Description of Changes to the Report on Facility Management Plan for Units 1-4 of Fukushima Daiichi Nuclear Power Station Based on the “Policy on the Mid-term Security”

November 14, 2012

Tokyo Electric Power Company

Overview of Changes

Today, the following content in the “Report on our Facility Management Plan for Units 1-4 of Fukushima Daiichi Nuclear Power Station Based on the ‘Policy of Mid-term Security’” was submitted to the Nuclear Regulation Authority.

① Seismic safety assessment of building taking into account the accumulated water in the basement [1 (Chapter 6)]

② Seismic safety assessment of the earthquake-resisting walls of the auxiliary operation shared facility common pool building [2 (Chapter 4)]

③ Spent fuel removal at Unit 3 [2 (Chapter 3)]

1. Overview of the cover installed for fuel removal
2. Structural/seismic strength of the cover installed for fuel removal (1)-(3)
3. Functions for preventing the dispersion and diffusion of radioactive materials
4. Fuel assembly falling during transportation

④ Spent fuel removal at Unit 4 [2 (Chapter 3)]

1. Re-examination of the structural/seismic strength of the cover installed for fuel removal
2. Safety functions and structural strength of the transport casks used within the power station site

Measures for fuel transportation within the power station site

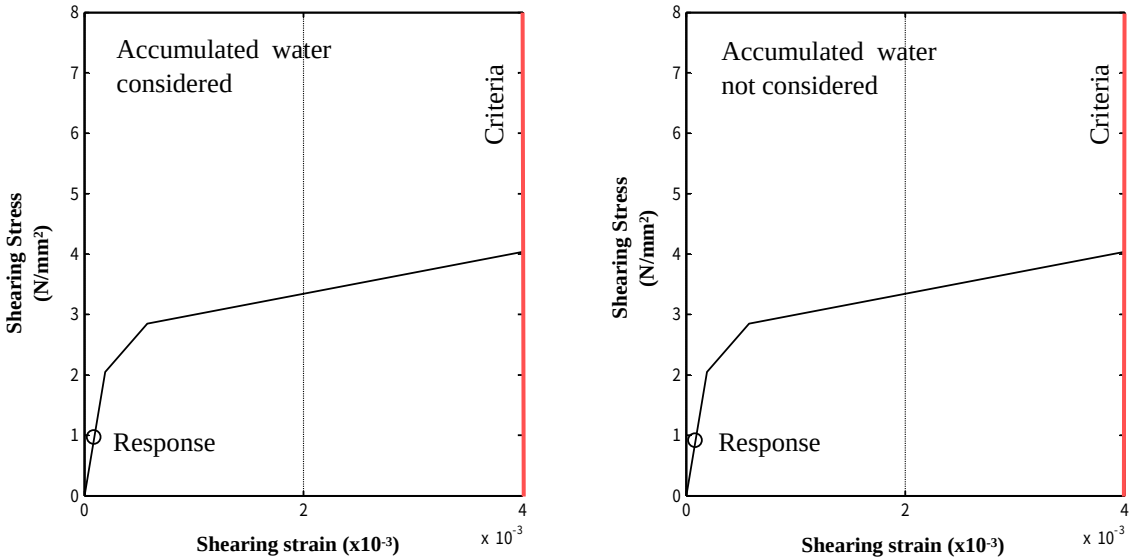
⑤ The existing 9 dry storage casks (1)-(2) [2 (Chapter 5)]

① Seismic safety assessment of building taking into account the accumulated water in the basement [1 (Chapter 6)]

- With the accumulated water in the basements of Unit 1 Reactor Building, Unit 2 Reactor Building, Unit 3 Turbine Building, Unit 4 Waste Treatment Building and Unit 3 Control Building taken into account, it was confirmed that the basement walls would not collapse when struck by the design basis earthquake ground motion Ss.

- The following is an example of the basement wall strength assessment results in relation to the design basis earthquake ground motion Ss.

