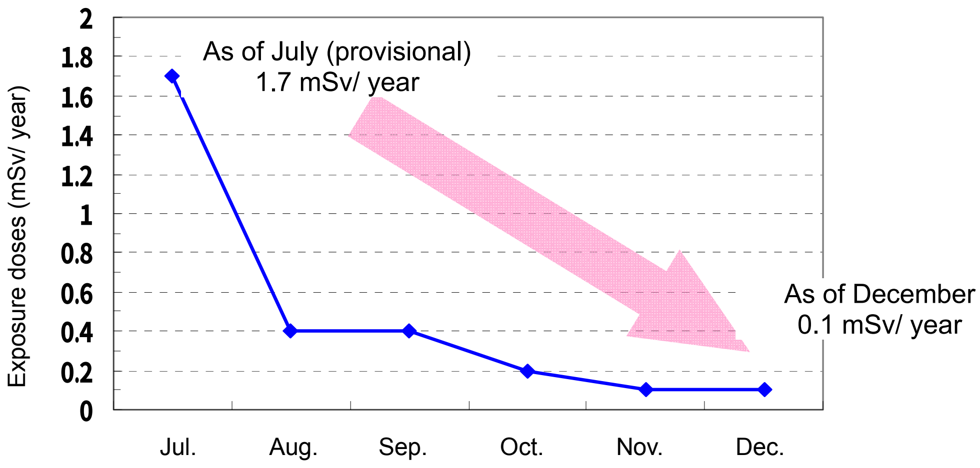
20km radius: Less than or equal to approx. 0.002 mSv/year

As a reference, the dose limit from the reactor facilities outside of the nuclear power stations is 1 mSv/year.

[Map Source: "Digital Japan" URL http://cyberjapan.jp/]

Exposure doses in case the release rate from the PCVs of Units 1 to 3 at the time of the evaluation continues for one year (mSv/year)

(Excluding the effect of the already released radioactive materials)



- The release rate of noble gas is estimated to be approx. 9.2 billion Bq/h (Dec. 9) at Unit 1 and approx. 0.9 billion Bq/h (Dec. 12) at Unit 2, based on the data monitored by the PCV gas control system (that of Unit 3, whose PCV gas control system is under construction, is also estimated at the same rate as Unit 2.) The exposure dose based on the aforementioned release rate is assessed to be approx. 0.00011 mSv/year in total of Units 1 and 2. This rate is much lower than the exposure dose based on the release rate of Cesium, thus we utilize the Cesium release rate as the main release rate.

4) Securing the mid-term safety of the circulating water cooling system

- Reliability of facilities

<Reliability of parts and materials>

- Confirmed that the parts and materials have the necessary structural intensity via conformation of standards, pressure tests and leakage tests.

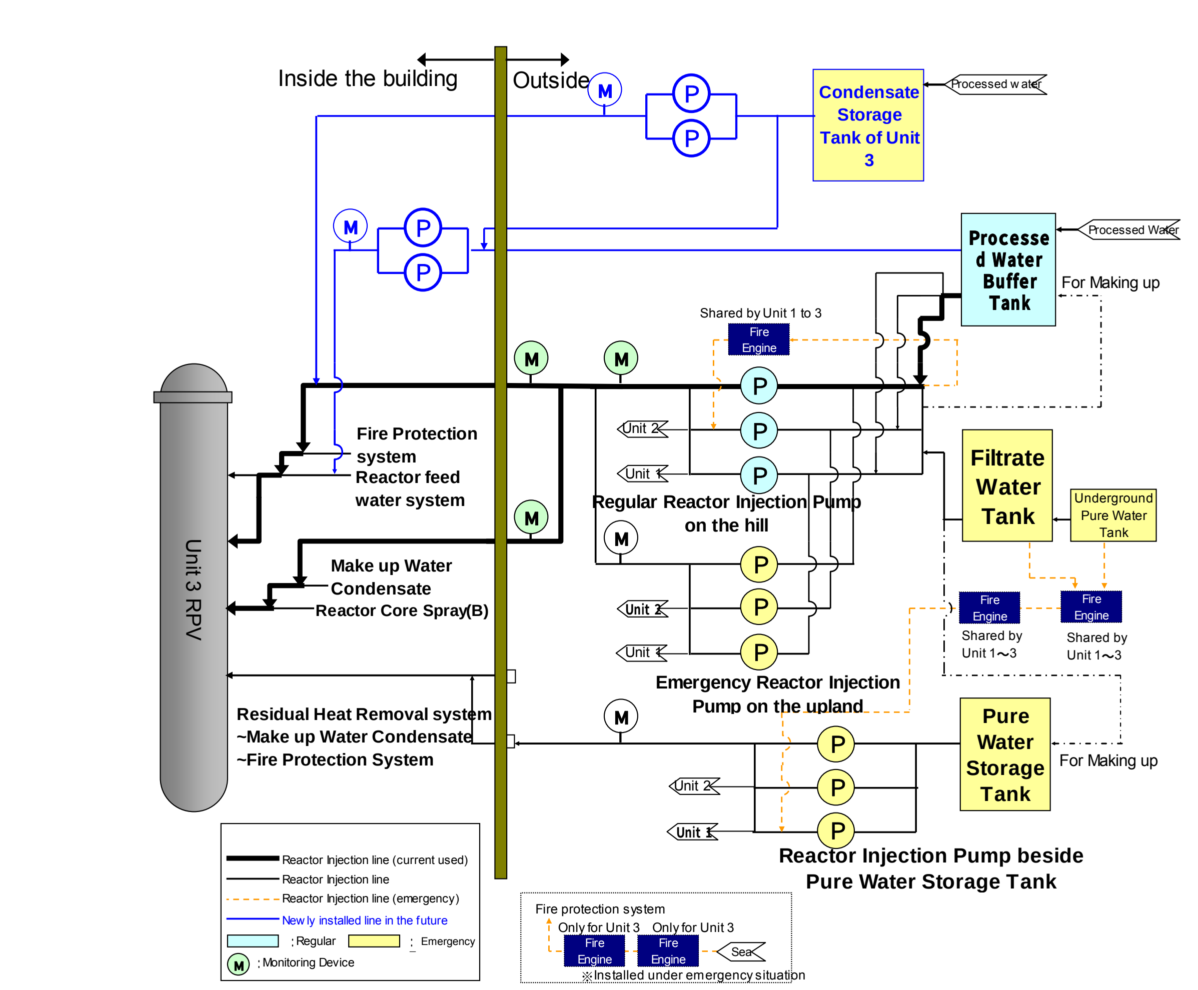
<Strength of structure and quake resistance>

- Analyzed strength of structure and quake resistance on facilities connected to RPV, and confirmed that those are secured.

<Power system & source redundancy, diversity and independency>

- Water injection pumps
  3 reactor injection pumps on the hill (35m above sea level) are used as a regular line and 3 emergency reactor injection pumps on the hill and 3 reactor injection pumps besides the pure water storage tank are on standby. 6 fire engines are also on standby.
- Tanks
  2 independent water sources consisting of both processed and filtrate water, are connected to multiple tanks (processed water buffer tank, filtrate water tank and pure water storage tank).
- Water injection line to reactor
  The reactor injection lines through the regular and emergency reactor injection pumps on the hill and the lines through the reactor injection pumps located besides the pure water storage tank are comprised of independent lines.
- Power source
  Electricity is able to be supplied from multiple bus bars and from the power supply car or the on-site emergency diesel generator. In addition, emergency reactor injection pumps on the hill and pumps located besides the pure water storage tank can receive power with or without an external power supply because they have their own diesel generators.

Example : Outline of Unit 3 Reactor Injection line



● Monitoring of cooling condition and detection of unusual conditions

- It is possible to monitor the flow rate and pressure of injected water using the display in the monitoring room at the Main Anti-Earthquake Building. The alarm will be triggered in the monitoring room when unusual conditions are detected.
- It is possible to monitor the temperature around the RPV in the monitoring room at all times.
- Furthermore, regular inspections to track down facility malfunctions will be conducted.

● Verify necessary actions and period for settlement

- Prepare measures such as the multiplication of power sources, water sources and reactor injection lines to be able to restart water injection within approximately an hour in the event of an accident.
- Even if all water injection facilities are not available, it is possible to resume water injection viA fire engine in approx. 3 hours.

- Assessment of conditions under an emergency situation
  - Per the Japan Nuclear Energy Safety Organization (JNES)'s conservative assessment, the exposure dose at the site boundary will be about 0.0048 - 0.29 mSv per unit even if water injection to the reactor is discontinued for 12 hours. It will remain below 1 mSv per year even if water injection is simultaneously disrupted at Units 1 to 3.

[Assessment Methodology and Conditions]

- The target nuclides for assessment of exposure doses were Cs134 and Cs137 and the assessment was conducted under the condition that Cesium on the upper side construction materials would evaporate after the temperature increases and be discharged into the environment.
- The discontinued time of water injection was estimated to be as follows: an hour for a transient phenomenon or a similar event, 7 hours for an accident or a similar event and 12 hours for a severe accident or a similar event (12 hours is conservative estimation compared to the required time (7 hours) to resume water injection viA fire engine at the accident in March and 3 hours to resume water injection in current condition.)
- Concerning the assessment of exposure doses, exposure from cesium deposited in the ground was considered in addition to the exposure from radioactive dust. Exposure dose for one year was assessed.

[Result of assessment]

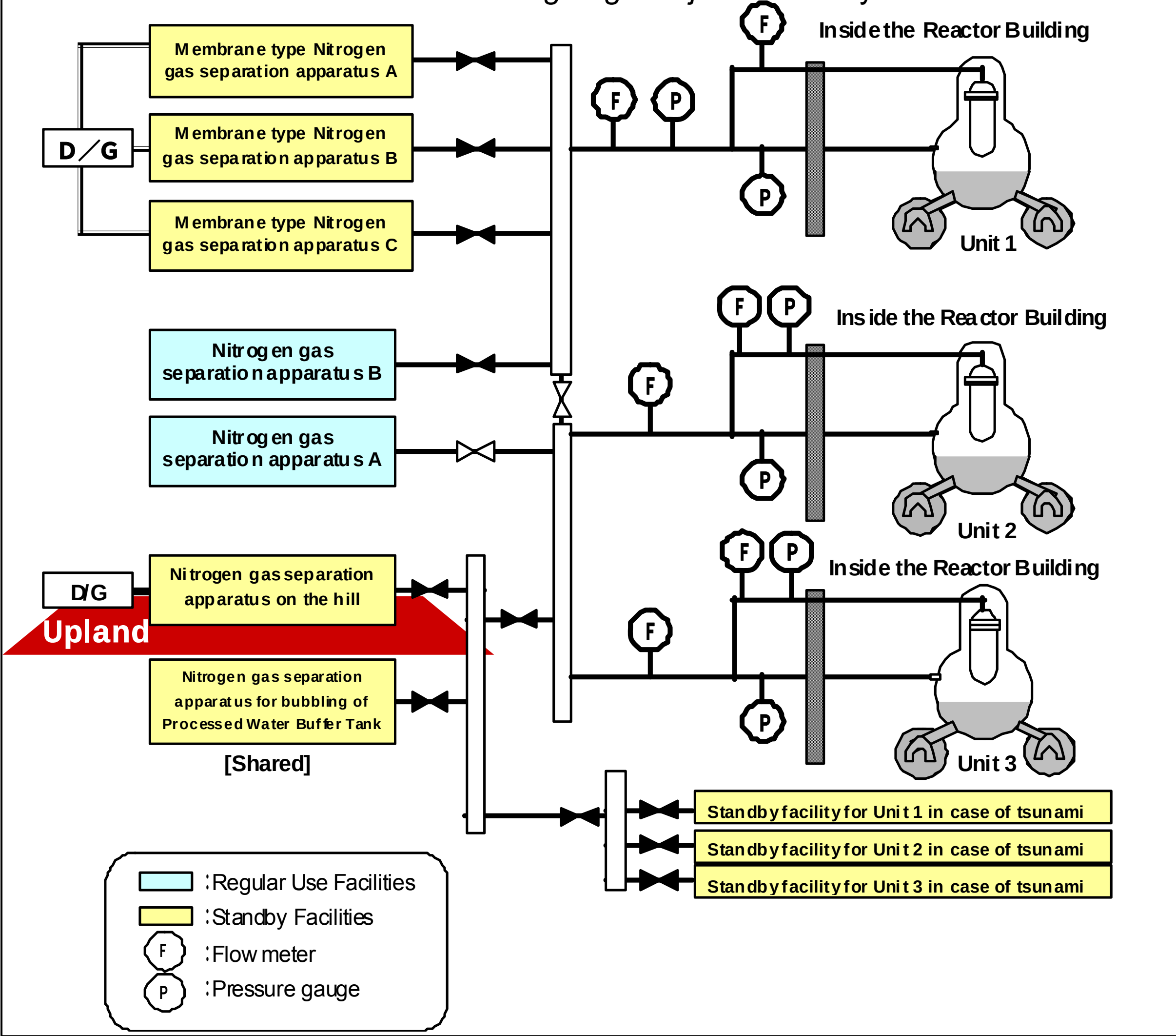
- Transient phenomenon or similar occurrences
  The exposure dose at the site boundary would be low enough and no additional release of significant radioactive materials was expected.
- Accidents or similar occurrences
  The exposure dose at the site boundary would be about 1.2×10^{-3} mSv with no significant risk of radioactive exposure to the neighboring community.
- Severe accidents or similar occurrences:
  Per the Japan Nuclear Energy Safety Organization (JNES)'s conservative assessment, the exposure dose at the site boundary will be below 1 mSv per year even if water injection is simultaneously discontinued at Units 1 to 3.

5) Measures to Avoid Unexpected Risks

[Assessment of measures to prevent hydrogen explosion risks and the assessment of emergency conditions]

- Nitrogen gas injection
  - Nitrogen gas was injected into the PCV in Unit 1 (Apr. 7), Unit 2 (Jun. 28) and Unit 3(Jul.14).
  - Facilities are redundant, diverse and have monitoring functions.
  - Just to be safe, nitrogen gas was also injected directly into the pressure vessel (Nov.30 at Units 1 and 3, Dec.1 at Unit 2).

Outline of Nitrogen gas Injection facility



- Redundancy and diversity of nitrogen gas injection facilities
  - In addition to 2 facilities for regular use (one of them stands by), 4 standby facilities (one of them was installed on the upland) were installed.
  - Nitrogen gas injection facilities have equipment that allows for electricity to be supplied from the power system or diesel generators.
  - 4 standby facilities have diesel generators.

- Monitoring function for nitrogen gas injection and hydrogen concentration.
  - Using a web camera, it is possible to monitor the pressure of injected nitrogen gas and the injected amount of nitrogen gas. In the event that unusual conditions are detected within these parameters or during an inspection, it will switch over to the standby facility. This includes valve manipulation or the switching over of the power supply.
  - This standby facility is built to be able to restart injection of nitrogen gas promptly in the event of a tsunami.
  - The hydrogen concentration in the Unit 2 PCV has also been monitored (0.5%, Unit 2, as of Dec. 6) and controlled at lower than the lower flammability limit concentration（*4%） by regulating the amount of injected nitrogen gas. Given that the hydrogen gas is generated by water radiolysis, the amount of injected nitrogen gas to Units 1 and 3 is also regulated.

* The Lower flammability limit is 4%.However, even if the amount of hydrogen gas exceeds 4%, the amount of oxygen must exceed 5 % of the whole volume in order to pose an explosion risk.

- Evaluation of conditions under unusual situations
  - Spare hoses will be installed immediately and nitrogen gas injection will be restarted.
  - There will be about 30 hours to achieve the lower flammability limit of hydrogen concentration in the event that the nitrogen supply is stopped. It will be possible to restart the nitrogen supply within this period.

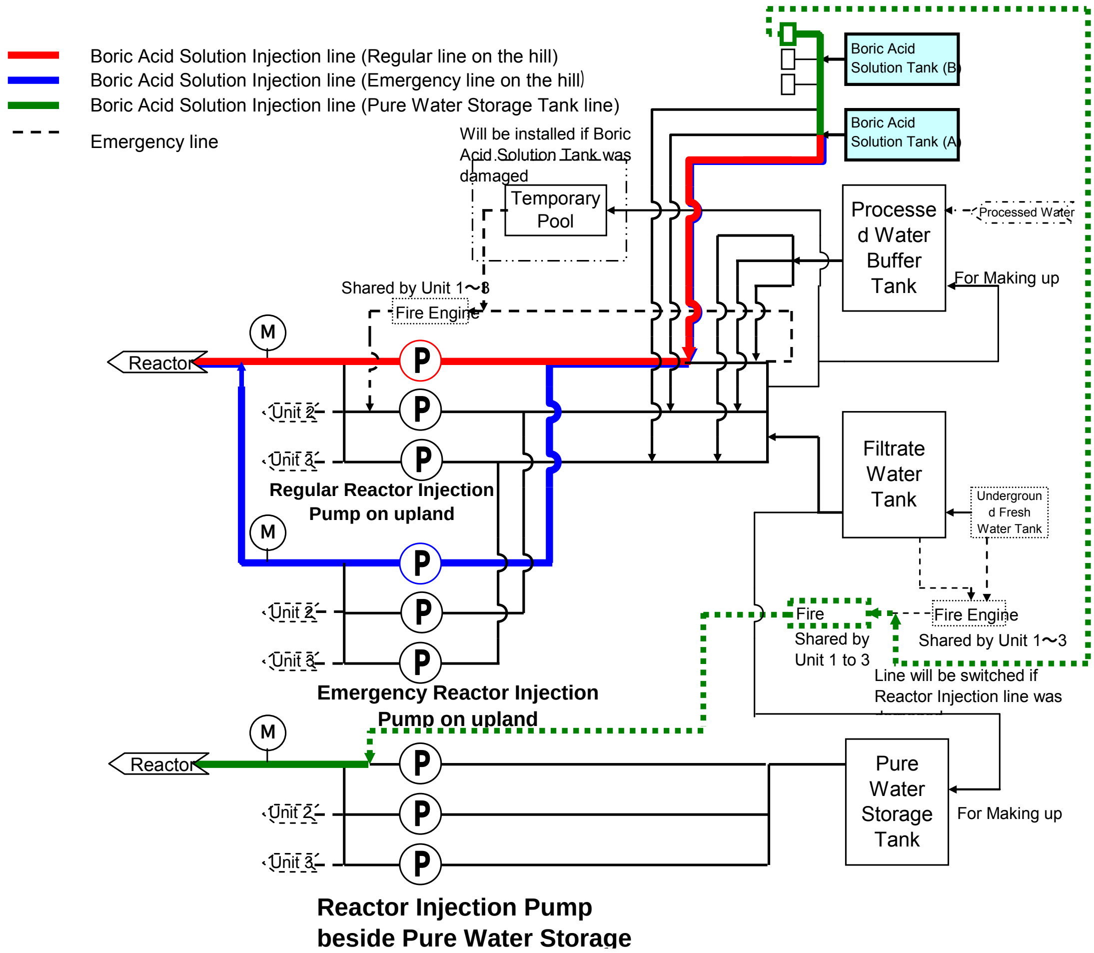
[Evaluation of measures to prevent criticality and emergency conditions]

- Boric acid solution injection
  - Given that the fuels have been damaged and their conditions have not been accurately confirmed, a Boric acid solution injection facility for the RPV and PCV (Boric acid solution injection facility) was installed as a precautionary measure.
  - Boric acid will be injected through the water injection lines to the reactor. The water injection lines have multiplicity, diversity and can function independently.
  - 2 boric acid storage tanks were installed on the upland where the impact of tsunami will be minor.
  - In addition, the installation of a temporary pool is in the works to prevent the simultaneous damage of the tanks.

