The Status of Nuclear Safety Reform Initiatives

May 27, 2025

Tokyo Electric Power Company Holdings, Inc.

Contents of this report

- At the Kashiwazaki-Kariwa Nuclear Power Station various safety measures have been implemented based on the lessons learned from the Fukushima Daiichi Nuclear Power Station Accident and technical preparations for the restart of Unit 7 have been completed. Preparations for the restart of Unit 6 should be completed by the summer of this year.
- However, in the wake of the Noto Peninsula Earthquake that occurred last year, we are carefully addressing the concerns and questions of community residents that feel uneasy about the ability to evacuate in the event of a compound disaster, and we are also engaged in preparedness support initiatives.
- While focusing on the issues mentioned above, at this meeting of the NRMC we will provide an update on how we are addressing labor accidents and physical protection issues as part of nuclear safety reform initiatives.

Report contents

1. Various safety measures implemented based on the lessons learned from the Fukushima Daiichi Nuclear Power Station Accident (Including progress made at Units 6/7)
2. Communicating with the region
3. Preparedness support initiatives
4. Addressing labor accidents and our “One Team“ approach
5. Physical protection initiatives

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1-①. Lessons learned from the Fukushima Daiichi Nuclear Power Station Accident and countermeasures

■ At the Kashiwazaki-Kariwa Nuclear Power Station countermeasures have been implemented based on the regrets and lessons learned from the Fukushima Daiichi Nuclear Power Station Accident not under the assumption that, "accidents will not happen," but rather that, "unforeseen accidents can happen."

Background and Lessons Learned from the Fukushima Daiichi Nuclear Power Station Accident

2:46 PM, March 11, 2011

Earthquake occurs (Hypocenter: Off the coast of Sanriku; magnitude: 9.0)

Reactor scram	Stop	• Automatic scram of reactor Units 1, 2, and 3 that were in operation
Power receiving/transmission equipment damage, loss of off-site power		• Power receiving equipment damage and the toppling of transmission towers leads to a loss of off-site power
Emergency generators started	Cool	• Emergency diesel generators started up, cooling water injection into reactors, etc. continues

3:35 PM, March 11, 2011

Tsunami arrives

Power required to cool the reactors is lost	Cool	• Vital equipment, such as emergency diesel generators, flooded by the tsunami resulting in function loss
Reactor cooling functions are lost	Cool	• Reactor cooling water injection shuts down leading to a rise in fuel temperature and meltdown • Hydrogen generated
Pressure vessel damaged, containment vessel ruptures	Contain	• Unit 1, 2, and 3 PCVs rupture • Radioactive substances and hydrogen leak into the reactor buildings
Buildings damaged by hydrogen explosions (Units 1, 3, and 4)	Contain	• Hydrogen explosions occur at Units 1, 3 and 4 causing significant damage to reactor buildings

Radioactive substances discharged into the environment (Units 1, 2 and 3) → Widescale soil contamination

Lessons learned from the accident

Poor tsunami protection made the site vulnerable to flooding by a tsunami

➡ Go to slide 3 for information on earthquake/tsunami countermeasures

Safety Measure 1

Measures for restoring power sources and alternate means for reactor cooling water injection and cooling in the event of a loss of all AC power were insufficient

➡ Go to slides 4 for information on power source enhancements

Safety Measures 2

➡ Go to slides 5 for information on cooling water injection system enhancements

Safety Measures 3

Measures for preventing hydrogen explosions following core meltdown and the discharge of radioactive substances were insufficient

➡ Go to slide 5 for information on measures to prevent the dispersion of radioactive substances

Safety Measure 4

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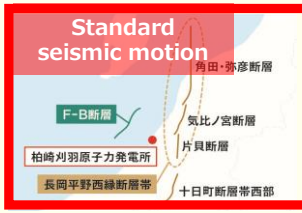
1-②. Safety Measure 1: Earthquake/Tsunami Countermeasures

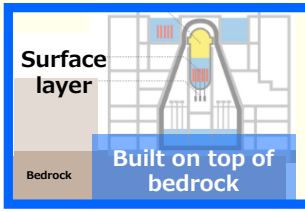
- Countermeasures implemented after redesigning important systems so that they can withstand an earthquake on par with the Noto Peninsula Earthquake and Chuetsu-Oki Earthquake.
- Facilities reinforced to prevent buildings from being flooded with seawater in the event of a tsunami

【Key】 … Countermeasures prior to the Fukushima Daiichi Nuclear Power Station Accident … Additional/strengthened countermeasures in light of the new regulatory requirements issued after the Fukushima Daiichi Nuclear Power Station Accident

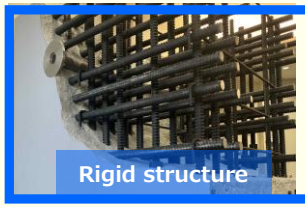
Earthquake countermeasure examples



Predicts largest earthquake that could occur in the vicinity of the power station based on the seismic record and geological surveys conducted on land and under the ocean around the power station.



The reactor buildings were built upon robust bedrock that is resistant to seismic motion



The reactor buildings were built with fatter rebar and thicker walls and normal buildings thereby enabling them to resist deformation under great stresses

Since the Chuetsu-Oki Earthquake, 1,400~3,000 additional piping supports inside the buildings have been added at each unit and they all can withstand standard seismic motion

Tsunami countermeasure examples

A document survey on tsunamis that have occurred in the vicinity of the power station and a numerical simulation based on active fault assessment results, etc., have been implemented. The maximum height of a tsunami that could impact the power station has been estimated based on those results.

