

**<Status Report>**  
**Status of General Inspections Implemented  
after Discovering Partial Incompletion of Safety  
Measure Renovations at Kashiwazaki-Kariwa  
Nuclear Power Station Unit 7**

September 22, 2021  
Tokyo Electric Power Company Holdings, Inc.

- The “Reform Team” that was established in response to partial incompletion of safety measure renovations at Unit 7 is conducting general inspections including verification of validity of investigation methods and investigation results regarding incomplete renovations as well as the following that were pointed out by the Nuclear Regulatory Agency, as a third-party in the internal nuclear power division.
  - Partial tests have not been performed for technical requirements compliance review in welds
  - Installation of some fire detectors in a location that does not satisfy installation requirements
- Non-conformances that are found in these general inspections do not pose an immediate risk on safety but still show problems of equipment quality. As we have caused a feeling of distrust among the people in the local community and we take this situation seriously, the Reform Team will lead actions to ensure safety of the power station such as conducting comprehensive investigations and appropriately implementing measures.
- Today, we will explain the progress of the general inspections conducted for a wider scope of investigations.

# Today's agenda

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- Explanations by the Reform Team today are as follows.

## <Partial incompleteness of safety measure renovations>

: The sequence of events have been put together and announced in the press conference on February 15 and June 10

- ✓ Progress of renovations are checked once again through marking work intended to centrally manage equipment information and field status, including all visible location that have been inspected. Thus, investigations of penetrations will continue through winter.
- ✓ Penetrations that have not undergone flood protection measures were additionally found at five locations.

## <Partial tests have not been performed for technical requirements compliance review in welds>

: The sequence of events have been announced in the press conference on February 15 and June 10

- ✓ The investigation responding to mechanical tests not being performed for filter vent expansion joints was expanded to all components subject to the new regulatory requirements (approx. 4,000 components), and similar cases were investigated.
- ✓ As a result, the investigation found 17 components that required additional actions due to not being subject to review, lack of documents and errors in the testing method. In the future, we will recheck the compliance and replace the relevant equipment.

## <Installation of some fire detectors in a location that does not satisfy installation requirements>

: The sequence of events have been published on the website as nonconformance of March 15 and April 19

- ✓ All fire detectors requiring compliance with the new regulatory requirements (approx. 2,000 units) were investigated and measured with laser.
  - ✓ Installation work was conducted upon confirmation by fire defense equipment officers of contractors, but installation that does not satisfy installation requirements was additionally found at 100 locations. For future pre-use operator inspections, appropriate locations will be re-examined and corrected (moved) based on effective detector performance.
- Countermeasures will be developed and implemented for the aforementioned problems upon thoroughly investigating the issue as we continue the general inspections.

# (Reference) Status of investigations that have been announced

Case	Details that have been announced as of June 10	Slides in today's briefing	
<p><b>1. Partial incompleteness of safety measure renovations</b></p>	<ul style="list-style-type: none"> <li>✓ Incomplete renovations were found at "89 locations categorized into 4 types"</li> <li>✓ All of these renovations required the demarcation of fire protection zones and flooding protection zones prior to identifying locations where renovations were to be implemented.</li> <li>✓ All visible penetrations (approx. 5,300 locations) of all penetrations (approx. 8,000 locations) have been inspected in the generation inspection</li> <li>✓ Penetrations in locations that cannot be directly viewed (approx. 2,700 locations) are currently being investigated (to continue through autumn)</li> <li>✓ Some renovations were overlooked since schematics in the possession of both TEPCO and manufacturers were not compared through coordination between departments as well as between TEPCO and manufacturers. Project frameworks will be developed and equipment information will be shared and systematized.</li> </ul> <p style="text-align: right;">&lt;Announced at the press conference on June 10&gt;</p>	<p>3~4</p>	
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Cases pointed out by the Nuclear Regulatory Agency (after construction)</p>	<p><b>2. Partial tests have not been performed for technical requirements compliance review in welds</b></p>	<ul style="list-style-type: none"> <li>✓ Partial tests have not been performed, actions were not taken and/or documentation was missing for technical requirement compliance review of filter vent welds at six locations</li> <li>✓ Similar cases are currently being investigated</li> </ul> <p style="text-align: right;">&lt;Announced at the press conference on June 10&gt;</p>	<p>5</p>
	<p><b>3. Installation of fire detectors at a location that does not satisfy installation requirements</b></p>	<ul style="list-style-type: none"> <li>✓ It was pointed out in the field observation by the Nuclear Regulatory Agency before pre-use operator inspection began that one fire detector in the Control Building did not satisfy the installation requirements of the Fire Services Act enforcement regulations. Later, the installation status was observed and the same situation was pointed out again.</li> <li>✓ Similar cases are currently being investigated</li> </ul> <p style="text-align: right;">&lt;Published on the website as non-conformance information of March 15 and April 19&gt;</p>	<p>6</p>