- Monitoring for recriticality
  - Conditions are being monitored via the monitoring post or portable monitoring post and by the RPV temperature.
  - In addition, noble gas concentration has been continuously measured at the Unit 1 PCV, and has been measured once a week via the sampling of gas in the Unit 2 PCV following the installation of the Unit 2 PCV gas control system. In the future, there are plans to install a radioactivity detector to the PCV gas control system and the facility will continuously monitor the presence of Xenon.

- Assessment of conditions under unusual situations
  - An assessment was conducted on the assumption that a recriticality would occur and that it would be impossible to inject Boric acid solution within 22 hours. Assessments show that the impact will be approx. 0.54 mSv at the site boundaries.
  - Xenon (noble gas) was detected at the PCV gas control system of Unit 2 (refer to Section II (5) for facility details). It was determined that it was generated due to not a critical reaction, but a spontaneous fission. As well as Unit 2, Xenon (noble gas) was detected at the PCV gas control system of Unit 1.
  - TEPCO considers that it is currently at a subcriticality state because the Iodine concentration in the accumulated radioactive water is continuously decreasing. TEPCO has concluded that the possibility of a recriticality occurring is quite low.

Overview of Boric acid solution injection facility



(2) Spent Fuel Pool

1. Achievement of the Step 2 Target: “More stable cooling”

- The status of “More stable cooling” was confirmed by installing heat exchangers and maintaining the pool water level.

Inside the Unit 4’s Spent Fuel Pool

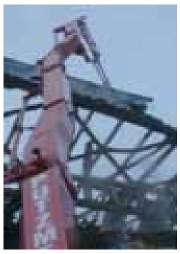
2. Current status and work implemented to achieve “More stable cooling”

1) Circulation Cooling

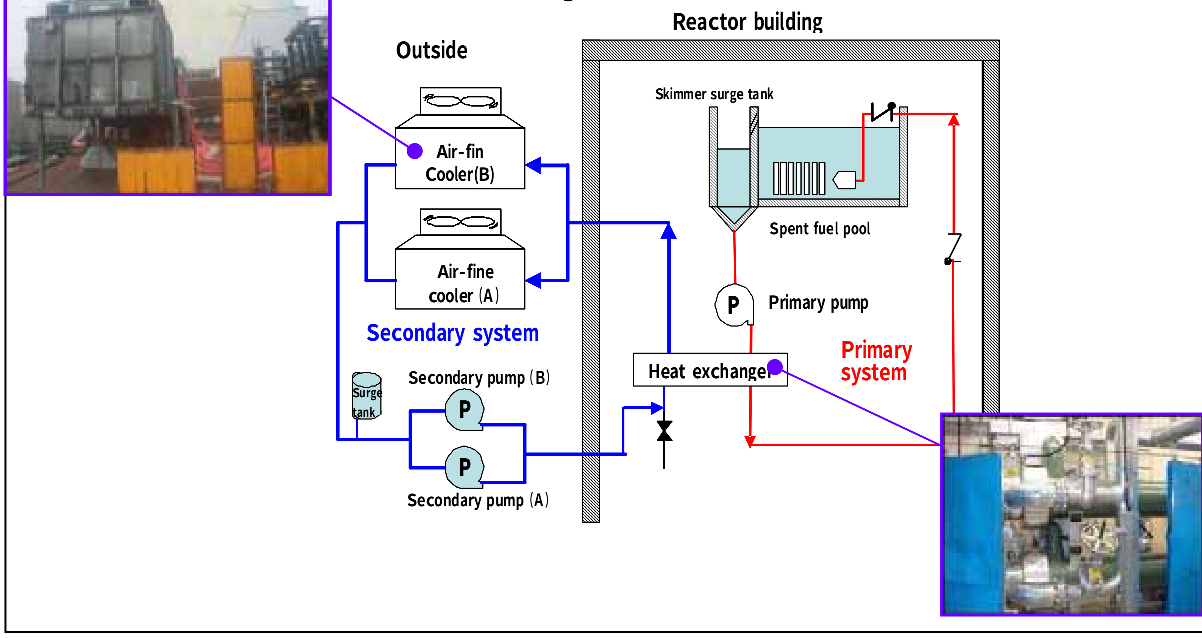
- At the beginning of Step1, cooling was implemented by means of water injection from the outside, e.g. utilizing “Giraffes (concrete pump vehicles)” or through recovered normal lines. The “Remote control operations of the “Giraffe” and equipment” (planned as the countermeasure of Step 2 at first) was realized ahead of schedule. Currently, this equipment is on standby inside the power plant.
- At Units 2 and 3, circulation cooling using heat exchangers was started during Step 1 (May 31 at Unit 2, Jun. 30 at Unit 3) which is the target set for Step 2. Later, the Circulating Cooling System was completed at Units 1 and 4 (Unit 1 Aug 10, Unit 4, Jul 31). This represented the achievement of the Step 2 target for all units.

From water injection to circulation cooling

Water injection using the Giraffe (Unit 4))

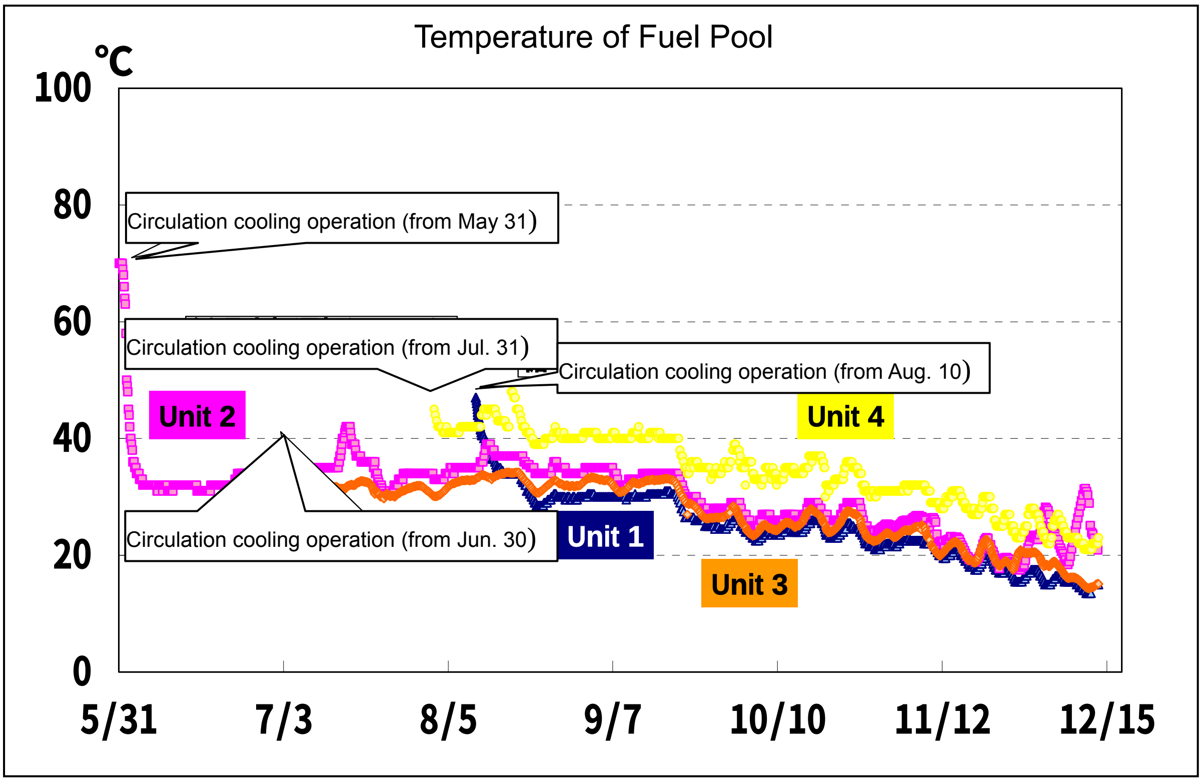


Heat exchanger installation (Unit 1)



2) Current status of Spent Fuel Pool

- Most fuels were confirmed to have not been damaged via the analysis of the radioactive materials concentration in the pool's water.
- The temperature of the pool was 15 degrees centigrade at Unit 1, 18 degrees centigrade at Unit 2, 15 degrees centigrade at Unit 3 and 22 degrees centigrade at Unit 4 (as of Dec. 15), having decreased enough to maintain stable cooling. Thus, the release of radioactive materials from the pool is being sufficiently suppressed.

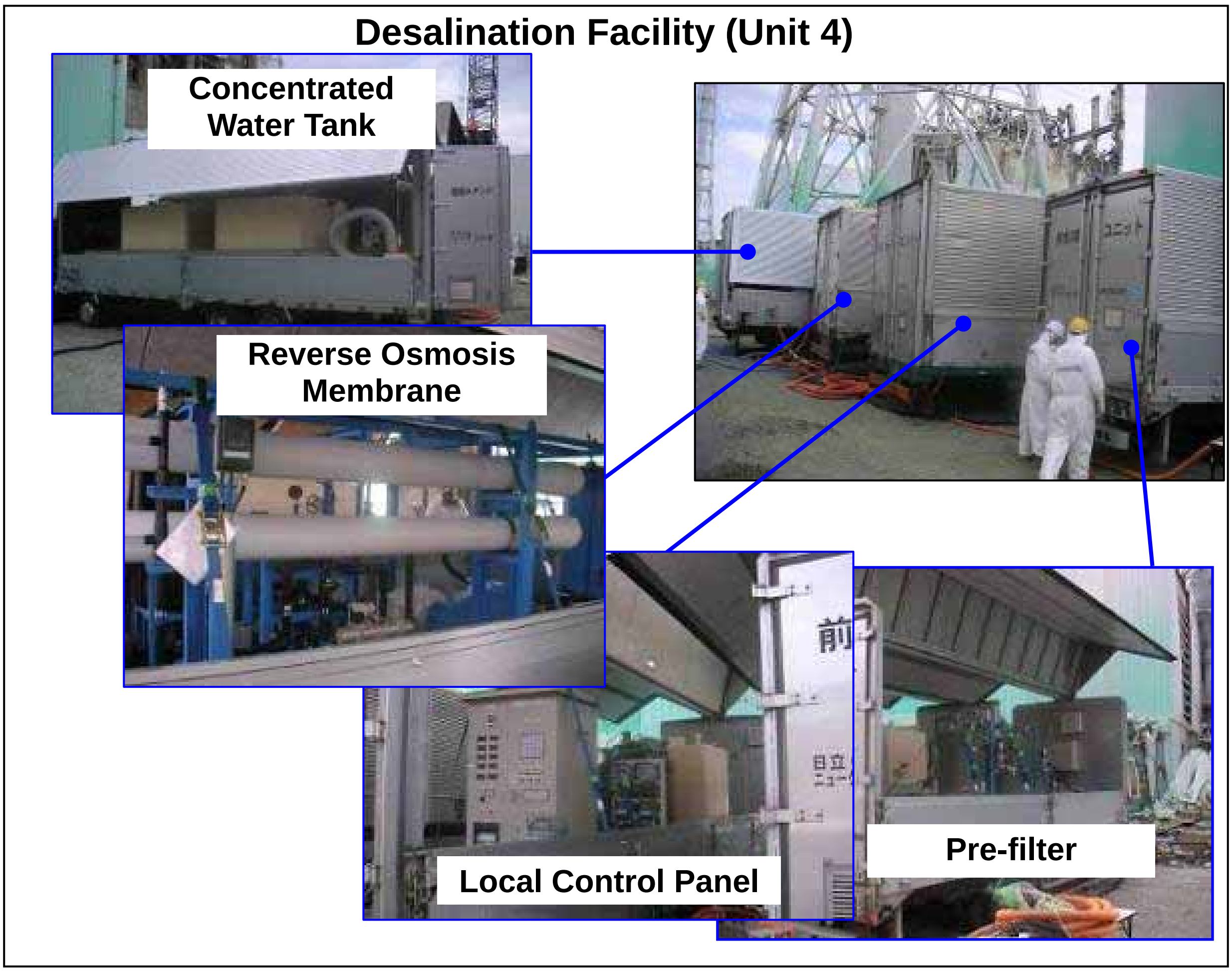


3) Evaluation of Emergencies

- Cases when a fuel pool can not be cooled due to the failure of primary/ secondary pumps and others were evaluated.
  - Though the increase of the water temperature and the decrease of the water level is anticipated, evaluations show that it would take at least 16 days (Unit 4) to reach the point where the water level of the fuel pool can be maintained at a certain level (2m water level from the top of the fuel: the water level at which water shielding is supposed to be effective),.
  - It is estimated that it would take approximately 6 hours to restart cooling after the loss of cooling function in the event that a concrete pump vehicle is used for cooling when it is difficult to use emergency water injection facilities due to an earthquake/tsunami.
  - For these reasons, evaluations show that there would be enough time in the event of an emergency.

4) Desalination of the water in Spent Fuel Pool

- Originally a mid-term issue, the measure to prevent the spent fuel pool from corroding due to its salt content has been implemented ahead of schedule.
  - The desalination facility began operating in Unit 4 (Aug. 20.)
  - The salt concentration of water (chloride ion concentration) in the spent fuel pool in Unit 4 before the operation of the desalination facility was 1,944 ppm (Aug. 20), while its concentration after the operation was 150 ppm (Nov. 5.)
- Desalination at Units 2 and 3, where sea water injections were carried out, will be done in turn.

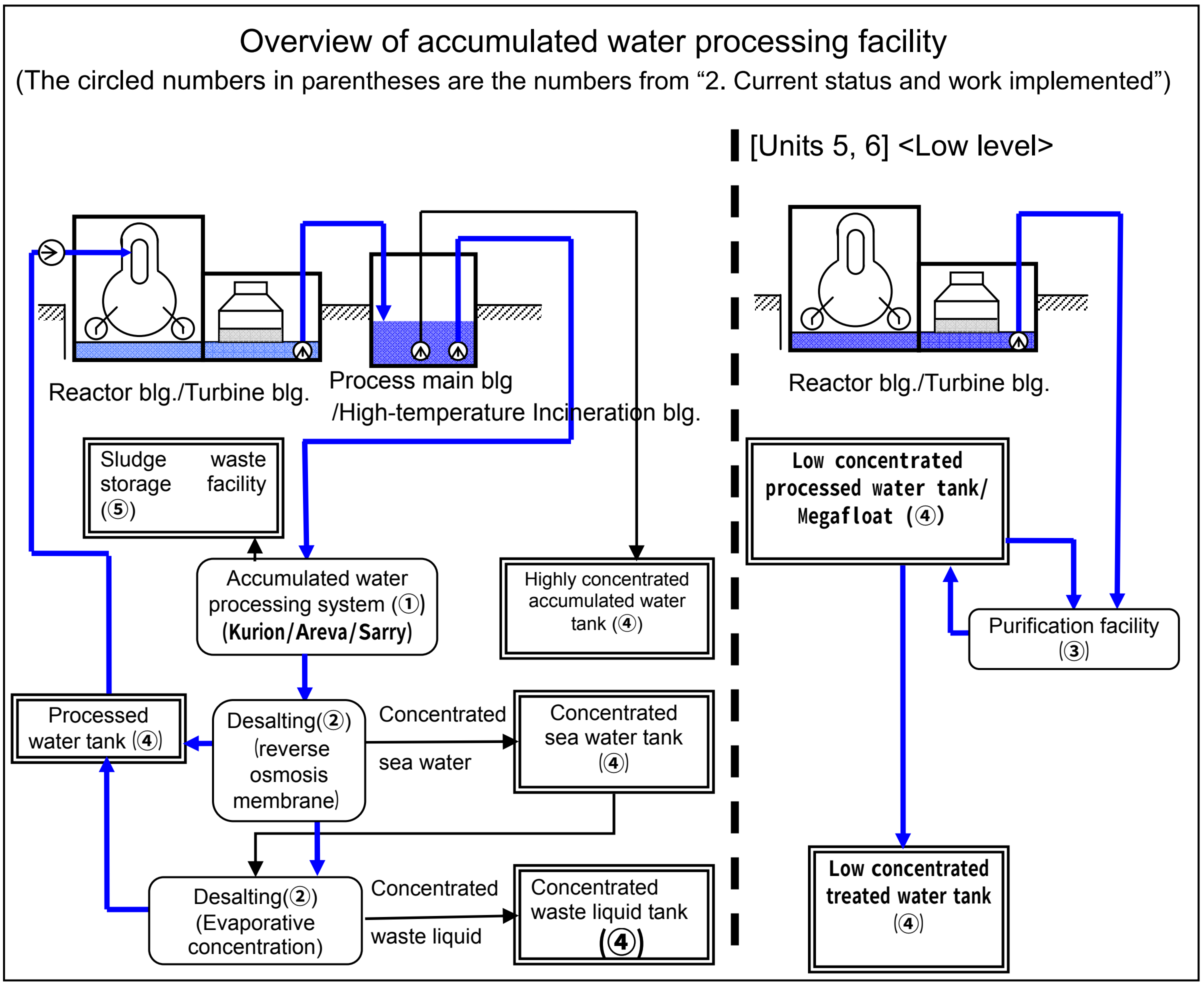


II. Mitigation

(3) Accumulated radioactive water

1. Achievement of Step 2 Target: “Reduction of total amount of accumulated radioactive water”

- The following measures were implemented and it has been confirmed that the total amount of accumulated radioactive water has been reduced by processing the accumulated radioactive water in the buildings via the processing facility’s stable operations.
  - Increased the amount of water to be reused via the expansion of the high-level contaminated water processing facility, steady operations and the desalination of decontaminated water.
  - Began considering the utilization of full-scale water processing facilities for high-level contaminated water.
  - Store/manage sludge waste generated from high-level contaminated water processing facility.
  - Implemented steel pipe sheet pile installation work at the port to prevent ocean contamination.