An embankment approx. 3m tall was built on land 12m above sea level resulting in a seawall that is 15 m above sea level (Unit 5~7 side)

※ Independent countermeasure separate from new regulatory requirements

Rooms containing systems used to cool the cores in the event of an accident and other vital equipment, such as emergency diesel generators, etc., have been fitted with watertight doors to prevent flooding.

Wall penetrations used for pipes and cables, etc., have been waterproofed to prevent rooms containing vital equipment from being flooded

1-③. Safety Measure 2: Securing Power Sources

- Multiple substitute power sources have been installed in order to provide power to systems used to cool the reactors, etc. in the event that all on-site power is lost.
- These substitute power sources have also been distributed so that they would not be impacted by a tsunami

【Key】 ··· Countermeasures prior to the Fukushima Daiichi Nuclear Power Station Accident ··· Additional/strengthened countermeasures in light of the new regulatory requirements issued after the Fukushima Daiichi Nuclear Power Station Accident

Examples of securing power sources

1

Five off-site power transmission lines have been built to ensure that necessary power can be received from off-site in the event of an accident

2

Started up in the event that off-site power was lost in order to provide required power. Can be used to cross-feed power to all units

3

Equipped with generators that produce electricity using turbines powered by diesel combustion gases, these trucks can provide power to large cooling systems. Parked in areas that would not be affected by a tsunami.

4

Highly mobile trucks that can be moved to wherever power is needed. Parked in areas that would not be affected by a tsunami

Additionally installed DC power sources

- The power station uses mainly DC power sources to power primary plant status monitoring and control systems. Therefore, the plant was built with multiple large capacity storage batteries to be used as these DC power sources.
- We have additionally installed large capacity storage batteries in high locations in the reactor buildings that are more than 15m above sea level and would not be impacted by flooding in order to improve reliability

1-④. Safety measures 3 and 4: Securing substitute cooling methods /Preventing the discharge of radioactive substances

- Redundant and diversified safety measure systems enable an accident to be brought under control
- In the rare event that it might be necessary to discharge radioactive substances into the atmosphere, an alternative circulated cooling system would enable the substances to be contained within the PCV for approximately 10 days after an accident, and filter vent equipment would reduce the number of radioactive substance particles by 1/1000.

【Key】 … Countermeasures prior to the Fukushima Daiichi Nuclear Power Station Accident … Additional/strengthened countermeasures in light of the new regulatory requirements issued after the Fukushima Daiichi Nuclear Power Station Accident

Examples of secured cooling methods

Cooling water injected into the reactors using motor-driven pumps and pumps driven by reactor steam

Driven by reactor steam this system can inject water into the reactors even in the event that all power was lost

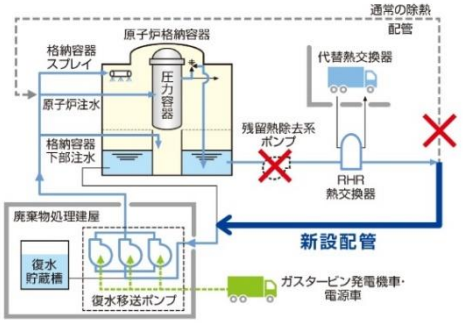
Can be used to inject cooling water into the reactors and spent fuel pools if motor-driven cooling water injection systems are rendered inoperable. Parked in locations that would not be affected by a tsunami.

Systems used to cool the reactors in the event that existing systems could not be used. Parked in locations that would not be affected by a tsunami.

PCV cooling

Preparing for rises in PCV temperature and pressure

Alternative circulated cooling system



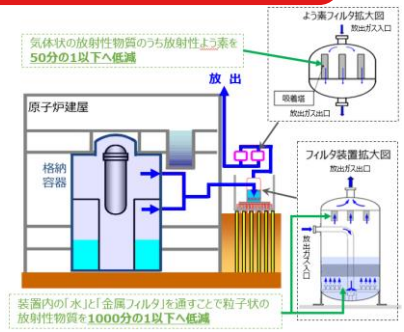
Could avoid the discharge of radioactive substances for approximately 10 days

- Can prevent the external discharge of radioactive substances and PCV rupture for a short period of time
- Allows time to repair other means of preventing the discharge of radioactive substance

Preventing the discharge of radioactive substances

Preparing for an increase in the concentration of flammable gases (hydrogen, oxygen) inside the PCV

Filter vent equipment



Filters out radioactive substances as much is possible before venting

- Reduces the amount of radioactive substance particles to less than 1/1000
- Reduces gaseous radioactive iodine to less than 1/50

