Appendix

First Quarter, FY2016

Nuclear Safety Reform Plan Progress Report

(Including Progress on Safety Measures at Power Stations)

Tokyo Electric Power Company Holdings, Inc.

August 8, 2016

TEPCO

S

TABLE OF CONTENTS

FOREWARD

We at TEPCO would like to extend our deepest apologies on everyone living in communities around the Fukushima Daiichi Nuclear Power Station and throughout society as a whole for the tremendous inconvenience and anxiety caused by the Fukushima nuclear accident and subsequent accidents and problems. The entire TEPCO Group will continue to work to facilitate the smooth and early compensation of those affected, accelerate recovery in Fukushima, move forward steadily with reactor decommissioning, and thoroughly ensure nuclear safety.

On March 29, 2013, TEPCO announced its "Reassessment of the Fukushima Nuclear Accident and Nuclear Safety Reform Plan," and we are currently proceeding with the implementation of nuclear safety reforms. The progress made is verified quarterly and the compiled results are released to the public. This report details the progress made during the first quarter (April-June 2016[1]) of FY2016.

Although we have moved forward with nuclear safety reforms, TEPCO discovered in February of this year that there were issues concerning notifications and reports about core meltdowns at Fukushima Daiichi Nuclear Power Station Units 1-3 made during the accident as well as erroneous explanations given to the Niigata Prefecture Technical Commission. A Third-Party Verification Committee was established to verify the facts and identify the causes underlying these actions. The Committee released the results of its investigation on June 16[2]. TEPCO has taken the results of the Third-Party Verification Committee's investigation very seriously, and we have compiled recurrence prevention measures in the form of "TEPCO's Apology and Promise" that enhance the Nuclear Safety Reform Plan (announced June 21[3]).

We would once again like to profoundly apologize to the people of Fukushima and Niigata prefectures as well as society at large for creating a situation that has caused great inconvenience and anxiety, and we will work with unwavering resolve to implement nuclear safety reforms so that society will recognize that TEPCO is worthy of being entrusted with the operation of nuclear power stations.

---

[1] Calendar dates in this report refer to 2016 unless otherwise noted.

[2] "On Receipt of the 'Investigation Results Report' from the Third-Party Verification Committee for Notification and Reporting on the Fukushima Daiichi Nuclear Power Station Accident
http://www.tepco.co.jp/press/release/2016/1300003_8626.html

[3] "TEPCO APOLOGIZES FOR PREVIOUS LEADERSHIP'S FAILURE TO ACKNOWLEDGE MELTDOWN DURING FUKUSHIMA ACCIDENT"
http://www.tepco.co.jp/en/press/corp-com/release/2016/1300509_7763.html

1. ISSUES RELATED TO NOTIFICATIONS AND REPORTS ABOUT CORE MELTDOWNS DURING THE FUKUSHIMA NUCLEAR ACCIDENT

We at TEPCO deeply regret that we were not able to prevent the Fukushima nuclear accident. We formulated the "Nuclear Safety Reform Plan" based on our resolution to never allow a severe accident to happen again, and we have implemented continual reforms as we aim to achieve the world's highest level of safety. In consideration of the reasons why core meltdowns at Fukushima Daiichi Nuclear Power Station Units 1-3 were not promptly announced at the outset of the Fukushima nuclear accident and the lessons learned from this mistake, we have revamped emergency response mechanisms and training, and confirmed that improvements have been made with regard to notification and public relations training as we reported in the "Reassessment of the Fukushima Nuclear Accident and Nuclear Safety Reform Plan" (March 29, 2013).

Nevertheless, because the internal manuals used at the time of the accident were not examined adequately for criteria for determining a core meltdown by the parties responsible for responding to the Niigata Prefecture Technical Commission, and internal parties that were aware of the contents of the manuals did not sufficiently share this information with the relevant parties, we stated erroneously to the Niigata Prefecture Technical Commission that "[t]here was no basis for determining a core meltdown" (announced on February 24). Following the announcement we immediately examined the stipulations in our current manuals regarding determining whether or not a power station has entered a state of emergency and providing notifications about this event, and have thoroughly conveyed this information throughout the organization.

To address this issue TEPCO established a Third-Party Verification Committee (March 9) that conducted interviews with a total of 70 people and scrutinized internal manuals. During the course of its investigation the Committee examined:

- Events that transpired and reasons why internal manuals were not used effectively to determine whether core meltdowns had occurred and publicly announce this information at the time of the accident
- Notifications and reports issued at the time of the accident
- Events that transpired and reasons why erroneous explanations were given to the Niigata Prefecture Technical Commission in regard to the events that transpired during the accident
- Other matters that the Third-Party Verification Committee regarded as necessary.

Of particular importance in the results released by the Committee on June 16 was the statement that, "*At the time of the accident, the then president issued instructions that the term 'core meltdown' was not to be used and announcements were withheld in accordance with his instruction.*" What this report verified were acts that betrayed trust and it is natural that society would view these acts as being part of an intentional cover-up.

As a nuclear power station operator TEPCO it is extremely important that we prioritize safety above all else and quickly convey the truth in an easy-to-understand manner to not only the siting community but also the whole of society. In light of the results of this investigation we have formulated recurrence prevention measures that we detail in "TEPCO's Apology and Promise" (announced on June 21).

TEPCO's Apology and Promise

TEPCO promises that, no matter what type of situation we are faced with, we will remain firm in our resolve to ascertain the facts, prioritize safety, and properly communicate the truth so as to maintain the safety and security of not only the people in the siting communities, but also the whole of society.

Press conference announcing TEPCO's response upon receipt of the Third-Party Verification Committee's investigation report

Based on the lessons learned from this incident, TEPCO has incorporated the following recurrence prevention measures into the Nuclear Safety Reform Plan. The progress made on these activities will be reported quarterly along with the progress of the Nuclear Safety Reform Plan (to be reflected in the measures noted in brackets from Q2).

List of Activities Related to Issues Pertaining to Notifications and Reports about the Fukushima Nuclear Accident

Item	Measure	Specific action	Deadline and current status
I-1. Effectiveness of emergency response	① Diversification of training scenarios such as scenarios where radiation levels constantly fluctuate 【Measure 5】	・ Notification and public relations training will be included in general training by utilizing harsh scenarios such as scenarios in which radiation levels at site borders or within the site constantly fluctuate thereby requiring continual notifications, and scenarios where a station blackout continues for a long period of time. ・ At the Kashiwazaki-Kariwa NPS and Fukushima Daini NPS, this training will begin in the second quarter and will continue to be implemented going forward about once every four training sessions	FY2016- ・ Formulation of training scenarios has begun
	②Review of training content for emergency responders 【Measure 6】	・ The content of training employed for emergency responders will be revised so that it improves the trainees' understanding of the roles of other response teams in the organization and the organization as a whole. ・ Specifically, each team's training materials and e-learning materials will include information about the roles of each team within the emergency response framework, the system and background for manuals	August 2016 ・ Revision has begun of each team's training materials and e-learning materials

Item	Measure	Specific action	Deadline and current status
		necessary for the emergency response, and important matters noted in such manuals.	
	② Manage skill through the implementation of comprehension tests about emergency response manuals 【Measure 6】	・ For all emergency responders, manual study sessions will be held to learn about the emergency response manual system, the background behind each manual, important matters noted in each manual, and other items after which comprehension tests will be given. Training and comprehension tests will also be implemented periodically thereafter to manage skill.	July 2016- ・ The preparation of teaching materials for the study sessions has begun
I-2. How public relations should be conducted during an emergency	① Designate a person responsible for technically determining how technical terms are to be used 【Measure 5】	・ The Nuclear Disaster Response Manual notes that the CNO of the Nuclear Power and Plant Siting Division shall be responsible for determining how technical terms are used.	August 2016 ・ Written order already issued
	② Clearly state in manuals that the role of the External Party Relations Coordinator is to “make proposals to the president” 【Measure 5】	・ In the Nuclear Disaster Response Manual, note that the role of the External Party Relations Coordinator is to make proposals about external party handling to the president	August 2016 ・ Written order already issued
	③Incorporate lessons learned from this event into training materials 【Measure 1】 【Measure 4】	・ In order to raise awareness about the importance of appropriate notifications during emergencies and public relations that take into account the perspective of society, the teaching materials used for management will reflect the course of events that transpired as well as issues to be addressed about the notification and reporting problem ・ In order to raise awareness about the importance of appropriate notifications during emergencies and public relations that take into account the perspective of society, teaching materials for the Social Communication Office and risk communicators will reflect the course of events that transpired as well as issues to be addressed about the notification and reporting problem	August 2016 ・ The information has been reflected in training materials for management ・ Training materials are being prepared
	④Conduct accident prevention training that assumes rigorous demands and other such requirements 【Measure 5】	・ Conduct training that incorporates rigorous demands and other requirements imposed from outside into the training scenarios with respect to external party handling during an emergency ・ Head Office training is to begin during the second quarter and will continue to be implemented going forward about once every four training sessions	August 2016 ・ Training is being prepared
	⑤Institute a practice of recording notifications, conversations and other	・ The general preparedness network at the emergency response headquarters (Head Office), has function recording audio and	August 2016 ・ Written order already issued

Item	Measure	Specific action	Deadline and current status
	communications with the central government and other parties 【Measure 5】	video conversations and other exchanges between TEPCO and the central and local governments during an emergency ・ Clearly stipulate in the Nuclear Disaster Response Manual that a record should be kept of exchanges with the central or local governments through this network during an emergency	
	⑥Make use of advice from outside experts 【Measure 4】	・ Create a list of outside experts that the external response coordinator may request advice from ・ In the guidelines concerning external response coordination, state that the advice of outside experts is to be incorporated in the External Party Relations Coordinator's proposals to the president	August 2016 ・ List of outside experts has been completed ・ Guidelines concerning external response coordination have been revised
II-1. How information should be shared	①Strengthen the sharing of information about important operational issues and other such topics in the Nuclear Power Division 【Measure 1】	・ Construct a system through which site superintendents and Head Office general managers distribute emails to all personnel in the Nuclear Power Division about the status of review of important reports and issues to be regularly communicated externally	August 2016 ・ Construction of the system has been completed
	②Prompt learning about the basis for safety design through OJT and the development of in-house specialists 【Measure 6】	・ Share teaching materials for all Nuclear Power Division personnel via the intranet for them to learn about important points pertaining to safety design as well as information about important operation experiences in the past as part of on-the-job training during daily operations. And, issue instructions that personnel are to study in their workplaces as TEPCO continues to cultivate experts that have expert knowledge. (in-house specialists)	July 2016 ・ Teaching materials are being prepared
	③ As part of the off-the-job training, leverage the soon-to-be-established Nuclear Personnel Training Center (provisional name) to get employees to always study and enhance individual skills 【Measure 6】	・ At the Nuclear Personnel Training Center (provisional name) a systematic approach (program developed and assessed by defining knowledge and skills based upon the capabilities required to perform tasks) will be used to revise current training management and providing training on the knowledge and skills necessary for each engineering department.	December 2016 ・ Activities have begun based on Fukushima Daini NPS
II-2. System for finding information	① Clearly state both internally and externally that the company's basic stance is to "proactively report" information	・ From the perspective of improving nuclear safety in the future and contributing to the improvement of notifications and public announcements, express in a message from the president to all employees that TEPCO's basic stance is to proactively report on all factual relationships and things noticed by employees during an accident. Explanatory	June 2016 ・ All such activities, including the communication of messages and dissemination of notifications to all employees, have

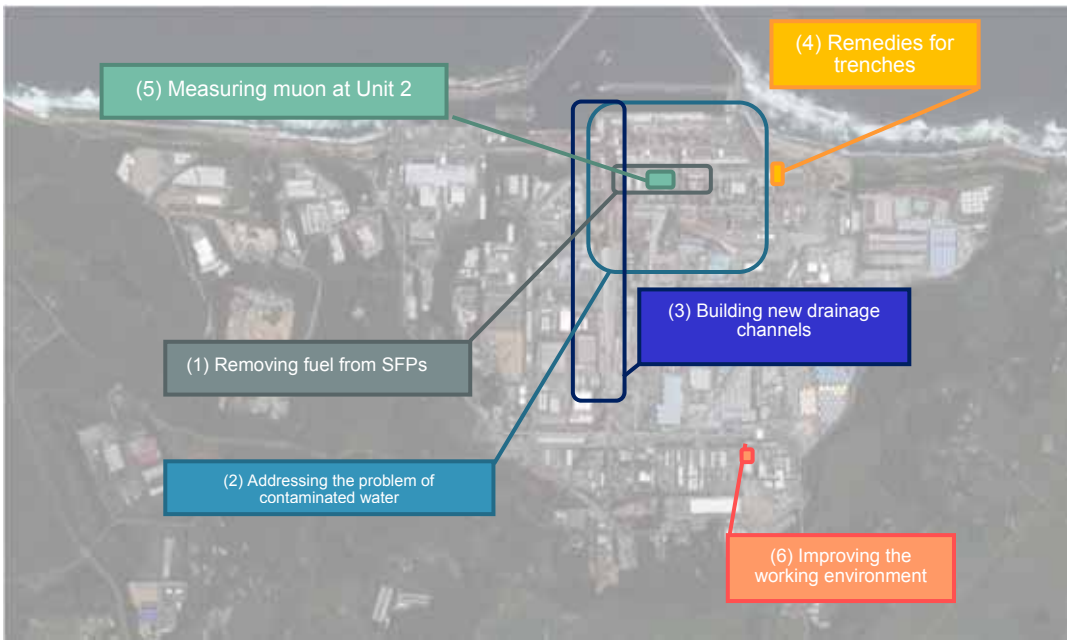
Item	Measure	Specific action	Deadline and current status
	【Measure 1】	materials should also be given to all employees. ・ Information to external parties should be given in the form of company press releases and publicly released reports on countermeasures	been completed
	②Collect information about notifications and public announcements at the time of the accident 【Measure 1】	・ Under numeral ①, call for the provision of information not noted in any of the investigative committee reports about the factual relationships during the accident for the purpose of improving notifications and public relations during an emergency ・ Note the contact information for the source of the information on the intranet	August 2016 ・A contact point was established on June 21, and information has begun to be collected
	② Call for information to be provided about items investigated by TEPCO HD and the Niigata Prefecture Joint Investigative Commission 【Measure 1】	・ Publish items investigated by TEPCO HD and the Niigata Prefecture Joint Investigative Commission on the intranet so that all employees may access such information, and call for the provision of related information	July 2016 ・A contact point was established on July 7, and information has begun to be collected

Of the “items that should be clarified about the meltdown announcements,” which the Third-Party Verification Committee was requested to investigate by the Niigata Prefecture Technical Commission, TEPCO HD and the Niigata Prefecture Joint Investigative Commission (provisional name) will examine those “issues not related to issues that TEPCO has requested the Third-Party Verification Committee to investigate.”

2. PROGRESS WITH SAFETY MEASURES AT POWER STATIONS

2.1 Fukushima Daiichi Nuclear Power Station

Progress has been steadily made on decommissioning the reactors at the Fukushima Daiichi Nuclear Power Station ("Fukushima Daiichi NPS") in accordance with the "Mid-and-Long-Term Roadmap Towards Decommissioning of Fukushima Daiichi Nuclear Power Station Units 1 to 4" (revised June 12, 2015).