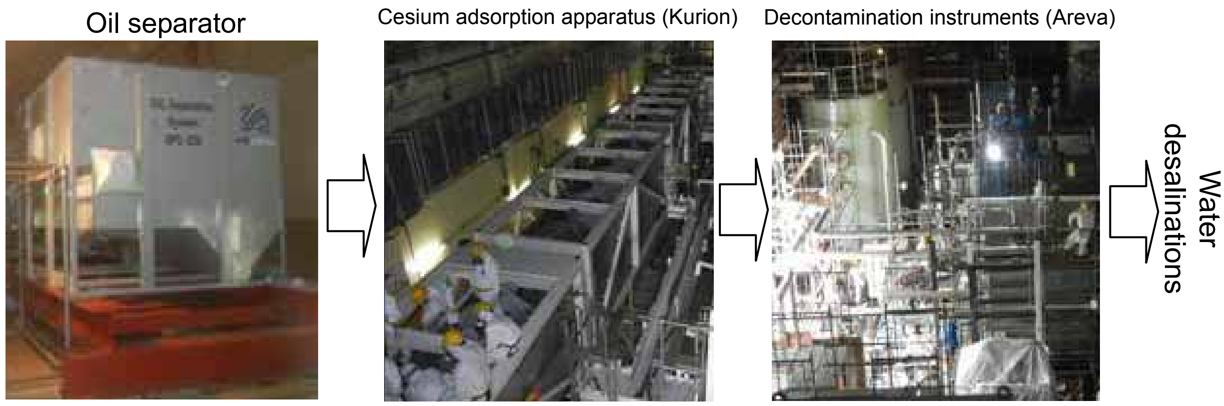
2. Current status and work implemented for "Reduction of total amount of accumulated radioactive water"

1) Installation of accumulated radioactive water processing facility

- NISA confirmed the contamination reducing effects and the safety measures of the installation (Jun. 9).
  - The following facilities were installed and began operations (Jun. 17). NISA has confirmed their safety.
  - Decontamination factor* of the processing facility for cesium is 10^6 for Kurion-Areva's apparatus (as of Aug.9) and 6 x 10^3 in Kurion (as of Nov. 29.)

  * Decontamination factor = cesium concentration of a sample before processing / cesium concentration of a sample after processing

Accumulated water processing facility (Kurion - Areva)



- In order to achieve stable processing, the cesium adsorption apparatus (SARRY) were installed and the augmentation of the adsorption apparatus was completed (Aug.18). NISA confirmed its safety.
- Decontamination factor* of the cesium adsorption apparatus is 5 x 10^5 (as of Nov. 29).

Augmentation of accumulated water processing facility (SARRY)

2) Installation of the desalination processing facility

- The following desalination processing facility (reverse osmosis membrane method) was installed to process water decontaminated by the accumulated radioactive water processing facility (Kurion-Areva) (Jun. 17).
- Additionally, the evaporative concentration apparatus was installed (three lines, Aug.7, Aug. 31, Oct. 9) and augmented the desalination facility.
- Ascertained that chlorine concentration had decreased from 1,700 ppm to approx. 3ppm utilizing the reverse osmosis equipment (per the Nov.1 results) and that there was a decrease from 9,000 ppm to below approx. 1 ppm utilizing the evaporative concentration apparatus (per the Nov. 29 results.)

Desalination Processing Facility

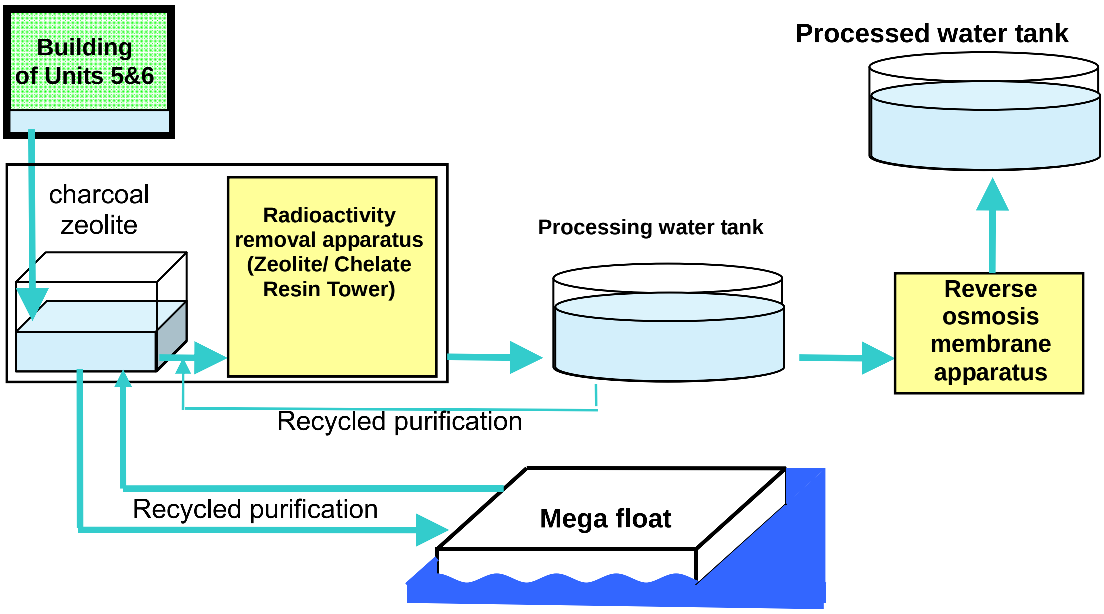
Reverse Osmosis Membrane Method

Installation of evaporative concentration apparatus

3) Purification of Low-level Contaminated Accumulated radioactive water

- Purified the low-level contaminated accumulated radioactive water using zeolite.

Facilities for purification of low level contaminated accumulated water



4) Securing storage

[Units 1 - 4]

- Installed tanks for high-level contaminated accumulated radioactive water underground (2,800 tons) in order to secure the storage facility urgently (Sep.17.)
- Tanks for receiving processed water are being installed and augmented in a timely manner (145,200 tons, as of Dec.12).

Storage of highly contaminated accumulated water and processed water

Tanks for receiving processed water

Tanks for receiving highly contaminated accumulated water (Installation work)

Concentrated sea water tank

Concentrated waste liquid tank

[Units 5 and 6]

- In order to store low-level contaminated accumulated radioactive water, tanks (May 31) and a Mega float (May 21) with a capacity of 12,200 tons (tanks) and 10,000 tons (Mega float) were prepared.

Storage of low-level contaminated accumulated water

Square tanks

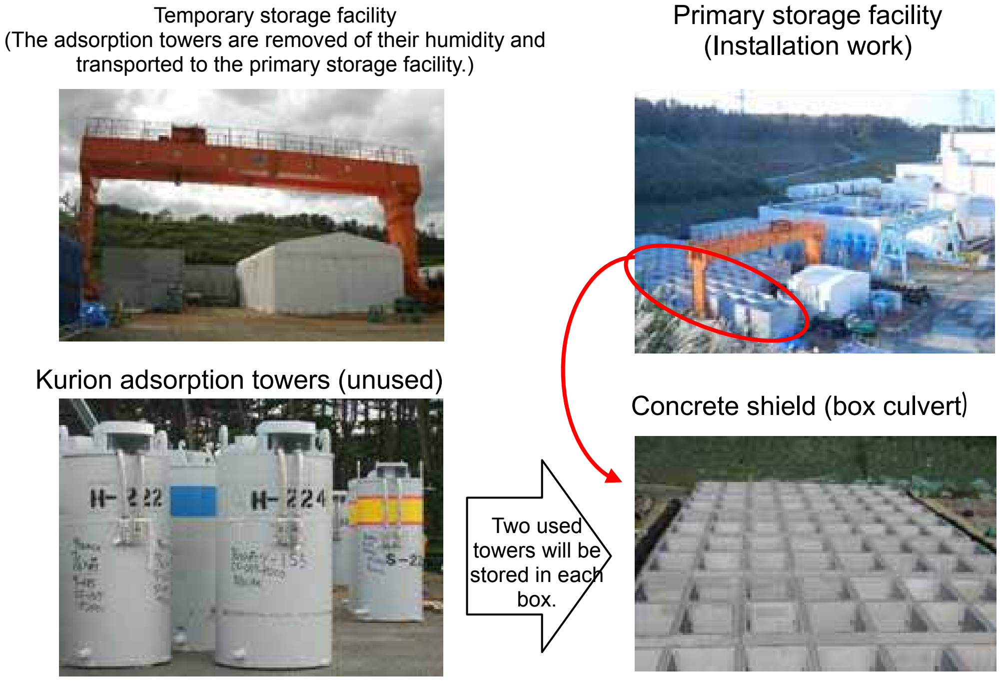
Round tanks

Mega float

5) Storage and management of sludge waste etc.

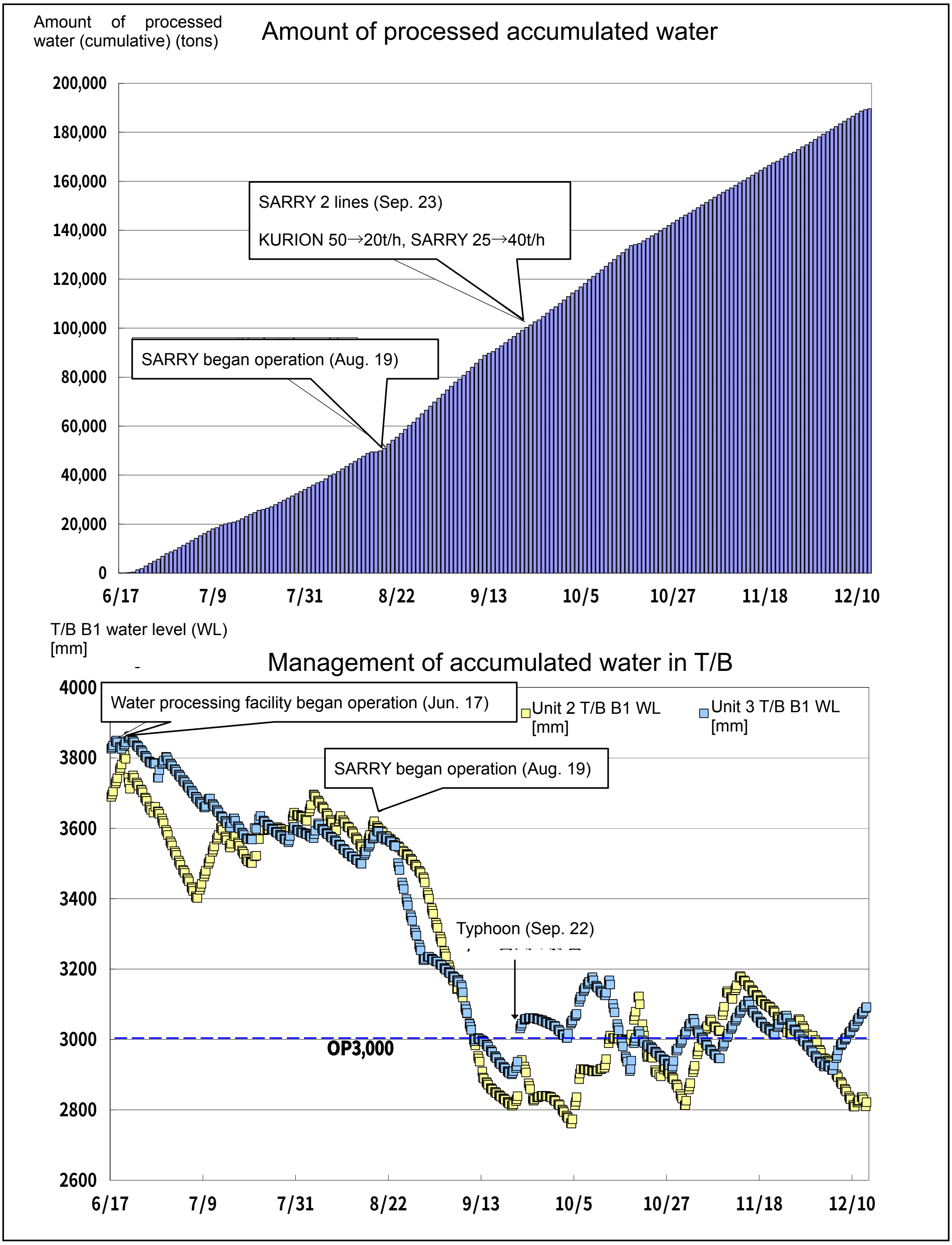
- Sludge waste with high radioactive concentration generated by processing the high-level contaminated water and high radioactive used-adsorption tower are being properly secured and managed respectively in the Centralized Waste Processing Building and adsorption tower storage facility.
- Implementing installation work for the sludge waste storage facility in order to expand the storage capacity.
- Implementing installation work for the used-adsorption tower storage facility in order to expand storage capacity.

Storage of used adsorption towers



6) Current status of the accumulated radioactive water processing

- Approx. 189,610 tons of accumulated radioactive water has been processed in total (as of Dec. 13), out of which recycled water (The amount of water reused for injection into the reactors) comprises approx. 80,534 tons (as of Dec. 13).
- The accumulated radioactive water level is being kept at the present target level (O.P 3,000). In other words, the total amount of accumulated radioactive water is at a level where it is able to withstand heavy rains as well as long-term processing facility outages. The accumulated radioactive water in the Unit 1 turbine building has been transferred into Unit 2, resulting in a decreased water level.


Amount of processed water (cumulative) (tons)
Amount of processed accumulated water
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
SARRY 2 lines (Sep. 23)
KURION 50→20t/h, SARRY 25→40t/h
SARRY began operation (Aug. 19)
6/17
7/9
7/31
8/22
9/13
10/5
10/27
11/18
12/10
T/B B1 water level (WL) [mm]
Management of accumulated water in T/B
4000
3800
3600
3400
3200
3000
2800
2600
Water processing facility began operation (Jun. 17)
Unit 2 T/B B1 WL [mm]
Unit 3 T/B B1 WL [mm]
SARRY began operation (Aug. 19)
Typhoon (Sep. 22)
OP3,000
6/17
7/9
7/31
8/22
9/13
10/5
10/27
11/18
12/10

7) Preventing Ocean Contamination

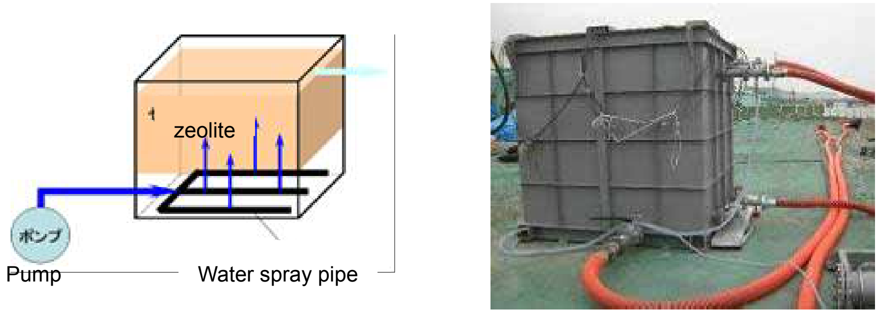
- Evaluation and countermeasure of discharged highly contaminated water and low contaminated water to the ocean.
  - NISA conducted an impact assessment on the outflow of highly contaminated water from Units 2 and 3 (Unit 2; April 2, Unit 3; May 11), and the discharge of low contaminated water conducted in March (May 24.)
  - NISA ordered the submission of the Plan of Prevention of outflow, enhancement of monitoring and the storing and treatment of contaminated water. Accordingly, TEPCO submitted the reports (Jun. 1, Jun. 2).
- Implemented the prevention measures of contaminated water inflow to the port by filling the pits nearby the port (Apr. 6 to Jun. 10) and placing the sliding concrete wall into the intake. (Jun. 29).

Filling Pits (Left: before working, Right: after work of filling concrete)

Installing sliding concrete wall at the intake channel

- Utilizing zeolite (material which adsorbs cesium) to purify the contaminated seawater in the port (Jun. 13).

Purification treatment by adsorbing Cesium using Zeolite (Left: Image, Right: Photo)



- In order to prevent the diffusion of contaminated water which flowed into the port, we set up a silt fence (Apr. 14).

Silt fence

- Completed the construction of the steel pipe sheet pile in order to block the damaged parts of the permeation prevention structure due to the tsunami at the south side of the intake canal of Units 1 to 4 (Sep. 28).

Status of steel pipe sheet pile

8) Evaluation and Actions during Emergency Situations

- Implement the measures below to monitor present leaks and prevent unexpected leaking.
  - Conduct monitoring utilizing the water gauge installed at the destination point during the transfer of accumulated radioactive water and radiation dose rate

measurement of transfer line of highly contaminated accumulated radioactive water. In case leakage occurs, the transfer of water will be stopped.

- Monitor treatment facilities with a leak detector and camera. In case leakage occurs, stop the leakage by sealing the leakage area.
- Detect leakage from storage tanks for highly contaminated accumulated radioactive water utilizing an alarm that detects water level decreases at each tank. In the event of unexpected leakage, the water in the tank will be transferred to the storage building temporarily and the tank will be isolated.

● NISA requesting TEPCO to report the range and amount of the leakage as well as the cause of and measures against the leakage of processed water from the evaporative concentration apparatus (Dec. 4, 11, 12).

- To investigate the cause of the occurrence of the leakage, to take recurrence prevention measures, and to assess the impact of radioactive materials on the environment (Dec.5)
- NISA requests TEPCO to take the following actions as the medium- to long-term actions from the viewpoint of further improving the leakage prevention measures (Dec.12)
- To conduct assessment of the impact of the radioactive materials flowed into the sea on the environment after increasing the measurement frequency of strontium concentration at marine monitoring (Dec.12)
- NISA requested TEPCO to submit a report promptly on the conditions for storage and treatment of the contaminated water (Dec.13)

● Took the actions described below in response to the leakage of processed water from the evaporative concentration apparatus (Dec. 4). Until the implementation of the preventive measures, instead using the evaporative concentration *apparatus (3A, 3B, 3C), strict patrolling measures etc. were implemented.