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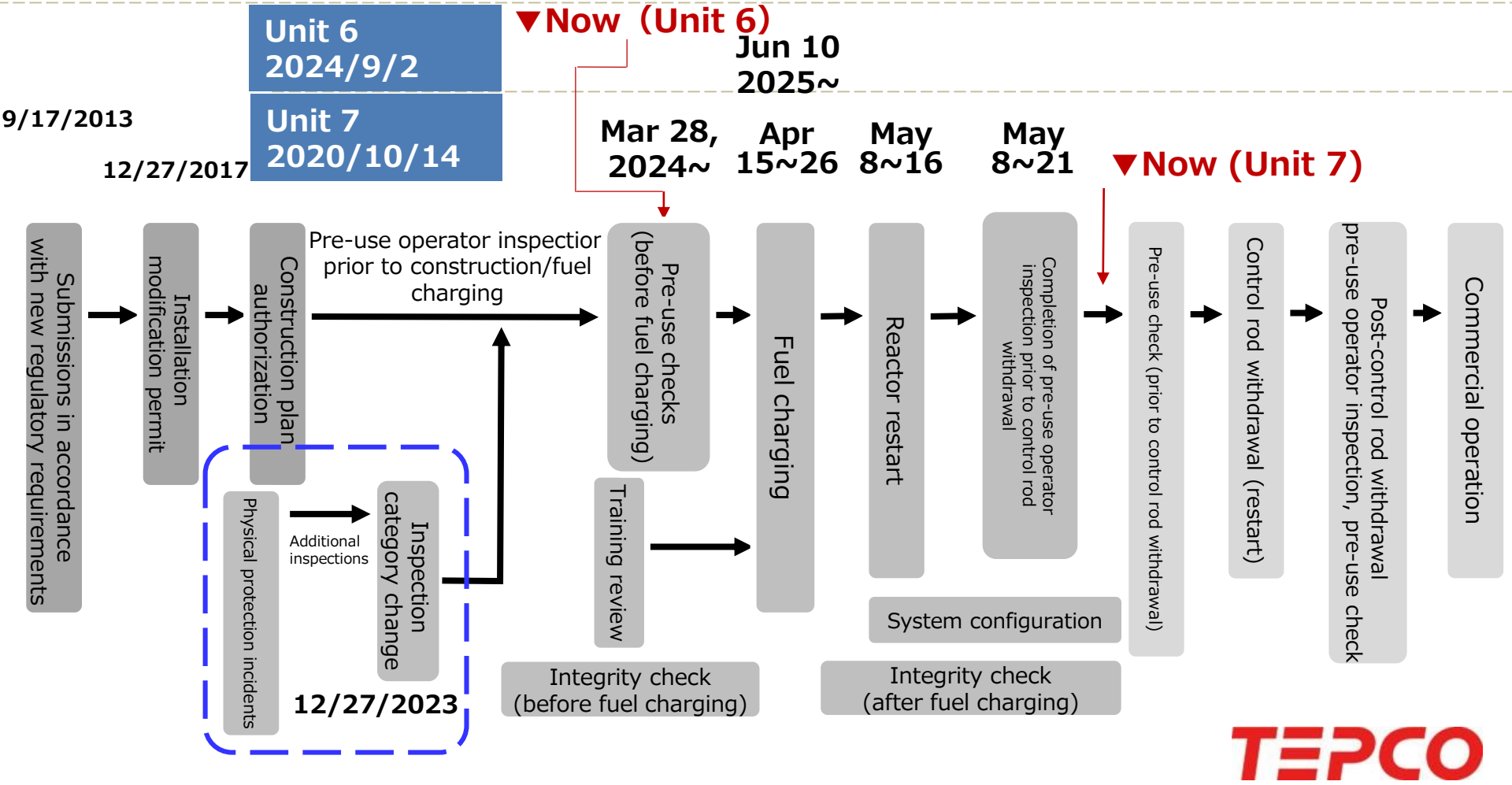
1-⑤. Progress at Units 6/7 and restart schedule

- In April 2024, Unit 7 was charged with fuel and technical preparations for reactor restart were completed in June of the same year. We are currently in the process of conveying the status of power station initiatives to regional residents.
- Safety regulation authorization for Unit 6 was received from the Nuclear Regulation Authority in February 2025 and all inspections required for restart have been completed. The reactor will be charged with fuel starting on June 10.