# 1. Partial incompleteness of safety measure renovations

## (1) Current progress of the generation inspection

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- Penetrations in locations that are difficult to be directly viewed (approx. 2,700 locations) of subject penetrations (approx. 8,000 locations) are currently being investigated. It is requiring time to assemble scaffolding and check the field for complicated buried routes.
- As part of actions for this problem, bearing future operation and maintenance activities in mind, each and every wall and floor penetration subject to fire/flood protection is given a control number and marked for identification so that equipment information and field status of penetrations are centrally and comprehensively managed.
- It is also checked again during this work whether there are any incomplete renovations including all visible locations that have been investigated, thereby steadily continuing investigations.
- Therefore, investigation of penetrations will continue through winter instead of autumn as originally scheduled.

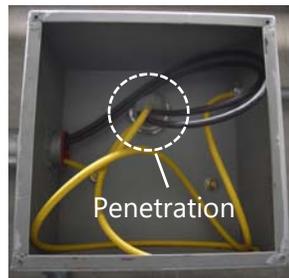
### <Marking work and investigation>



Penetrations in high areas are checked by assembling scaffolding



Recording of marking



Each screwed lid of metal boxes are opened and checked

- ✓ Status of all penetrations is centrally managed in the project framework.
- ✓ Upon doing this, marking work and investigations are checked by the design management departments and work management departments in person.



Marked metal box

- ✗ Penetrations requiring fire protection measures are given a **red circle**
- ✗ Penetrations requiring flood protection measures are given a **blue circle**
- ✗ Penetrations requiring neither measures are given a **black circle**

1. Partial incompleteness of safety measure renovations

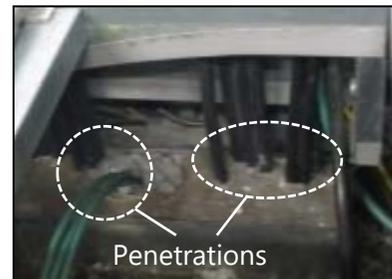
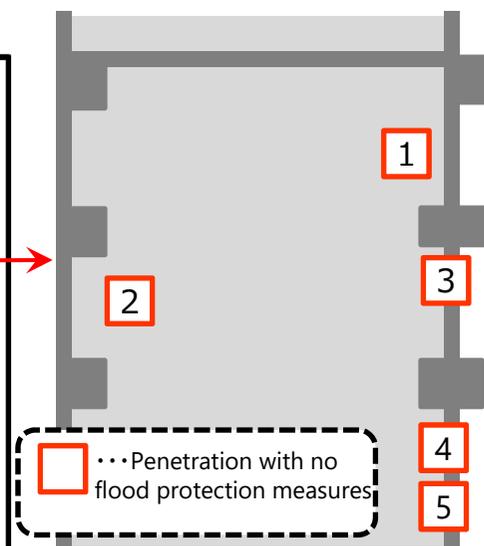
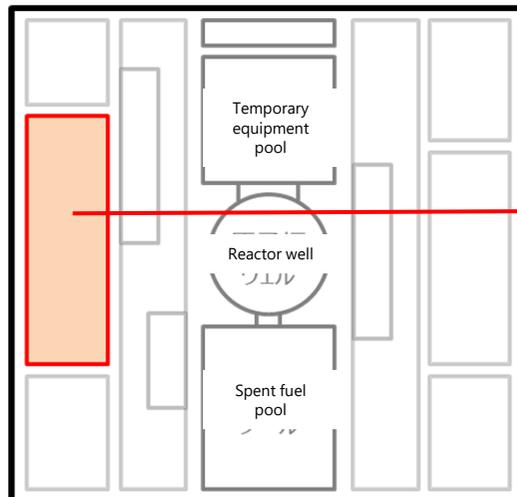
**(2) Incomplete penetrations that were discovered in the additional inspection**

- Penetrations that had not undergone flood protection measures were additionally discovered at five locations in the investigation of penetrations in locations that cannot be directly viewed after the announcement on June 10
- These penetrations were overlooked since schematics were not compared between the design management departments and work management departments (similar cases had occurred in past incomplete renovation cases) \*See Slides 10-12 for details
- Aforementioned locations shall undergo flood protection measures

**<Additionally discovered penetrations>**

Renovation details	Occurred location	Common process-related problems
Flood protection measures <b>(Similar to type ③ on Slide 7)</b>	Wall and floor penetrations at 3MF of Unit 7 Reactor Building (5 locations)	Schematics of flood protection zones should have been compared between design management departments and work management departments of TEPCO

Unit 7 Reactor Building 3MF (plan view)



**All locations are under the floor and are difficult to be directly viewed**

## 2. Partial tests have not been performed for technical requirements compliance review in welds

# Components found in the additional inspection

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- The investigation was expanded to all components subject to the new regulatory requirements (approx. 4,000 components), in response to the issue pointed out\*1 by the Nuclear Regulatory Agency in the course of Unit 7 inspections.