*8 Evaporative concentration apparatus in total of 3 lines (1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C)

- Specify the leaking point of the evaporative concentration apparatus

  We confirmed the existence of a leak on the piping near the outlet of the heat exchanger of the evaporative concentration apparatus (3A) in the field. Due to high levels of radiation in the field, we plan to confirm the leakage points after reducing exposure via decontamination measures.
- Specify the leakage points in the evaporative concentration apparatus and the dam

  We confirmed deformation and damage on both the concrete floor of the house and the seal material of the dam in the field.
- Investigation of Causes

  After specifying the points of leakage, TEPCO plan to conduct a detailed inspection and a root cause analysis (by mid Dec.)
- Preventive measures

After the inspection, we will consider implementing preventive measures and extending the countermeasures in other facilities. (by next January)

- Leakage preventive measures

TEPCO will install leak detectors inside the dam, which prevents contaminated water spreading and leaking outside, at the desalination facility. Also add function to alarm to the control room.

- In case of a long term shutdown of the accumulated radioactive water processing facility, it will be possible to store the accumulated radioactive water generated during this period in the turbine building and in the high contaminated accumulated radioactive water receiving tank, which have a one-month estimated storage capacity. It will be possible to fix and restart the facility during this period.

9) Action Plans hereafter

- TEPCO submitted the following report of operation and management plan for its facilities based on "SAFETY DIRECTIVE" Ensuring Mid-Term Safety"" (3) to NISA, which includes Radioactive liquid waste treatment facilities and its related facilities (Dec. 15).

  - TEPCO will implement necessary consideration of liquid waste management countermeasures as below and prepare them. Hence, TEPCO will not release radioactive contaminated liquid water to the ocean except in the cases of utmost necessity.
    - Drastic countermeasures against underground water inflow into the reactor building etc. in order not to increase contaminated water.
    - Measures to improve the treatment ability of accumulated radioactive water processing facilities and measures to keep stable operation of them, including alternative facilities in case of trouble.
    - Measures to install more facilities on the land etc. to manage radioactive accumulated radioactive water.

  - TEPCO does not and will not release radioactive contaminated water to the ocean without the understanding and agreement among the related ministries and agencies.

(4) Underground water

1. Achievement of the Step 2 Target: “Prevent contamination in the ocean”

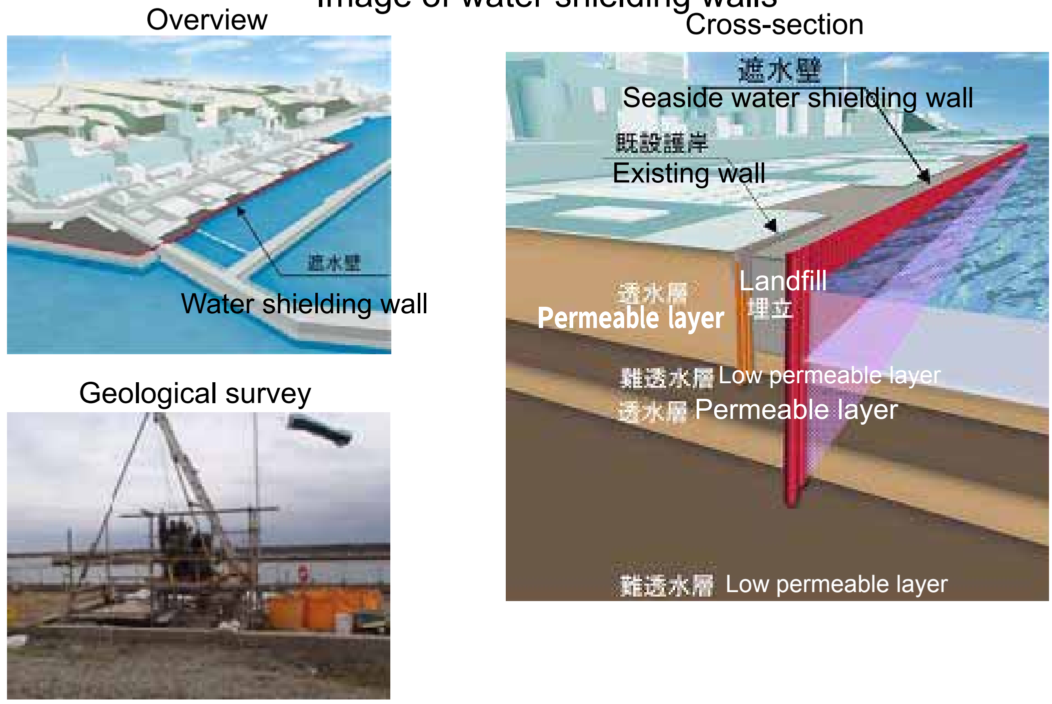
- Manage accumulated radioactive water that flows into the underground water and implement preventive measures to halt the spread of contamination into underground water and the ocean.
  - Prevent the leaking of accumulated radioactive water in the building by ensuring that the accumulated radioactive water level is lower than the sub drain water level (confirm viA radioactive materials concentration analysis of the sub drain water).
  - Start the placement of the impermeable wall in front of the existing seawall of Units1-4 (this will prevent the spread of contaminated underground water from flowing into the ocean)

2. Current status and work implemented to “Prevent contamination in the ocean”

1) Consideration and Construction of Impermeable wall

- To take all possible measures to ensure the prevention of contamination in the ocean via the underground water, we evaluated the impermeability and quake resistance measures, and then implemented a study of the optimal impermeable wall that would serve as a barrier against inflowing of contaminated underground water.
- After the study, we started the construction of the water-proof steel pipe sheet pile in front of the existing seawall of Units 1-4 (Oct 28.) And a geological investigation consisting of measurements and a boring survey etc. is underway.
- After a comprehensive consideration of the effects or impacts of the shielding wall installation on the land side, it has been concluded that installation only on the ocean side should be appropriate at the present time

Image of water shielding walls



2) Implementation of preventions against expansion of contamination in groundwater

- Prevent the leaking of accumulated radioactive water in the building by ensuring that the water level of the accumulated radioactive water in the building is lower than the sub drain water level.
- Based on a radioactive concentration analysis at the sub drain, confirmed that the leakage of accumulated radioactive water in the building was prevented.
- Completed installation of 7 pumps at the sub drain pit on the turbine building side (Jul. 29).

(5) Atmosphere /Soil

1. Achievement of the Step 2 Target: "Prevent scattering of radioactive materials"

- Implement the below countermeasures and inhibit the scattering of radioactive materials deposited at the power station.
  - Spray the dust inhibitor agent and remove debris.
  - Place the reactor building cover (Unit1)
  - Start removing debris on top of the reactor building (Units 3 and 4)
  - Consider the installation of a reactor building container

2. Current status and work implemented to "Prevent scattering of radioactive materials"

1) Implemented work: Dispersion of inhibitor agent

- In the power station(plane/slope):approx 400,000m^2 (targeted area) completed (Jun. 28)
- Around buildings: approx 160,000m^2 (targeted area) completed (Jun. 27)

Dispersion of inhibitor agent

2) Installation work of the cover at the reactor building of Unit1

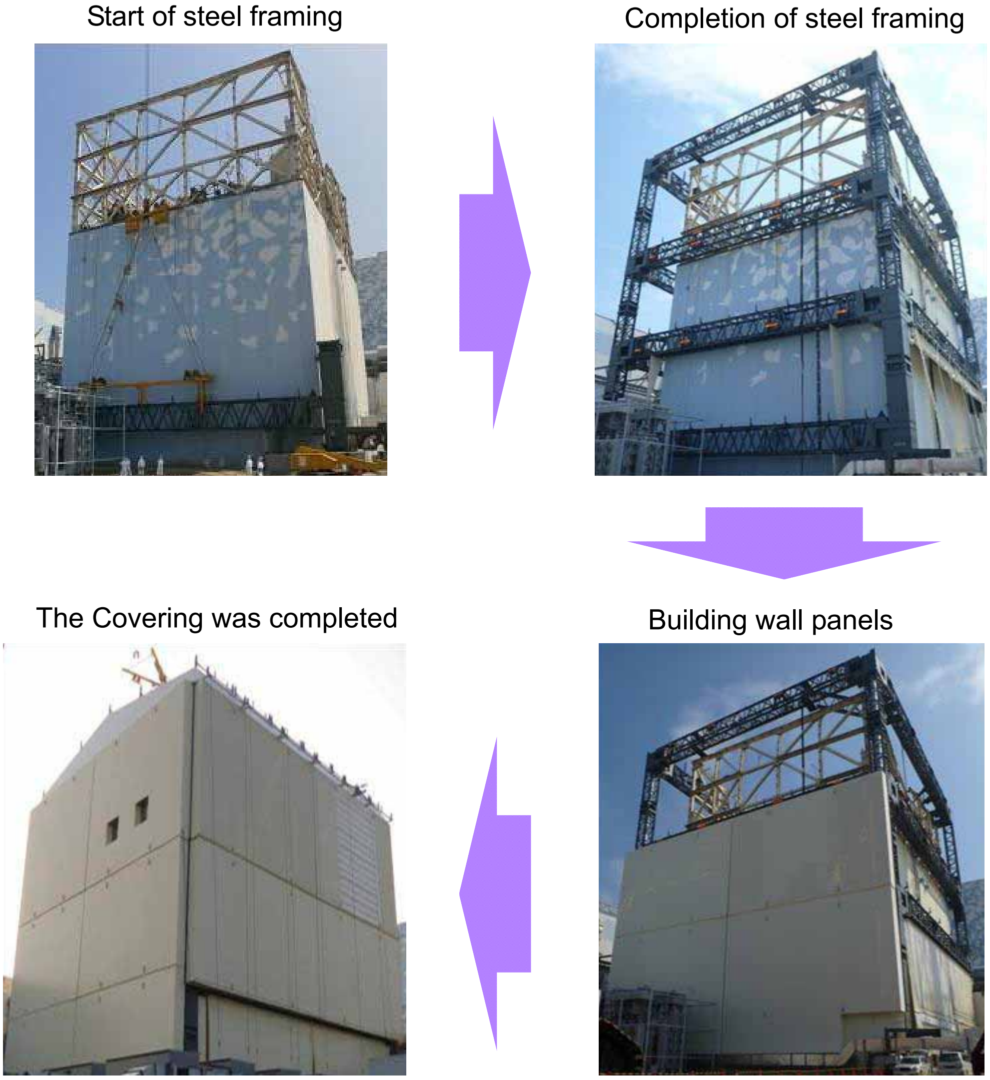
- NISA confirmed the safety (Jun. 24). Then, started construction work (Jun. 28)
- Implemented a tentative assembly at Onahama Port.

Reactor building cover

Tentative assembly at Onahama port (Aug.10)

- Steel framing (Aug. 10 – Sep. 9)
- Following the furnishing of cover panels and auxiliary equipments such as ventilation, the Unit 1 reactor building cover was completed (Oct. 28)

Installation of the Unit 1 Cover



3) Debris removal on top of the reactor building of Units 3 and 4

- Prior to installing covers over Units 3 and 4, debris removal at the R/B tops was implemented so as to prevent radioactive materials from scattering and improve working conditions.
- In preparation for debris removal, basic designing, ground debris removal, and demolition of obstacles were done.

Ground debris removal and demolition of obstacles

Removal of the debris fallen around Unit 3 R/B

Demolition of the obstacles around Unit 4

- Started debris removal on top of the reactor building of Unit 3 (Sep. 10)

Debris removal at Unit 3

On Sep. 10

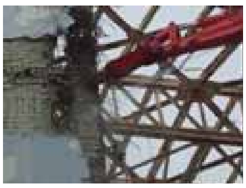
On Dec. 2

- Started debris removal on top of the reactor building of Unit 4 (Sep. 21). To prevent fuel damage due to falling debris etc, we covered the spent fuel pool with floats (Oct. 14).

Debris removal at Unit 4

Covering of SFP

Debris removal at the top



4) Debris removal and management

- Debris removal
  - Approx. 29, 000 m^3 debris have been removed and collected, out of which approx. 6,000m^3 are stored in approx. 900 containers (as of Dec. 16.)
  - The removed debris and waste resulting from cut down trees due to site clearing etc. were transported after we classified them according to their kinds and radiation dose.

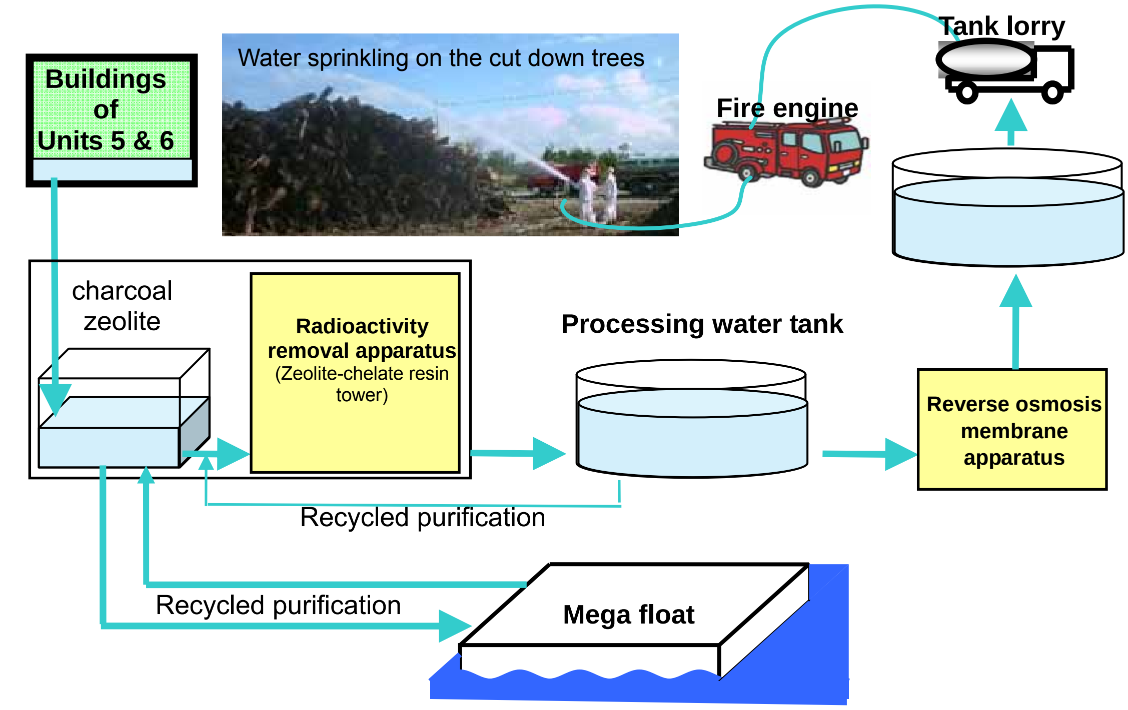
Before and after the debris removal (upper: before, lower: after)

- Debris management
  - Debris are stored in the containers and reserved in the buildings according to the amount of radiation dose.
  - The approach lane to the waste storage area is marked off and a No Entry sign was posted to prevent entrance of unauthorized personnel
  - Except for the radioactive accumulated radioactive water treatment facilities and the other areas under construction, the storage areas are secured, fully utilizing the land within the site.

Debris storage area (Left: Containers storing debris, Right: Storage tent)

- Water sprinkling for prevention of scattering
  - In order to avoid spontaneous combustion and dust scattering, we have sprinkled recycled water within the site. (this water has been purified to meet bathing standards).

Water sprinkling within the site and related facilities



Purified water analysis results and guideline values for bathing water

(Unit：Bq/cm^3)

Nuclide	Purified water analysis results (detection limit)	Radioactive materials guideline for bathing water (Ministry of the Environment)	＜Reference＞ WHO Standard (drinking water)
Iodine 131	ND (＜9.0×10^{-4})	3.0×10^{-2}	1.0×10^{-2}
Cesium 134	ND (＜1.3×10^{-3})	5.0×10^{-2} (Sum of Cesium 134 and 137)	1.0×10^{-2}
Cesium 137	ND (＜1.4×10^{-3})		1.0×10^{-2}
＜Reference＞			
Tritium	2.6×10^{0}		$1.0\times10^{+1}$
Strontium 89	ND (＜8.4×10^{-5})		1.0×10^{-1}
Strontium 90	ND (＜4.8×10^{-5})		1.0×10^{-2}

5) Installation of PCV Gas Control System

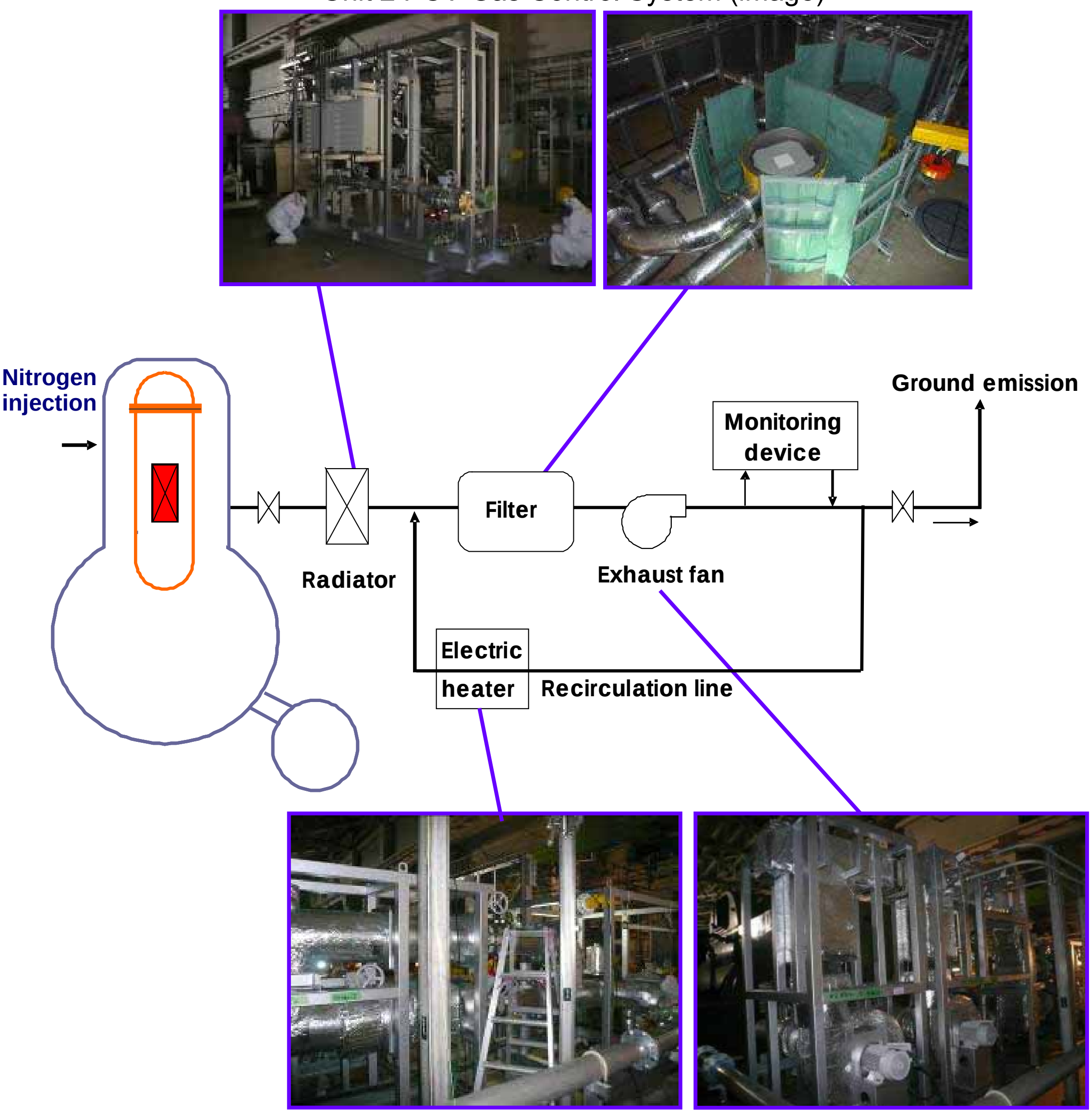
- PCV Gas Control System at Unit 2 started operation. (Oct. 28)
- Test operation at Unit 1 (as of Dec. 14) and installation work also started at Unit 3. (Sep. 30)
- Careful measures are taken such as nitrogen injection and adoption of static electricity resistant hose since highly concentrated hydrogen was detected in the piping arrangement on which are to be worked.