  - The maximum responses of Unit 1 Reactor Building basement walls with and without the accumulated water in the basement taken into considerations are shown in the diagrams below.



The maximum responses on the shear skeleton of Unit 1 Reactor Building basement walls in consideration of the accumulated water in the basement

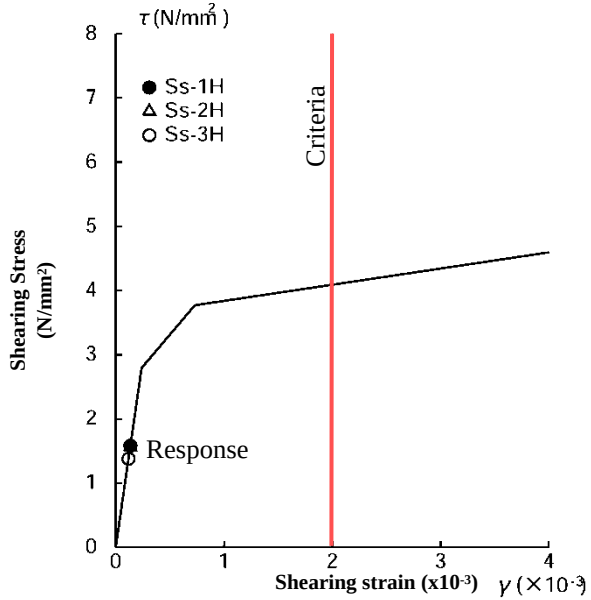
- Seismic safety assessment will be performed for other buildings as well.

② Seismic safety assessment of the earthquake-resisting walls of the auxiliary operation shared facility common pool building [2 (Chapter 4)]

- As a result of assessing the seismic safety of the earthquake-resisting walls of the auxiliary operation shared facility common pool building, it was confirmed that the walls are capable of sufficiently withstanding the design basis earthquake ground motion Ss.

- The following is an example of the earthquake-resisting wall strength assessment results in relation to the design basis earthquake ground motion Ss.

  - The maximum response of the earthquake-resisting walls of the auxiliary operation shared facility common pool building are shown in the diagram below.