\*1 Partial tests have not been performed for technical requirements compliance review of filter vent expansion joint welds (see Slide 13 for details)
- As a result, 17 components that require additional actions were found. Compliance will be reviewed and components will be replaced upon compiling assessment documents.
- Technical requirement compliance review of welds is complicated as it requires to check wide-ranging drawings and records from the time of construction and one component could have different construction requirements, construction timing and construction company involved. Causes will be investigated thoroughly along with other issues during the general inspections for incomplete renovations.

### <Additionally found components>

Category	Component name (1 section is counted as 1 component for pipes)	Number of components (17 components in total)	Response policy
Not subject to technical compliance review	Filter vent system instrument	6	Conduct welding contractor inspection and replace components with instruments with no welds
	Condensate make up water system pipe	4	
	Filter vent system pipe	5	
Assessment documents not created	Standby gas treatment system pipe	1	Check and assess records again and conduct technical requirements compliance review
Different nondestructive inspection*2	Filter vent system pipe	1	

\*2 PT (penetrant test) was conducted instead of RT (radiographic test)

**Technical requirements compliance review of welds:** Components that have already been constructed or have commenced construction at the time of enforcement of the new regulatory requirements cannot be checked that they comply with the new regulatory requirements through the welding contractor inspection conducted during the construction work. Thus, records at the time of construction are collected and assessed to check compliance with the new regulatory requirements similarly to the welding contractor inspection.

### 3. Installation of some fire detectors in a location that does not satisfy installation requirements

#### Discovered detector in the additional investigation

- All fire detectors subject to the new regulatory requirements (approx. 2,000 units) were investigated in response to an issue\*1 being pointed out twice during the field observation by the Regulatory Agency inspectors before the pre-use operator inspection.  
 \*1 Insufficient isolation distance from the outlet (see Slide 15 for details)
- The investigation comprised of gathering actual measurements using laser and assembling scaffolding and of checking whether the installation location of each detector satisfied the installation requirements according with the Fire Services Act enforcement regulations.
- As a result, the location of 100 detectors\*2 did not satisfy the installation requirements. For future pre-use operator inspections, appropriate locations will be re-examined and corrected (moved) based on effective detector performance.  
 \*2 The final number of detectors was determined upon pre-service confirmation by the Nuclear Regulatory Agency
- Contractors checked installation of fire detectors after construction by measuring with their eyes, and TEPCO did not point that out or instruct to make corrections (depended on the judgment of fire defense equipment officers of contractors). Causes will be investigated thoroughly along with other issues during the general inspections for incomplete renovations.

#### <Additionally discovered detectors>

Factors	Number of units (100 units in total)	
	①Less than 1.5m from the outlet	②Less than 0.6m from the wall/beam
Isolation distance was measured with one's eyes instead of actually measuring it	13 units	61 units
Overlooked since the outlet was not visible due to temporary scaffolding	2 units	—
Outlet was mistaken for inlet since wind pressure was not felt	2 units	—
Misrecognized that isolation distance did not need to be secured for ventilation ports that are not outlets of the air conditioner or areas where there is usually no air flow	22 units	—

① is subject to smoke and heat detectors

② is only subject to smoke detectors

**Reference 1: Partial incompleteness of safety measure renovations**

**Incomplete renovations that have already been publicly announced**

**(disclosed as of June 10)**

- 89 locations categorized into 4 types have been announced as Partial incompleteness of safety measure renovations at Unit 7 implemented in compliance with the new regulatory as shown in the below table.
- All of these cases occurred in the construction work that required the design of a fire protection zone or a flood protection zone prior to specifying the work target.