Progress made on the principal work at Fukushima Daiichi NPS

(1) Removing Fuel from Spent Fuel Pools

◆ Unit 1

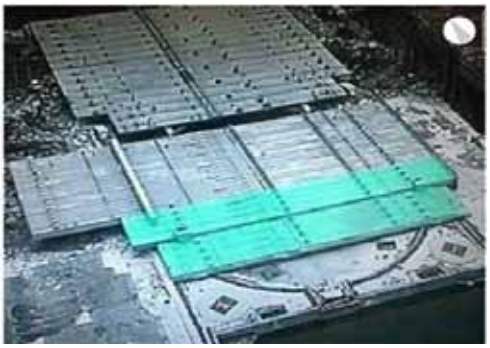
On February 4, the work of installing a sprinkler system (pipe system extending to sprinkler nozzles, etc.) to prevent dust from dispersing was begun as part of the dismantling of the reactor building cover. On April 28, installation of all 13 sprinkler system nozzle units was completed on the operating floor (top floor of the reactor building). During this installation, no significant fluctuations were seen on any of the dust monitors or at monitoring posts as the work was performed. Also, with the aim of formulating a plan to remove debris hindering fuel removal, a preliminary survey of debris conditions was conducted from March 28 to April 7 to acquire the data necessary for future survey methods and devices. Preparations are continuing with the aim of beginning fuel removal in FY2020 (number of fuel rod assemblies stored in the spent fuel pool: 392).

Installation of sprinkler system nozzle units

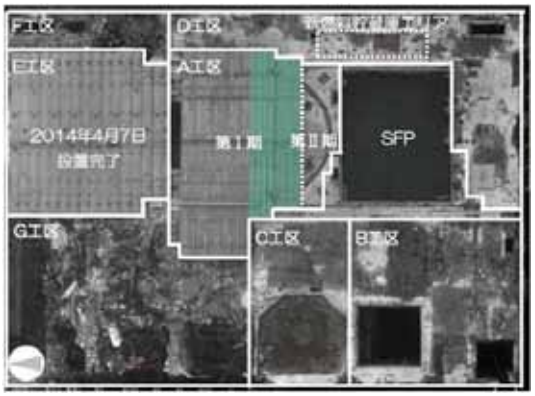
Installation of sprinkler system pipes

◆ Unit 3

With the aim of removing fuel from the spent fuel pool, the operating floor (top floor of the reactor building) has been decontaminated along with the installation of shielding so as to reduce ambient dose in an area where manned work will be performed. The installation of shielding was begun on April 12 for Term I in Work Area A (see photo below) and completed on April 22, and the effect of a reduction in radiation levels due to the shielding was confirmed. After decontamination was completed of the fresh fuel storage facility area, shielding for Term II in Work Area A is scheduled to be installed (installation target is set for second quarter), following shielding in Work Areas B/C and D. Thereafter, the plan is to install the fuel removal cover and new fuel handling machine, and to begin removing fuel which is stored in the spent fuel pool in FY2017 (number of fuel rod bundles stored in the spent fuel pool: 566).

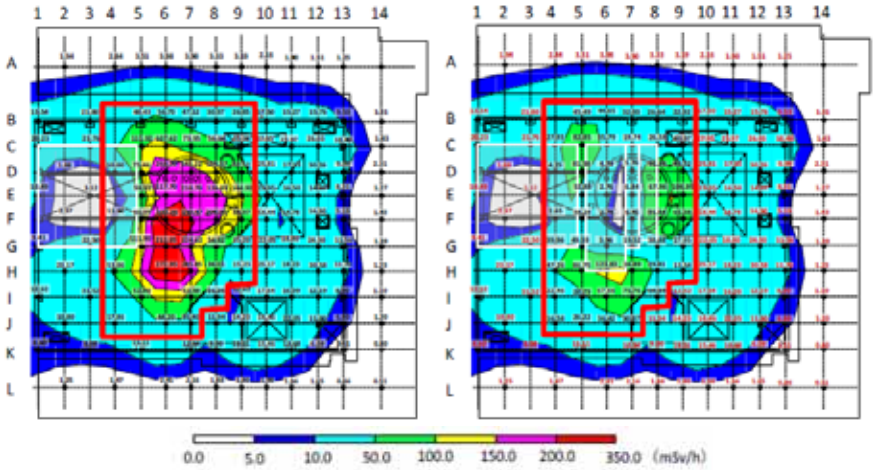


Shielding installation



Panoramic view of Unit 3 operating floor

(Green area is the manned work area, and heat exchange paint will be applied as a measure to prevent heatstroke)

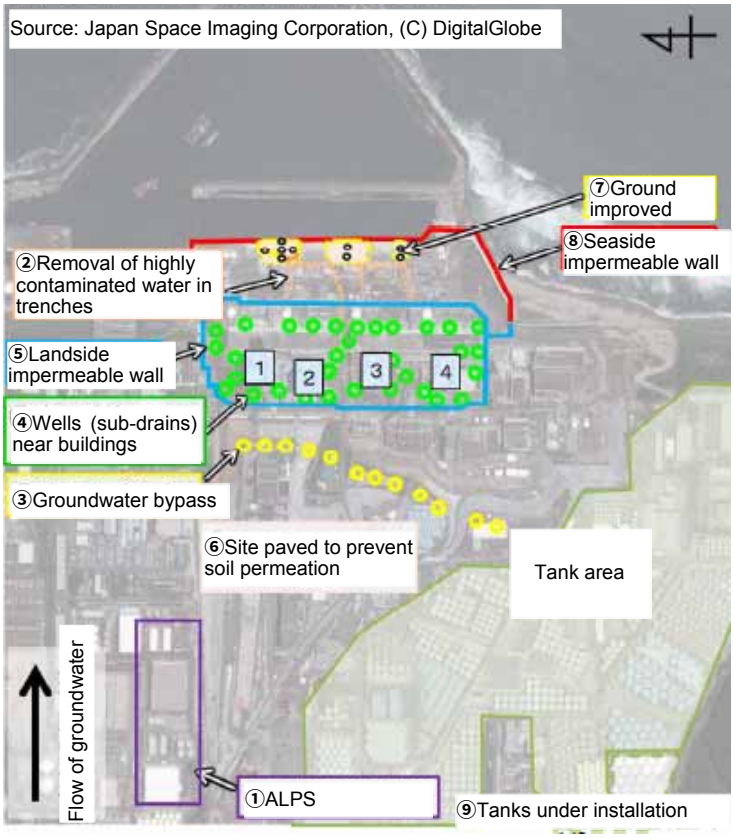


Reduction in radiation level due to the shielding installed (left: before; right: after)

(2) Addressing the Problem of Contaminated Water

Based on the three basic policies of “removing contamination sources,” “isolating water from contamination sources,” and “preventing leakage of contaminated water,” TEPCO is continuing to implement measures to prevent the outflow of contaminated water into the power station port, and address the problem of contaminated water leaking from tanks.

Measures to remove contamination sources		
Cleaning up contaminated water using the Advanced Liquid Processing System (ALPS)	Diagram①	Completed May 2015
Removal of contaminated water from inside seawater pipe trenches	Diagram②	Completed December 2015
Measures to isolate water from contamination sources		
Drawing up groundwater through groundwater bypasses	Diagram③	Operation commenced April 2014
Drawing up groundwater through wells (sub-drains) near buildings	Diagram④	Operation commenced September 2015
Installation of frozen-soil impenetrable wall on land side of units	Diagram⑤	Operation commenced March 2016
Pavement of site to keep rainwater from permeating the soil	Diagram⑥	Work ongoing
Measures to prevent leakage of contaminated water		
Improvement of ground with soluble glass	Diagram⑦	Completed March 2014
Installation of impermeable wall on seaside of units	Diagram⑧	Completed October 2015
Installation of tanks (replacement with welded tanks)	Diagram⑨	Work ongoing

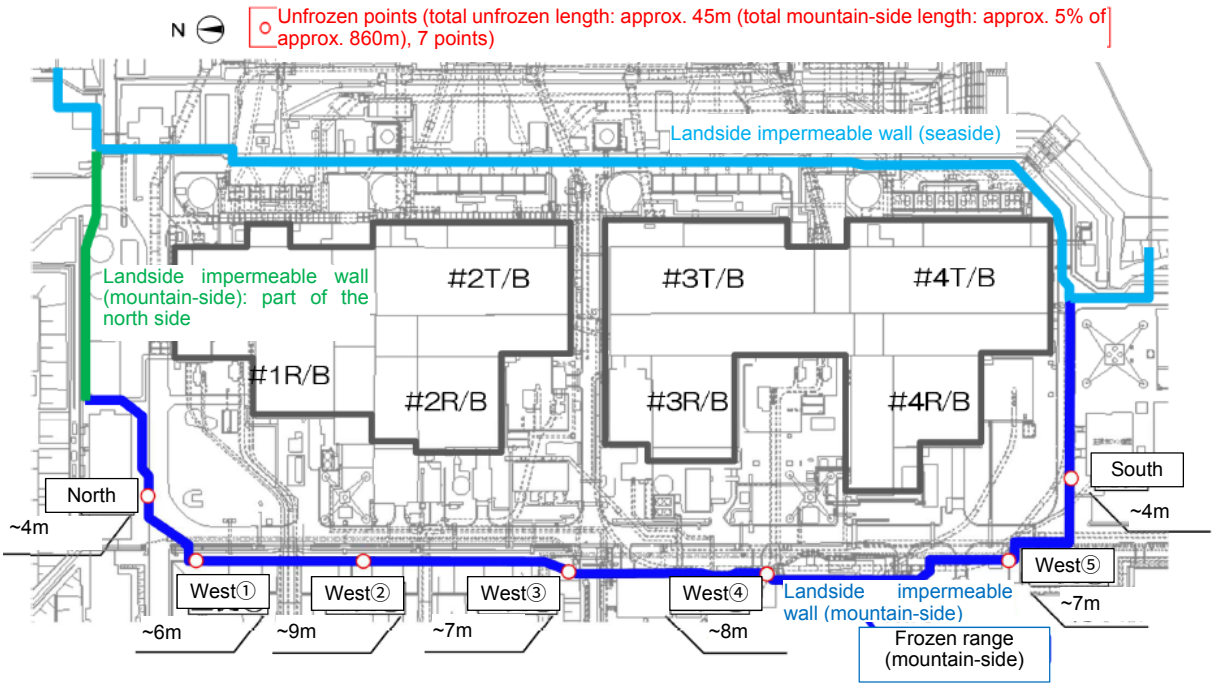


Principle work items related to contaminated water countermeasures

◆ Freezing Initiated of Landside Impermeable Wall

Freezing of the landside impermeable wall surrounding Units 1-4 was initiated across the range configured for the first stage (Phase 1) on March 31 (preliminary freezing of some areas along the mountain-side (areas and other points where there are significant intervals between freezing pipes and thus more difficult to freeze), the entire seaside area, and some areas to the north). Any water level and water head differences that have arisen were able to be confirmed both inside and outside the impermeable wall (seaside) boundary, so the transition was made to the first stage (Phase 2) on June 6, and freezing was initiated across a range excluding mountain-side areas that have yet to be frozen (approx. 5%) (approx. 95% of the entire length along the mountains is being frozen). The fast flow of groundwater is thought to impact areas where the temperature has been slow to fall, so cement grouting material has been spread (supplementary construction method) thereby decreasing the flow rate and promoting freezing.

Opening a valve on a freezing pipe (Phase 2)



Range of closure of landside impermeable wall in the first stage (Phase 2)

(3) Building New Drainage Channels

Facing[4] over an extended area has increased the amount of rain water flowing into Drainage Channel K and Drainage Channel BC, so new drainage channels have been constructed for rainwater to address the altered catchment basin. Water has been allowed to flow through along the north route (in the direction of the shallow draft quay) since April 27 and along the south route (in the direction of Drainage Channel K) since June 20.

North route pipes (Diagram: Photo ②)　　South route pipes (Diagram: Photo ①)

[4] Facing refers to paving with asphalt or spraying with mortar so that rainwater does not seep into the ground. This has the effect of reducing the amount of groundwater.

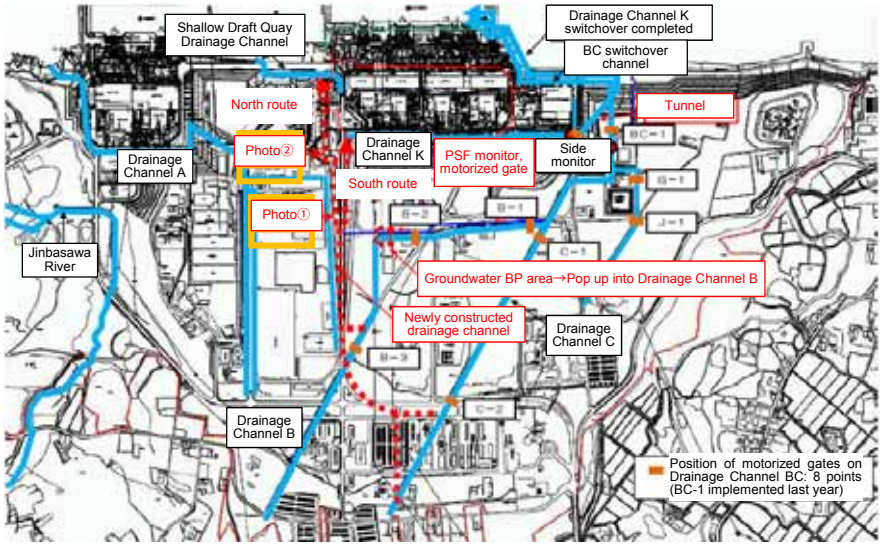
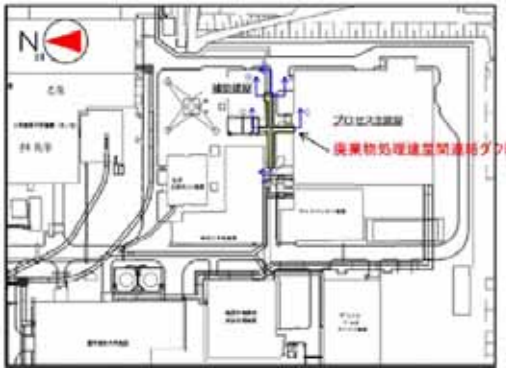


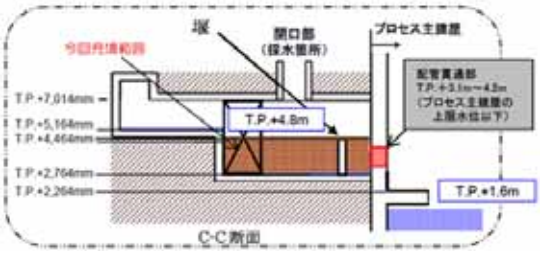
Diagram of newly constructed drainage channels

(4) Status of Remedies for Trenches with Stagnant Water

It was confirmed that contaminated water was stagnating and groundwater flowing into the connecting duct between the waste processing buildings, so work was initiated on May 10 to fill these areas and transfer the water. The water transfer was completed on June 8, and approximately 274 m³ were filled by June 13. Based on the results of inspections of stagnant water in other trenches connected to the building, consideration will be given to the risk of contaminated water leaking, risk of water flowing into the buildings and field conditions in scheduling a series of responses to remove the stagnant water and fill the area.



Position of connecting duct between waste processing buildings



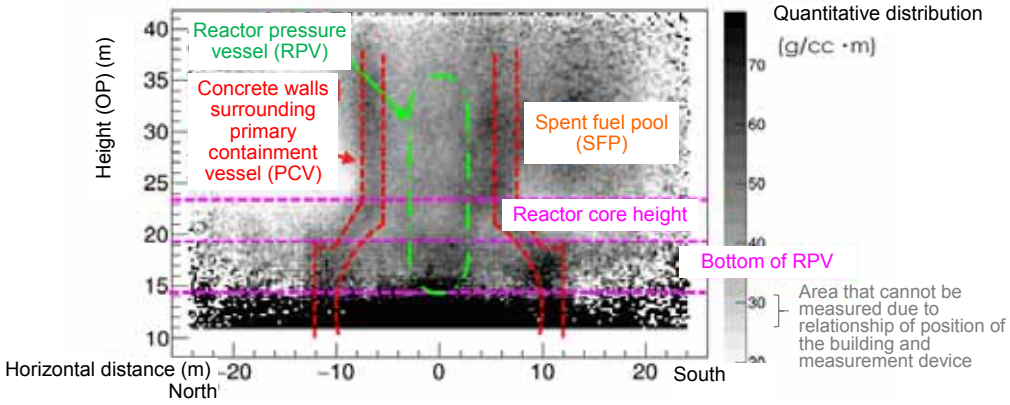
Area filled

(5) Measuring Muon at Unit 2 to Ascertain the Position of Debris in the Core

A measurement device, which employs the muon transmission method and whose effectiveness was confirmed based on the results of measurements at Unit 1, was installed on the west side of the Unit 2 reactor building (March 17). Measurement began on March 22 to identify the location of fuel debris inside the Unit 2 reactor. Shadows of the shielding concrete around the reactor containment vessel, spent fuel pool and other key structures were confirmed, and data has been acquired in a methodical manner. Measurements will continue to be taken to accumulate data, which we will continue to verify and consolidate.