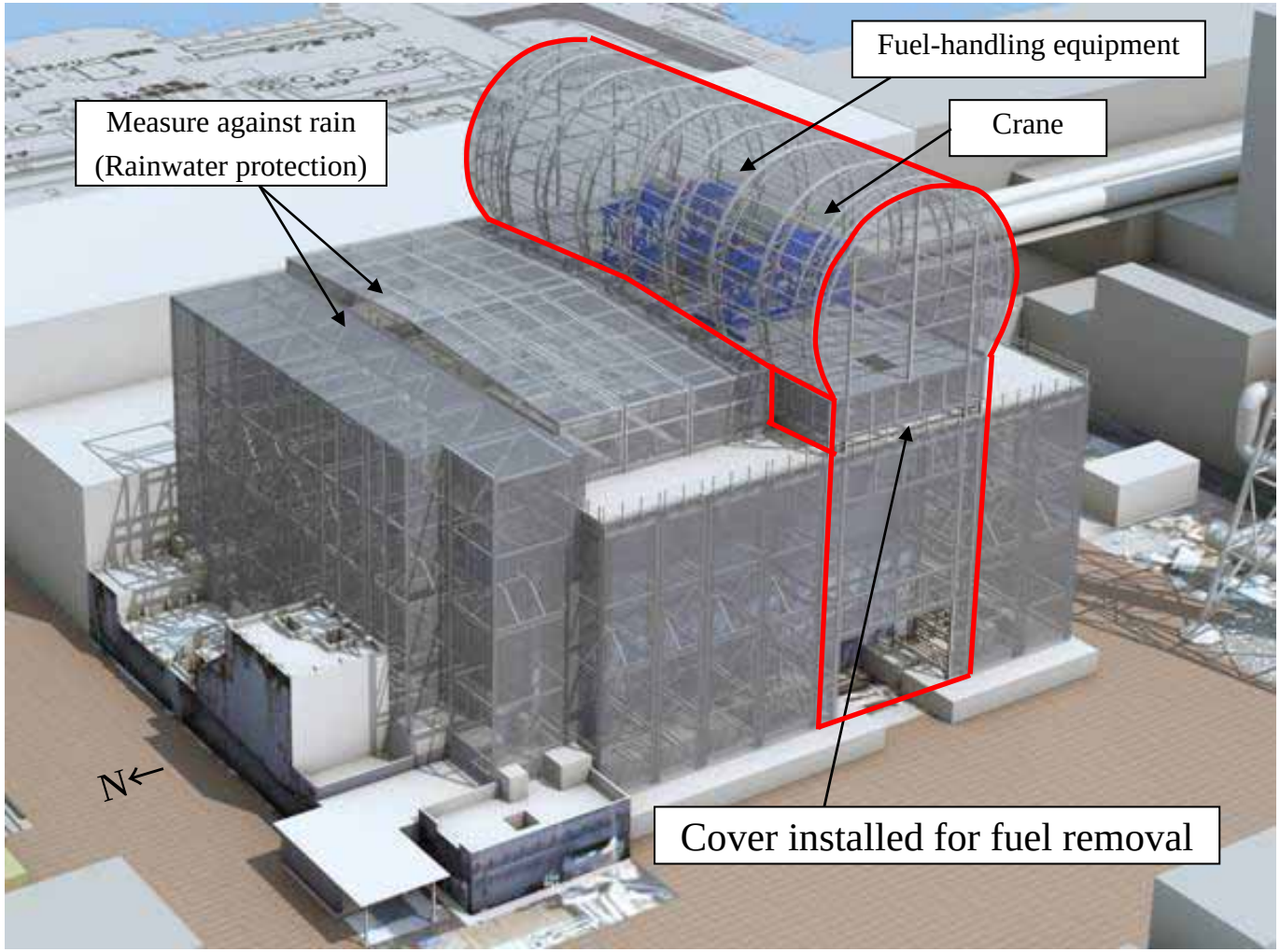
The maximum response on the shear skeleton of the earthquake-resisting walls of the auxiliary operation shared facility common pool building

- Seismic safety assessment will be performed on the pool framework of the auxiliary operation shared facility common pool building.

1. Overview of the cover installed for fuel removal

■Overview (Area inside the red line)

- Steel truss structure
- Height: 54m
- North-south: 19m
- East-west: 57m
- Cladding:
  Steel folded plate



Cover installation for fuel removal at Unit 3 (Northwest side)