**<Incomplete renovations that have already been publicly announced>**

Type	Date of Disclosure	Renovation Details	Incomplete Renovations	Notes
①	Jan. 27	Fire protection equipment installation	Damper installation in the Units 6/7 Control Building (seven units)	Completed on April 26, 2021
②	Feb. 15		Fire detector installation in the Unit 7 Reactor Building (five units)	Completed on February 19, 2021
③	Feb. 26	Flood protection measures (penetrations)	Waterproofing of pipe floor penetrations in the Unit 7 Reactor Building (one penetration)	Completed on March 31, 2021
④	Mar. 3	Fire protection measures (penetrations)	Fireproofing of piping wall penetrations in the Units 6/7 Waste Treatment Building (4 penetrations)	Underway
	Jun. 10		Fireproofing of penetrations (72 penetrations)	

## Reference 2: Partial incompleteness of safety measure renovations

### Basic procedure for the general inspection (publicly announced on February 15 and June 10)

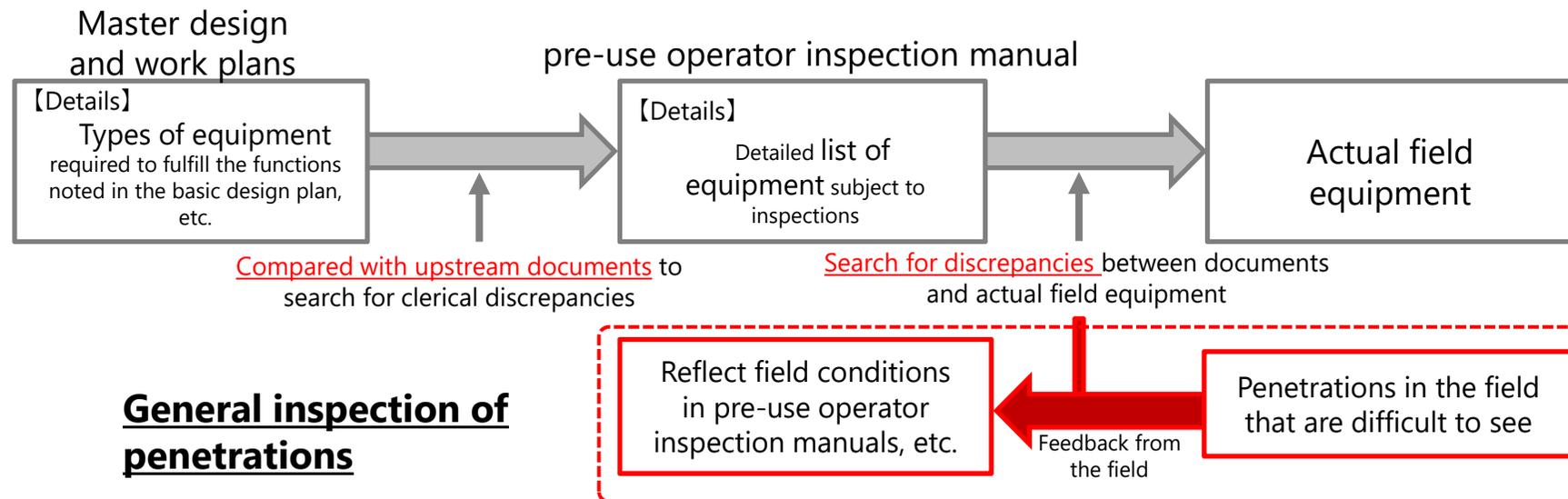
8

- The general inspection was led by a Reform Team comprised of members from Corporate and the power station

#### <General inspection implementation method>

- Identify discrepancies with equipment between the master design and workplan permits, and the pre-service operator inspection manual.
- Upon doing this, search for discrepancies between the pre-service operator inspection manuals for said equipment and the status of work being done in the field.
- In the current "investigation of penetrations that are in locations that cannot be directly viewed", field conditions need to be reflected in pre-use operator inspection manuals.

#### Compare the details of design and workplan permit applications with actual work being done in the field



Appropriate measures shall be quickly implemented if any nonconformances pertaining to equipment integrity or function are found during the pre-service operator inspection currently underway

## <Problems of partial incompleteness and addressing these problems>

### ➤ **Insufficient coordination between departments**

The renovation should have been ordered after confirming all protected zone requests by all departments in conjunction with the protected zone demarcation changes.

⇒ A project leader well-versed in design/renovation work will head up Unit 7 fire protection and flooding protection projects through which design management departments will coordinate with work management departments. This same project system will be employed from the design stages of renovations to be made at subsequent units.

### ➤ **Insufficient coordination between TEPCO and manufacturers**

The renovation should have been ordered after comparing the schematics between TEPCO and manufacturers and conducting detailed field investigations in order to identify the penetrations

⇒ TEPCO will cooperate with manufacturers in sharing information on Unit 7 safety renovation work and design/equipment information required to operate and maintain equipment thereafter. For subsequent units, field investigations will be quickly conducted to gather and manage such information. At the same time, information management that utilizes 3-D scans shall be systemized.