Muon measurement device

Installation of measurement device



Assessment of quantitative distribution based on measurements taken using the muon transmission method

(6) Improving the Working Environment

◆ Installation of Showers at Large Rest Center

The third floor of the large rest center has been equipped with 30 individual shower units. Operation of the facility began in April.

Shower unit at large rest center

◆ Survey of Actual Work Arrangements

From the survey conducted of workers during the previous fiscal year, there were replies suggestive of inappropriate work arrangements. Therefore, TEPCO conducted a survey of actual work conditions via general contractors of instances where company names were able to be verified. The results of the survey confirmed that, on the whole, workers were being treated appropriately. We will continue to use the questionnaires and other surveys conducted periodically each year to gather comments and requests from all workers, and we will endeavor to ensure appropriate

working conditions, eradicate any anxieties, and create a workplace where workers feel fulfilled.

2.2 Fukushima Daini Nuclear Power Station

Since the accident, TEPCO's Fukushima Daini Nuclear Power Station ("Fukushima Daini NPS") has implemented safety assurance measures to maintain the cold shutdown, conducted training, prepared for a severe accident based on the lessons learned from the Fukushima nuclear accident, and carried out activities to support reactor decommissioning at Fukushima Daiichi NPS.

(1) Activities for Improving Safety

◆ Enhancing Engineering Capabilities for Direct Management of Work

This training, which was launched based on the lessons learned from the Fukushima nuclear accident and has been conducted by dividing employees into four teams[5] to enhance their technical skills for directly managing work, has entered its third year, bringing the process to a new level in aiming to have these teams be able to "resolve an emergency by exercising the practical skills they have gained through daily training even if the unexpected event escalates into an emergency." As part of this effort, to further develop basic technical capabilities, night training has been conducted with personnel responding to an emergency in the dark of night. TEPCO will continue to provide such training as we work to enhance our employees' technical skills for directly managing projects.

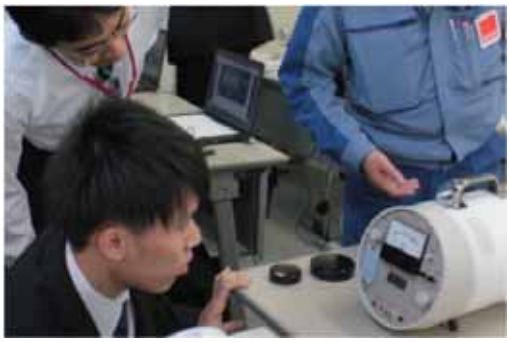
Night training in operating heavy machinery

◆ New Employee Training

New employee training was conducted for 59 new employees of the Nuclear Power Division who will be assigned to Fukushima Daiichi NPS or Fukushima Daini NPS. In addition to learning specific knowledge necessary for a nuclear power workplace, such as a basic knowledge of nuclear power and the principles and characteristics of field facilities and equipment for measuring radiation, senior employees imparted to the new employees lessons learned from the response to the Fukushima nuclear accident.

[5] When the equipment needed for a cold shutdown was destroyed by the large disaster, four teams (debris removal, motor replacement, cable connection and pump restoration) were formed of only TEPCO employees, who worked to respond to the accident and restore facilities and equipment during the first three days of the accident.

Training on basic nuclear power knowledge



Training on how to use radiation measuring instruments

Tour of operators training on a simulator

(2) Confirming the Adequacy of Restoration Reports Based on the Emergency Action Plan

The restoration work on all units was completed on May 30th 2013 in accordance with the "Restoration Plan for Facilities Related to Maintenance of Cold Shutdown," which was formulated based on the Nuclear Operator Emergency Action Plan. Hence, a report was compiled of the restoration status, and submitted to the Prime Minister, Nuclear Regulation Authority, Fukushima Prefecture Governor, Mayor of Naraha Town, and Mayor of Tomioka Town (June 5, 2013).

On the basis of an on-site inspection conducted by the nuclear regulatory agency as well as other investigations, the appropriateness of the information detailed in this report was confirmed on June 13 of this year. Following this confirmation, it is now possible to rescind the state of emergency at the power station, but TEPCO decided to maintain the state of emergency after taking into consideration the circumstances surrounding the power station, and we will make absolutely sure that safety is assured.

(3) Assistance with Fukushima Daiichi NPS Reactor Decommissioning

Fukushima Daini NPS has provided various levels of support for safely and reliably implementing the reactor decommissioning work at Fukushima Daiichi NPS. The achievements made in the first quarter are listed below (all of these activities are ongoing).

- Transporting Fukushima Daini NPS low-level radioactive waste transport containers to Fukushima Daiichi NPS
- Laundering special undergarments for use in control zones
- Temporarily storing assembled tanks for contaminated water storage (steel circular tanks)
- Supervising sand slurry production to be used in covering the seabed inside the port

2.3 Kashiwazaki-Kariwa Nuclear Power Station

(1) Progress in Implementing Safety Measures

At the Kashiwazaki-Kariwa Nuclear Power Station ("Kashiwazaki-Kariwa NPS"), we are advancing safety measures principally with respect to Units 6 and 7, for which applications have been presented to amend these reactor establishment licenses, based on the lessons learned from the experience of the Fukushima nuclear accident.

Overview of Safety Measures

Preparations for tsunami and interior inundation	• Installation of 15m high seawalls, tidal walls, waterproof doors and other structures for protecting important facilities and equipment inside buildings from inundation caused by a tsunami • Tsunami monitoring cameras have been set up so that the emergency response headquarters and main control rooms are able to monitor a tsunami if one strikes • In order to prevent the inundation of important safety facilities in cases where the interior of a building is flooded as the result of damage to equipment inside the building, building penetrations have been waterproofed, doors to important equipment rooms have been made watertight, and permanent sump pumps have been installed that operate using emergency power sources
Preparations for power loss [Augmenting power sources]	• In order to ensure power even in the case of a station blackout, power sources have been multiplexed and diversified through the deployment of gas-turbine generating vehicles, installation of emergency power panels, as well as the deployment of multiple power supply cars, alternative DC batteries and other such equipment • In order to augment means for injecting cooling water into the reactors even if all power is lost, preparations have been made to ready the means for injecting cooling water into reactors by installing alternate high-pressure cooling water injection pumps (steam turbine driven pumps), preparing alternate means for injecting cooling water into reactors using the make-up water condensate system powered by a gas turbine generating vehicle, and setting up cooling water injection heads outside reactor buildings so that fire engines may be used to inject cooling water from outside the building
Preparations against damage to the reactor core or spent fuel [Augmenting heat removal and cooling functions]	• In order to provide an ultimate heat removal means as a measure to prevent a severe accident, an alternate reactor core component cooling system was installed • Reservoirs have been built to ensure water sources • To maintain cooling of the spent fuel pool, cooling water injection heads have been installed outside the reactor building so that cooling water may be injected using fire engines and a supplemental line has been added, which is independent from the existing pool cooling system
Preparations against damage to reactor containment vessel or reactor building [Measures to prevent damage due to excessive PCV pressure and prevent a hydrogen explosion]	• To augment the means for depressurizing the reactor pressure vessel, backup portable batteries, nitrogen cylinders and air compressors have been deployed • To prevent damage to the reactor containment vessel, above-ground filtered venting equipment has been installed that releases pressure and heat from inside the reactor containment vessel to the outside • To prevent hydrogen from accumulating and remaining inside the reactor building, static catalytic hydrogen recombination systems, hydrogen discharging top vents on the reactor building roof as well as other equipment have been added
Preparations against dispersion of radioactive materials	• To curb the dispersion of radioactive materials outside the site, water sprinklers (high-capacity water cannons, etc.) have been deployed so that cooling water can be injected from outside the reactor buildings
Preparations against fires [Measures against	• Fire belts have been established to prevent forest fires from spreading to the reactor

external and internal fires]	facilities • To prevent important safety facilities from being rendered unusable due to a fire inside a building, measures have been taken to fireproof penetrations, and different types of fire detection devices have been added as well as stationary fire extinguishing equipment, refractory walls, fire dampers, cable wrappings and other such measures
Enhancement of the emergency response	• Communications equipment has been augmented in order to ensure the means for notification and communication (satellite phones installed, etc.) • Multiple access routes have been readied and the roads reinforced in order to ensure emergency vehicle access

In addition, measures have been implemented in a systematic manner to prepare not only for earthquakes and tsunamis, but also tornadoes, volcanic eruptions, magnetic storms, cyber-terrorism and other external hazards.

The status of progress made on projects during the first quarter is described below.

◆ Enhancement of Heat Removal and Cooling Functions

- In order to prevent core damage, new alternate high-pressure cooling water injection systems driven by a steam turbine have been added to the existing high-pressure coolant injection systems, which are the reactor core isolation cooling systems, to create multiple tiers of reactor coolant injection systems. At both Units 6 and 7, installation has been completed of the main pump units for the alternate high-pressure cooling water injection systems. At Unit 6, installation of pipes and supports as well as laying cables is still ongoing. The installation work has been completed at Unit 7 and trial operation data using on-site steam was collected (June 2, 2016) and is now being evaluated.

◆ Preventing Damage to Pressure Containment Vessel (PCV) from Over Pressurization

- Installation of Above-Ground Filtered Venting Equipment

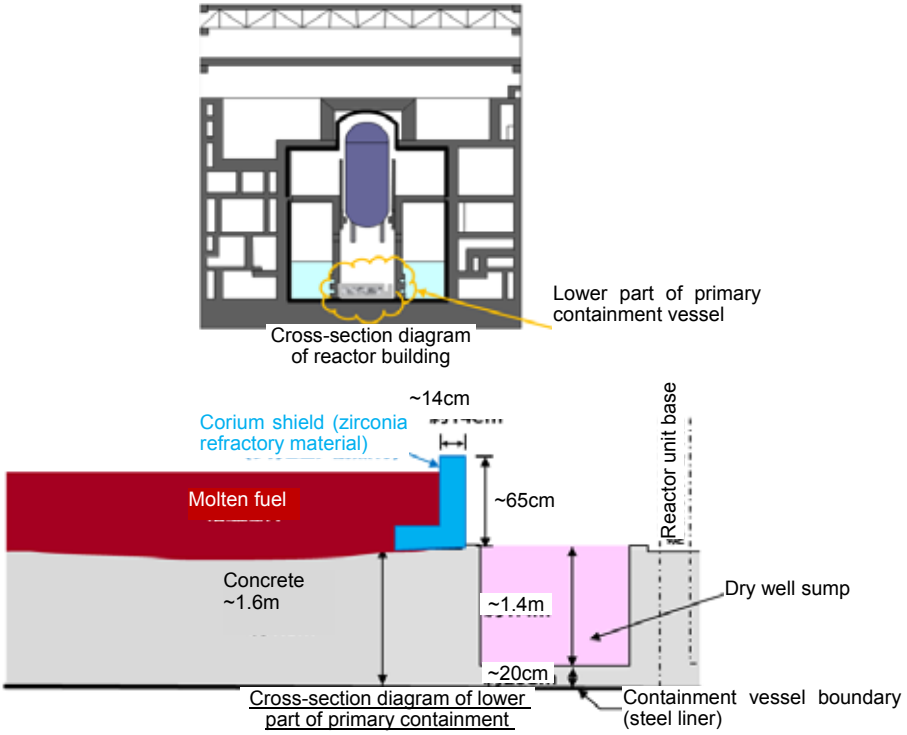
  The above-ground filtered venting equipment releases pressure and heat externally to prevent damage to the reactor containment vessel. Filtered venting equipment is being installed to reduce the quantities of gaseous organic iodine and particle radioactive materials released into the atmosphere at such time. Currently, installation of these systems is underway at Units 6 and 7. At Unit 7, pressure and ventilation tests have been completed, and the iodine filter (capable of removing 98% or more of the organic iodine) has been fitted (November 28, 2015). Work is currently being performed to wrap the system with thermal insulating material along with the application of paint. At Unit 6, the fitting of iodine filters above the main filtered vent unit was completed (January 15), and pressure and ventilation tests have been completed on the pipes around the iodine filter (April 9).

Pipes around iodine filter (Unit 6)

Pressure testing of pipes (Unit 6)

- Installation of Corium Shield

  If, during a severe accident, molten fuel damages the bottom of the reactor pressure vessel and falls into the lower part of the primary containment vessel, it could then erode the concrete of the dry well sump base and come into contact with the steel liner thereby compromising the boundary function of the primary containment vessel. For this reason, corium shields[6] are to be installed to prevent molten fuel from flowing into the dry well sump[7] and hinder any erosion of the sump base concrete, thereby preventing the primary containment vessel boundary from coming into contact with molten fuel. The corium shield has been adopted voluntarily as one of the lessons learned from the Fukushima nuclear accident. Installation of a corium shield was completed at Unit 7 on May 27.



[6] High heat-resistant material (zirconia refractory material) is used that has a heat resistance temperature of 2,700°C

[7] Tank into which water is discharged from machinery and pipes inside the primary containment vessel.

Installed corium shield (Unit 7)
(Left: before; right: after)

◆ Augmentation of Power Sources

- Installation of New Gas-Turbine Power Supply Car Facility and Emergency Switchboard on the Arahama Side

  A dedicated power facility has been installed at an elevated area next to Units 1-4 (Arahama-side: 21m above sea level) which is separate from the existing emergency power facility so that power may be supplied from gas-turbine generator vehicles, power supply cars and other such power sources when an accident occurs that results in a loss of power. The deployment of one unit was completed on April 12, and a second unit is currently in the process of being deployed. From the standpoint of further enhancing safety and reliability, construction of a similar power facility is currently underway at an elevated area 12m above sea level next to the Unit 7 turbine building.

Additional air-cooled gas turbine power supply car

Emergency switchboard on the Arahama side

◆ Addressing External Hazards

- Protection of Light Oil Tanks

  The light oil tanks, which are erected outside and may be affected by a tornado, are currently being replaced with tanks having a thicker grade of steel[8] so that they will be able to withstand collisions with flying objects (Unit 6: 2 units; Unit 7: 2 units). At both Units 6 and 7, the tanks have successfully passed completion inspections conducted in the presence of the fire

[8] Steel thickness: approx. 9mm on old tanks and approx. 36mm on new tanks.

department (inspection completed of fourth tank on April 21), and the construction work has been completed.

Light oil tanks at Unit 6

Light oil tanks at Unit 7

- Flying Object Countermeasures (Anchoring Manhole Covers)

  Measures have been implemented to anchor manhole covers which may be thrown about by a tornado (Units 6 and 7).