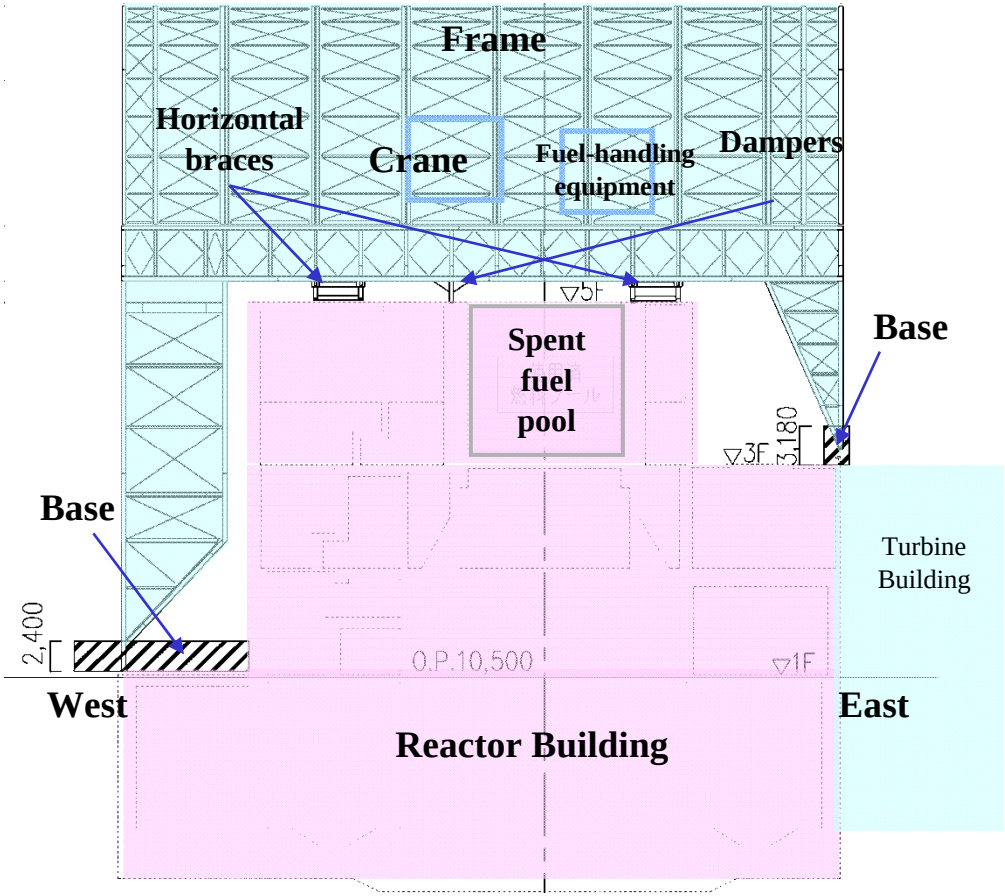
2. Structural/seismic strength of the cover installed for fuel removal (1)

■ Overview of the cover structure

- The cover installed for fuel removal is a structure to support the crane and the fuel handling equipment used for carrying the casks in and out .

- The foundation of the cover is supported by the east-west lower tiers of the Reactor Building. (Its structure does not allow load to be placed on the upper tiers which are damaged.)

- Horizontal braces and dampers have been installed on the 5th floor of the Reactor Building to prevent the cover from being deformed in an earthquake.



East-west cross section of the cover installed for fuel removal

2. Structural/seismic strength of the cover installed for fuel removal (2)

■ Examination of the structural / seismic strength of the cover

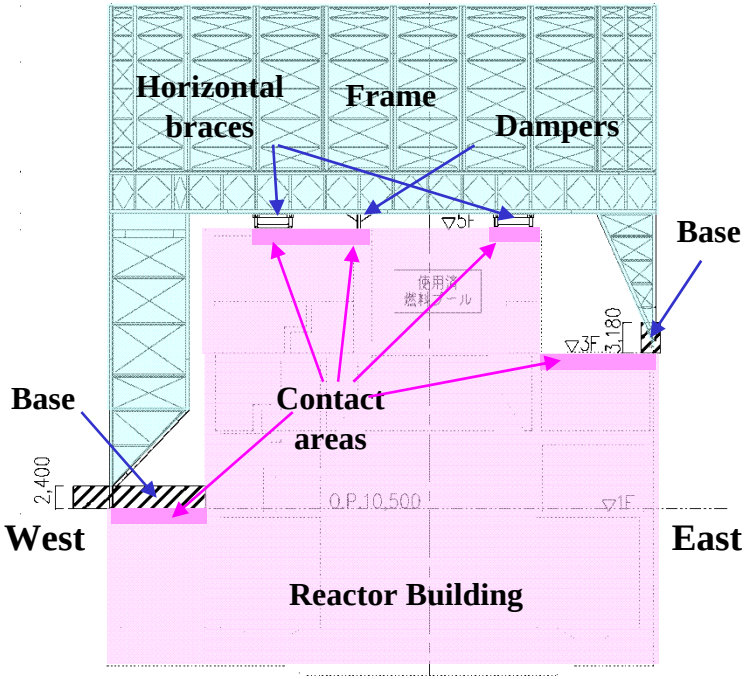
- As for the structural strength, the cover was designed to withstand the seismic force which is **1.5 times greater** than the force specified in the **Building Standards Act**.
- As for the seismic strength, it was confirmed that there would be no impact on the spent fuel pool and spent fuel racks when struck by the **design basis earthquake ground motion Ss**.