**Case ① of additionally found incomplete renovation**

1 · 2

- When the design management departments created the flood protection demarcation map, they used the wrong color for the subject areas.
- The work management did not recognize these penetrations as needing flood protection measures. Thus, the renovation was overlooked.

Legend	With flood protection requirements	No flood protection requirements
Increased flood protection requirement		
No change		
Decreased flood protection requirement		

Indication of flood protection zones (image)

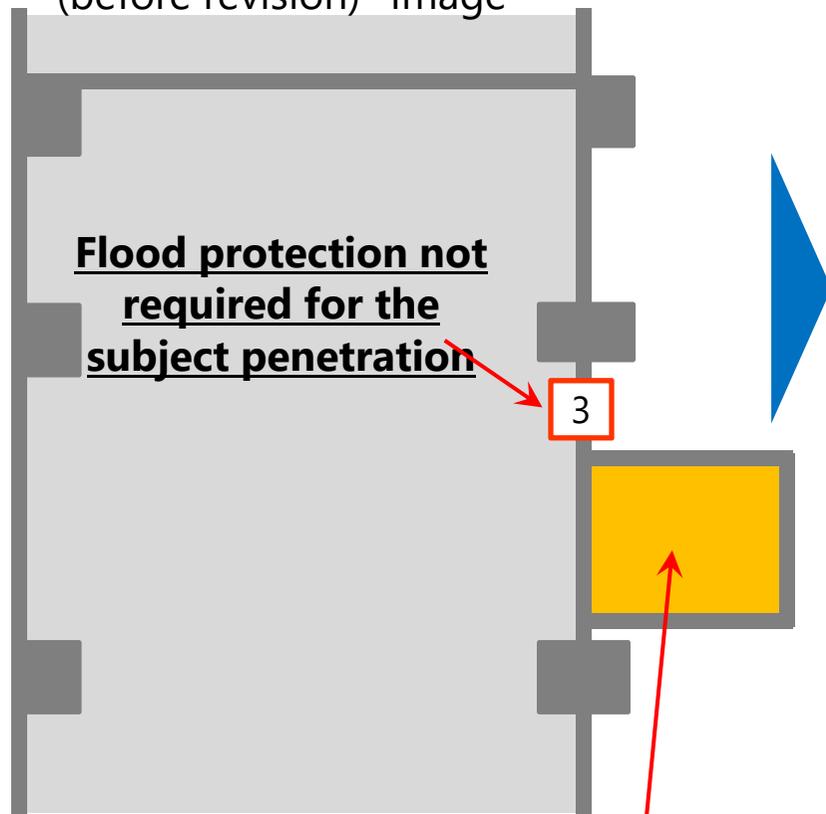
✓ The subject floor newly required floor protection, but the flood protection demarcation map that the design management departments created incorrectly indicated the area with the color that indicated "no change" in flood protection requirement

**Case ② of additionally found incomplete renovation**

3

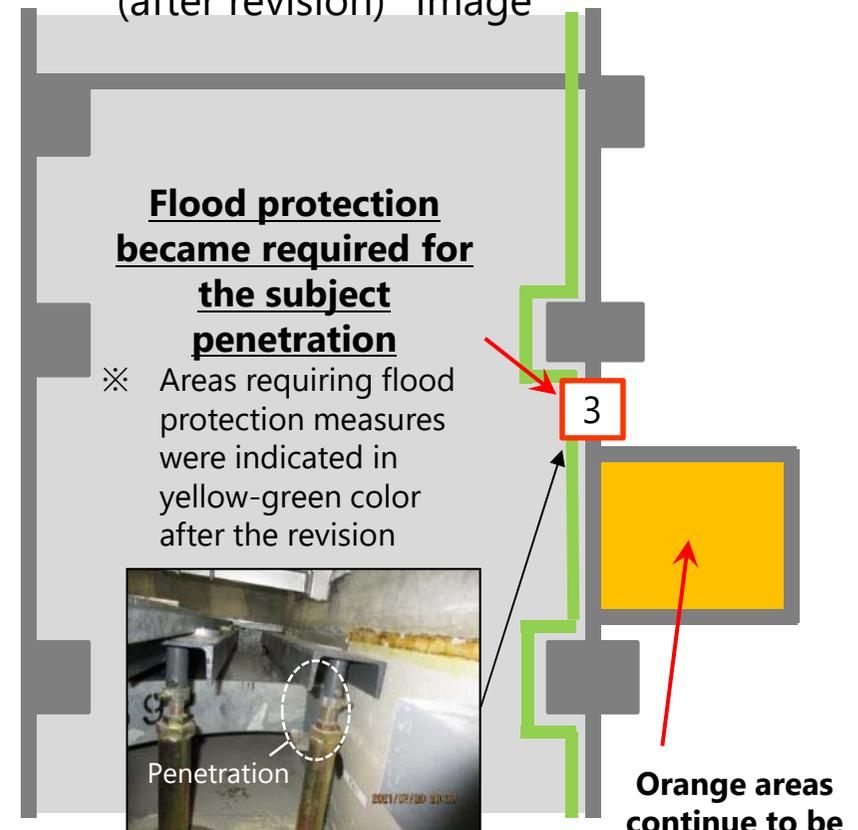
- The design management departments presented the materials on the revision of the flood protection demarcation map to the work management departments but they did not explain it in detail.
- The work management departments did not check the details of the revision with the design management departments, and incorrectly determined the penetration as not subject to flood protection measures.