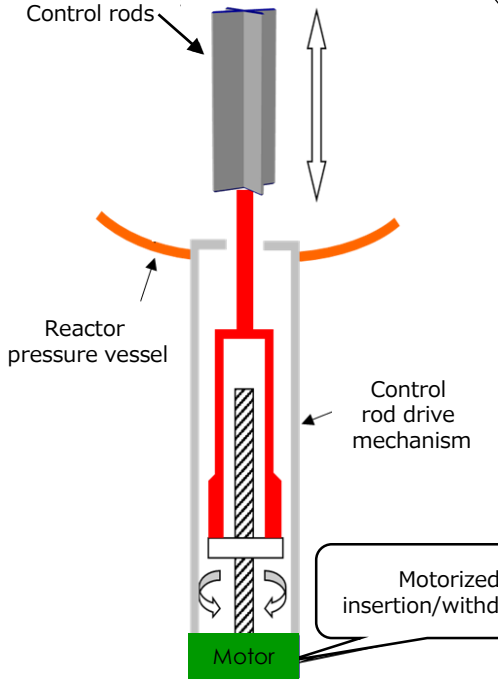


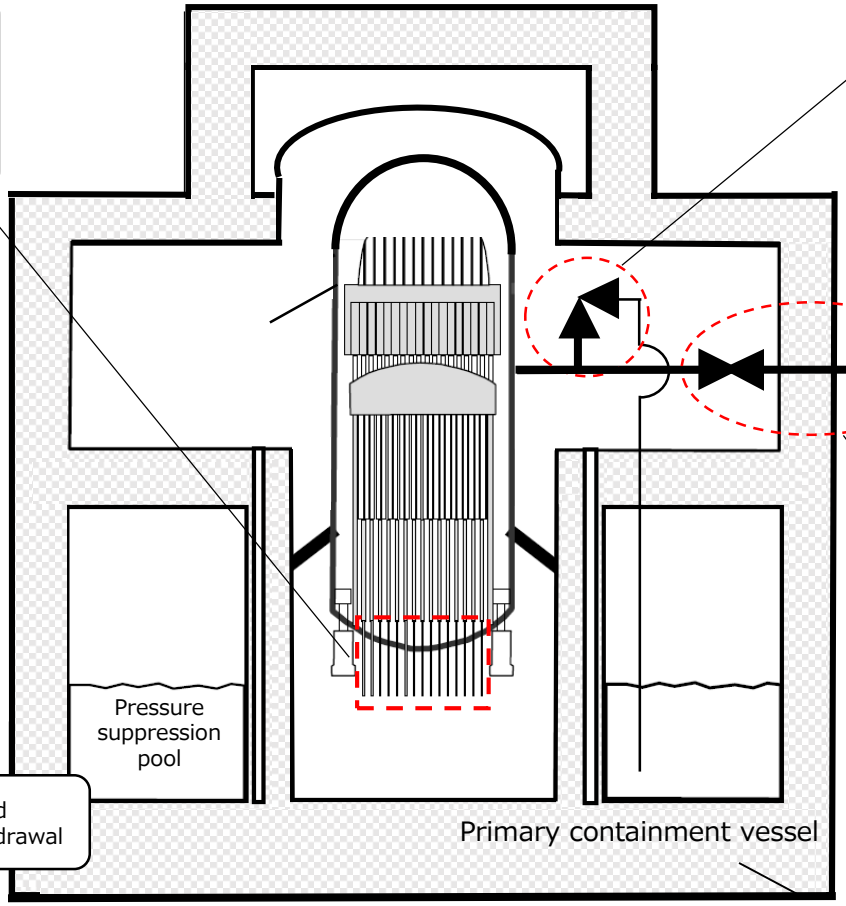
1-⑥. Unit 6 reactor main system integrity check

■ As with Unit 7, we are confirming the integrity of the main reactor systems at Unit 6

③Control rod drive mechanism (ongoing)

【Check details】
Each of the motorized 205 control rods will be inserted/withdrawn to confirm that the entire control rod drive mechanism works correctly





②Main steam relief safety valve (4/17)

【Check details】
The operation of the main steam relief safety valve will be checked

To turbine

①Main steam isolation valve (4/10, 4/15)

【Check details】
The main steam isolation valve will be checked to confirm that it opens/closes correctly and pressure via compressed air will be applied to confirm that there are no leaks

1-⑦. Emergency response training

- Operators engage in training scenarios that are more severe than the Fukushima Daiichi Nuclear Power Station Accident and through integrity checks and training at thermal power plants that are actually in operation, they improve the senses they need to operate an actual plant and gain real-world experience.
- In order to improve the ability to cooperate with emergency first responders, in FY2023 off-site power repair training was implemented in coordination with TEPCO Power Grid, a core company, and in FY2024 training on how to respond to a compound disaster (nuclear + fire) was implemented in coordination with the public fire department after developing scenarios of suitable difficulty that envision actual disasters on a wide scale.
- During emergency response drills in FY2024, other power stations acting as assessors commented that, "there is good coordination between field commanders and site personnel, and we get the sense that everyone has become quite experienced through daily training," "the power station headquarter commander quickly determined the emergency action level (EAL)," and "it feels like all issues pertaining to communicating information to external parties have been rectified."

General training
(more than 180 times)

Off-site power repair training

Compound disaster
response training

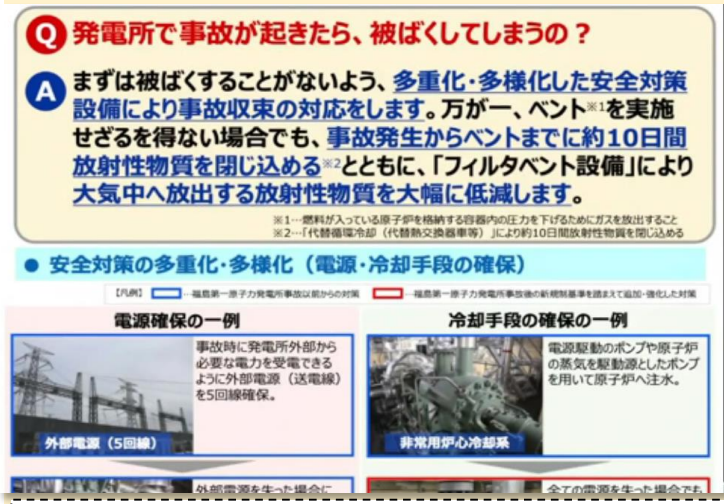
2．Communication with the region

- Regional residents have expressed concerns over evacuating in the event of a compound disaster in the wake of the Noto Peninsula Earthquake of last year.
- TEPCO communication booths that are set up throughout all of Niigata Prefecture are used to carefully address concerns and questions pertaining to power station safety. Since FY2024 we have increased the frequency at which we set up these booths in order to have as many people as possible come visit.
- Briefings for prefectural residents are also held in order to address their concerns and questions. And, in December 2024, we started a new initiative called the “TEPCO Forum,” which was held to hear the opinions of prefectural residents and deepen their knowledge and understanding about energy, radiation, and power station safety.