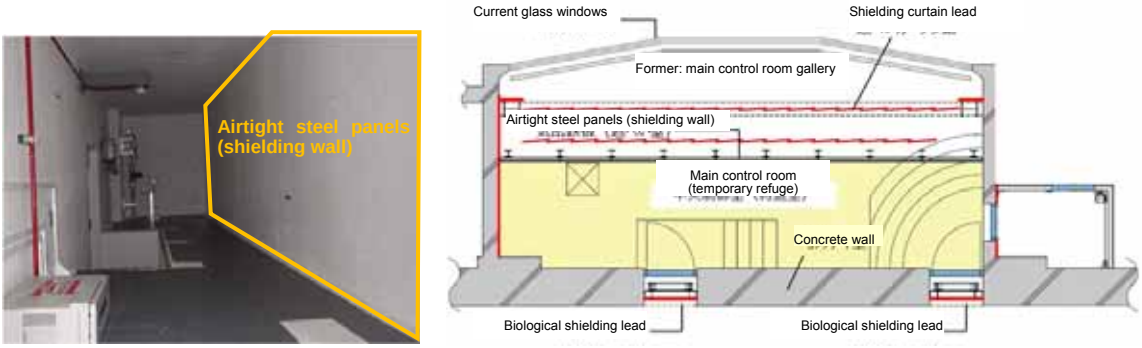
Anchored manhole cover

◆ Improvement of Main Control Room Environment

- Airtightness Testing of Unit 6/7 Main Control Room and Construction Work

  A temporary refuge has been set up that is equipped with communication equipment and other infrastructure facilities. Shielding has also been added as well as an air conditioning and ventilation system inside the main control room in order to prevent exposure to external radiation when a severe accident occurs. During an accident (when there is a rise in radiation dose), operators may take shelter in the temporary refuge for a short time so that they may remain in the main control room and continue the response, which involves the necessary plant monitoring and operations. Currently, work is underway to install a ventilation system[9] and implement measures to make the temporary refuge airtight.

[9] The ventilation system is comprised of air cylinders, pipes, valves and other equipment. This system pressurizes and ventilates the inside of the refuge area to “prevent radioactive materials from being introduced into the temporary refuge area” and “maintain oxygen and carbon dioxide levels within limits” thereby ensuring the refuge area is habitable.



Installation of shielding wall (left: post-installation; right: top view of refuge area in main control room)

(2) Explanations Provided to the People of Niigata Prefecture

◆ Community Visits and Power Station Tours

Representatives from the Niigata Headquarters (Niigata Division, Kashiwazaki-Kariwa NPS and Shinanogawa Power Station) have been visiting local governments and organizations in Niigata Prefecture in order to explain the safety measures currently being implemented at Kashiwazaki-Kariwa NPS as well as the status of decommissioning efforts at Fukushima Daiichi NPS. In particular, in the Kashiwazaki-Kariwa region, we have visited the presidents of neighborhood associations in Kashiwazaki City and Kariwa Village to develop a dialogue so that we may hear a wide range of opinions and answer people's questions, and we have developed activities that promote a dialogue, including proactively recommending tours of the power station.

Since the Fukushima nuclear accident, the number of people who have toured Kashiwazaki-Kariwa NPS as of the end of June (cumulative figures) is 13,563 from the Kashiwazaki-Kariwa region and 34,422 from throughout Niigata Prefecture.

Also, approximately 41,000 households have been visited in Kashiwazaki City and Kariwa Village to talk about the current situation at the power station, and TEPCO engaging in activities that allow us to listen closely to the opinions of people in the region (initiated in May). Through these activities, we have received comments from a broad range of people in the community, such as "TEPCO should make more of an effort to engage in a dialogue through explanatory meetings and visits" and "efforts such as these are good."

◆ Explanatory Meetings and Briefings

- Activities in Siting Communities

  A meeting of the "Fureai Talk Salon" was held at a TEPCO public relations facility (June 2016) in order to create an opportunity to explain the status of safety measures at Kashiwazaki-Kariwa NPS to women in the siting communities. At the salon, along with an explanation of the efforts to improve safety at Kashiwazaki-Kariwa NPS based on lessons learned from the Fukushima nuclear accident, opinions were exchanged and a tour conducted of the power station. Also, so that people in the community may easily participate in the session, a culture workshop was also held in conjunction with the salon. The participants provided comments helpful for power station operation, such as "I am uneasy about living close to a power station, but participating in the salon helped me to feel a close connection."

Fureai Talk Salon

- Activities Directed at All of Niigata Prefecture

  Press conferences given by a representative of the Niigata Headquarters have been started (May 10) to report the Niigata Headquarters' efforts to people throughout Niigata Prefecture. At the first press conference, the representative gave a report on activities carried out in FY2015 as well as presented an outlook for the current fiscal year, and he responded to questions from media outlets in the prefecture.

◆ Public Relations Activities Through the Media and Other Outlets

New television commercials have been broadcast that focus on "people working at the power station." The commercials communicate TEPCO's determination to keep each and every person who works at Kashiwazaki-Kariwa NPS safe, and we are striving so that people will understand what TEPCO is doing to improve safety of the power station.

Television commercial "Each and Every Person's Determination"

(3) Third-Party Reviews

◆ Undergoing WANO Peer Reviews

In June, Kashiwazaki-Kariwa NPS underwent a WANO Peer Review. Based on the WANO PO&C[10], good practices and manners to be improved (gaps vis-à-vis excellence) were identified, and we are currently working to strengthen measures to

[10] Performance Objectives & Criteria, which are formulated by WANO and not released to the public

prevent foreign material intrusion into the reactors, improving operator training instructors' skills, and making other improvements.

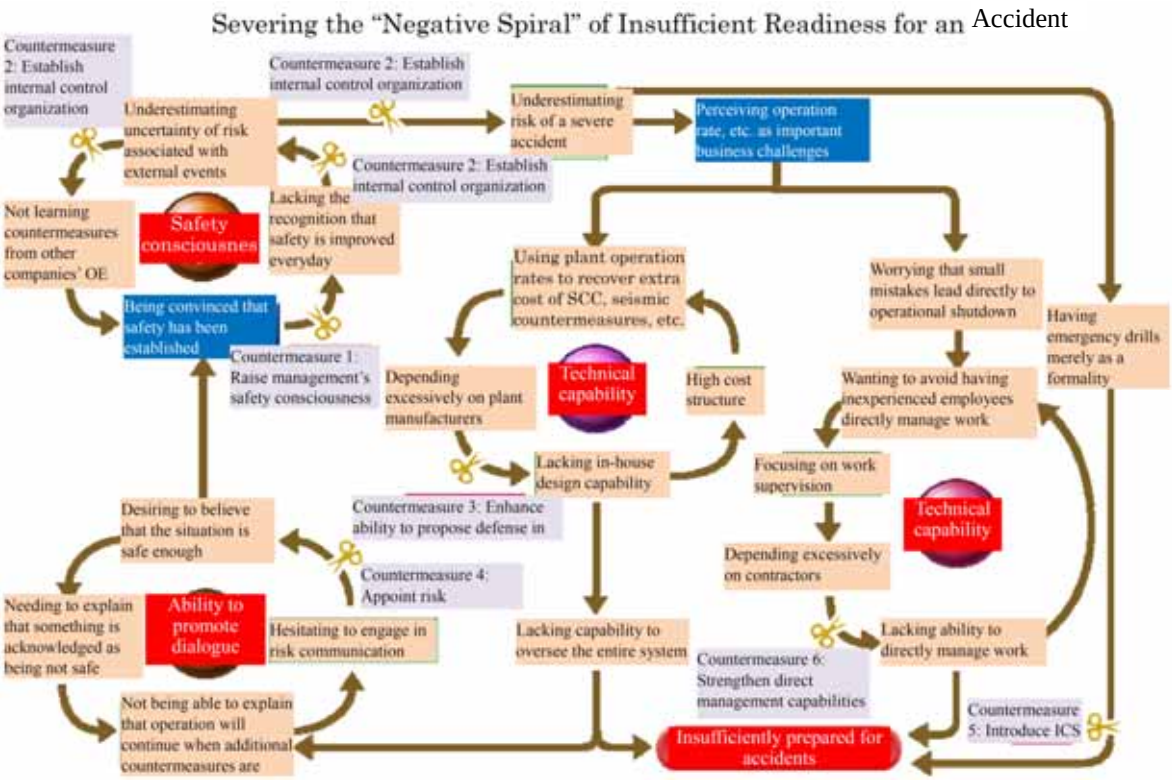
In the future as well, TEPCO will proactively use reviews conducted by WANO, JANSI[11], and IAEA, which are institutions that have accumulated knowledge and specialization about the nuclear power industry both inside and outside Japan, as we will endeavor to make improvements that enhance nuclear safety.

[11] Japan Nuclear Safety Institute

3. PROGRESS WITH NUCLEAR SAFETY REFORM PLAN (MANAGEMENT)

The progress made on the Nuclear Safety Reform Plan (Management) is summarized according to the achievements made in the first quarter, and the principal future plans are given regarding each of the six measures for severing the “negative spiral” that has exasperated structural issues faced by the Nuclear Power Division.

In addition, measurements of nuclear safety reform KPIs, which were established in the third quarter of FY2014, and assessments of these indices are provided in section 3.7 “Assessment of the Degree to which Nuclear Safety Reform has been achieved.”



3.1 Measure 1: Reform from Top Management

(1) First Quarter Achievements

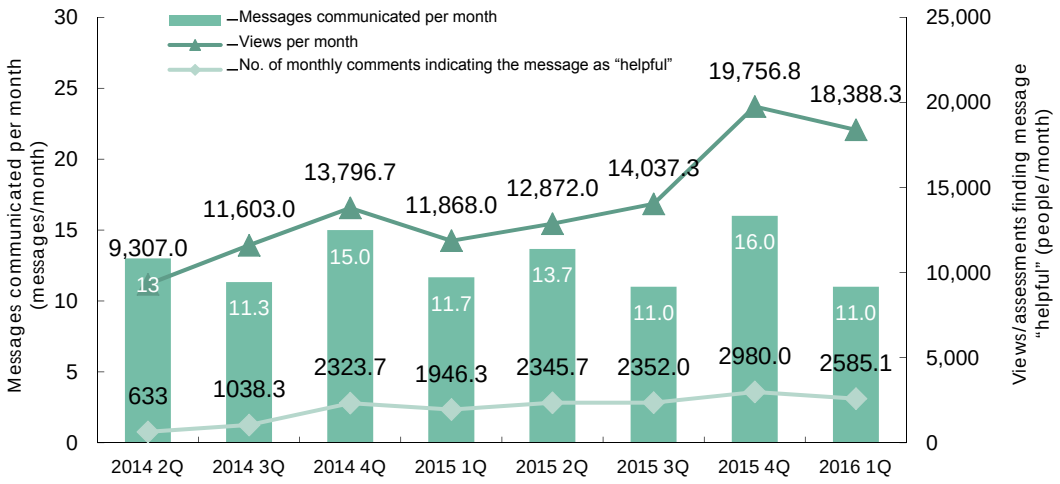
【Measure 1-1: Increase Safety Awareness Throughout the Entire Organization and Among Management】

- Direct Dialogue among Nuclear Power Leaders
  - Since the fourth quarter of FY2015, Head Office nuclear power leaders (Nuclear Power and Plant Siting Division CNO and other general managers) have headed out to the power stations to initiate a direct dialogue with power station executives (site superintendents, unit superintendents, Nuclear Safety Center director, and power station general managers). These exchanges continued to take place in the first quarter as well with Head Office nuclear

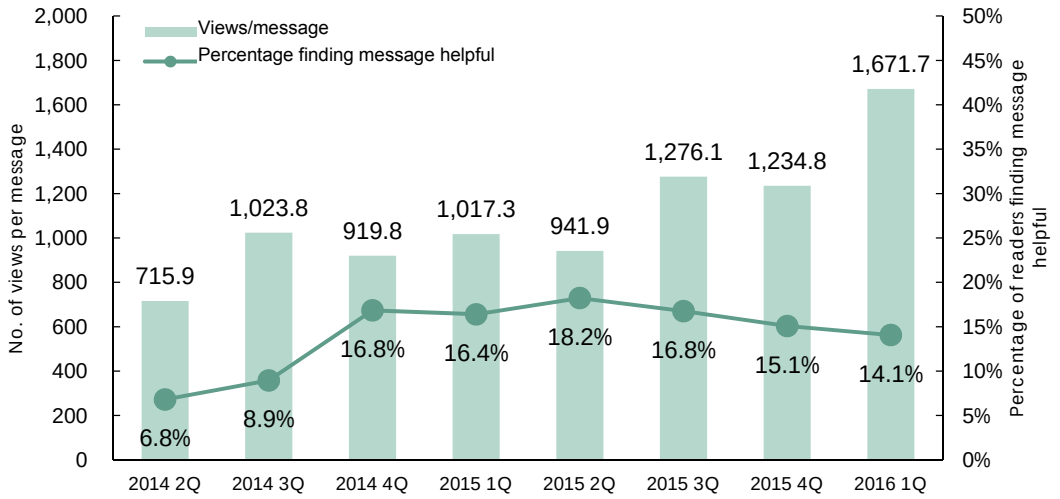
power leaders and power station executives engaging in direct dialogues (June 23 at Fukushima Daini NPS and July 4 at Kashiwazaki-Kariwa NPS)[12]. In these direct dialogues, there were discussions about the direction the human resource development needs to take to enhance nuclear safety. The participants shared a policy whereby personal development in key areas would proceed mainly through the Nuclear Personnel Training Center (provisional name). Also, time needs to be created for education and training in order to advance personnel training and improve technical capabilities, and the participants confirmed that each and every nuclear power leader would be personally responsible for his or her actively involvement in streamlining the way work is currently executed and making the process more efficient.

- Communication of Expectations by Nuclear Power Leaders
  - To further nuclear power reforms, the expectations of nuclear power leaders and the reasoning and other information underlying such expectations need to be appropriately conveyed and disseminated. Therefore, nuclear power leaders have issued messages to convey these expectations using video, intranet, email, meeting forums, talks during morning meetings and other such means. In particular, messages from the CNO of Nuclear Power and Plant Siting Division are delivered by email to each and every employee of the Nuclear Power Division.
    - The status of employee views of messages communicated by nuclear power leaders over the intranet is given below. In comparison to the fourth quarter of FY2015 when there were many messages related to March 13, there have been fewer messages communicated. Consequently, the number of employee views as well as the number of people evaluating these messages as “helpful” have also trended downward. However, when such categories are converted to the number per message, then the number of viewers exceeds 1,600, which is approximately half of the personnel assigned to the Nuclear Power Division. Although some creativity has been seen in, for example, the transmission of messages linked to the “Characteristics of People, Leaders and Organizations Embodying a Healthy Nuclear Safety Culture (10 Traits and 40 Behaviors of a Healthy Nuclear Safety Culture),” the percentage of people assessing these as “helpful” has remained around 14%.

[12] At the Fukushima Daiichi Decontamination & Decommissioning Engineering Company, regular meetings have been held each morning (approx. 30 minutes) which are attended by executives from the president on down, including vice presidents (which includes site superintendents) and Head Office general managers and at which pending matters are confirmed and other matters addressed. Additionally, the same personnel have been holding management meetings (approx. 2 hours) twice a week to discuss technical issues and other matters related to organization and operations.

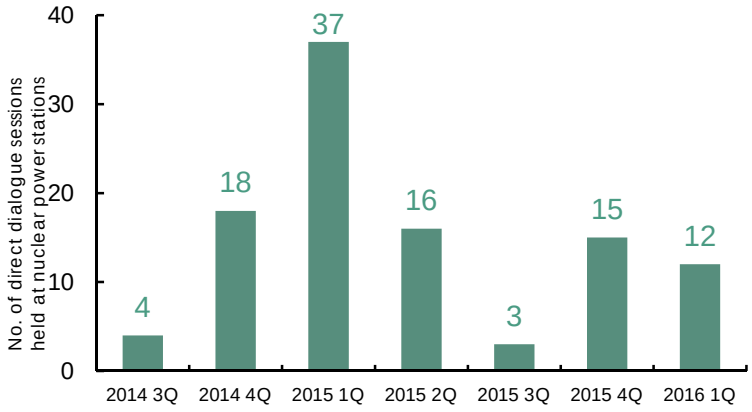


Number of intranet messages viewed/number of readers finding message "helpful" (monthly average)



Number of views per intranet messages/number of readers finding message "helpful" (monthly average)

- In order to convey "thoughts" that are not able to be put into messages transmitted over the intranet, the CNO of Nuclear Power and Plant Siting Division has continued to engage in a direct dialogue with power station and Head Office employees since February 2014.
- In addition to the direct dialogues, during the first quarter, the "expectations for nuclear safety reforms" and the fact that "the starting point for TEPCO's nuclear safety is the lessons learned from the Fukushima nuclear accident" have been directly conveyed in group manager training and new employee training. After such training ends, dialogues are initiated by email with each and every training participant (53 group managers and 109 new employees).