Flood protection demarcation map (before revision) \*Image



Only orange areas subject to floor protection

Flood protection demarcation map (after revision) \*Image



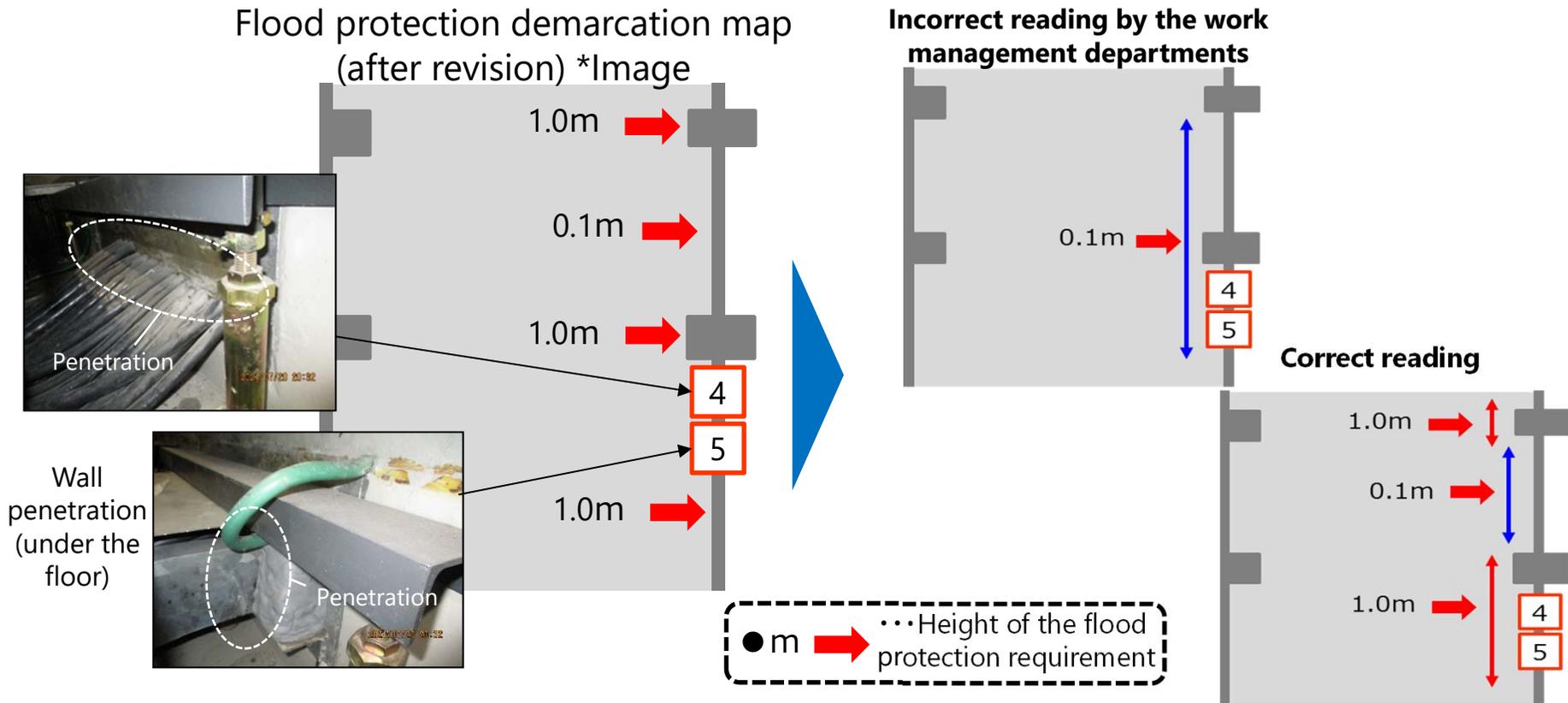
Wall penetration (under the floor)