PCV Gas Control System Concept

- After bringing the reactor bottom temperature to below 100°C, we use this system to adjust the PCV pressure at the same level as the atmosphere by extracting the same amount of gas as the amount of nitrogen that will be filled inside the PCV in order to reduce the amount of radioactive materials released from the PCV.
- Meanwhile, the extracted gas is purified of radioactive materials utilizing the filters, monitored and then released.
- The amount of radioactive materials released from the PCV will be reduced due to a decline in the reactor temperature. However, a further decrease is to be expected utilizing this system.
- Removal efficiency by filter* is below approx. 1/14,000 (at Unit 2, as of Dec. 6).

*Removal efficiency by filter=cesium concentration at the filter exit / cesium concentration at the filter entrance

Unit 2 PCV Gas Control System (image)



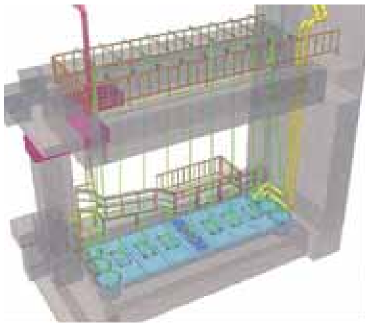
6) Sealing the openings at the Reactor Building

- As we lower the water level of accumulated radioactive water at the basement of the turbine buildings of Units 1 to 4 etc., the dust concentration inside the building will increase due to the radioactive materials that have accumulated in this area. Hence, we have shut off the general airflow to reduce the dust concentration inside the building.
- To be more precise, we have sealed the openings leading to the basement. A balloon was used to close the larger openings.

Closure of the openings per balloon

Pressurized balloon

The balloon installed at the opening (image)



The opening before the balloon installation (photo taken from 2nd floor)

The opening after the balloon installation (photo taken from 2nd floor)

7) Consideration of Reactor Building Container

- Per the pool fuel removal and the PCV / RPV surveys conducted, we will proceed with a basic design for the mid-to-long term.

III. Monitoring and Decontamination

(6) Measurement, Reduction & Disclosure

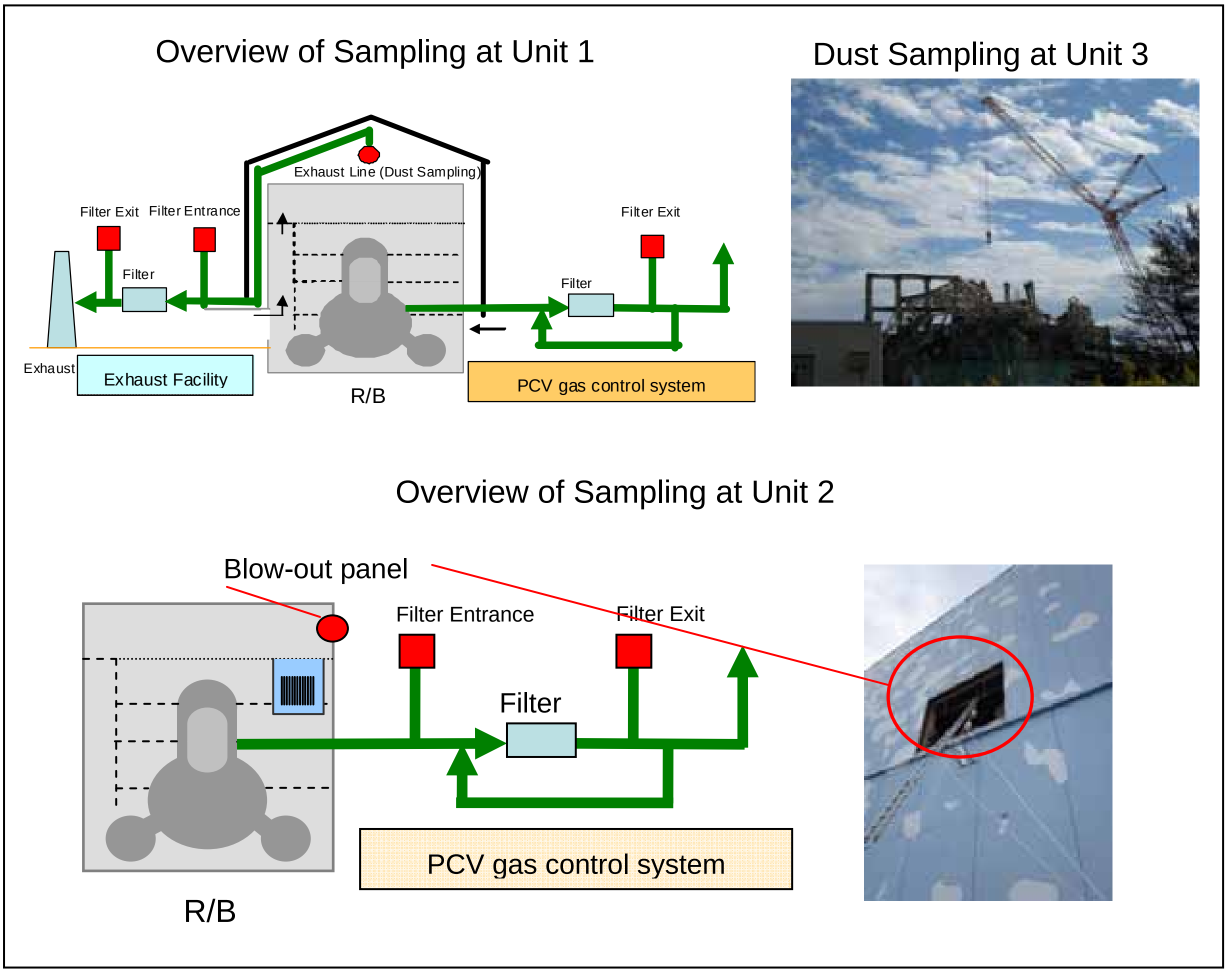
1. Achievement of the Step 2 Target: “Sufficient reduction of radiation dose”

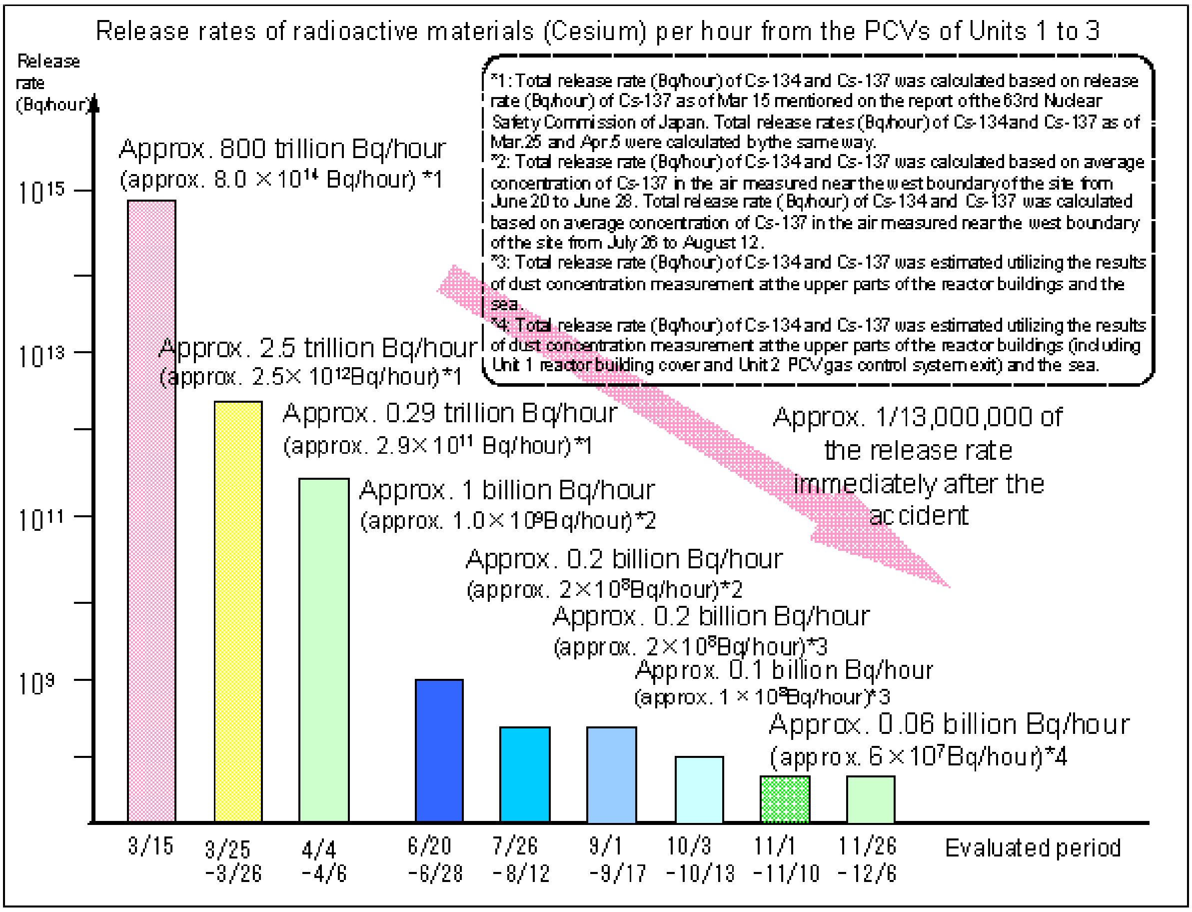
- Monitoring by the central government, prefecture, municipalities and TEPCO and the expansion, improvement and disclosure of it.

2. Current status and work implemented to achieve “Sufficient reduction of radiation dose”

1) Public Radiation Exposure Dose due to Additional Release from the PCV (same as “I. (1) 3)”)

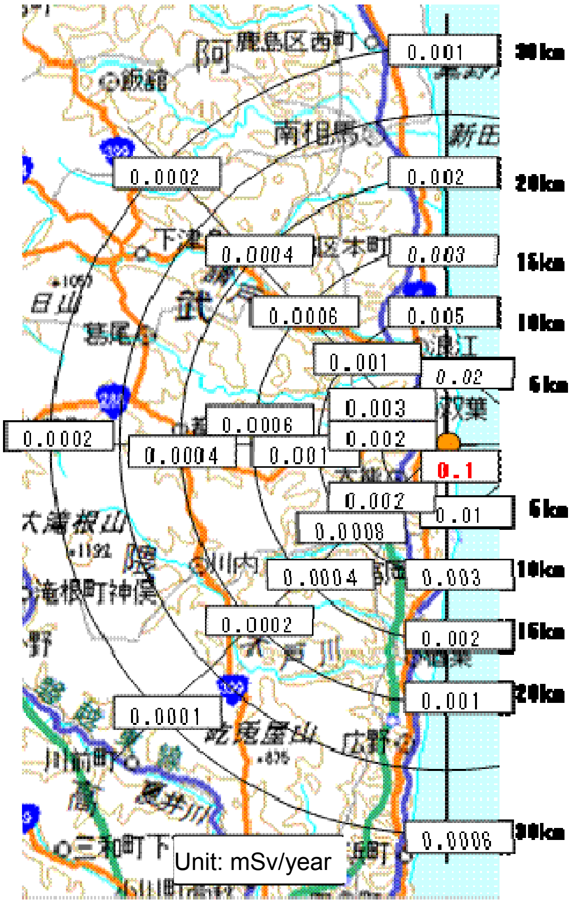
- Evaluated the current release rate for Cesium from PCVs of Units 1 to 3 utilizing the airborne radioactivity concentration (dust concentration) at the upper parts of the reactor buildings etc.
  - The current release rate for each Unit is estimated as follows: Unit 1: approx. 0.01 billion Bq/h, Unit 2: approx. 0.01 billion Bq/h and Unit 3: approx. 0.04 billion Bq/h, based on the dust concentration at the upper parts of the reactor buildings etc.
  - The current total release rate from Units 1-3 based on the assessment this time is estimated to be approx. 0.06 billion Bq/h at the maximum, which is 1/13,000,000 of the release rate at the time of the accident.
- For reference, the current release rate for Cesium from the PCV of Units 1-3 utilizing the airborne radioactivity concentration (dust concentration) at sea was evaluated. The result was approx. 0.02 billion Bq/h (The previous version: 0.02 billion Bq/h.)


Overview of Sampling at Unit 1
Exhaust Line (Dust Sampling)
Filter Exit
Filter Entrance
Filter
Exhaust
Exhaust Facility
R/B
Filter Exit
Filter
PCV gas control system
Dust Sampling at Unit 3
Overview of Sampling at Unit 2
Blow-out panel
Filter Entrance
Filter Exit
Filter
PCV gas control system
R/B


Release rates of radioactive materials (Cesium) per hour from the PCVs of Units 1 to 3
Release rate (Bq/hour)
10^15
10^13
10^11
10^9
Approx. 800 trillion Bq/hour
(approx. 8.0 ×10^14 Bq/hour) *1
Approx. 2.5 trillion Bq/hour
(approx. 2.5× 10^12Bq/hour)*1
Approx. 0.29 trillion Bq/hour
(approx. 2.9×10^11 Bq/hour)*1
Approx. 1 billion Bq/hour
(approx. 1.0×10^9Bq/hour)*2
Approx. 0.2 billion Bq/hour
(approx. 2×10^8Bq/hour)*2
Approx. 0.2 billion Bq/hour
(approx. 2×10^8Bq/hour)*3
Approx. 0.1 billion Bq/hour
(approx. 1 × 10^8Bq/hour)*3
Approx. 0.06 billion Bq/hour
(approx. 6×10^7Bq/hour)*4
Approx. 1/13,000,000 of the release rate immediately after the accident
*1: Total release rate (Bq/hour) of Cs-134 and Cs-137 was calculated based on release rate (Bq/hour) of Cs-137 as of Mar 15 mentioned on the report of the 63rd Nuclear Safety Commission of Japan. Total release rates (Bq/hour) of Cs-134 and Cs-137 as of Mar.25 and Apr.5 were calculated by the same way.
*2: Total release rate (Bq/hour) of Cs-134 and Cs-137 was calculated based on average concentration of Cs-137 in the air measured near the west boundary of the site from June 20 to June 28. Total release rate (Bq/hour) of Cs-134 and Cs-137 was calculated based on average concentration of Cs-137 in the air measured near the west boundary of the site from July 26 to August 12.
*3: Total release rate (Bq/hour) of Cs-134 and Cs-137 was estimated utilizing the results of dust concentration measurement at the upper parts of the reactor buildings and the sea.
*4: Total release rate (Bq/hour) of Cs-134 and Cs-137 was estimated utilizing the results of dust concentration measurement at the upper parts of the reactor buildings (including Unit 1 reactor building cover and Unit 2 PCV gas control system exit) and the sea.
3/15
3/25 -3/26
4/4 -4/6
6/20 -6/28
7/26 -8/12
9/1 -9/17
10/3 -10/13
11/1 -11/10
11/26 -12/6
Evaluated period

- The radiation exposure per year at the site boundaries has been assessed at approx. 0.1 mSv/year at the maximum based on the aforementioned release rate (The target is 1 mSv/year, excluding the effect of already released radioactive materials.)

Exposure doses in cases where the current release rate from the PCVs of Units 1 to 3 continues for one year (mSv/year) (Excluding the effect of already released radioactive materials)



(Overview of the estimated figures)

Site Boundary: Less than or equal to approx. 0.1 mSv/year

5km radius: Less than or equal to approx. 0.02 mSv/year

10km radius: Less than or equal to approx. 0.005 mSv/year

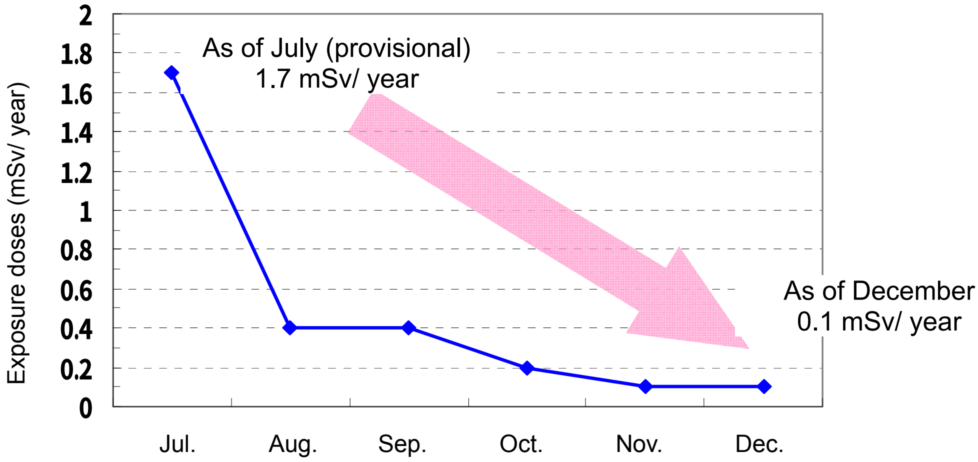
20km radius: Less than or equal to approx. 0.002 mSv/year

As a reference, the dose limit from the reactor facilities outside of the nuclear power stations is 1 mSv/year.