＜ TEPCO communication booths ＞

- Set up 178 times since 2015. 39,732 visitors (as of May 8, 2025).
- Set up 42 times during FY2024. 11,300 visitors.
- Opinions elicited at the booths are provided as feedback to the power station and leveraged in power station operations

<Briefings for prefectural residents/TEPCO Forum>



It was explained that in the event that it was necessary to discharge radioactive substances into the atmosphere, the substances can be contained inside the primary containment vessel for approximately 10 days after an accident and the actual amount of radioactive substances would be drastically reduced by filter vent equipment

3-①. Preparedness support initiatives: Agreement with Niigata Prefecture on nuclear preparedness cooperation

- On October 16, 2020, TEPCO signed an agreement on nuclear preparedness cooperation with Niigata Prefecture in order to improve the effectiveness of protective measures based on the Niigata Prefecture Nuclear Disaster Evacuation Plan
- In accordance with this agreement, a system of cooperation will be built during times of normalcy in order to provide vehicles and personnel to aid with the evacuation of residents in the event of emergency, and this framework of cooperation shall be continually reviewed and improved through participation by TEPCO in nuclear preparedness training implemented by Niigata Prefecture.

＜Agreement on nuclear preparedness cooperation (areas of cooperation)＞

（1） Personnel for screening (screening when leaving the site during an evacuation) and material/equipment support

（2） Provision of personnel and vehicles to help evacuate people with special needs residing in social welfare facilities

（3） Provision of information predicting the dispersion of radioactive substances

（4） Use of training to review the cooperative framework in place to respond to a nuclear disaster and deliberation/revision of said cooperative framework based on training results

＜Examples of actual corporation based on the agreement (Evacuation of people with special needs)＞

- In accordance with the agreement, 31 welfare vehicles capable of transporting people with special needs from facilities within the PAZ are to be deployed
- To be lent to the welfare facilities during times of normalcy (Deployed)
- In the event of an emergency, 62 employees would assist with the evacuation of people with special needs

Welfare vehicles (evacuation support vehicles)

Assistance with the evacuation of people with special needs

<Recent participation in Niigata Prefecture nuclear preparedness training>

FY2020	FY2021	FY2022	FY2023	FY2024
Approx. 140 people	**Approx. 150 people**	**Approx. 180 people**	**Approx. 210 people※**	**Approx. 170 people**

※Implemented on a large scale as general preparedness training held by the Government

Screening during evacuation

Assistance with the evacuation of people with special needs

3-②. Preparedness support initiatives: Joint research with universities and opening TEPCO facilities, etc. to the public

- We've already declared our cooperation to strengthen snow-removal measures in order to improve the effectiveness of evacuation measures
- As part of regional preparedness, which includes natural disasters, through joint research with Nagaoka University of Technology we have commercialized a water changer (water purifier that uses microorganisms)
- TEPCO's Service Hall will be open to the public for use as a temporary evacuation center in the event of a natural disaster. And, we are deliberating additional support measures.

<Joint research with Nagaoka University of Technology>

- In 2020 we signed a comprehensive agreement on coordination pertaining to preparedness/disaster reduction
- Through joint research we have developed preparedness products, such as a water changer® and a preparedness vaccine breaker kit®, that was commercialized with the help of companies in Niigata Prefecture.
- The water changer® was used in the aftermath of the Noto Peninsula Earthquake that occurred on January 1, 2024

Used in the wake of the Noto Peninsula Earthquake

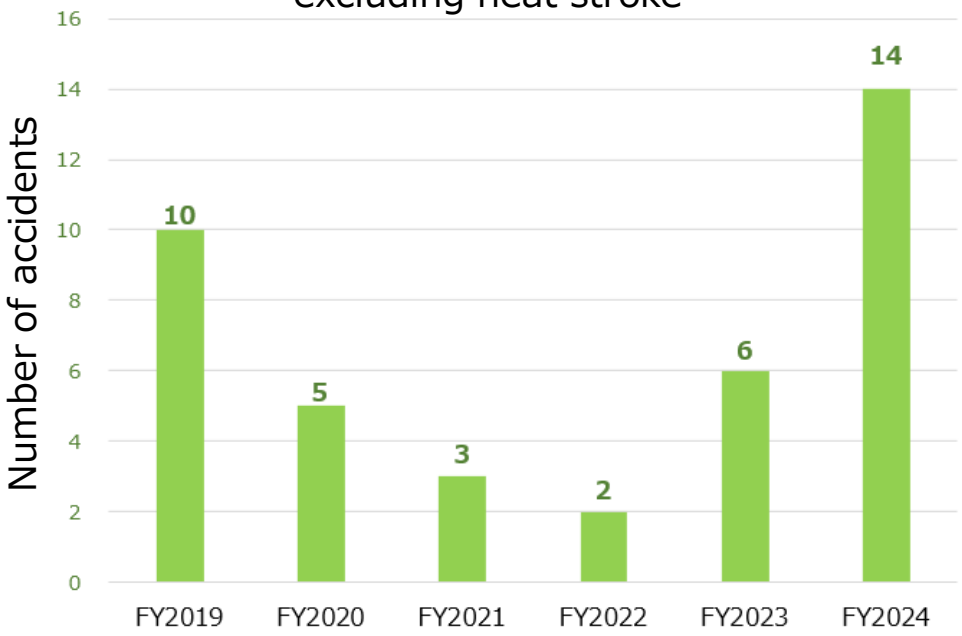
<Opening TEPCO facilities the public>

- TEPCO's service Hall will be open to the public for use as a temporary evacuation center in the event of a natural disaster
- Going forward, steps will be taken while listening to the opinions of regional residents to open the Kashiwazaki Resilience Center and the Kashiwazaki new main office building, which are slated for construction, to the public in the event of a disaster.