Number of direct dialogue sessions held between the Nuclear Power and Plant Siting Division CNO and personnel in the workplace

- Since FY2015, the CNO of the Nuclear Power and Plant Siting Division and the President of Fukushima Daiichi Decontamination & Decommissioning Engineering Company (FDEC) have presented awards to people that have strived to achieve high objectives as well as people that have taken the initiative in undertaking significant challenges pertaining to the completion of TEPCO's various missions. Details on the number of awards given during third quarter are as follows.

Number of awards presented by the CNO of the Nuclear Power and Plant Siting Division and President of the Fukushima Daiichi Decontamination & Decommissioning Engineering Company (FDEC)

Time period	Head Office	Fukushima Daiichi NPS	Fukushima Daini NPS	Kashiwazaki-Kariwa NPS
FY2015	24(2)	47	19	24
FY2016				
1st quarter	4	6	4	6

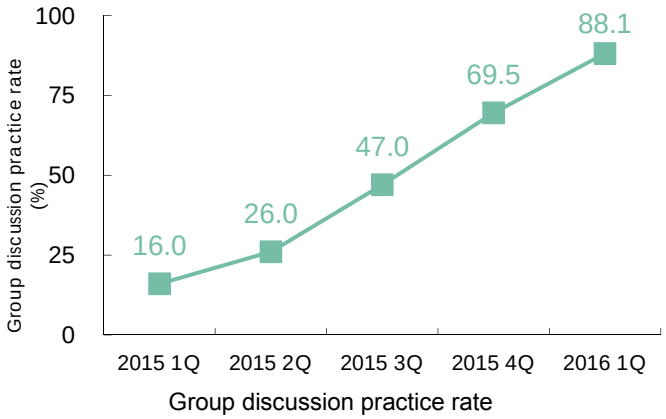
Figures in parentheses are for Higashidori (included in total)

【Measure 1-3: Spread a Safety Culture Throughout the Organization】[13]

- Prevalence of Nuclear Safety Culture Throughout Organizations
  - The Nuclear Power Division has established the "Characteristics of People, Leaders and Organizations Embodying a Healthy Nuclear Safety Culture (10 Traits and 40 Behaviors of a Healthy Nuclear Safety Culture)." The Division has urged personnel to become aware of these characteristics by conducting retrospective reviews through which daily they compare their own actions to these characteristics, and TEPCO has engaged in activities which constantly seek to raise safety awareness.
  - The rate at which individuals are practicing these retrospective reviews has continued to be 95% or higher, showing that this activity has taken hold among personnel.

[13] With regard to "Measure 1-2: Develop Nuclear Power Leaders," the prescribed training is planned for the second quarter. The problems with notifications and reports as relates to the Fukushima nuclear accident will be taken into account and the events that transpired in relation to this problem and countermeasures adopted to prevent any such recurrence will be reflected in the training.

- The rate at which group discussions have been practiced has risen to 88.1%. Members are gaining new insights as a result of individual retrospective reviews and learning from each other. The group discussions have also become customary, accordingly activities have been instituted for superiors to participate in the discussions in order to ascertain and improve the quality of the group discussions.



- In order to enhance nuclear safety, it is essential that contractors also understand nuclear safety reforms and create a nuclear safety culture, so 33 occupational safety advisers from the head offices of 18 contractors were invited to a session of the Nuclear Safety Information Liaison Council (June 21). At the Liaison Meeting, instead of the previous unidirectional communication by TEPCO conveying its instructions to contractors, group discussions were held to engage in interactive communication and share information about the Fukushima nuclear accident which is the starting point for TEPCO's nuclear safety culture, thoughts about nuclear safety reforms, and TEPCO's expectations of contractors with regard to nuclear safety.

Group discussions at the Nuclear Safety Information Liaison Council
(Left: presentation linking nuclear safety and work in the field; right: group discussion underway)

- Benchmarking Based on Overseas' Standards
  - Benchmarks are being set based on excellence (best practices) demonstrated in Japan and other countries, and TEPCO has been proactively incorporating these benchmarks so that we may achieve the world's highest levels of safety.
  - During the first quarter, for nine days beginning on May 1, TEPCO conducted benchmarking in relation to the Nine Mile Point Nuclear Generating Station in

the United States in order to examine gaps between TEPCO's power stations and a nuclear operator in the United States that is practicing excellent operation management. Good practices were confirmed, such as personnel from other units coming to provide assistance in preparing records and other documentation when a plant is being started up, and people raising their hand when they are speaking so as to call attention to the speaker when sharing information in the main control room. TEPCO will incorporate such benchmarks into our activities to improve our own operation management.

Benchmarking the operations performed during plant startup

(2) Principal Future Plans

【Measure 1-1: Increase Safety Awareness Throughout the Entire Organization and Among Management】

- With regard to intranet messages communicated by nuclear power leaders, we will aim to increase the percentage of readers assessing such messages as "helpful," and will continue to strive to create innovative message content and methods through which such information is transmitted.

【Measure 1-3: Spread a Safety Culture Throughout the Organization】

- With regard to increasing the awareness of safety throughout the entire organization and spreading the nuclear safety culture, lectures about the nuclear safety culture and repeated training thoroughly instill the lessons learned from the Fukushima nuclear accident, and these will be provided for middle-management, who plays an important role in increasing safety awareness and spreading the safety culture.
- We will continue to spread awareness about improving safety together with contractors through interactive communication at sessions of the Nuclear Safety Information Liaison Council. Also, at each power station, instead of the previous unidirectional communication of TEPCO conveying its instructions to contractors, we will advance efforts that emphasize interactive communication to further disseminate the nuclear safety culture in a manner that is more closely related to the workplace, and apply it to actual work in the field.
- Also, with regard to outside audits of contractors, in addition to the previous basic audits of the status of contractors' observance of manuals and other such

instructions, we will engage in an exchange of opinions about safety awareness and nuclear safety culture to build a common foundation.

- The results of benchmarking based on good practices in Japan and other countries will be incorporated into CAP[14] (Measure: 3-5), which is discussed later, to prevent delays in initiating improvement activities and reliably follow up after activities have commenced.

3.2 Measure 2: Enhancement of Oversight and Support for Management

(1) First Quarter Achievements

【Measure 2-1: Nuclear Safety Oversight Office Conducts Monitoring and Executes Improvements in Response to Indications and Proposals】

- Nuclear Safety Oversight Office Monitoring Activities

The views of the Nuclear Safety Oversight Office based on the past several months of monitoring activities conducted mainly during the first quarter are given below. These views were reported to the Executive Committee on July 26 and the Board of Directors on July 28.

Nuclear Safety Oversight Office (NSOO) Quarterly report

1. Fukushima Daiichi

In this quarter, we have seen continuing improvements in many areas and a good standard of leadership. We also observed some examples of poor "Behaviours" compared to the standards of the WANO Performance Objectives and Criteria (PO&C);

- Poor management involvement in several areas of operator training.
  - Such as lack of training observation and lack of leading improvement of training performance.
- A shift duty patrol were insensitive to minor risks.
  - Flammable material near electrical equipment, key control for safety related equipment and response to a minor alarm.
- Poor co-ordination between the interested parties such as the architecture, mechanical and radiation protection departments concerning the requirement for continuous dust monitoring around Unit 1.
- Lack of conservative decision making in the recent site emergency

[14] Corrective Action Program

exercise

- not assuming worst case plant condition regarding a decrease in pond water level and a dust monitor alarm.

We have previously said that the emphasis on nuclear risk assessment is not strong enough. It is improving and a strategy has been developed to correct this as part of the Infrastructure Development Project.

2. Fukushima Daini

We have continued to monitor nuclear safety during shutdown, and in this quarter have focused on maintenance.

We have seen continuing improvements and a good standard of leadership. We also observed some examples of poor "Behaviours" compared to the standards of the WANO Performance Objectives and Criteria (PO&C);

- Insensitivity to minor risks.
  - Corrosion of the support system for the sea water section of the fuel pool cooling system, surface corrosion of the RHR system piping and a failure to remove flammable material from the switchyard.

- Slow follow through on a WANO recommendation.
  - WANO asked that flammable material should be removed from the switchyard in August 2015

- Poor co-ordination between various sections involved in the Sea Water part of the Spent Fuel Cooling System.
  - There is a low heat load. Therefore the operational mode is 1 Pump and 1 Heat Exchanger operational. The resultant differences in flow rate could affect erosion in the heat exchanger. Although this is a low level risk, there was poor communication regarding the flow rate changes between the operational and maintenance teams.

3. Kashiwazaki Kariwa

We have continued to assess the nuclear safety aspects of the preparations for restart at KK units 6&7, focusing on prevention of core damage events.

3.1 Safety Enhancement of Equipment

We observe continued efforts to correct the design process problems. We see efforts to improve the design problems with respect to the flooding and fire prevention measures in the ventilation ducts of safety sensitive equipment.

3.1.1 Maintenance Schedule

18 months ago we recommended that the maintenance schedules of relevant equipment should be changed from a cycle based schedule to a time based schedule. No clear schedule was made and so progress has been slow. However we now see better progress.

3.2 Emergency Response – TSC

KK continues to hold regular and frequent drills and site exercises in the Technical Support Centre and, although there are areas for improvement, KK continues to learn and improve from this process. There is still the need to bring the capabilities of all the key post holders, such as the unit heads, up to the same level as the best ones (and higher).

Progress continues, but has been slow, in the completion of manuals and guides for emergencies.

3.3 Emergency response – Operations

The teams are working hard to improve with the help of US CFAM advisors.
Improvements are still being sought to bring all the teams up to the same level as the best (and higher).

There is still room for improvement in the standard of operator response as highlighted by NSOO and others' assessments. For example;

- the division of roles and responsibilities between the shift manager and control room supervisor
- the involvement and positioning of the instructors in simulator training
- the technique of freezing training to learn and correct errors before proceeding

4. Corporate Assessments

Poor communications and confusion over responsibilities led to poor monitoring of important WANO recommendations on fire protection at 2F.

Regarding safety culture development NSOO is pleased to see a program to encourage a better safety culture amongst our contractors, the lead being taken by the CNO.

5. CNSO Insight

A Human Resource Centre has been established to improve the training and competence of the TEPCO staff. The annual staff rotation process should be reviewed to ensure that the competence baseline is maintained during the process.

6. **NSOO Performance** - Closure of all NSOO Team Assessment Actions and corporate actions.

NSOO continues to get good response from the line management to the findings and recommendations.

- Of the 113 actions raised prior to this Quarter, 82 are closed.
- In this Quarter we raised 10 new recommendations.
- The rate of closure is approximately equal to the rate of creation of recommendations.

7. Benchmarking

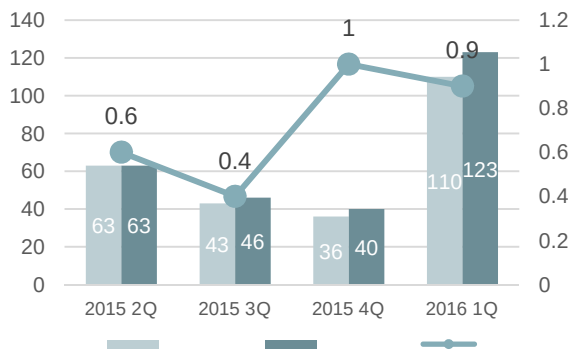
NSOO has attended conferences, Nuclear Safety Review Boards, and visited American utilities, WANO and Sellafield to further our understanding and gain experience and insight into the best standards of oversight.

【Measure 2-2: Enhance the Role of Middle Management】

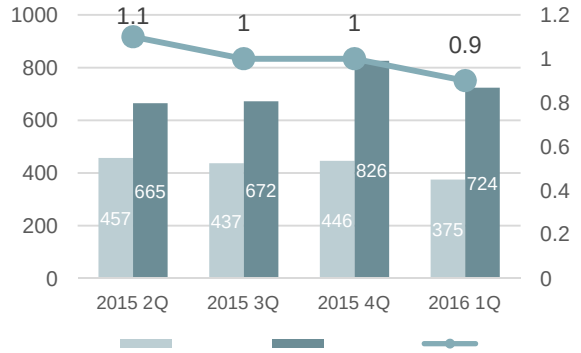
- Enhancement of Management Observations
  - In order to promote nuclear safety reforms and enhance nuclear safety, improvements must be appropriately implemented. Accordingly, management observations (MO), which have been incorporated by outstanding nuclear operators in other countries, have been used to monitor what is happening in the field and accurately ascertain any problems.
  - In the first quarter, in order to enhance management's ability to conduct on-site observations within the Maintenance Department, Operations Department and other specialized fields, overseas experts provided on-site coaching. The result has been steady improvement of management observations. At Kashiwazaki-Kariwa NPS, non-observance of rules and inconsistent basic actions such as "not performing safety measures that have been arranged in work schedules and determined by job hazards" and "not using appropriate equipment, tools or safety gear" have come to be understood as habitual bad practices at the level of worker behavior and should be improved. In addition, at Fukushima Daini NPS as well, the results of management observations in each specialized area have been compiled and assessed to identify items that should be improved.
  - The results of the first quarter are given below.

Category	Head Office	Fukushima Daiichi NPS	Fukushima Daini NPS	Kashiwazaki-Kariwa NPS

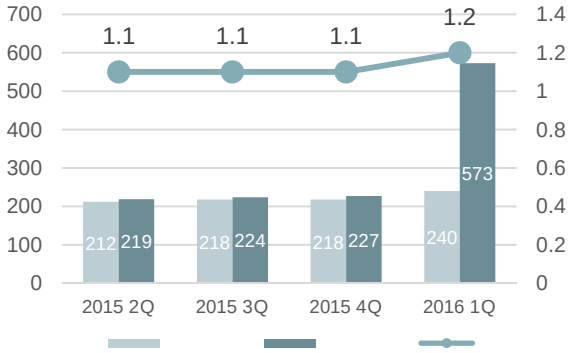
No. of MOs conducted*	110 0.9 times per man month	375 0.9 times per man month	240 1.2 times per man month	443 1.5 times per man month
No. of good practices and areas for improvement identified*	123 +250%	724 -12%	573 +252%	1,304 +1%



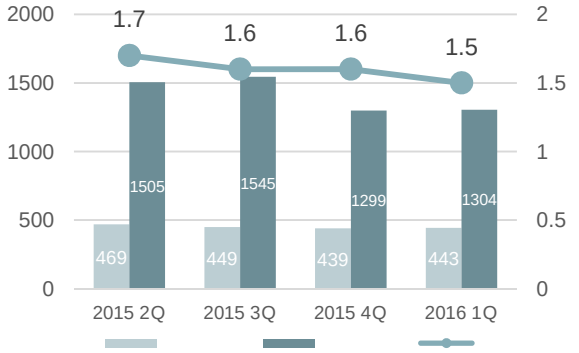
Head Office



Fukushima Daiichi NPS



Fukushima Daini NPS



Kashiwazaki-Kariwa NPS

(2) Principal Future Plans

【Measure 2-1: Nuclear Safety Oversight Office Conducts Monitoring and Executes Improvements in Response to Indications and Proposals】

- The Nuclear Safety Oversight Office will continue to monitor activities that are important for nuclear safety, point out issues to be addressed, and make suggestions as it advances improvements in nuclear safety. In addition, the results of overseas benchmarking will be applied to achieve our aim of having the world-class level monitoring operations as well.
- The assessment is that the pace at which the Nuclear Safety Oversight Office issues new recommendations and the pace at which these are completed correspond for the most part, but it has been pointed out that there are still items whose improvement needs to be accelerated and followed up, and the Nuclear Power Division will address these in a priority manner.