■Structural strength examination procedure

① Frame
② Horizontal braces
③ Bases
④ Contact areas
⑤ Cladding

■Seismic strength examination procedure

① Frame
② Horizontal braces
③ Dampers
④ Bases
⑤ Contact areas
⑥ Reactor Building

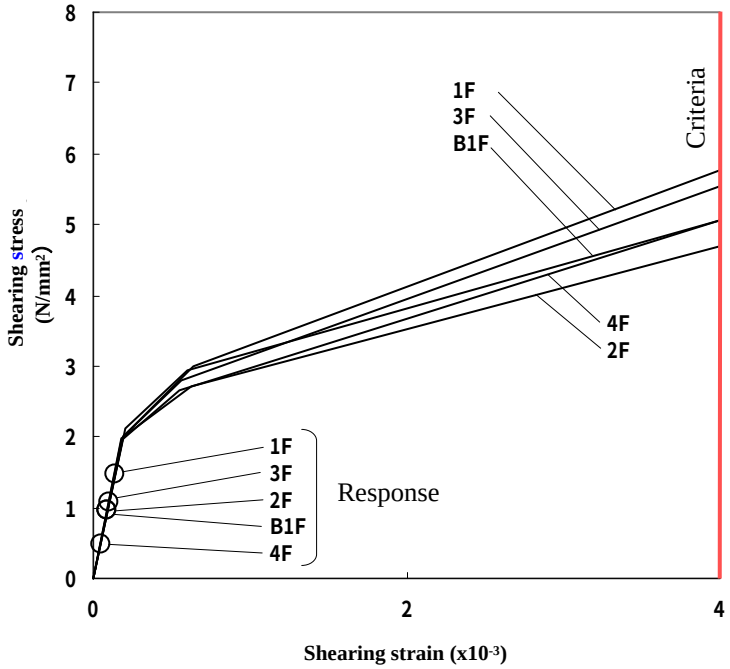


East-west cross section of the cover installed for fuel removal

2. Structural/seismic strength of the cover installed for fuel removal (3)

■ The following is an example of the strength assessment results of the earthquake-resisting walls of the Reactor Building in relation to the design basis earthquake ground motion Ss.

- The maximum story drift angle of the frame was 1/720 which is roughly 1/10 of the criteria of 1/75. Also, the ratio of the maximum stress to the yield strength of the frame was 0.9 and the ductility factor was less than 1, which about 1/5 of the criteria for ductility factor of 5.
- The maximum response of the Reactor Building is shown in the diagram below.