[Map Source: "Digital Japan" URL http://cyberjapan.jp/]

Exposure doses in case the release rate from the PCVs of Units 1 to 3 at the time of the evaluation continues for one year (mSv/year)

(Excluding the effect of the already released radioactive materials)



- The release rate of noble gas is estimated to be approx. 9.2 billion Bq/h at Unit 1 and approx. 0.9 billion Bq/h at Unit 2, based on the data monitored by the PCV gas control system (that of Unit 3, whose PCV gas control system is under construction, is also estimated at the same rate as Unit 2.) The exposure dose based on the aforementioned release rate is assessed to be approx. 0.00011 mSv/year in total of Units 1 and 2. This rate is much lower than the exposure dose based on the release rate of Cesium, thus we utilize the Cesium release rate as the main release rate.

2) Joint monitoring by the central government, prefecture, municipalities and TEPCO

- Per instructions from the Ministry of Education, Culture, Sports, Science and Technology, TEPCO has been conducting sampling and measurements on land and in the seAs explained below.

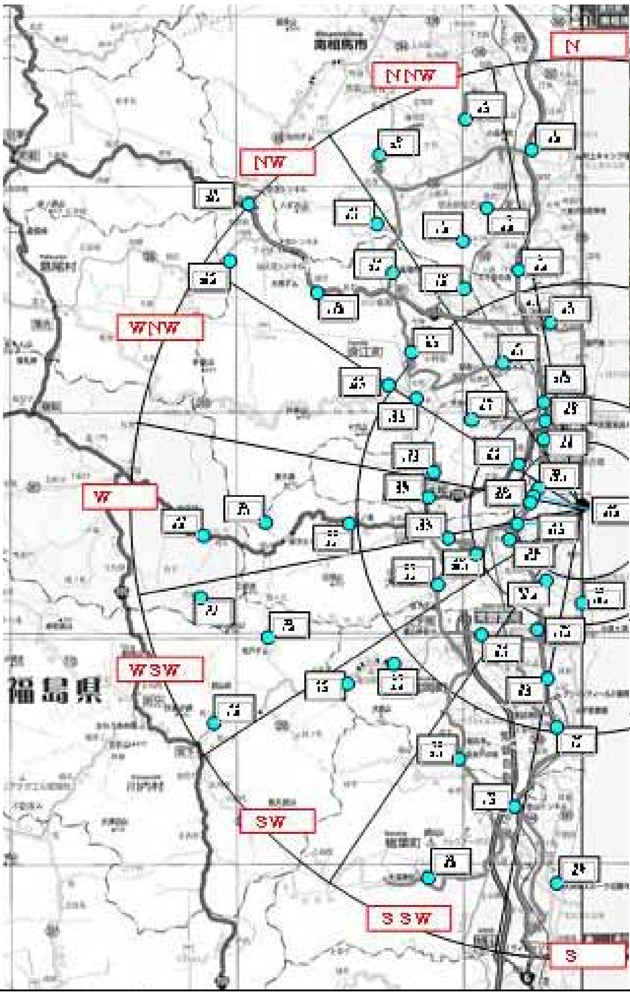
[Land]

<Monitoring within a 20km radius>

- Measurement of airborne radioactivity concentration by the on-site support team from the Federation of Electric Power Companies (FEPC) at 50 points (once a week)
- Dust sampling at 5 points around a 10 km radius by the same team (once a month)

Airborne radioactivity concentration measurement points and work status

Airborne radioactivity concentration measurement at 50 points



Measurement by the support team from FEPC

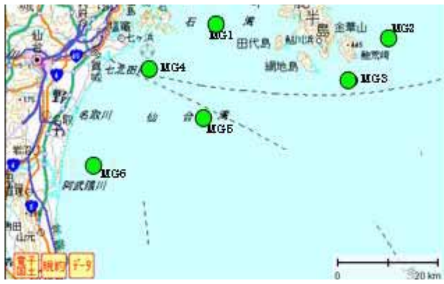
[Sea]

<Fukushima Prefecture>	<Ibaraki Prefecture>	<Miyagi Prefecture>
Seawater at 11 points within the site bay (once a day) Seawater at 4 points along the coast (once a day) Seawater at 8 points within a 20km radius (every two days) Seawater at 3 points within a 30km radius (once a week) Seawater at 10 points outside a 30km radius (once a week) Seabed soil survey at 25 points (once a month)	Seawater at 5 points (once a week)	Seawater at 6 points (twice a month)

SeArea sampling points

Fukushima Prefecture

Miyagi Prefecture



Ibaraki Prefecture

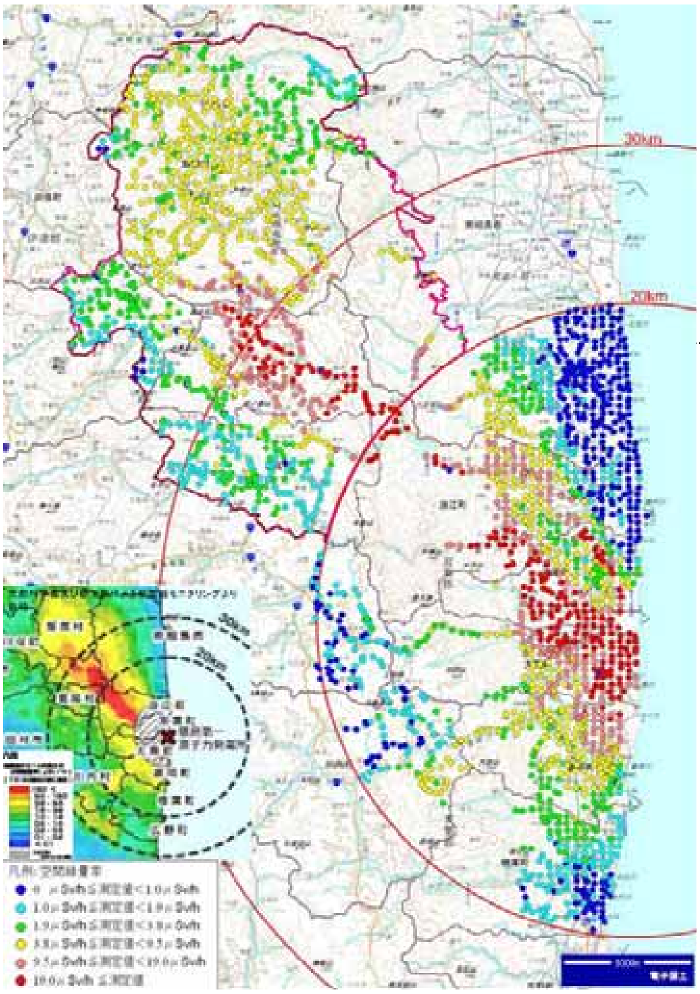
- Sampling of seawater and seabed soil within a 15km radius in front of the power station is being implemented with an unmanned survey boat.

Unmanned survey boat

- The Cabinet Office and the Ministry of Education, Culture, Sports, Science and Technology announced a detailed implementation plan (“Basic Data Collection Monitoring”, “Wide Area Monitoring” and “Detailed Monitoring”) at restricted areas and deliberate evacuation areas (Jun. 13.)

- The Cabinet Office and the Ministry of Education, Culture, Sports, Science and Technology announced the “Wide Area Monitoring” result (Sep. 1.)

Wide Area Monitoring results map (height: 1m) and selection method of monitoring points



Divide the target areas by 2km x 2km meshes, selected approx. 20 points*1 from each mesh based on the basic data collection results*2 and monitor the airborne radioactivity concentration (Jul.4 – Aug.20.)

*1 Various places such as 16 points by dividing each mesh 500m x 500m as well as crowded places (schools, public facilities, parks, shopping malls, supermarkets, shrines and temples, etc.) were selected.

*2 Airborne radioactivity concentration was monitored around Namie Station and Tomioka Town Station whose surrounding environments differ. The distribution of the air dose rate was developed based on the density of radioactive materials that were discharged by the accident and accumulated inside the soil etc.

- TEPCO joined in developing the “Wide Area Monitoring” plan and conducting monitoring (approx. 800 persons in total.)

Measurement work of Wide Area Monitoring

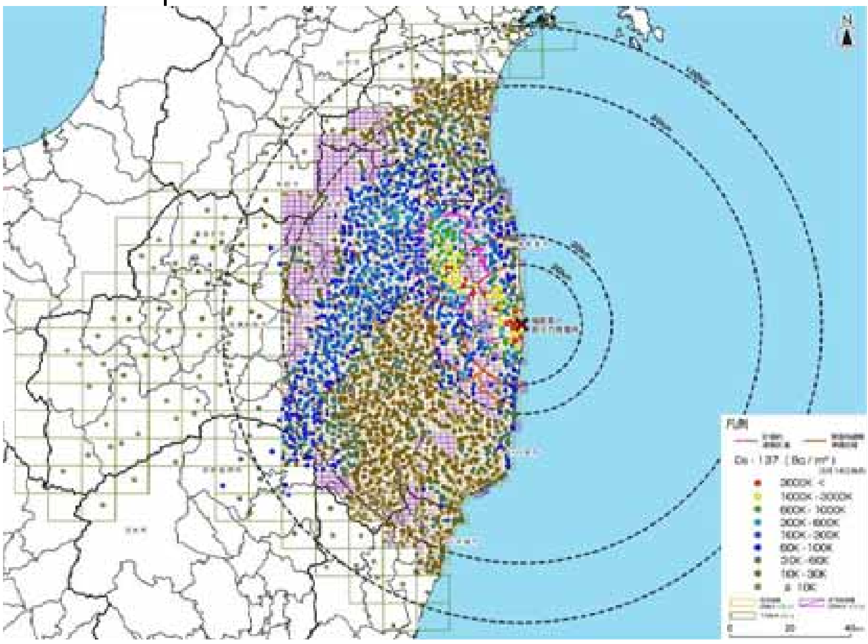
- Based on the result of Wide Area Monitoring, the “Detailed Monitoring” on houses, roads and school grounds was implemented in order to collect basic data for the development of the implementation plan to improve the environment of these areas (mid-June to end of October.)

※ Detailed Monitoring; in order to collect basic data to consider environmental improvement measures that will allow evacuees to return home, investigate subjects such as the atmosphere (monitoring car, dust), soil, forests, artifacts (roads, buildings), and water (rivers, ponds, irrigation) in detail.

- TEPCO also collected information for effective decontamination via the results of the Wide Area Monitoring and Detailed Monitoring.

- The Ministry of Education, Culture, Sports, Science and Technology published the “Distribution Map of Radiation Doses etc. (Map of Radioactive Cesium Concentration in Soil)” (Aug. 30). Thereafter, sequentially published maps of the radioactive concentration of Iodine 131, Plutonium 238, 239+240, Strontium 89, 90 Tellurium 129m and Silver 110m.

Map of Concentration of Radioactive Cesium



This map is developed based on the measurement of airborne radioactivity concentration at approx. 2,200 points within about 100km from the station and the sampling of soil at a 5cm depth from the ground surface at around 5 points for each radiation measurement point and their nuclide analysis.

- Measurement of airborne radioactivity concentration and soil sampling were conducted by universities, the Japan Atomic Energy Agency, National Institute of Radiological Sciences, Japan Chemical Analysis Center and an on-site support team from the FEPC, etc.

Soil sampling by an on-site support team from the FEPC

3) Consideration and commencement of full-scale decontamination

[Implemented Central Government Countermeasures]

- Determined the “Basic Concept for Pushing Ahead with Decontamination Work” and the “Basic Policy for Emergency Response on Decontamination Work” which sets forth the target and stance for two years onwards (Aug. 26).
- Concurrently, the “Guidelines for Municipal Decontamination Work” was introduced in order to facilitate decontamination in the fields of each municipality (Aug.26).
- From late August, model projects of decontamination operations at broader areas including residences, roads and vegetation began at Date City and

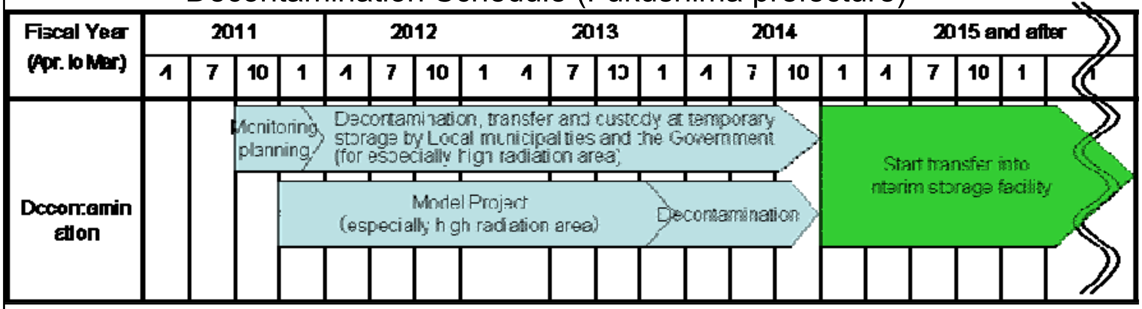
Minami Soma City.

- In order to urgently implement the decontamination, based on the “Basic Policy for Emergency Response on Decontamination Work”, the cabinet decided to tap into approx 220 billion JPY from the Great East Japan Earthquake Recovery and Reconstruction Reserve Funds (Sep. 9).
- The Fukushima decontamination promotion team (Ministry of the Environment/ Cabinet Office etc.) started providing municipalities with advice on the development of municipal decontamination plans and dispatching experts (Japan Atomic Energy Agency, TEPCO) (Oct. 3).
- Taking advantage of the Great East Japan Earthquake Recovery and Reconstruction Reserve Funds, in order to lower the annual radiation dose at 12 municipalities designated as restricted areas and deliberate evacuation areas etc., the “decontamination model demonstration project at restricted areas and deliberate evacuation areas” was begun (Nov. 18).

● Promulgated the “Act on Special Measures concerning the Handling of Environmental Pollution by Radioactive Materials Released due to the Accident at the Nuclear Power Stations in connection with Tohoku-Chihou-Taiheiyo-Oki Earthquake on March 11, 2011” (Aug. 30).

- Published “A work schedule for development of the interim storage facility (roadmap)” targeting the transfer to the interim storage facility three years after the full-scale transfer to the temporary storage yard per “The basic concept of the interim storage facility required in dealing with environmental contamination due to radioactive materials resulting from the accident at Fukushima Daiichi Nuclear Power Plant, TEPCO” (Oct. 29).

Decontamination Schedule (Fukushima prefecture)



Extract from “The basic concept of the interim storage facility required in dealing with environmental contamination due to radioactive materials resulting from the accident at Fukushima Daiichi Nuclear Power Plant, TEPCO” (Ministry of the Environment, Oct.29. 2011).

- Began detailed monitoring in regions where the central government shall implement decontamination per the Act on Special Measures concerning the Handling of Environmental Pollution by Radioactive Materials (Nov. 7).
- Cabinet approved the basic policy per the Act on Special Measures concerning the Handling of Environmental Pollution by Radioactive Materials (Nov .11).
- Began decontamination by the Self-Defense Force to recover the office

functions of Naraha Town, Tomioka Town, Namie Town and Iitate Village, which have been chosen to be decontamination active base in the runup to activities directed by the Ministry of the Environment starting next January (Dec. 7.)

Decontamination by the Self-Defense Force

- Promulgated Ordinance for Enforcement of the Act on Special Measures concerning the Handling of Environmental Pollution by Radioactive Materials (Dec.14)
- Published a decontamination guideline which explains specifically decontamination methods, how to collect, convey and store removed soil, or investigation methods to designate implementing areas (Dec. 14).

- Published a report of the "investigative commission by experts regarding the prevention of radiation hazards for workers engaged in decontamination work" (Nov.28). The Ministry of Health, Labour and Welfare is in the process of establishing new regulations and guidelines. (to be effective from Jan. 1, 2012)

[Activities that TEPCO is participating in]

A) Activities inside restricted areas and deliberate evacuation areas

- TEPCO started cooperation on detailed monitoring to develop decontamination plan for the areas where the government will implement the decontamination work. TEPCO supports to develop radiation dose map via unmanned helicopters, monitoring vehicles and person who measures.
- Based on the results of the wide area monitoring and detailed monitoring and TEPCO's knowledge (radiation control and construction supervising, etc.), in order to facilitate the Government's demonstration of the decontamination model project in the restricted area, TEPCO cooperates with the Japan Atomic Energy Agency (JAEA), a contractor of this project.
- Per the Ministry of the Environment's request, TEPCO provided approx 30 staff for the Self-Defense Forces activities to decontaminate 4 municipal offices, such as site management and radiation control of the decontamination work.

TEPCO cooperates with SDF for **decontamination**

B) Activities outside restricted areas and deliberate evacuation areas

- For the purpose of assisting the municipalities in the creation of the decontamination plan, TEPCO started personnel support for the government's experts dispatch program (Oct. 3). Mainly TEPCO staffs having expertise in radiation etc. are provided. They are handling queries from municipal governments on decontamination methods and radiation protection.
- Participated in the municipalities' decontamination work at Fukushima Prefecture and engaged in pre-monitoring and decontamination activities. Continuously assist decontamination activities to enable the evacuees to return home as soon as possible.

IV. Countermeasures against aftershocks, etc.

(7) Tsunami and reinforcements, etc.