【Measure 2-2: Enhance the Role of Middle Management】

- Management observations have taken hold, but they are tending to stagnate at a pace of once a month, and the target needs to be gradually raised.
- In addition to increasing the frequency at which management observations are conducted, we will work to improve the capabilities for conducting management observations as a way of enhancing quality by clarifying the expectations for each specialization, specifying the perspectives that management observations should adopt, and continuing to hold INPO/WANO training as well as providing on-site coaching by overseas experts.

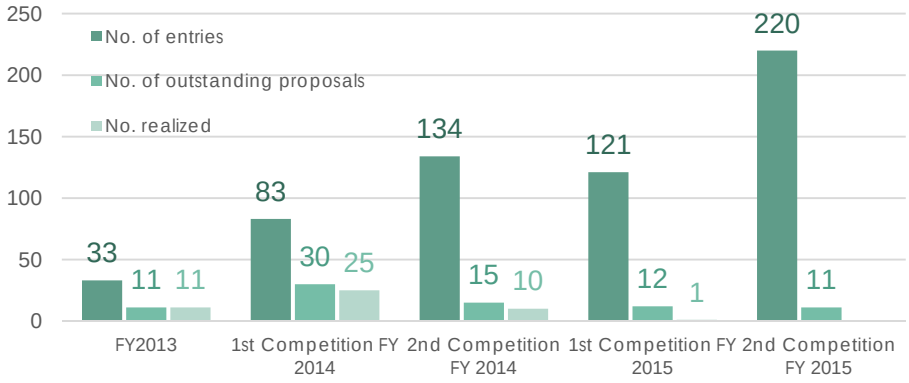
3.3 Measure 3: Enhancement of Ability to Propose Defense in Depth

(1) First Quarter Achievements

【Measure 3-1: Hold Competitions for Strengthening the Ability to Propose Safety Improvements】

- TEPCO has been holding Safety Improvement Proposal Competitions so that personnel may, in addition to conducting multi-faceted reviews from the perspective of defense in depth, acquire the technical ability to propose cost-effective safety measures and have these proposals realized promptly. The current status of these competitions is as follows.
  - Beginning in January, the second competition of FY2015 was held with a total of 220 entrants, the highest number since the competitions began. The number of proposals has increased thanks to promotion by senior personnel actively calling on people in charge to submit proposals, and the establishment of targets related to the number of proposals. In the first quarter, 11 outstanding proposals were selected by the judging committee and voting by employees in the Nuclear Power Division.
  - The following are the outstanding proposals realized in the first quarter.
    - FY2014 1st Competition: Of the outstanding proposals (30), one outstanding proposal has been newly realized since the previous report was issued (total of 25)
    - FY2014 2nd Competition: Of the outstanding proposals (15), none have been newly realized since the previous report was issued (total of 10)
    - FY2015 1st Competition: Of the outstanding proposals (12[15]), one outstanding proposal has been realized

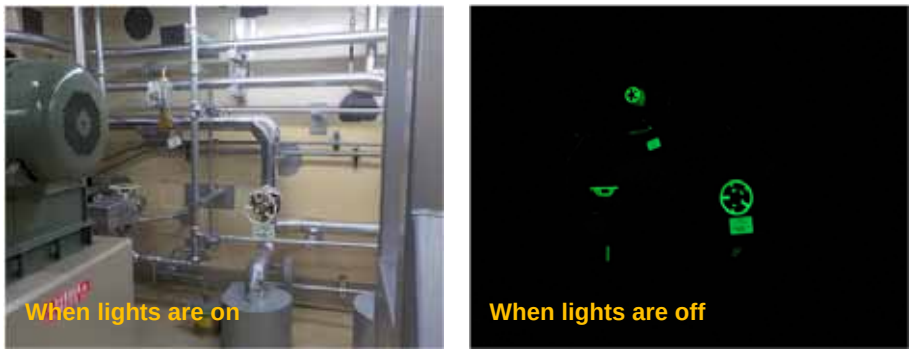
[15] Of the 13 outstanding proposals, one has been adopted at multiple power stations, so, including this, there are a total of 12 outstanding proposals.



Number of Safety Improvement Proposal Competition entries, outstanding proposals, and proposals realized

First competition of FY2014

- So that the work of recovering from an accident can be precisely performed even when the lights are no longer lit up, high-intensity luminous material is affixed and luminous paint applied to the cooling water injection equipment and other valves as well as evacuation routes out of buildings so that such equipment may be used when no power is available, and the visibility of this material and paint is assured. (Fukushima Daiichi NPS, Fukushima Daini NPS, and Kashiwazaki-Kariwa NPS)



High-intensity luminous material applied to important equipment and serving as guides along evacuation routes and as evacuation signs (Kashiwazaki-Kariwa NPS)

First competition of FY2015

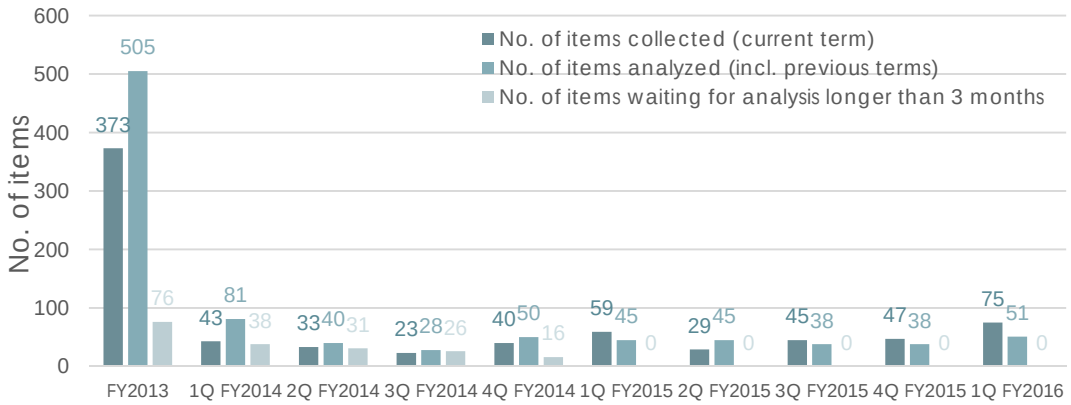
- To prevent heatstroke, portable WBGT[16] displays and outdoor clocks have been set up so that working time can be checked. (Fukushima Daiichi NPS)

Portable WBGT display and outdoor clock (left: full view; right: enlarged display) (Fukushima Daiichi NPS)

【Measure 3-2: Utilize Operation Experience (OE) Data from Inside and Outside Japan】

- One of the lessons learned from the Fukushima nuclear accident is that we should study other companies' failures. TEPCO believes that something that occurred somewhere else in the world could also happen at one of our power stations, and we are reviewing and implementing appropriate countermeasures that take into account such failures.
- Operational processes employed prior to the Fukushima nuclear accident have been improved. Operation experience (OE) data has been collected from both inside and outside Japan, and the reviews of countermeasure accelerated. All personnel in the Nuclear Power Division have been working to utilize this information.
  - During the first quarter, 75 pieces of new OE data were collected and 51 of these analyzed, this figure includes previously collected OE data. The items continue to be processed in a systematic manner, and no pieces of data have been waiting for longer than three months to be analyzed.

[16] Wet Bulb Globe Temperature: Indicator showing ①humidity, ②solar radiation and radiation intensity as well as other heat elements of the surrounding environment, and ③temperature. It is used to prevent heatstroke.



OE data collected and analyzed

- TEPCO has initiated intensive study sessions to focus on important OE data (severe accidents and SOER[17] from both inside and outside Japan), and we are working to improve synopses of these accidents and other problems as well as increase personnel's understanding of the lessons learned.
  - In the fourth quarter of FY2015, personnel responsible for nuclear safety at power stations and licensed reactor engineers were appointed to serve as OE training instructors, thereby strengthening the system that enables personnel to learn from OE data.
  - In the first quarter, teams of experts from overseas conducted intensive courses on major accidents (case study of the fire at Browns Ferry Nuclear Plant) (Head Office: April 11 and 26; Fukushima Daiichi NPS and Fukushima Daini NPS: July 6 and 13; Kashiwazaki-Kariwa NPS: June 28 and 29) in an effort to improve the capabilities of the entire Nuclear Power Division.

Intensive course on the fire at Browns Ferry Nuclear Plant (Kashiwazaki-Kariwa NPS)

- In July 2015, TEPCO and our contractors started to collect information about near-miss accidents. The collection methods, which were first used at Fukushima Daiichi NPS, are being successively expanded to Fukushima Daini NPS and

[17] SOER: Significant Operating Experience Report

Kashiwazaki-Kariwa NPS. Also, so that such data is effectively utilized, contractors and TEPCO have been collaborating to analyze the data and are considering formulating improvement measures.

【Measure 3-3: Construct Processes for Improvement Based on Hazard Analyses】

- TEPCO is developing approaches and systems in preparation for accidents and hazards which have high potential for a cliff-edge effect and entail substantial uncertainty about the frequency of their occurrence, and we are formulating and implementing countermeasures on the assumption that such accidents occur.
- At Kashiwazaki-Kariwa NPS, the analysis of approximately 30 hazard items was finished in FY2014, and we are currently reviewing and implementing countermeasures in accordance with the plan formulated.
  - In the first quarter, the Hazard Analysis Expert Team confirmed the status of countermeasure implementation in its meetings.
  - In the meetings, the Expert Team reviewed the proposed operating procedures for responding to the impact of electromagnetic waves resulting from solar flares or other such causes, and made the decision to reflect these in written procedures.

【Measure 3-4: Improve Processes for Periodic Evaluations of Safety (Safety Reviews)】

- TEPCO's improvement activities are not limited to addressing non-conformances, items indicated during safety inspections, or items indicated during third-party reviews. We have carried out safety reviews so that, on our own accord, we are continually and actively improving nuclear safety by delving into the causes underlying problems.
- The status of safety reviews at our power stations is as follows.
  - Fukushima Daiichi NPS

    A variety of indicators have been analyzed and reviewed in regard to activities in FY2015 for creating a nuclear safety culture. Comparisons of self-assessments by group managers as well as JANSI survey results and other assessment results showed that there are weaknesses in "following, maintaining and managing procedures and rules" as well as "appropriate lateral deployment." These assessment results have been reflected in FY2016 activity plans, and activities have been launched to overcome these weaknesses, including reassessing rules in accordance with actual operating conditions and considering lateral deployment throughout the power station of measures to prevent recurrences of non-conformances.
  - Fukushima Daini NPS

    With regard to the "accident operating procedures and facilities for emergency safety measure facilities (portable facilities)" which were implemented in FY2015, TEPCO has confirmed procedural documents and conducted interviews with the relevant offices. We have compiled the review results and are working to make improvements, including a dispersed arrangement of materials and equipment necessary for operation of power supply cars, and reflecting precautions in operating procedures to be taken when it rains. We will continue to scrutinize the review plans for the current fiscal year in order to safely maintain the cold shutdown.
  - Kashiwazaki-Kariwa NPS

As part of our activities to reduce risks in the field, we are continuing to launch activities to identify and improve procedures important for our emergency response. In the first quarter, TEPCO focused on scenarios assessing the effectiveness of accident analyses and successful paths derived from PRA results and other such data, and we have made preliminary conceptual deductions about procedures that are able to effectively reduce risks. Confirming and verifying such procedures through actual training and employing them in the field will lead to improvements in the procedures as well as TEPCO's education and training menu.

【Measure 3-5: Promote Improvement Activities through Operation of the CAP System[18]】

- There was previously a system in place for managing investigations into the causes of non-conformances and the status of implementation of corresponding countermeasures as well as OE data, which had been identified as contributing to enhancing nuclear safety, but the system was insufficient for adding other information as well as delving deep into causes to comprehensively analyze vulnerabilities. In order to ameliorate the situation, not only non-conformance and OE data but also information useful for improving nuclear safety (management observation results, benchmarking results, external review results, near-miss incident data, etc.) will be managed in an integrated manner using CAP, and our aim is to improve efficiency and effectiveness by reducing any overlap in improvement activities and adopting more fundamental countermeasures.
- Improvement of Operations Management of Non-conformance Data
  - So that non-conformance events are not allowed to recur, TEPCO has enacted a policy whereby the personnel responsible for a specific process conduct self-reviews that determine the causal analysis and level of corrective actions (reassessment of management grade) based on the magnitude of the non-conformance results as well as the magnitude of any potential risks and learning that may be gained from the event (policy went into effect in July)
  - With regard to assessments of the effectiveness of actions for correcting non-conformances, TEPCO has improved its operations so that quality assurance departments verify whether or not countermeasures are effective and continue to be implemented (manual revised on May 16).
- Conducting Benchmarking in the United States
  - TEPCO conducted benchmarking vis-à-vis nuclear power operators in the United States that have put CAP into operation contributing to improvements (Duke Energy's Head Office and its Brunswick Nuclear Generating Station, and Exelon's Braidwood Nuclear Generating Station) (April 23 to May 1).
  - Based on the results of benchmarking, TEPCO is considering giving CAP a central place in the management of operations and strengthening processes in which nuclear power leaders participate more actively. Furthermore, by also reassessing the relationship with self-assessments and other processes in addition to CAP, TEPCO will construct a system for comprehensively managing all improvement activities (Performance Improvement Program).

[18] CAP: Corrective Action Program

Screening session at the Brunswick Nuclear Generating Station

【Measure 3-6: Improve Ability to Resolve Issues Traversing Organizations (Change Management)】

- An analysis of the Nuclear Safety Reform Plan found that, when resolving issues in which multiple organizations are involved, poor project management is a cause of the slow pace of resolution and the insufficiency of anticipated results. In order to improve these, TEPCO formulated a policy stating that full-time project leaders shall be appointed in principle, and providing the specifying and sharing of responsibilities, authorities, targets, expectations and deadlines as well as the policy that organizational leaders respond in a methodical manner when shared issues arise in addition to regular progress reports.
- In order to verify any effects, TEPCO has made "improvements in maintenance operation processes (introduction of Maximo[19])," applied improvement policies, monitored situations, and verified the extent of any improvements in project management.
  - For improvements in maintenance operation processes (introduction of Maximo), TEPCO has proceeded with a review that focuses on Kashiwazaki-Kariwa NPS, and programming and operational tests are underway. Decisions on the key specifications and other such matters have been deliberated and decided by the Project Steering Committee (Chair: General Manager, Nuclear Power Plant Management Department) (decisions were made in the first quarter on the system research plan and system resource schedule), and TEPCO has steadily moved the project forward while making decisions at each critical juncture in accordance with the improvement policy. The system is scheduled to go operational this autumn.
  - In the first quarter, as part of the change management activities (activities necessary for efficiently and effectively implementing changes), posters were displayed in all departments at Kashiwazaki-Kariwa NPS and the Head Office Nuclear Power Division, and the people involved have begun to become more aware of changes in processes at the power stations and the Head Office.

[19] IT solution for realizing strategic asset management.

Poster displayed in departments at the Kashiwazaki-Kariwa NPS and Head Office Nuclear Power Division

(2) Principal Future Plans

【Measure 3-1: Hold Competitions for Strengthening the Ability to Propose Safety Improvements】

- CNO Awards are scheduled to be presented to outstanding proposals entered in the Second Competition of FY2015. Also, during the second quarter, TEPCO will begin soliciting entrants for the First Competition of FY2016. We will continue to increase the number of proposals entered and scores assessed as well as work to promptly realize any outstanding proposals.
- We will monitor the process all the way through realization of outstanding proposals from the Second Competition of FY2015. In cases where proposals are not smoothly realized, we will expeditiously conduct follow-ups.