Orange areas continue to be subject to floor protection

**Case③ of additionally found incomplete renovation**

4 · 5

- The design management departments held a briefing on the revision of the flood protection demarcation map, but they did not thoroughly check whether the work management departments correctly understood the revision
- The work management departments did not check the details of the revision, and thus, incorrectly determined the subject penetrations as not subject to flood protection measures



- ✓ When the design management departments revised the flood protection demarcation map, they set the flood protection requirement of the wall that included penetrations 4 5 as "able to withstand flooding of 1.0m" (=requiring flood protection measures)
- ✓ The work management departments incorrectly read the waterproofing requirement of the subject wall as "0.1m" (=not requiring flood protection measures), which caused the renovation to be overlooked

**Reference 7: Partial tests have not been performed for technical requirements compliance review in welds**

**Sequence of events and overview (announced as of June 10)**

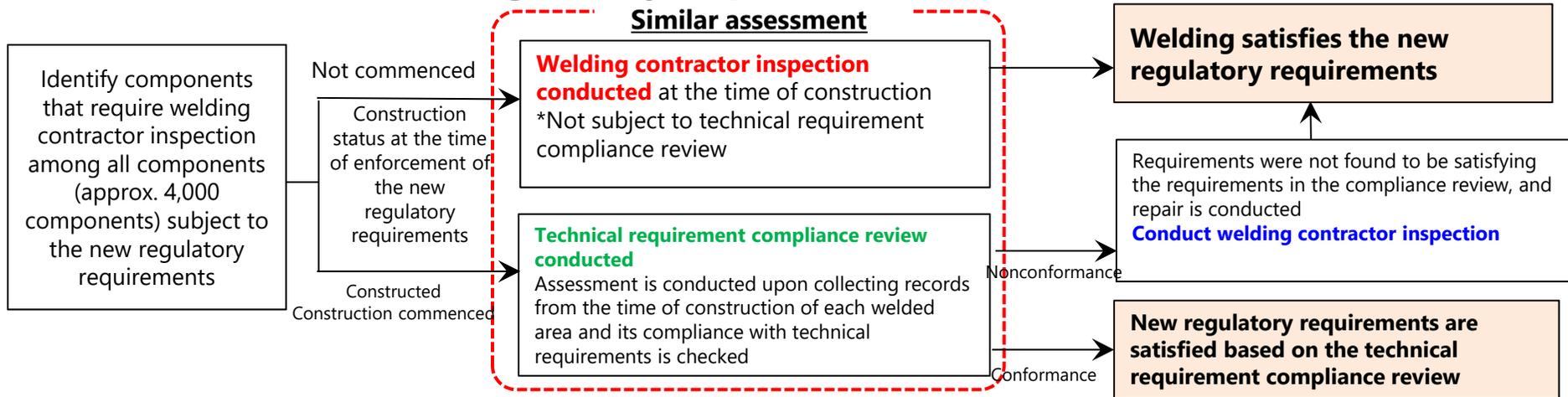
- An investigation to confirm that other filter vent expansion joint welds comply with technical requirements was conducted after the issue (no mechanical tests performed) was pointed out by the Nuclear Regulatory Agency in the course of Unit 7 inspections.
- The investigation found four expansion joints that had already been welded to be not subject to the technical requirement compliance review or to be missing assessment documents.

**<Cases that have been announced>**

Category	Date of disclosure	Component name	Number of components (6 components in total)	Response policy
No mechanical tests performed	February 15	Unit 7 filter vent expansion joint (drain transfer pump outlet)	2	Replace subject components
Not subject to technical requirement compliance review	June 10	Unit 7 filter vent expansion joint (filter inlet)	1	
		Unit 7 filter vent expansion joint (filter outlet)	1	
Assessment documents not created		Unit 7 filter vent expansion joint (drain transfer pump inlet)	2	