1. Achievement of the Step 2 target: “Prevent further disasters”

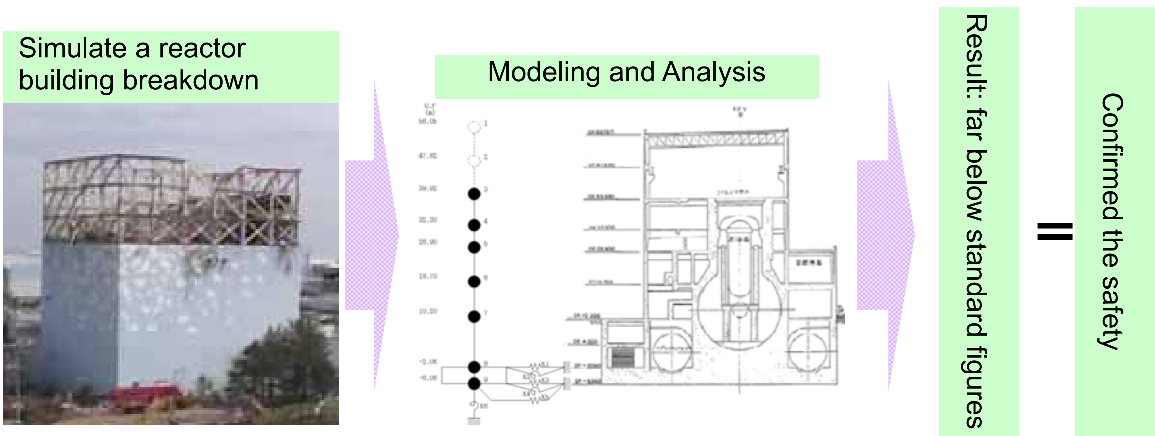
- Prepare for extraordinary events (earthquakes and tsunami, etc.) to prevent the impact of disasters so that the situation will not worsen.
  - Via the seismic assessment of all Units’ reactor buildings, seismic safety minus additional reinforcements has been confirmed. In addition, support structures have been installed at the bottom of the Unit 4 spent fuel pool to broaden the margin of safety.
  - Installed a temporary tide barrier as a countermeasure against tsunamis caused by earthquakes. In addition, implemented several kinds of countermeasures for radiation shielding, thus preventing disaster impact.

2. Current status and work implemented to achieve “Mitigation further disasters”

1) Implemented seismic resistance assessment for all Units

- The consideration of current seismic resistance and reinforcements, etc. for the reactor buildings of Unit 2, Unit 5 and Unit 6 were done and evaluated by Aug. 26 (Unit 1 and Unit 4 were completed by May 28 and Unit 3 was completed by Jul. 13.) The results of the analysis showed that the amount of seismic resistance was sufficient minus any reinforcements.

Seismic resistance evaluation (Image: Unit 1)



- In adition to the aforementioned assessement, visual inspections were implemented for the support structures for the Reactor Feed Water System piping that were evaluated as being especially weak. The final results now show that all support structures are sound.

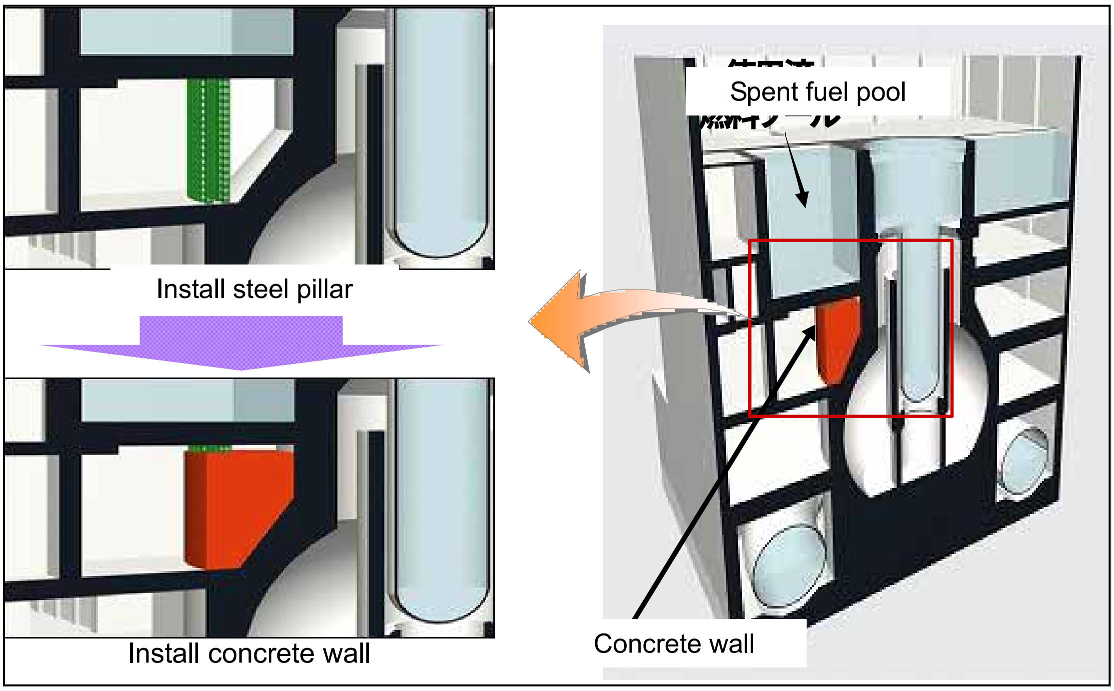
Support Structure for Piping

2) Installed support structures at the bottom of the Unit 4 spent fuel pool

- The results of the analysis showed that the amount of seismic resistance was sufficient minus any reinforcements. Nevertheless, we installed support structures at the bottom of the pool in order to broaden the safety margin.
  - Installed steel pillars on June 20, which contributed to load reduction
  - Installed concrete and grout on July 30 to ensure sturdiness.

Installation of support structures

Installation image



Injecting grount (Jul. 30)

Before steel pillar installation (May 31)

Placing concrete (Jul. 21)

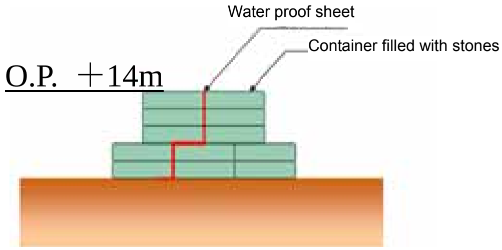
Installing steel pillar (Jun. 20)

3) Installed Temporary Tide Barrier

- Some experts and institutions pointed out the possibility that aftershocks with an eight magnitude could occur offshore of the epicenter region where the Tohoku-Chihou-Taiheiyou-Oki Earthquake originated. Hence, we built a temporary tide barrier as a countermeasure against tsunamis that could be caused by aftershocks (May 18 - Jun. 30).

Installation of Temporary Tide Barrier

Location



Cross-Section of Temporary Tide Barrier (Image)

Installation work

Installed situation

4) Several kinds of Radiation Shielding Countermeasures

- Countermeasures were implemented to prevent radioactive material emissions and shield radiation in the event of a prolonged suspension of water injection to the reactor or the spent fuel pool.
- Installed facilities that will put slurry (a mixture of water and solid material such as sands) through the upper part of the reactors and spent fuel pools in order to prevent radioactive material emissions as well as shield radiation.

Facilities to put slurry

Manufacturing

Transfer piping

Concrete pump vehicle

V. Environmental Improvements

(8) Living/ working Environment

1. Achievement of the Step 2 Target: “Enhancement of Environment Improvement”

- Implemented the following countermeasures to improve workers’ living/working environment that was harsh in the immediate aftermath of the accident so as to maintain worker motivation.
  - Improved conditions such as providing healthier meals, installed bathing and laundry facilities.
  - Set up temporary dormitories and on-site rest stations.

2. Current status and work implemented to achieve “Enhancement of Environment Improvement”

1) Improved Conditions via Meals, Bathing & Laundry Facilities etc.

- From May, providing lunchboxes for lunch and supper at Fukushima Daini Nuclear Power Plant and J Village.
- Installed shower and laundry equipment, etc. at temporary dormitories.

2) Setting up temporary dormitories and on-site rest stations

- Completed construction of temporary dormitories able to accommodate 1,600 persons (Aug. 31). Presently, approx. 1,200 persons have moved in (as of Nov. 1).
- Twenty on-site rest stations have been established in total (all together, approx. 4,750m^2 in size with a capacity to accommodate approx. 1,600 persons) (as of Nov. 1).

Exterior and interior view of the on-site rest stations

On-site Rest Station Facilities

Restroom

Air shower

Drinking Water

(9) Radiation Control/ Medical care

1. Achievement of the Step 2 Target: “Enhancement of Healthcare”

- The following healthcare measures were implemented
  - Countermeasures against heat strokes and influenza
  - Increase in the number of whole body counters and monthly measurements of internal exposures
  - Per NISA, reinforcement of radiation controls and thorough management of exposure doses
  - Automated record-keeping of personal radiation dose, issuance of personal exposure dose record slips, introduction of worker photo identification
  - Consideration of long-term healthcare such as enhancing workers’ safety training and establishing a database to monitor workers’ health

2. Current status and work implemented to achieve “Enhancement of Healthcare”

1) Healthcare, etc.

- Health checkup
  - The Ministry of Health, Labor and Welfare (MHLW) instructed TEPCO on Apr. 25, to conduct additional health checkups every month for those workers whose exposure dose exceeds 100 mSV and who engage in emergency work for over a month. Implementation rate of additional health checkups in October was 86.5% (as of Nov. 16).
  - Routine check ups of recent health conditions and the tracking of the medical history of new site workers has begun (since Oct. 24)

Health checkup sheet for a new site worker


健 康 調 査 票

- Countermeasures against heat strokes and influenza
  - MHLW instructed TEPCO to implement countermeasures against heat strokes (Jun. 10). Countermeasures such as limiting working hours and/or providing intermissions, providing cool vests, ensuring a sufficient intake of water and salt, and the monitoring of health conditions have been implemented.

Heat stroke Countermeasure Examples
(Left: Cool vest, Right: Cool scarf)

Displaying posters on heat stroke prevention

- To prevent influenza, preparation of infection prevention goods, conducting vaccinations (7,325 workers were vaccinated (as of Dec. 8)), and controlling site access by monitoring the sick viA thermograph.

Influenza Countermeasures
(Searching for the fever-stricken viA thermograph)

Influenza Vaccination
(at J-Village)

2) Increase the number of whole body counters (WBC) and conduct periodical measurements of the internal exposure dose of workers

- The number of WBC was increased as planned (12 units have already been installed as of Oct. 3)
- From September, once-a-month internal exposure measurements were started.

Installation of WBC

3) Management of Exposure Dose, etc.

- NISAnd MHLW instructed TEPCO to improve exposure dosage controls in light of the fact that at the beginning of Step 1, some workers were exposed to dosage amounts exceeding the limit. In response, exposure controls were tightened and countermeasures were developed to prevent recurrences.
  - Regarding exposure dosage control, as some female workers were exposed to dosage amounts exceeding the limit, NISA reprimanded TEPCO, and instructed them to improve exposure controls and assessed TEPCO's countermeasures (May 25).
  - After it was discovered that some workers while engaged in emergency work were exposed to dosage amounts of 250 mSv, NISA reprimanded TEPCO and instructed them to investigate the causes and develop countermeasures to prevent recurrences (Jun. 10). As a result, TEPCO submitted reports (Jun. 17). It was confirmed that six workers had been exposed to amounts exceeding the dose limit of 250mSv (Jul. 7). NISA instructed TEPCO to implement 8 items for improvement (Jul 13).
  - Regarding external exposure dosage controls, MHLW instructed TEPCO to address the issue, including reporting to the companies from where each worker was dispatched (May. 23).
  - Regarding internal exposure dosage controls, MHLW has already received reports on the check up results of workers engaged in emergency work. MHLW received the results of 17,671 out of 17,780 workers in total: 3,742 of 3,745 workers engaged in emergency work in March, 3,609 of 3,620 new workers in April, 3,022 of 3,027 new workers in May, 2,126 of 2,139 new workers in June, 2,129 of 2,132 new workers in July, 1,115 of 1,117 new workers in August, 1,119 of 1,130 new workers in September, and 809 of 870 workers in October (Nov. 30).

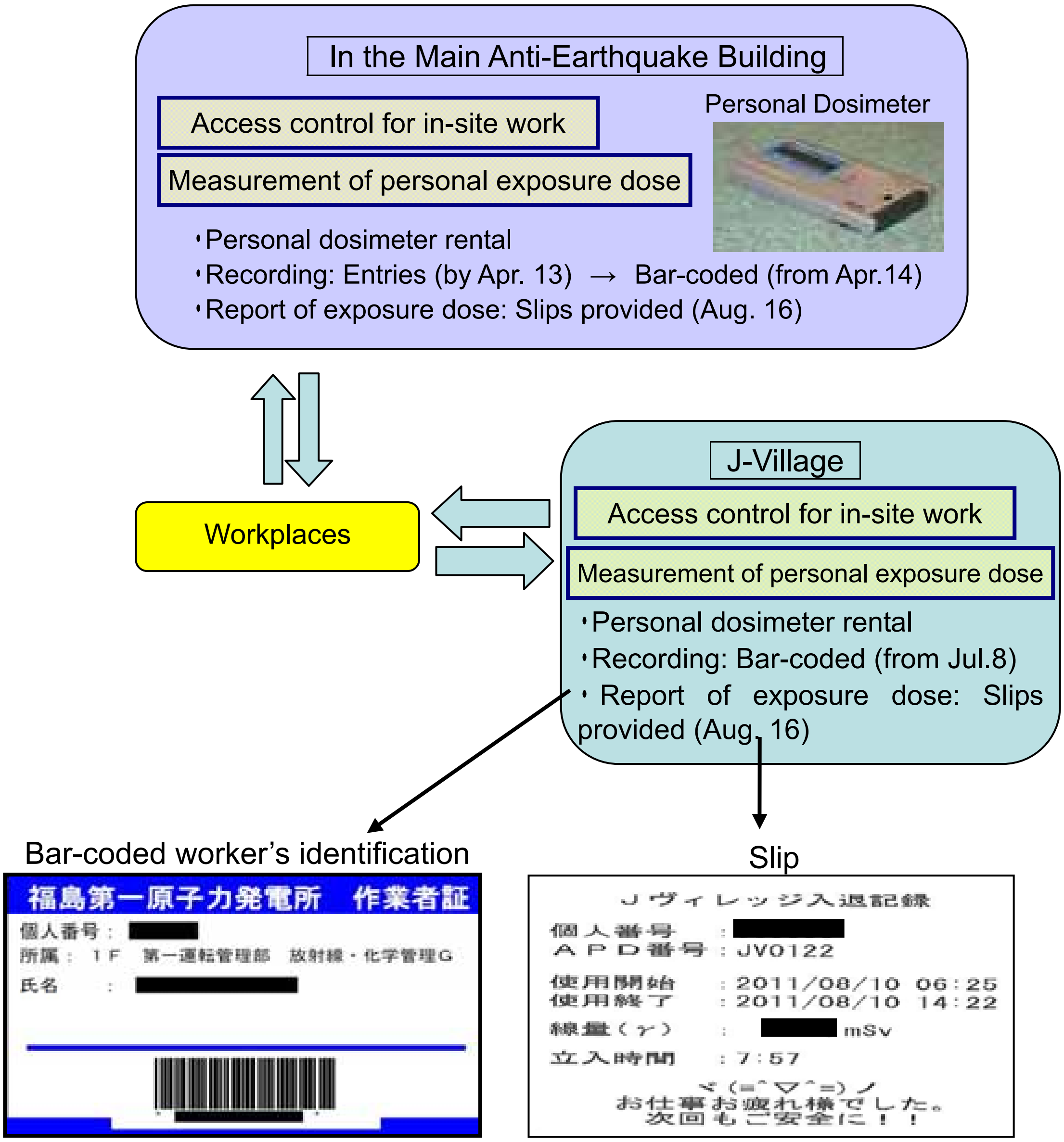
Workers engaged in emergency work	Workers who have undergone measurements and evaluations of internal exposure dosage	Workers to be measured and evaluated for internal exposure dosage
3,745 from March	3,742	3
3,620 from April	3,609	11
3,027 from May	3,022	5
2,139 from June	2,126	13
2,132 from July	2,129	3
1,117 from August	1,115	2
1,130 from September	1,119	11
870 from October	809	61
17,780 in total	17,671	109

- MHLW instructed TEPCO to submit advance work reports if the work would entail an effective exposure dosage of more than 1 mSv /day (May 23). After checking 602 reports that TEPCO and its partner companies submitted, TEPCO was ordered to make some improvements. Subsequently, MHLW confirmed that 585 of the reports were satisfactory (as of Dec. 9).
- MHLW and NISA lowered the upper limit of exposure dosage for workers newly appointed for emergency work after Nov. 1 to 100 mSv/y, with the exception of those engaged in emergency operations to deal with events such as the loss of a reactor cooling function in areas in or around the reactor facilities etc where there is the possibility of being exposed to over 0.1 mSv/h. (Nov 1). Following the completion of Step 2, their special ministry ordinances that allowed for an exposure dosage limit of 250 mSv for emergency work was rescinded. (However, for experts who are required to conduct specialized work such as maintain the reactor cooling function, a temporary upper limit of 250 mSv / y valid until Apr. 30, 2012 was approved.)
- Since mid-June, airborne radioactivity concentration within the site has been kept below the standard level that would normally require the wearing of full-face masks. TEPCO has begun allowing workers to work without wearing a full-face mask (a half-faced mask) in limited areas in order to reduce the work load. (Nov. 8).

● Keeping track of personal exposure dosage

- New simplified access control system utilizing a bar-code system at the Main Anti-Earthquake Building of Fukushima Daiichi Nuclear Power Station was installed (bar-coded) (Apr. 14). At the same time, automated record-keeping of the entry and departure of workers and radiation dosage data was started.
- In addition, at J-Village, a simplified access control system utilizing a bar-code system was installed (bar-coded) (Jun. 8).
- Worker photo identification was introduced step by step (Jul. 29).
- Issuance of personal exposure dose record slips per entry was started (Aug. 16).