【Measure 3-2: Utilize Operation Experience (OE) Data from Inside and Outside Japan】

- In the future, intensive courses taught by overseas experts to learn about major accidents and SOER will be launched in a systematic and planned manner, and OE training instructors at each power station will develop training courses to be held within the power station. Through these activities, TEPCO aims to have all employees of the Nuclear Power Division gain a thorough understanding of important OE data synopses and the lessons to be learned.

- Furthermore, in FY2016, we will incorporate the study of OE data into education and training programs for the Nuclear Power Division.
- Of the OE data-related PIs, the daily OE implementation rate, which shares OE data at daily meetings and other such forums, will be omitted[20] as it has continued to achieve the targets set, and the "rate of OE training undergone by management" will be established as a new PI because it is indicative of a "posture of actively learning on one's own about important OE data irrespective of superficial causes," and this PI will be measured beginning in the second quarter.

【Measure 3-3: Measure 3-3: Construct Processes for Improvement Based on Hazard Analyses】

- Beginning in the second quarter, TEPCO will begin to identify and analyze hazards at Fukushima Daiichi NPS.

【Measure 3-4: Improve Processes for Periodic Evaluations of Safety (Safety Reviews)】

- TEPCO has been reviewing methods to select themes in conjunction with the implementation of safety reviews at power stations. Because the difference between safety reviews and other improvement activities continues to diminish, our aim is to have the results of various PI analyses, management reviews, and results of other activities that contribute to improving nuclear safety be broadly incorporated as inputs, and comprehensive analyses conducted on the status of nuclear safety achievement so that we are able to deduce weaknesses in our activities.

【Measure 3-5: Promote Improvement Activities through Operation of the CAP System】

- Because we have decided to use CAP to improve performance based on non-conformance management, TEPCO is taking into account benchmarking results in reviewing the implementation of the following improvements. In October, full-scale operation of the CAP program for making improvements is scheduled to begin.

Improvements and Actions when CAP is introduced

Improvement	Proposed Remedy	Action
Strengthen participation and commitment of executives and managers	Draft expectations about CAP	・ Clarify the behaviors that everyone is to practice from the top on down to regular employees
	Consolidate the Non-conformance Management Committee, Problem Review Committee, Information Liaison Committee and other committees and councils, and merge these into the Performance Improvement Council (provisional name)	・ Reassess the participation of executives and managers in meetings (including securing the necessary resources)
Strengthen the CAP framework whose	Reassess screening guidelines	・ Reassess the guidelines in terms of analytical systems in keeping with

[20] Although it will be emitted from the Nuclear Safety Reform Plan PIs, this PI will continue to be measured and monitored.

aim is to improve performance		the intensity of the learning, and reassess management grades in CFAM activities
	Have line assignments for CAP experts	・ Assign full-time personnel to CAP for each functional area such as operations, maintenance, etc.
	Integrate the results of observations on behavioral levels into CAP	・ Integrate and manage near-miss incidents and management observations, which are managed separately from non-conformance management, into CAP
	Analyze and assess in an integrated manner the activities necessary for performance improvement	・ Monitor and assess in an integrated manner information for improvements such as external reviews, self-assessments and benchmarks

【Measure 3-6: Improve Ability to Resolve Issues Traversing Organizations (Change Management)】

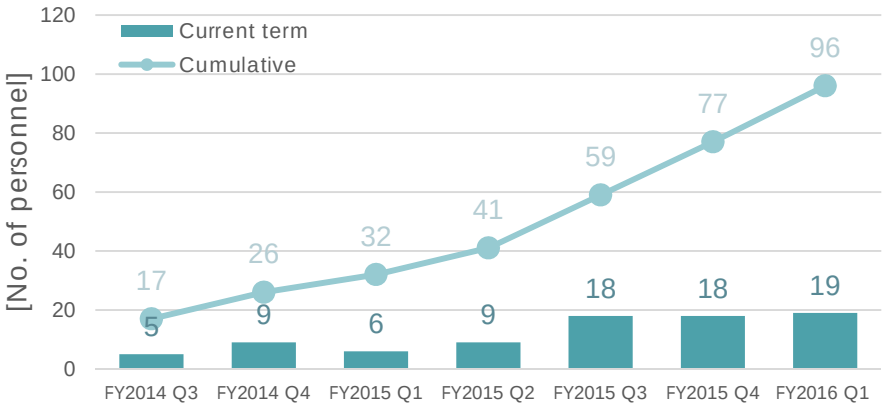
- With the aim of introducing new operational processes and establishing information technologies, TEPCO will analyze comments and other opinions expressed at explanatory meetings and reflect these in future change management activities, while continuing to provide explanations to the concerned parties about process changes.

3.4 Measure 4: Enhancement of Risk Communication Activities

(1) First Quarter Achievements

【Measure 4-1: Systematic Appointment and Training of Risk Communicators】

- Currently, there are 44 risk communicators serving (as of July 1). Risk communicators were initially appointed from among managers in engineering fields, but the scope was broadened beginning last fiscal year from the standpoint of diversity to include management in administrative fields. Furthermore, the first woman risk communicator was appointed at Kashiwazaki-Kariwa NPS this past quarter.
- To strengthen liaisons between the engineering departments and the Corporate Communications Department as well as raise awareness among engineering employees about external communication, TEPCO continues to train engineering department managers at Fukushima Daiichi NPS for postings in the Fukushima Corporate Communications Department (19 personnel were posted during the first quarter of FY2016 for a cumulative total of 96).



Number of Fukushima Daiichi engineering managers that have undergone training for assignment in the Fukushima Corporate Communications Department

- Situational training was conducted, in which risk scenarios were assumed, for people in charge of public relations at service centers and other offices (April 5). TEPCO has worked to improve the communications capabilities necessary for the respective roles that our personnel play in situations closely approximate reality, while, at the same time, sharing information simultaneously by videoconferencing. Management and outside evaluators have also participated in evaluating the training.

Situational training for public affairs officers

【Measure 4-2: Practice Risk Communication】

A: Overview

- The Social Communication Office and risk communicators have continued to propose to management and the Nuclear Power Division policies for guiding explanations about countermeasures and announcements about risks. Particularly, taking into account the problems experienced with notifications and reports related to the Fukushima nuclear accident, the person responsible for the external response during a crisis situation will directly present proposals to the president about the communication of information from the viewpoint of society.
- The Corporate Communications Department and Social Communication Office have been central to the continuing effort to communicate information both in Japan and vis-à-vis other countries over the internet and SNS, as well as

producing easy-to-understand explanatory materials, mainly in the form of videos, that describe progress made in reactor decommissioning and what this process entails.

B: Status of Activities in the Fukushima Area

- In the Fukushima area, TEPCO has proactively engaged in communication through briefings and other presentations to local governments, relevant groups and people in the community about the decommissioning of Fukushima Daiichi NPS, measures to address contaminated water, and safety measures at Kashiwazaki-Kariwa NPS. TEPCO takes into account the comments and requests expressed by everyone, and we will continue to improve these activities.
  - At a meeting of the Fukushima Council for Decommissioning and Contaminated Water Countermeasures[21] (11th meeting held on April 20, 2016), comments were expressed such as "I would like discussions about the future handling of ALPS-treated water, which contains tritium, to take into account social science perspectives and environmental science knowledge in addition to the assessments compiled by the government's task force from a technical perspective" and "problems still arise between workers and TEPCO employees that are attributable to communication. I would like you to examine the problems that arise carefully and consider measures to prevent such communication problems." TEPCO also received the comment that, "in making a decision whether to return home, it would be beneficial if TEPCO communicated in an easy-to-understand manner the details of projects that are underway on-site for decommissioning Fukushima Daiichi NPS." TEPCO will continue to be committed to preparing information communication tools that are easy to understand such as videos, pamphlets, leaflets and other public relations materials.
  - At meetings of the Prefectural Council on Safety Assurance in Decommissioning the Fukushima Prefecture Nuclear Power Station[22] (first meeting of FY2016: May 9; second meeting: May 14; on-site tours of Fukushima Daiichi NPS were also held on both occasions), comments were received such as, "with people who evacuated going back home now, I would like to ask that the work be performed so that people feel secure that nothing unanticipated will happen" and, "although progress has been made in improving the environment on-site, my impression is that it will still take a long, long time. The rumors are still severe, and I would like to ask for an early resolution of the situation." Also, at the Council's third session (June 1), comments were received such as, "the people in the Prefecture are also very worried about the risks entailed in the work of dismantling Units 1 and 2. I would like to ask that in the future as well you provide sufficient explanations about your plans and achievements in forums such as this meeting to improve people's understanding." TEPCO will take into account such comments and provide sufficient explanations about work plans and achievements at the Council's meetings in the future as well, and we will be sure to provide information to people in the prefecture, including those who are returning home.

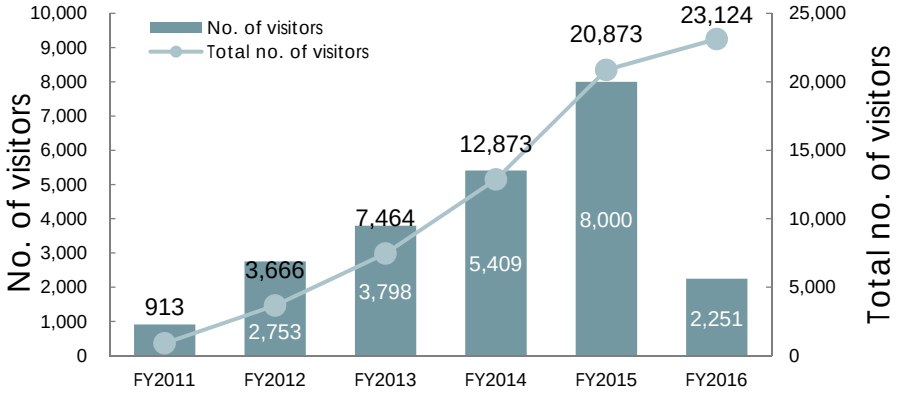
[21] Established in February 2014, and, in addition to the chair (State Minister of Economy, Trade and Industry), the Council is comprised of Fukushima Prefecture and the surrounding local governments, relevant local groups, experts, regulators, Secretariat of the Decommissioning and Contaminated Water Countermeasures Team and TEPCO.

[22] Established in August 2013, and comprised of 13 concerned municipalities as well as various groups engaged in commerce, industry, agriculture, forestry, fisheries, tourism and other sectors, including academics.

- In response to requests and demands from educators in Fukushima Prefecture, TEPCO has assisted with education about radiation and continues to provide information about reactor decommissioning. In May, as part of the science classes at high schools in Fukushima Prefecture, Fukushima Revitalization Headquarters Representative Ishizaki and Fukushima Daiichi Decontamination & Decommissioning Engineering Company President Masuda provided an explanation about the progress made in decommissioning the reactors at Fukushima Daiichi NPS, compensation, decontamination, activities supporting the revitalization and other areas to approximately 1,000 students, and they exchanged views with the students. The participating students posed questions about changes in radioactive material concentrations, activities for restoring trust with community residents, and what is being done so that a nuclear accident will not happen again and to revitalize Fukushima. In the future as well, TEPCO will actively cooperate to further strengthen liaisons with educators in the local communities.

Science class at a high school in Fukushima Prefecture

- TEPCO continues to accept people for tours of Fukushima Daiichi NPS, and we have been endeavoring to improve people's understanding by having them directly see the power station in contrast to press conferences, handouts or websites, from which it is difficult to get a real feeling of what is happening.



Change in the number of visitors touring Fukushima Daiichi NPS (since FY2011)

- The website "1 FOR ALL JAPAN," which was set up for the roughly 7,000 workers at Fukushima Daiichi NPS and their families (launched in October 2015), has garnered an average of 28,000 views each month. Since April, two interviews have been published per month and videos posted as well. Up

until now, interviews have provided the bulk of the content, but TEPCO is planning to publish content highlighting new technologies as well. Also, a monthly newsletter “1F Monthly” has been issued in conjunction with the website, and approximately 2,000 copies are distributed at Fukushima Daiichi NPS and J-Village.

Website “1 FOR ALL JAPAN”

C: Status of Activities in the Niigata Area

- In the Niigata area, the Niigata Headquarters, Kashiwazaki-Kariwa risk communicators and the Social Communication Office hold regular information liaison meetings, and have been working to collect information about risks and proactively make information available to the public, just as is being done at Fukushima Daiichi NPS.
- In addition to the regular community briefings, the activities for engaging in an interactive dialogue with stakeholders in Niigata Prefecture include holding meetings to exchange opinions with women in the Prefecture, dialogues with experts, and tours of Kashiwazaki-Kariwa NPS. With women experts, TEPCO has conducted regular roundtable discussions at the Niigata Headquarters to continue such exchanges (total of 37 attendees during the first quarter).

D: Information Communicated by Management

- Management has used press conferences in Fukushima and Niigata to communicate messages.
  - A press conference was held at which the incoming and outgoing site superintendents at Fukushima Daiichi NPS and Fukushima Daini NPS addressed the media (June 30). Newly appointed Fukushima Daiichi NPS Site Superintendent Uchida and Fukushima Daini NPS Site Superintendent Ishii expressed their aspirations and determination to do their best on their new appointments. Also, former Site Superintendent Ono, who was stepping down as head of Fukushima Daiichi NPS, talked about the achievements made during his tenure and the issues still to be addressed.

Press conference with incoming and outgoing site superintendents
(from left: Ono, Uchida, and Ishii)

- In the Fukushima area, Fukushima Revitalization Headquarters Representative Ishizaki and Fukushima Daiichi Decontamination & Decommissioning Engineering Company President Masuda have held regular press conferences at the end of each month. This time, upon reaching the one-year anniversary of the Niigata Headquarters' establishment, Niigata Headquarters Representative Kimura held a press conference in Niigata City (May 10) at which he talked about the Niigata Headquarters' activities and efforts of operators regarding the "approach of improving nuclear accident countermeasures." In the future, the Niigata Headquarters representative will hold regular quarterly press conferences to explain to people in the community the Niigata Headquarters' activities, future plans and other important information.

Press conference with Niigata Headquarters Representative

E: Disseminating Easy-to-Understand Information and Utilizing SNS

- TEPCO has continued to produce video-based explanatory materials in our effort to make the information transmitted about nuclear power easier to understand. In the first quarter, TEPCO released 14 new videos (9 about Fukushima Daiichi NPS, and 5 about Kashiwazaki-Kariwa NPS (both are cumulative figures)). Moreover, the Fukushima Daiichi Decontamination & Decommissioning Engineering Company has continued to engage in activities with the awareness of making these public relations communicative, including using videos entitled "Risk Communicator On-site Reports" at regular press conferences in J-Village.
- TEPCO continues to disseminate information via SNS.
  - Comments by President Hirose, Fukushima Daiichi Decontamination & Decommissioning Engineering Company President Masuda and other

executive managers about Fukushima Daiichi NPS have been posted on Facebook (3 posts during the first quarter). Also, TEPCO has continued to post information on Facebook about the progress made in decommissioning Fukushima Daiichi NPS as well as improvements made in the working environment (45 posts in the first quarter). TEPCO is working to eradicate the image that people in other countries tend to associate with Fukushima Daiichi NPS as a “dangerous site.”

- Fukushima Revitalization Headquarters Representative Ishizaki and Niigata Headquarters Representative Kimura have continued to post information on Facebook (posts during the first quarter: 15 by President Ishizaki and 18 by Representative Kimura).
- TEPCO has continued to post information telling about safety measures adopted at Kashiwazaki-Kariwa NPS on TEPCO’s official Facebook page (posts during the first quarter: 2).
- TEPCO has continued to post the “RC Series” on the official Facebook page. Risk communicators post articles directly on the page to communicate a broad range of information about TEPCO’s nuclear power, including risk information related to Fukushima Daiichi NPS as well as scenes from dialogues and other activities in society (posts during the first quarter: 8).