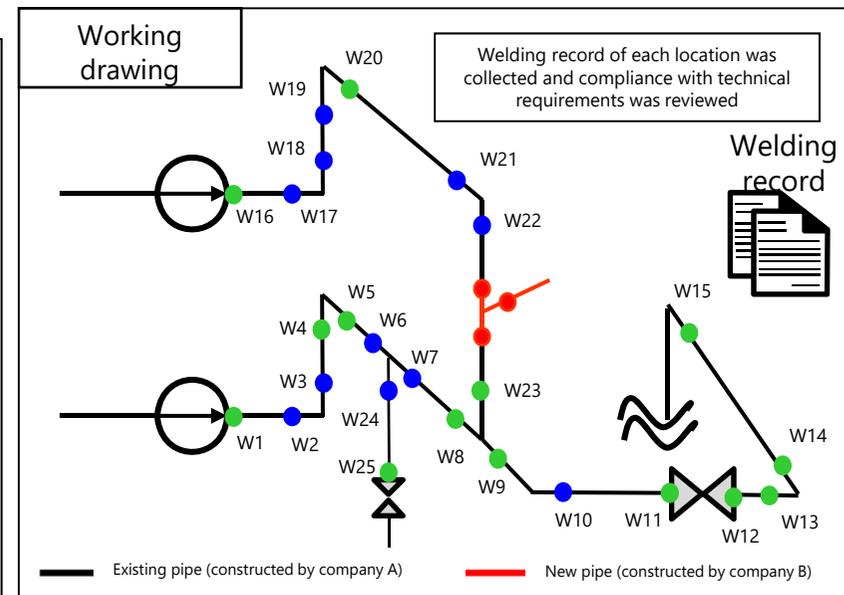
**Confirmation process and errors this time**

**<Process to confirm new regulatory requirements of welds>**



**<Errors this time>**

- ✓ TEPCO did not detect it as a problem that the inspection records submitted by contractors did not comply with the requirements (mechanical tests not performed / different nondestructive inspection)
- ✓ Misrecognized as not subject to the technical requirement compliance review since the record forms received from contractors were the same as those used for the welding contractor inspection
- ✓ Misrecognized as welds subject to the technical requirement compliance review and not subject to said review both existed on a single component (section)
- ✓ Identification was overlooked as multiple members divided up the work
- ✓ Both TEPCO and contractors determined that additional assessment was unnecessary, but assessment documents should have been created based on confirmation by expert welding organizations



※ ● ● ● in the welding drawing are welded areas. ● has undergone welding contractor inspection, ● has undergone technical requirement compliance review, ● requires welding contractor inspection based on the technical requirement compliance review

# Reference 9: Installation of fire detectors in a location that does not satisfy installation requirements

## Sequence of events and overview

- February 2021, it was pointed out during the field observation of Nuclear Regulatory Agency inspectors before the pre-use operator inspection that the fire detectors in the storage battery room of Unit 7 Control Building do not satisfy the installation requirements\*.  
<Published on the website as nonconformance information for March 15>
- Installation status of fire detectors was investigated in response to the above issue (first investigation), and three detectors including the detector that was pointed out were moved to an appropriate location.  
(In the first investigation, areas that can be reached were actually measured, and areas that could not be reached were measured with one's eyes using a scale as a guide)
- In April, it was pointed out during the field observation of Nuclear Regulatory Agency inspectors before the pre-service operator inspection that two fire detectors in the class III measurement power panel room of Unit 7 Control Building do not satisfy the installation requirements (air outlet of the ventilation port mistaken for inlet). <Published on the website as nonconformance information for April 19>

### <Detectors that were pointed during the field observation, and detectors discovered in the first investigation>

Confirmed date	Location	Number of units	Category of insufficiency
February 16 (pointed out)	Storage battery room in Unit 7 Control Building	1 unit (corrected)	① Less than 1.5m from outlet
From February 20 to March 10 (first investigation)		2 units (corrected)	
April 14 (pointed out)	Class III measurement power panel room in Unit 7 Control Building	2 units (not corrected)	

Image of installation requirement

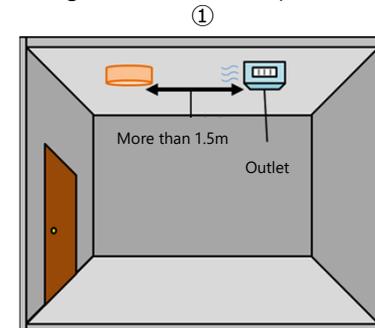
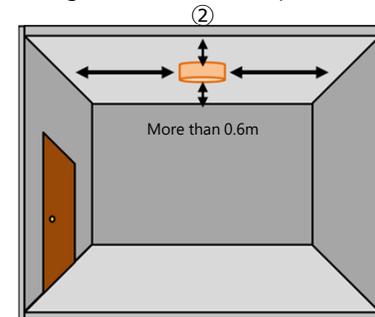


Image of installation requirement



\*Major installation requirements of fire detectors (smoke/heat)

- ① Install the detector more than 1.5m from the air outlet of the ventilation port. However, if the outlet is located more than 1m from the ceiling on a wall, the detector may be installed within 1.5m from the outlet.
- ② Install the smoke detector more than 0.6m from the wall or beam.