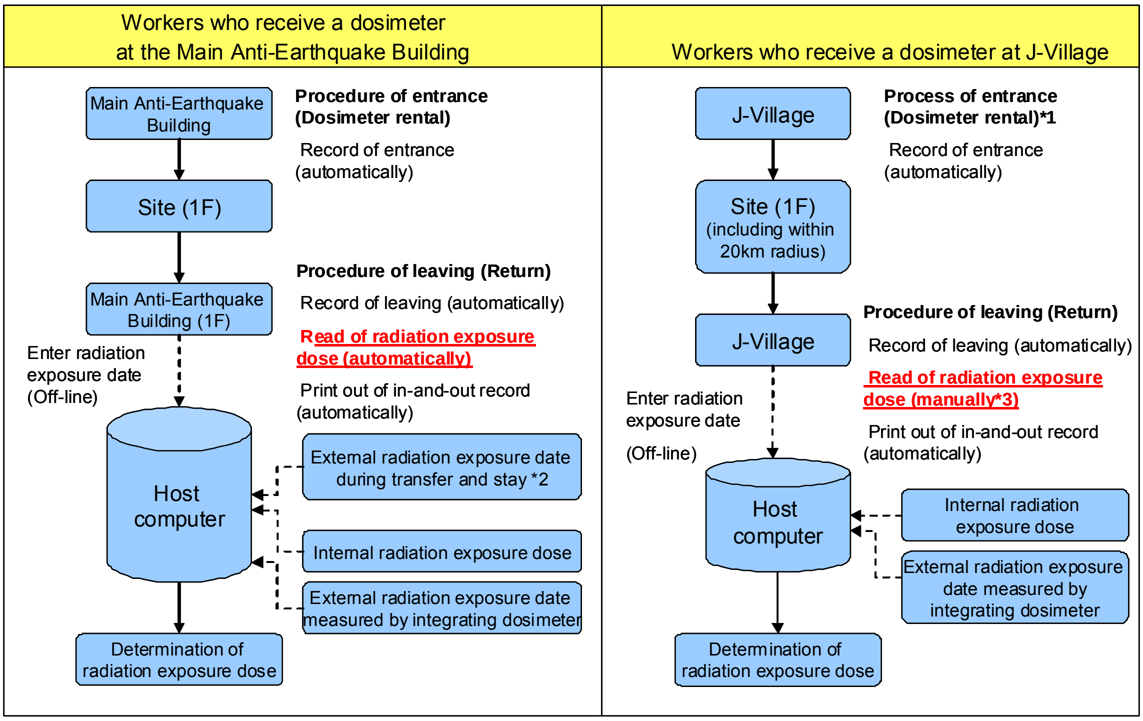
Current management of personal exposure dosage



* Worker's identification with photograph has been introduced in turn.（Jul. 29）

- The management of radiation dosage data was switched from personal computers to host computers. The new system has begun operating, and its reliability, maintainability, and security have been improved (Nov. 13).

Management of radiation exposure dose for workers



***1: Dosimeters handed out at J-Village do not have automatic reader function.**

***2: In case of receiving dosimeters at the Main Anti-Earthquake Building, regarding radiation exposure dose during transfer between J-Village and Main Anti-Earthquake Building, and during staying in Main Anti-Earthquake Building, measured integrated value of airborne radioactivity doses are added monthly according to each person's work.**

***3: The doses read by dosimeters are entered into special PC when leaving. Then, they are transferred to the host computer.**

- Long-term Health Care
  - MHLW released a report from an expert committee concerning the creation of a database to monitor worker health and long-term health care management (Sep. 26).
  - MHLW revised the Ordinance on the Prevention of Ionizing Radiation Hazards and ordered TEPCO to submit exposure dose records and health check records, etc. for long-term health care, and announced a guideline regarding the implementation of examinations etc. per exposure dose (Oct. 11).

4) Continuous Medical System Improvements

- Establishment and Maintenance of the Emergency Medical Room
  - At Fukushima Daiichi Nuclear Power Station, in the past there had been only one doctor on duty at any given time within a 24-hour period at the Main Anti-earthquake Building (May 29). However, due to the collaborative efforts of MHLW and Ministry of Education, Culture, Sports, Science and Technology (MEXT) to second a medical team and establish a medical care system, there are now multiple doctors on duty at any given time in a 24 hour period 7 days a week.
  - From September, emergency medical specialists have been dispatched to

the Unit 5/6's emergency medical room whose service hours will be extended to all months of the year instead of only during the summer. (Sep. 1).

- The 24-hour presence of nurses and radiation specialists was realized (Nov. 26).
- The number of workers treated at Unit 5/6's emergency medical room are as follows: 23 in July, 13 in August, 14 in September, 22 in October, 21 in November, and 3 in December (as of Dec. 6)

Medical Room in the Main-Anti Earthquake Building

Unit 5/6's Emergency Medical Room

Doctors and nurses (left), Radiation Specialist (right) at Unit 5/6's Emergency Medical Room

- Speeding Up Patient Transportation
  - By improving the medical and decontamination facilities, we are able to ensure speedy patient transportation and direct transportation to hospitals of emergency patients who have not been contaminated (Emergency transportation vehicles including 3 ambulances were arranged.).

Training of screening and decontamination of a patient
(in front of the entrance of the service bldg of Unit 5/6)

Ambulance and Patient Carrier

(10) Staff training/Personnel Allocation

1. Achievement of the Step 2 Target: “Systematic staff training and personnel allocation”

- Promotion of staff training in conjunction with the Government and TEPCO

2. Current Status and Work implemented for “Systematic staff training and personnel allocation”

1) Promote staff training etc. in conjunction with the government and TEPCO

- Conduct training for high-demand staff engaged in radiation related work
- TEPCO has been conducting “radiation survey staff training” targeting employees and TEPCO group company employees and has already trained approx. 4,400 personnel.
- The government has been conducting “Radiation Survey Staff Training” (7 times till Oct. 7 with approx. 200 personnel trained. 3 more training sessions planned for Dec.), “Radiation Protection Staff Training” (3 times till Dec. 16 and approx. 70 personnel trained.)
- In accordance with affiliated companies’ needs, launched a new framework to find workers nationwide through the Japan Atomic Industrial Forum (JAIF).

Radiation Survey Staff Training

2) Secure adequate number of staff

- Since this October, TEPCO has reshuffled 70 employees (as of Dec. 9) who were exposed to high levels of radiation.
- From the perspective of being able to secure adequate number of staff

continuously, TEPCO implemented a questionnaire survey to improve the work environment. Based on the results, TEPCO implemented improvements such as the reduction of the full-face mask area, speedy radiation monitoring by utilizing the gate monitor, and expansion of the parking areAt J-village, etc.

- Develop measures to reduce exposure dose in the Main Anti-Earthquake Building.

Action plan for Mid to Long-term Issues

1. Work implemented during Step 2

- The government developed “the concept of securing mid-term safety”.
- TEPCO developed the plant operation plans based on the above policy followed by a government review.

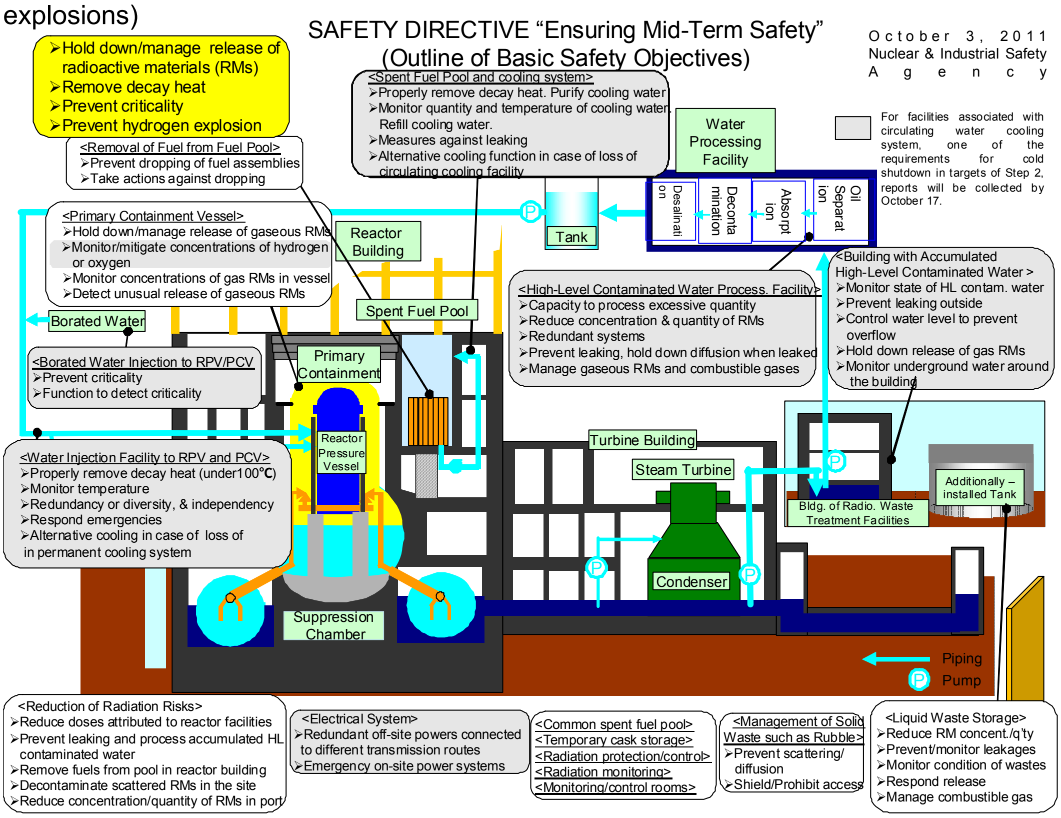
2. Current status and work implemented

1) NISA instructed TEPCO to comply with “the concept of securing mid-term safety”

- NISA released (on Oct. 3) “the concept of securing mid-term safety” concerning Units 1 to 4 of Fukushima Daiichi Nuclear Power Station of TEPCO”” in order to secure safety during the period (mid-term: within approx. 3 years) which starts from the completion of Step 2 and ends before starting the decommissioning of the reactors”.

*In order to manage additional emissions of radioactive materials from the nuclear reactor facilities and to restrain radiation doses, the following four (4) items as well as the required basic targets and necessary conditions for safety will be established.

- To identify the emission sources of radioactive materials, implement adequate restraint measures and monitor them (Emission restraints and managing functions)
- To adequately remove the decay heat of the reactor pressure vessels, the primary containment vessels and the spent fuel pools (Cooling function)
- To prevent criticality in the reactor pressure vessels, the primary containment vessels and the spent fuel pools (Function to prevent criticalities)
- To detect, adequately manage and treat flammable gases (Function to prevent hydrogen explosions)



2) TEPCO reported to NISA in accordance with their instructions

- TEPCO reported on the operating plan and the safety assessment results regarding the circulating water cooling system (Oct. 17, Nov. 9 and Dec. 7).
- NISA reviewed and confirmed that mid-term safety had been secured (Dec. 12).

On site inspection

- Other systems, etc. were reported as well (Dec. 8).

3) Evaluation by Nuclear and Industrial Safety Agency

- The Nuclear and Industrial Safety Agency (NISA) carefully evaluated in light of experts' views, the contents of the TEPCO's report on the facility operation plan (part 1) that is based on the TEPCO's report "The Concept of Securing the Medium-term Safety at Units 1 to 4 at Fukushima Dai-ichi Nuclear Power Station".
- The evaluation confirmed that reliability of the components of the circulating water cooling system is ensured by diversification and other measures; anomaly can be detected and alternative measures are available in case of inoperability of the system; and no significant radiological risk is expected in case of any accident.
- NISA confirmed the adequacy of TEPCO's report and reported that to the Nuclear Safety Commission (December 12).

(□) Adequate decay heat removal from reactor and prevention of hydrogen explosion

- Reactor water injection systems were installed to remove the decay heat from the nuclear fuel material that is remaining in the reactors.
- A small amount of hydrogen is generated by radiolysis of water due to radiations emitted from the nuclear fuel material. Nitrogen gas seal systems were installed to prevent hydrogen explosion and the air in the containment vessels and reactor pressure vessels was substituted by

nitrogen gas to maintain the hydrogen concentration below the flammability limit (4% for hydrogen and 5% for oxygen).

[Reliability of reactor water injection system]

— Water injection systems for pressure vessels and containment vessels are provided with multiple backup systems in case of failure or accident.
— Water injection by fire engines is available within 3 hours in case of all of the newly installed water injection systems become inoperable.

[Reliability of nitrogen gas seal system]

— Multiple nitrogen production devices were installed. A part of them are powered by dedicated generators.

[Safety assessment of the case where reactor water injection system become inoperable]

— The independent assessment by NISA for a very severe case (where all of the newly installed water injection systems at Unit 1-3 become inoperable simultaneously and they remain inoperable for 12 hours) showed that the effective dose at the site boundary was less than 1 mSv per year.

(□) Prevention of criticality in the reactors

— It is difficult to assume the possibility of re-criticality, since the nuclear fuels in the reactors are considered to be in the shape far from suitable to criticality. However, even if re-criticality is conservatively assumed, criticality is impeded by injection of boric acid solution (boron absorbs neutrons and impedes criticality) and impact on the environment would be negligible.

[Reliability of boric acid solution injection system]

— The pumps and power sources of the reactor water injection systems are used also for the boric acid solution injection systems. Therefore both systems have same level of reliability.
— Multiple boric acid solution tanks are installed.

[Criticality detection function]

— Criticality is detected by temperature rise.
— Criticality is detected by radiation detectors (monitoring posts) at the site boundary.
— In addition, short half-life nuclides that are released during criticality are measured (devices were installed at Unit 1 and 2 and will be installed at Unit 3 in early February)

[Assessment of accident where re-criticality occurs and boric acid solution injection system is not initiated]

— The assessment under severe conditions (boric acid solution cannot be injected for 22 hours after the initiation of criticality) showed that the effective dose at the site boundary was as low as about 0.54 mSv.

(□) Spent fuel pool cooling

— Circulating water cooling equipment is installed to remove decay heat from the spent fuel stored in the spent fuel pool (ex.: the water temperature of the spent fuel pool at No.4 reactor was 85 ^{o}C at the time of emergency measures after the time following the accident and it was cooled to 23 ^{o}C by the circulating water cooling system (7 December 2011).

[Reliability of the circulating water cooling equipment for the spent fuel pool]

— The moving parts of the circulating water cooling equipment (cooling tower, pump and heat exchanger) are redundant. The decrease of water level by vaporization or leak can be recovered by water injection from the outside.

[Improvement of water quality]

— Salt removing equipment is installed to the pools in which seawater was infected as emergency measure after the accident, in order to prevent corrosion of spent fuel cladding and structure of the pools.

[Safety assessment of the case where the circulating water cooling equipment is unavailable]

— The assessment result with severe conditions (breakdown of pumps, loss of power) shows there is enough margin in time or more than 16 days for important works for repair or replacement of equipment to restart water injection.

(□) Treatment of high level radioactive water

— Highly-radioactive contaminated water accumulated in the reactor buildings and turbine buildings due to tsunami and inflow of reactor coolant is treated to reduce the concentrations of radioactive materials (cesium-134/137) to about 1/10,000. The treated water is reused as water for reactor injection.

[Reliability of the contaminated water treatment equipment]

— The contaminated water treatment equipment provides more than one system to prepare any malfunction. The moving parts like pumps are redundant as a general rule.

[Leakage control from equipment]

— Leakage from the high level contaminated water treatment equipment is controlled by detectors and weirs and buildings are used to prevent leakage expansion.

— Learning from the leakage from the desalination equipment to the outside of the site occurred on 4 December, the similar weirs are checked and repaired. The leakage detector are installed to all the weirs including relevant ones and modification of the weirs are being under consideration.

— The outside storage tanks of concentrated salt water are in static state.

They are checked by patrolling visual inspection and if leakage is found, it will be plugged and weir will be installed.

[Control of high-level contaminated water accumulated in buildings]

— The level of contaminated water is controlled to be lower than the groundwater level in order to prevent the contaminated water accumulated in the buildings from leaking out of the buildings. By doing this, leakage of contaminated water is prevented, although ground water comes in through cracks.

[Storage capacity of used cesium adsorption tower and sludge]

— The storage facilities for used cesium adsorption tower and sludge resulted from contaminated water treatment and the condensate saline water resulted from the desalination systems have enough storage capacity against the amount of generation, and additional facilities will be installed as required.

[Safety assessment for long-term suspension of contaminated water treatment system]

— Even if the contaminated water treatment system stops operation for a long time, the system can be reconstructed within about one month and the contaminated water generated during the suspension period can be collected in unused capacity of the turbine building, high concentration accumulated radioactive water receiver tank, or others. There will thus be no leakage of contaminated water into the ocean. Even if the water level temporarily rises due to heavy rain, leakage can be prevented as sufficient vacant capacity has been secured and by upgrading the treatment capacity of the system.

4) Action plan for mid and long-term issues, by the end of decommissioning, has been ongoing

- Mr. Edano, The Minister of Economy, Trade and Industry together with Mr. Hosono, The Minister for the Settlement from and Prevention of Nuclear Accidents issued directives to TEPCO, ANRE and NISA (Nov. 9).
  - To develop a reasonable and specific timeline within the timeframe by the end of decommissioning.
  - To develop an R&D plan for settlement from the accident and decommissioning.
  - To secure a sufficient number of on-site workers from both TEPCO and external sources while improving work conditions.
  - To improve system reliability such as the circulating water cooling system, and

to treat highly concentrated contaminated water accumulated in the buildings in a rapid manner. To develop plans to achieve this end.

- To decrease the radiation exposure dose at site boundaries due to newly discharged radioactive materials from the whole of the power station to a level less than 1 mSv/year as soon as possible. To develop plans to achieve this end.
- To conduct waste control and decontamination at the site. To develop plans to achieve this end.
- To start the removal of spent fuels from the spent fuel pools in the reactor buildings within approx. 2 years. To develop plans to achieve this end.
- To begin the removal of melted fuels within 10 years. To develop plans to achieve this end.

- Hereafter, the new organization, which will be reorganized from the Government-TEPCO Integrated Response Office, will develop a mid-to-long-term roadmap and promote necessary measures including on-site work as well as R&D towards decommissioning such as the removal of fuels from the spent fuel pools.

Conclusion

As mentioned, the Step 2 targets for each issue have been achieved and TEPCO's Fukushima Daiichi Nuclear Power Station Units 1 to 3 Reactors have been stabilized (in case an accident occurs, we will be able to maintain the radiation dose at the site boundaries at a sufficiently low level.)

Hence, the to-do actions set down by the Roadmap have been completed and the Government-TEPCO Integrated Response Office shall be reorganized into a new body. Hereafter, the new organization will develop a "Mid-to-long-term Roadmap towards the Decommissioning of Units 1 to 4 at Fukushima Daiichi Nuclear Power Station, TEPCO" (hereafter Mid-to-long-term Roadmap)

The Mid-to-long-term Roadmap addresses necessary actions including on-site work and R&D towards decommissioning such as removing the fuels from the spent fuel pools and damaged fuels believed to be located inside the RPVs and PCVs.

The new organization and the Mid-to-long-term Roadmap will adopt the basic mission of "enabling evacuees to return to their homes and for all citizens to be able to secure a sound life." The Government and TEPCO will continue in their efforts to achieve this end.

Lastly, we would like to express our appreciation to those parties whose valuable contributions such as the technical assistance and on-site work helped us immeasurably in our being able to complete the Roadmap. Furthermore, we would like to extend our sincerest gratitude for the help and support provided by our overseas partners in completing the Roadmap.

End