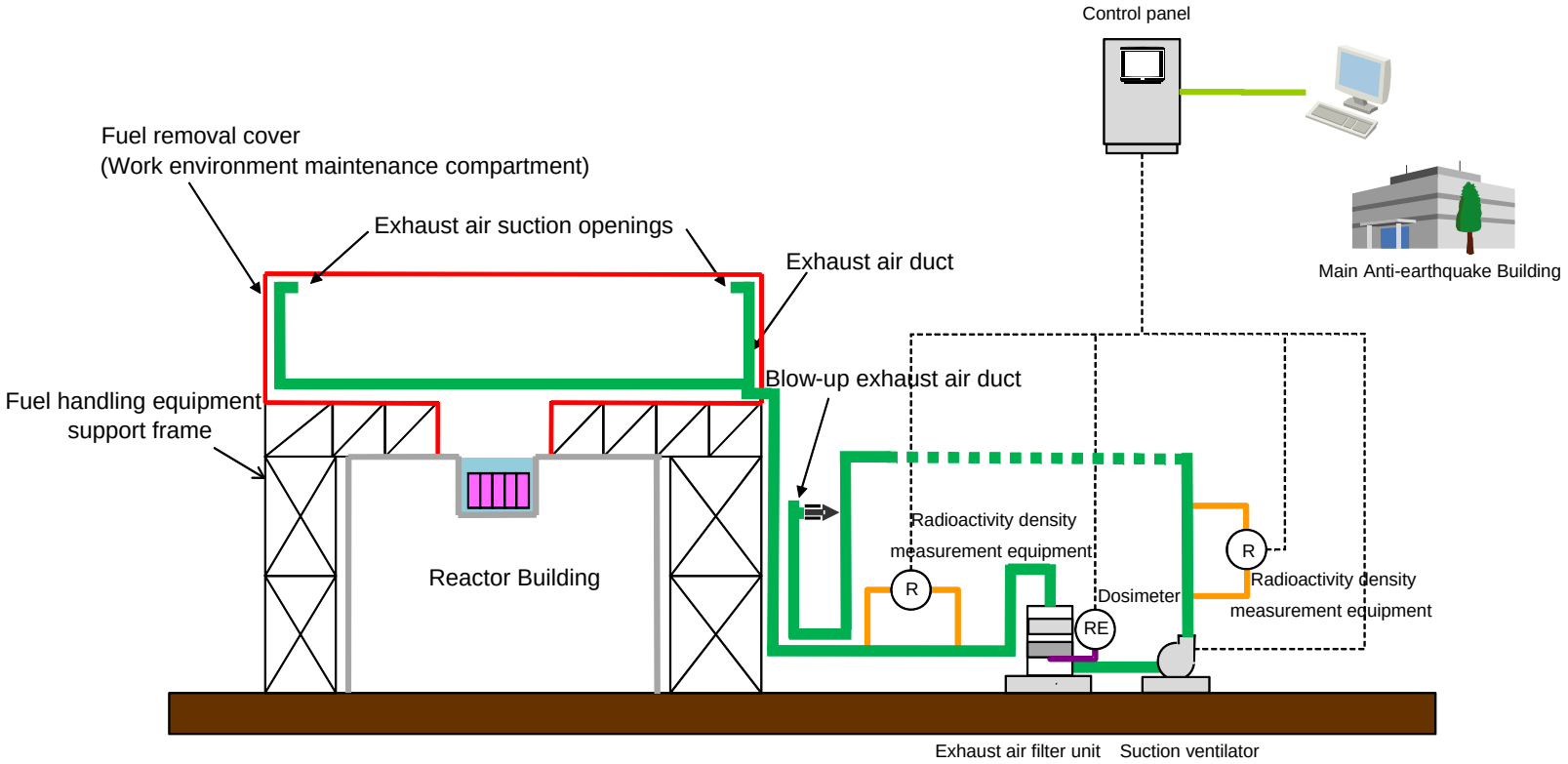


The maximum response on the shearing skeleton of the Reactor Building earthquake-resisting walls after cover installation

3. Functions for preventing the dispersion and diffusion of radioactive materials

■ The ventilating equipment of the fuel removal cover is designed to guide the gas inside the cover to the exhaust air filter unit and release the air of reduced radioactivity density to the atmosphere through the blow-up exhaust air duct.

■ If air with the radioactivity density measured in the upper part of the Reactor Building on September 6, 2012 (Cs-134: 5.2E-4, Cs-137: 8.0E-4) were to be released through the exhaust air filter unit, the radiation dose would result in approximately 0.015mSv/year at the power station site boundaries.



Overview of the ventilating equipment of the cover installed for fuel removal

4. Fuel assembly falling during transportation

■ Though it is quite unlikely that the fuel assemblies fall off of the fuel handling equipment during transportation since two-fold prevention measures have been implemented, an assessment was done assuming a case where it happens.

■ As a result of assessment done under the conditions below, the radiation dose at the site boundaries was estimated to be approx. 1.5E-4mSv/year.

- The number of fuel assemblies to be damaged if fuel assemblies fall into the reactor core is estimated to be 2.3, which is the same as the number specified in the permit for reactor installation.