4-①. Addressing labor accidents and our “One Team“ approach

- Whereas the number of labor accidents had been on a decreasing trend until FY2022, they have increased since FY2023
- A mechanism has been built with contractors by which disaster prevention officers from not only the company involved in the labor accident, but also all other contractors, meet in the field after a labor accident occurs to discuss the issue and prevent similar accidents from happening again. (Joint contractor review meetings “Waigaya meetings”)
- These “Waigaya meetings” are one example of One Team initiatives at the Kashiwazaki-Kariwa Nuclear Power Station

Annual trends in the number of labor accidents excluding heat stroke



Joint contractor review meeting “Waigaya meetings”

“Waigaya meetings” are one example of One Team initiatives intended to build trust that transcends individual positions and build a framework of cooperation

4-②. One Team Initiatives

- In addition to joint contractor review meetings, other joint contractor initiatives are underway at the Kashiwazaki-Kariwa Nuclear Power Station, such as encouraging workers to greet one another
- Initiatives aimed at stable operations/achievement of high operation rate have also been started as "one team" initiatives

【 Example of One Team initiatives 】

Since April 2022, workers have been encouraged on a daily basis to greet one another when they pass through the front gate, baggage check area, and at the protection sub-headquarters.

Contractor site superintendents also participate in these activities in order to contribute to improving communication between station personnel and contractors

Encouraging greetings

The Head Office, power stations and contractors work together to achieve stable operation and a high operating rate, thereby contributing to the provision of a stable and affordable supply of power

① Power station interwoven with the regional community at which regional workers can work at throughout the year
② Use of kaizen to create a front line that uses processes to improve safety/quality
③ Cultivation of human resources that can see opportunities for kaizen, and have in-house capabilities, technological prowess, and field skills

Initiatives aimed at stable operations/achievement of high operation rate

One Team Philosophy

1. Everyone on the team has to share a common objective.
There should be no distinction between clients and vendors. Managers, team leaders, and workers must transcend their roles, cooperate, and act with a common objective.

2. There needs to be a basis of trust upon which everyone treats each other as a buddy.
Everyone that works at the power station should be treated as a buddy, and everyone on the team needs to build a relationship of equal standing.

3. The team must be able to complete tasks safely and efficiently.
The team should share information on problems and work together to find the optimal solution so that workers in the field can move forward safely with their tasks.

5. Progress and status of physical protection initiatives

- Improvements have been made to both equipment and equipment operation methods so as to improve the accuracy of security in order to address the physical protection incidents that occurred, such as the unauthorized use of an ID card.
- Security personnel throughout the entire power station have been encouraged to proactively share information on anything out of the ordinary that they notice and quickly make corrections, and a monitoring office under the direct supervision of the president checks these initiatives to prevent them from becoming lax.

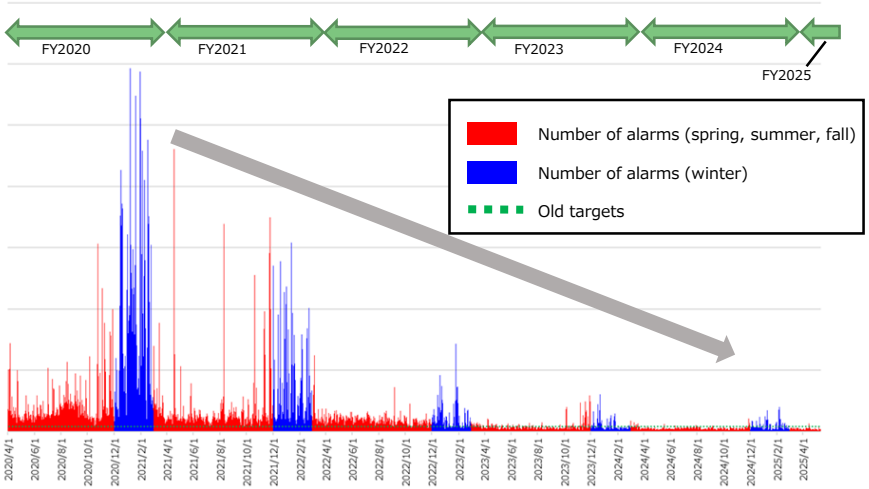
【 Recent physical protection topics 】

① Reduction in the number of false alarms

- The number of false alarms has dramatically decreased since replacing intruder detection devices with units more suited to the weather conditions. ※
- Further improvements will be made to further decrease the number of false alarms

※ Reducing the number of false alarms means less burden on monitoring personnel and contractors thereby enabling normal monitoring

Mid/long-term trends in the number of alarms （2020.4.1~2025.5.11）



② Alleviating congestion during rush-hour

- Power station entry checkpoints were becoming congested during the morning rush hour, so various congestion mitigation measures were implemented and the congestion at the front gate has been alleviated

Road to the front gate early in the morning on February 5

- Vehicles carrying people with only hand luggage prioritized for entry (continued from last year)
- Restrictions on the entry of vehicles and trucks for which inspections require time (same as above)
- Use of smart lanes (February)

- Added inspection lanes (April)
- Earlier inspection commencement time (same as above)