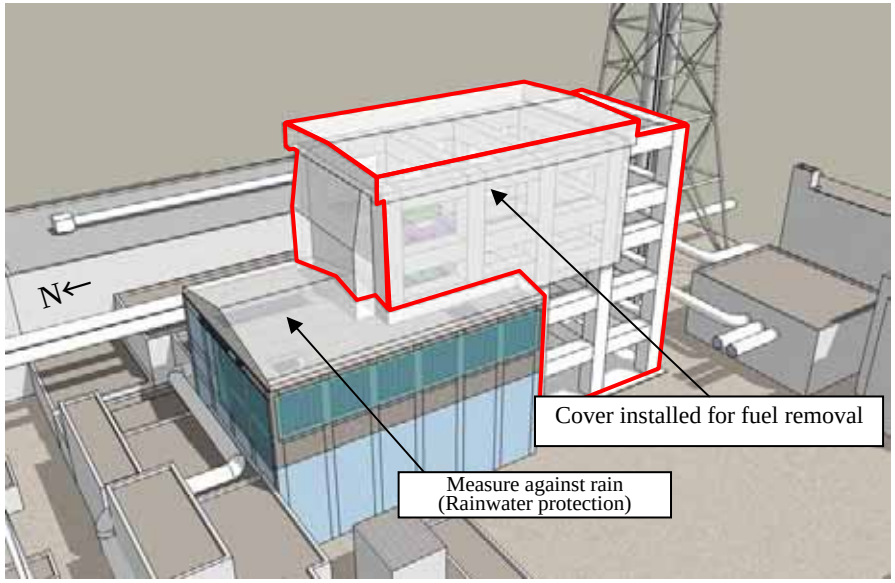
- The spent fuel is to be removed 365 days after being cooled (Approx. 1,600 days will have lapsed when the fuel is actually removed.).

- The entire volume of noble gas released migrates from underwater to the air inside the cover.

1. Re-examination of the structural/seismic strength of the cover installed for fuel removal

■ Outline

The structural/seismic strength of the cover was re-examined in consideration of the determined crane weight and ground improvement test results. As a result, no problem was found with its structural/ seismic strength.



Cover installation for fuel removal at Unit 4 (Northwest side)

2. Safety functions and structural strength of the transport casks used within the power station site/Measures for fuel transportation within the power station site

■ Two of the existing NFT-22B type casks (which store 22 fuel assemblies) at Fukushima Daiichi Nuclear Power Station will be used for fuel transportation within the power station site.

■ Based on the safety evaluation results including the structural strength, heat removal, shielding and criticality, it was confirmed that the casks fulfill the safety requirements for the transport casks.

■ The measures for fuel transportation within the power station site will be implemented in accordance with “Article 13 of the Rules on Installment, Operation, etc. of Commercial Power Reactors (transport conducted at a factory or NPS).”

⑤ The existing 9 dry storage casks (1) [2 (Chapter 5)]

Regarding the existing nine dry storage casks storing spent fuel in the cask storage building, information on their soundness and the method for taking them out of the cask storage building has been added.

■ The current condition of the existing nine dry storage casks

➢Appearance

As the dry storage casks were flooded by the tsunami, foreign substances, dirt and scratches were found on the surface. However, there was no significant abnormality which would affect the structure such as deformation.

➢Surface temperature

As a result of measuring the trunk part of the dry storage casks with an etched-stem type thermometer, the temperature fell in the range of 31 C to 35 C (ambient temperature: 21 C), which is equivalent to that of before the earthquake. Therefore, there should be no problem.