Road to the front gate early in the morning on April 10

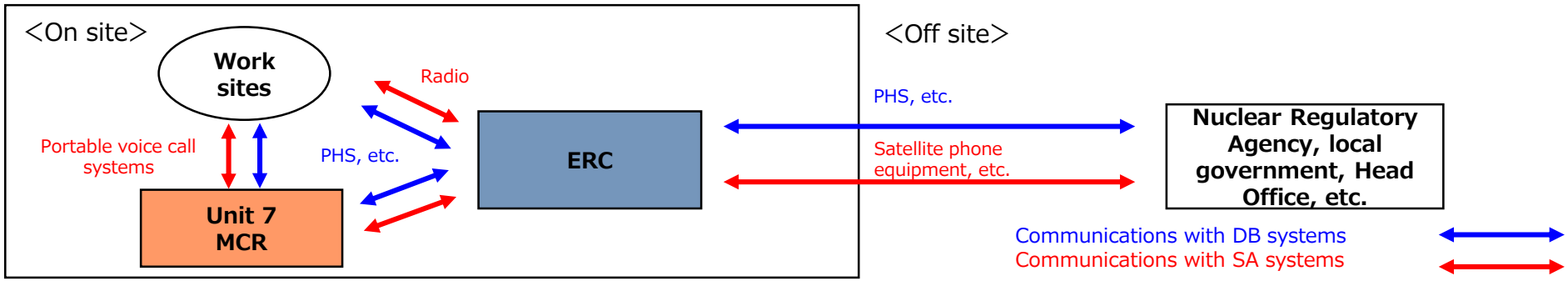
Our resolution

"Keep the Fukushima Nuclear Accident firmly in mind; we should be safer today than we were yesterday, and safer tomorrow than today; we call for nuclear power plant operators that keep creating unparalleled safety."

Reference materials

Nuclear regulatory inspection category change

- As a means of communicating in-house and with external parties, PHS, etc. (DB systems ※1) have been installed in the emergency response center and the Unit 7 main control room along with satellite phone systems, etc. (SA systems ※2) that would be used in the event of DB system nonconformity in accordance with the new regulatory requirements.
- Predetermined numbers have been set for SA systems to indicate LCO as prescribed in the safety regulations and any inability to fulfill these requirements due to malfunction, etc., is to be deemed as an LCO deviation ※3. In the year ending January 31, 2025, four LCO deviations occurred in conjunction with satellite phone system nonconformances.
- At a meeting of the Nuclear Regulation Authority held on April 30, the inspection handling category ※4 was switched from Category 1 to Category 2 and TEPCO received notification of the implementation of additional inspections and the need to submit a report on plans to implement corrective measures (said report was submitted to the Nuclear Regulation Authority on May 12)



※1 DB systems (Design basis accident handling systems): Existing systems installed prior to the implementation of the new regulatory requirements

※2 SA systems (Severe accident handling systems): Equipment installed to supplement existing systems in order to guarantee diversity in accordance with the new regulatory requirements

※3 The safety regulations stipulate the quantity of devices that must be operational in order to ensure safety functions as well as temperature/pressure limitations that must be abided by for each reactor status. These are referred to as "Limiting Conditions for Operation" (LCO)

※4 Category 1: Action objectives for each area of monitoring are being fulfilled and the operator can make improvements independently

Category 2: Action objectives for each area of monitoring are being fulfilled, but there is slight degradation of safety actions taken by the operator

Direct cause of satellite phone system coms failure

- A cause analysis chart was created to identify the location of the malfunction and investigate the cause
  - Nonconformities found with the integrated circuit (IC) that is part of the antenna No. 1 and No. 5 motherboard

    It is assumed that the cause of the nonconformity was accelerated degradation caused by temperature differences throughout the year
  - It is assumed that moisture found its way inside the connector and caused an internal short that led to the coms failure

Date of occurrence	Installation location	Nonconforming component	Investigation results
First incident: November 21, 2024	Unit 5 ERC	Satellite phone terminal No.1 Antenna No.1	• Terminal nonconformity could not be reproduced and assumed to be transient • Antenna internal IC nonconformity found • **It is assumed that the cause of the nonconformity was accelerated degradation caused by temperature differences throughout the year**
Second incident: January 14, 2025		Satellite phone terminalNo.2	• Cannot be reproduced, assumed to be transient
Third incident: January 27, 2025		AntennaNo.5	• Antenna internal IC nonconformity found • **It is assumed that the cause of the nonconformity was accelerated degradation caused by temperature differences throughout the year**
Fourth incident: January 31, 2025	Unit 7 MCR	Connector	• **It is assumed that moisture found its way inside the connector and caused an internal short that led to the coms failure**

Satellite phone system Underlying causes①

■ The facts of the incidents contained in this report were compiled and TEPCO confirmed from the results of cause analysis that it has **no organizational problems or performance issues** pertaining to design, procurement, installation, or maintenance management.

○Performance pertaining to the design, procurement, installation, and maintenance management of satellite phone systems was considered upon conducting interviews with installation firms and TEPCO employees managing said systems, gathering documentation, etc., and creating a chronological order chart.

✓ Considering the chronological order of "antenna internal IC damage," and "infiltration of moisture into connector"

①Design

It was confirmed that environmental resistance is focused on and that design is managed upon clarifying specifications required for SA systems installed outdoors

② Procurement

It was confirmed from the procured equipment usage environment specifications that the design requirements were fulfilled

③ Installation

It was confirmed that there were no installation-related defects (infiltration of foreign objects or moisture inside the antenna, damage to the connector heat shrink cap, etc.)

④ Maintenance management

In regards to inspections of the aforementioned system, during SRCM assessment (reliability-focused maintenance), a function check was performed through failure mode analysis and periodic communications checks, and it was confirmed that repairs would be made if necessary

⇒ As a result of the considerations mentioned above, **the various actions that TEPCO took from design to maintenance management were deemed to have been suitable**

Satellite phone system Underlying causes②

○Reason for selecting the SA system satellite communications system carrier

- ✓ By using a distributed carrier for SA communication systems that use satellites, carrier-side maintenance and malfunctions do not have an impact on multiple systems
- ✓ The aforementioned satellite phone system utilizes highly airtight connectors and long cables due to the installation location thereby resulting in significant transmission loss, and the selected carrier was the only one that could handle the system.

○Investigation into similar incidents in the past

- ✓ A research into similar incidents that occurred at the Kashiwazaki-Kariwa Nuclear Power Station found that the antenna had been replaced twice, however the manufacturer's opinion of these incidents was that they were both the result of **manufacturing defects** and that the causes were different from the four LCO deviations.
- ✓ **No similar incidents have occurred** at the Fukushima Daiichi Nuclear Power Station, Fukushima Daini Nuclear Power Station, manufacturer or other power companies.

Satellite phone system Underlying causes③

○An underlying cause map was created with the multiple satellite phone system nonconformances that occurred in succession at the top in order to see if there are organizational problems related to three facts.

- ✓ Underlying causes that hindered the prevention of system malfunction

  Out of the direct causes of the malfunction, there was no knowledge about the antenna IC failure mode

  In regards to the transmission route, there are discrepancies during manufacturing of outdoor components

  The satellite phone terminal error needed to be addressed in a manner that was not mentioned in the user manual

  All of these events were difficult to predict and there were no organizational problems that led to them

- ✓ Underlying factors that prevented quick completion of countermeasures

  Countermeasures had been deliberated from the first malfunction but the manufacturer's investigation was unable to identify the malfunctioning component and there were no similar incidents in the past to refer to. Furthermore, malfunctions kept occurring thereby **preventing quick implementation of countermeasures, but there were no organizational problems that led to this.**

- ✓ Underlying causes of why there were no backup units

  The aforementioned systems were designed to have a certain degree of reliability as permanently installed SA systems and it was thought that function would be maintained through regular maintenance and inspection.

  Furthermore, in regards to having backups to address LCO deviations, since the pre-use operator inspection could be implemented with only the number of installed systems required by the approved design and construction plan, TEPCO thought it was adequate to have a mechanism in place to be able to independently acquire substitute systems, and quickly make repairs [rather than install backup systems]. Therefore, **the decision to not install backups is considered to have been suitable based on the situation at the time, and there were no organizational problems that led to the incidents.**

  ※ The approved design and construction plan (basic design plan) mentions the number of required systems (Unit 5 ERC: 5; Unit 7 MCR: 1) as shown in the attachment

○No foreseeable problems or organizational problems were found, and appropriate steps were taken to quickly implement countermeasures after the first event happened, so there were no facts that indicate a deterioration of performance or safety culture.

○In light of these incidents, efforts are being made to further improve performance and safety culture

Satellite phone system improvement plan and implementation status

- Countermeasures implemented based on the knowledge acquired through the analysis of the direct causes and underlying factors pertaining to the coms failure of satellite phone systems
- Backup systems installed to ensure the required number of satellite phone systems as a way to make further improvements

		Prior to changes	After changes
Countermeasures for the cause of coms failure	Antenna nonconformity countermeasures	SRCM assessment (reliability-focused maintenance) implemented and repairs made if necessary	SRCM assessment (reliability-focused maintenance) implemented and systems updated every four years. Based on this, all existing antennas were replaced
	Connector nonconformity countermeasures	The crimped connector on the antenna side was covered with heat shrink tubing to prevent the infiltration of moisture	Self-adhering tape wrapped around the heat shrink tubing to further prevent the infiltration of moisture
	Temporary coms failure countermeasures	Steps taken to address temporary coms failure (reboot)	More detailed procedures created ・Steps to address warning lamps and failure logs ・Investigation procedure for determining malfunctions
Countermeasures to ensure the required number of satellite phone systems		Installation of required quantity	Additional systems installed to be used as backups kept on hot standby

Location	Required number	Installed number
Unit 5 ERC	5	5
Unit 7 MCR	1	1
Unit 6 MCR	1	1

Location	Required number	Installed number
Unit 5 ERC	5	5+1
Unit 7 MCR	1	1+1
Unit 6 MCR	1	1+1 (Underway)

Specialized Safety Facility (SSF)

- Specialized Safety Facility (SSF) are backup systems used to prevent damage to the primary containment vessels in the event that facilities are rendered inoperable on a wide scale as a result of "widescale damage caused by the intentional crashing of an aircraft" into a power station
- The schedule is under detailed review but specifications are still being solidified so the anticipated completion dates of construction have been changed and the Nuclear Regulatory Agency notified

※ Unit 7: March 2025→August 2029; Unit 6: September 2026→September 2031

Design basis accident handling systems (DB systems)

Severe accident handling systems (SA systems)

＋ Backup systems to handle terrorism or an aircraft crash, etc.

Specialized Safety Facility (SSF)