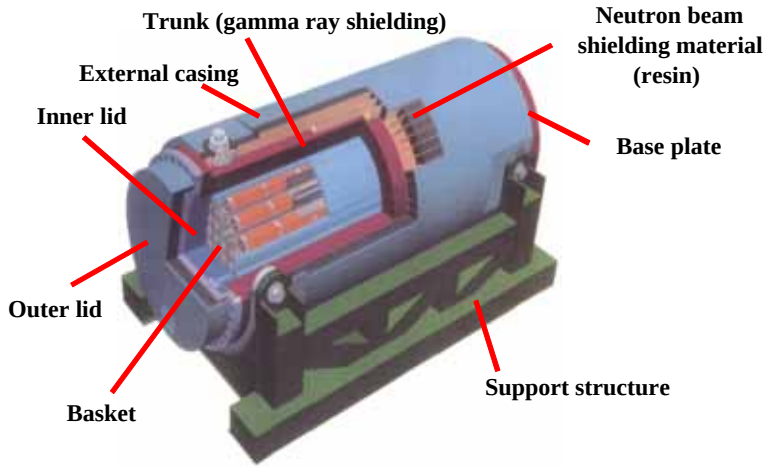
➢Ambient dose

The dose equivalent rate of the dry storage casks measured with a portable dosimeter was approx. 3 μ Sv/h on the surface, which is equivalent to that of before the earthquake. Therefore, there should be no problem.

➢Sealed structure

Though the metal gasket of the outer lid of its double-lid structure seems to have been exposed to salt, the sealed structure is maintained by the inner lid gasket which allows for separation between the inside of the cask and the outer environment.

Though the permanently installed monitoring instrumentation system cannot be used, the current condition is believed not to pose any safety issues. Manual monitoring is being performed once a week.



Overhead view of the dry storage cask

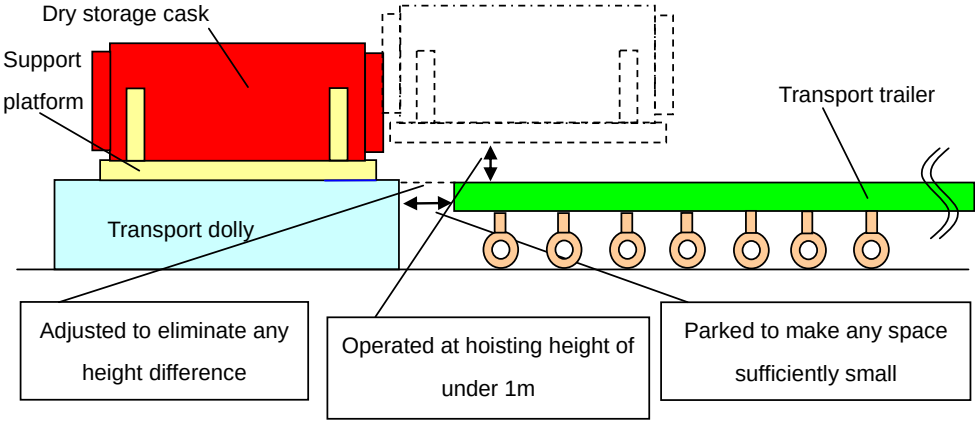
⑤ The existing 9 dry storage casks (2) [2 (Chapter 5)]

■ Soundness confirmation of the existing nine dry storage casks (conducted at the common pool)

- The outer lid metal gaskets of all 9 casks will be replaced as they seem to have been exposed to salt. In the case that air leakage exceeding the standard leakage rate is found at an air leakage test, the inner lid metal gaskets will also be replaced.
- Gas sampling will be performed for all 9 casks to check for fuel damage based on the presence of krypton (hereafter Kr) gas. If Kr gas is detected, all the fuel inside the casks will be removed and other sound fuel stored in the common pool will be loaded into the casks instead.
- For one of all the casks, the outer lid metal gasket, basket inside the cask and fuel assembly appearance will be inspected.

■ Overview of the method for taking casks out of the cask storage building

- As the overhead traveling crane in the building was severely damaged and cannot be used, the casks will be put on a transport trailer by a mobile crane to be transported.
- Since the mobile crane has a single sling and fall prevention measure (double sling) cannot be implemented, it will be operated according to specified procedure including the hoisting height limit so as to mitigate impact in the case that it falls.



Conceptual diagram of carrying out casks