F: Information Disseminated to Other Countries

- TEPCO continues to visit and hold briefings at foreign embassies in Tokyo (first quarter: Embassy of the Russian Federation, Taipei Economic and Cultural Representative Office, Delegation of the European Union to Japan, and Embassy of the Republic of Korea in Japan). In addition to the decommissioning of Fukushima Daiichi NPS and treatment of contaminated water about which there is great interest, TEPCO has provided explanations in keeping with requests as well, including the status of Kashiwazaki-Kariwa NPS. Also, in May, the German Minister of the Environment and representatives of the German media toured Fukushima Daiichi NPS.
- TEPCO has also prepared an information booklet especially for people in other countries, which was distributed at the International Forum on the Decommissioning of the Fukushima Daiichi Nuclear Power Station held in April (17 booklets provided to European, American and Asian media in the first quarter).

Information booklet showing the path toward decommissioning Fukushima Daiichi NPS

- TEPCO has actively communicated information to the media in other countries about the decommissioning of Fukushima Daiichi NPS, progress made in dealing with contaminated water, and improvements in the working environment. For the

media in Asia, from the standpoint of eradicating harmful rumors, TEPCO has provided information about the results of seawater monitoring conducted inside and outside the Fukushima Daiichi NPS port as well as the results of seafood sampling.

- In March of this year, a major news photo agency collected material on the workers at Fukushima Daiichi NPS, and has shown how determined the workers are to decommission the reactors through 172 media services around the world (as of June 21). Also, television programs produced by the Discovery Channel about Japan's reactor decommissioning technology and Fukushima's bright future have been broadcast in 16 countries throughout Asia and Oceania since March 11 (countries: Japan, Taiwan, South Korea, Brunei, Cambodia, Hong Kong, Indonesia, Macau, Malaysia, Mongolia, Papua New Guinea, Philippines, Singapore, Thailand, Vietnam, and Myanmar).

Discovery Channel's "Fukushima: On the Frontline with Joel Lambert"

G: Internal Communication

- As part of TEPCO's response to the company split following a transition to a holding company system in April, opportunities have been further expanded for exchange between core subsidiaries and the Nuclear Power Division. In May, TEPCO Power Grid President Takebe and other members of the executive management visited Kashiwazaki-Kariwa NPS and Niigata Headquarters. At Kashiwazaki-Kariwa NPS, through an exchange of opinions with the site superintendent and other power station executives and a tour of the facilities, the participants shared their values about improving safety and confirmed that mutual exchanges and assistance would continue going beyond the corporate framework.

Tour of Kashiwazaki-Kariwa NPS (seawall)

Exchanging opinions at Niigata Headquarters

- In June, Nuclear Power and Plant Siting Division CNO Anegawa visited the Ryugasaki Service Center where he engaged in a dialogue with the Center's employees. Questions covering a broad range of topics were posed, ranging from the current state of Fukushima Daiichi NPS, Fukushima Daini NPS and Kashiwazaki-Kariwa NPS to the nuclear fuel cycle and other items about the outlook of the nuclear power business, which CNO Anegawa answered. What sort of changes are taking place within the Nuclear Power Division is a subject of great concern within the company, so the CNO of Nuclear Power and Plant Siting Division as well as other nuclear power leaders will continue to engage in a dialogue with other departments.

Dialogue with Nuclear Power and Plant Siting Division CNO Anegawa
at the Ryugasaki Service Center

【Measure 4-3: Promote and Support Risk Communication Activities】

A: Improving Risk Communicators' Skills

- TEPCO has drawn up training plans to maintain and improve the skills of risk communicators. Taking into account the problems experienced with notification and reporting related to the Fukushima nuclear accident, TEPCO has specified plans to strengthen an awareness of the importance of making information public from the perspective of society as well as filing appropriate notifications during emergencies.
- TEPCO invited IAEA crisis communication consultant Mariko Nishizawa (President, Litera Japan) to hold training workshops for public relations officers (April 6). Following a lecture about modes of risk communication using numerous case studies and the front lines of corporate risk communication, participants worked to improve their ability to engage in risk communication.
- From the perspective of broadening the horizons of risk communicators about nuclear safety, TEPCO has encouraged risk communicators to share their knowledge beyond the regions to which they are assigned. Risk communicators themselves have served as instructors, holding study sessions on the topic of safety measures at Kashiwazaki-Kariwa NPS since February (sessions held in the first quarter: 4 study sessions and 2 tours).

B: Assembling Knowledge from Other Countries

- In partnership with Sellafield Ltd., TEPCO has been holding monthly sessions of the Fukushima-West Cumbria Study Group since May so that both companies may learn about each other's experiences in the interest of supporting

decommissioning in the field of communication and improving the ability to promote dialogue and provide information to people in the community.

- At the first session, Sellafield Ltd. gave an explanation of a “case study of dialogue with Norway,” and attendees learned that prompt and open provision of information is essential for building trust with communities.
- At the second session, TEPCO provided an explanation to Sellafield Ltd. about the history leading up to establishment of risk communicator positions, their roles and activities. The Sellafield Ltd. representatives were very interested in the presentation, including the support provided by management for risk communicators, and stated that “Britain could also learn a lot from this effort.”

Fukushima-West Cumbria Study (via videoconferencing)

◆ TEPCO has encouraged proactive exchange so that we may learn a broad range of knowledge from around the world. In May, TEPCO held a session to exchange views with the French Alternative Energies and Atomic Energy Commission (CEA), and, in June, with American Electric Power and the Société française d'énergie nucléaire. In particular, TEPCO identified a case study presented by CEA about the operation of a museum “VISIATOME”, which garners 20,000 visitors annually, as part of the CEA’s dialogue with the community to talk about the Marcoule nuclear site (currently being decommissioned).

(2) Principal Future Plans

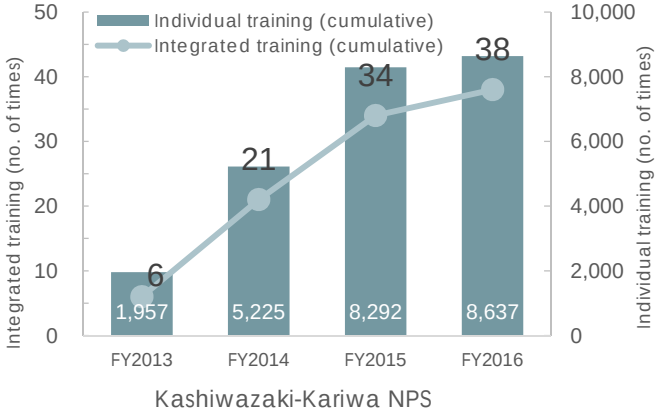
- While improving training for risk communicators, TEPCO will work to further improve their skills. In addition, taking into account the problems experienced with notifications and reports related to the Fukushima nuclear accident, we will also concentrate our energy on bolstering systems and tools which are employed by the people responsible for communicating information and responding externally during a crisis.
- TEPCO will continue to actively create opportunities for dialogue with Sellafield Ltd. and other institutions and experts overseas, and we will use the knowledge gained to improve our activities.

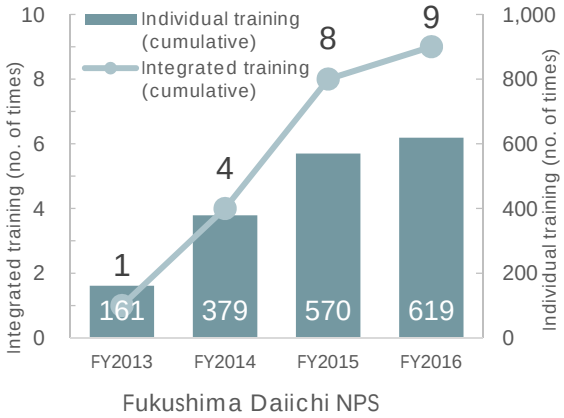
3.5 Measure 5: Enhancement of Power Station and Head Office Emergency Response Capabilities

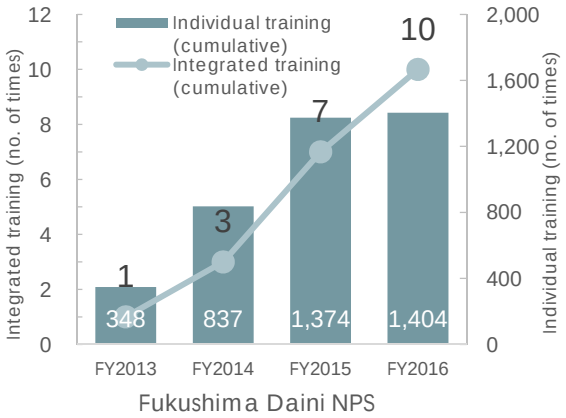
(1) First Quarter Achievements

【Measure 5: Enhance the Emergency Response Capabilities (Organizational) of Power Stations and the Head Office】

- In accordance with the Mid- to Long-Term Plan formulated in March of this year, TEPCO has been conducting emergency response training. In the first quarter, integrated training was conducted at each site as planned. After taking into account personnel changes in July at the Head Office, the plans were modified so that integrated training would be provided in the second quarter collectively with the newly assigned personnel.
- TEPCO has repeatedly provided individual and integrated training so that we may improve the emergency response and operational capabilities of our emergency response organizations. A listing of the training and achievements at each power station is given below.







- Fukushima Daiichi NPS
  - Integrated training was conducted on June 6 at Fukushima Daiichi NPS, which assumed a loss of cooling function in the spent fuel pools at Units 1-3.

- A new flowchart for accident resolution was formulated for this training and the effectiveness of the response using this flowchart confirmed for addressing events that arose at the spent fuel pools at Units 1-3. The issues identified were that the timing for using the accident resolution flowchart after the event occurred was unclear and that the sharing of important information, such as the period of time over which the pool water had fallen, was insufficient. In the future, TEPCO will make improvements, including "specifying the timing for using the accident resolution flowchart as immediately after an event occurs" and "sharing the accident resolution flowchart on a large screen in the emergency response headquarters."
- With regard to the necessity for improving the sharing of information within the emergency response headquarters and teams, which was identified during the previous training, so that information can be easily shared within the headquarters, the overall coordinator and team leaders were positioned in close proximity, which facilitated communication with the teams and improved overall communication.

Scene of a training session at the Main Anti-Earthquake Building at Fukushima Daiichi NPS

- Fukushima Daini NPS
  - Integrated training was conducted that assumed a variety of accidents for the purpose of strengthening the Fukushima Daini NPS's capability to respond to a disaster resulting from a triggering event other than an earthquake (April 28, May 30, and June 29).
  - In the third training session, it was assumed that there was a high-volume water leak inside the reactor building, the water level in the spent fuel pool fell, and there was a partial loss of DC power. For all elements, it was verified that emergency responders could handle them, and the emergency response headquarters chief and coordinators reliably shared information when it was necessary to make decision confirming or otherwise verifying EAL [23] determination criteria for the events that occurred and the EAL rescission criteria following resolution of the events.
  - Also, the May and June training sessions took into account the Kumamoto earthquake, which struck in April. These sessions used scenarios in which repeated strong earthquakes were assumed that resulted in a nuclear

[23] Emergency Action Level: standard that enables personnel to make objective determinations about warnings, facility and site emergency conditions and an overall state of emergency.

disaster. According to the official in charge of overseeing safety[24], the training provided the opportunity for personnel to make decisions about heading out into the field, withdrawing and heading out once again with consideration given for accident conditions, and the exercises confirmed the propriety of decisions that prioritized personal safety over conditions in the field. Questions about such determinations were clarified and shared within the headquarters.

- So that information is shared promptly and efficiently within the organization, improvements have been made so that briefings are conducted for personnel when transitioning into an emergency response organization, an issue identified from problems in the initial response when the event arose.

- Kashiwazaki-Kariwa NPS
  - Integrated training was conducted on April 28, May 23, June 13, and June 27.
  - Following the advice provided by foreign advisers, the April 28 integrated training utilized a scenario in which simultaneous accidents were assumed at multiple units, radioactive materials were leaking from multiple points, radiation doses were rising, and there were injured so that a more complex training session would be provided.
  - During this session, as a result of concentrating on whether or not to vent Unit 7, personnel responded insufficiently to the leak of radioactive materials from the Unit 1 turbine building and a rise in radiation dose in the area of Unit 6. The training identified issues related to prioritization when multiple reviews are required simultaneously. In the future, TEPCO will improve our response by indicating the approach to prioritizing responses and determining such a policy at headquarters.
  - Just as at Fukushima Daini NPS, the May 23 integrated training was conducted using a scenario where strong earthquakes repeatedly struck resulting in a nuclear disaster. An area for improvement was identified in that procedures were necessary for instructing withdrawals from the field and confirming the safety of personnel while a series of earthquakes are striking.

Training at Kashiwazaki-Kariwa NPS

- Head Office

[24] Executive position managing work and personal safety in general at the Emergency Response Headquarters.

- Because confusion was still observable during the previous integrated training at the Head Office with regard to sharing information with power stations, individual training was first conducted for each functional team.
- So that the Information Team deputy team leaders are able to promptly collect information about the power station, they were positioned with members of the same time instead of next to the team leader. In the individual training, it was confirmed that the deputy team leaders were able to consolidate power station information, which was collected by team members, in a timelier manner. The progress made will be verified in the upcoming integrated training.
- The Procurement Team engaged in training on coordinating information about providing assistance and supplies with the power station procurement team. More specifically, the delivery of relief supplies, which the Restoration Team had arranged, was assumed to be carried out by the Procurement Team, which included making the necessary arrangements. The results confirmed that this assumption may lead to a higher hierarchy becoming involved in coordinating information at both the power station and Head Office, thereby resulting in confusion during the emergency. In order to remedy this situation, an issue was identified about the necessity of clarifying which arrangements should be made within the power station and which should be made within the Head Office. The items to be coordinated will be consolidated and the effectiveness confirmed during individual and integrated training.

Individual training held for the Head Office Information Team

(2) Principal Future Plans

- In accordance with the Mid- to Long-Term Plan, TEPCO will systematically address the issues identified during emergency response training in the first quarter.
- There are issues that need to be responded to right away, such as improving the methods which the Head Office uses to acquire information from power stations as well as gaps in the quality and quantity of integrated training among the power stations, and TEPCO will accelerate improvements to address these.
- With regard to supplying relief materials, because of the necessity of conducting actual exercises to confirm coordination with a broad range of concerned parties, TEPCO will draft plans so that such actual exercises may be conducted during this fiscal year.

3.6 Measure 6: Development of Personnel for Enhancing Nuclear Safety

(1) First Quarter Achievements

【Measure 6-1: Improve Technical Capabilities for Direct Management so that Severe Accidents Do Not Result】

- Activities of Maintenance Personnel
  - Fukushima Daiichi NPS

    In order to improve emergency response capabilities, Fukushima Daiichi NPS has continued to work to provide training that enables personnel to acquire practical skills through direct management of projects (operating power supply cars, training in connecting electrical cables, training in operating heavy machinery, etc.).


Training in operating heavy machinery


Training in operating a power supply car

  - Fukushima Daini NPS

    In order to improve emergency response capabilities at Fukushima Daini NPS, personnel have been assigned to one of four teams (①Debris Removal and Road Restoration Team, ②Power Generator Switchover Team, ③ Temporary Cable Connection Team, and ④ Cooling Water Pump Restoration Team), and have been constantly practicing to improve their skills. Also, training has been conducted at night and with responders wearing full-face masks in the aim of further enhancing their technical capabilities. Moreover, training has been conducted for personnel to acquire basic technical skills by newly deploying heavy machinery (back hoe with claw attachment) for dismantling buildings so that we may extend the range of our emergency response capabilities. In addition, TEPCO has initiated

training in recording video using drones and disseminating the broadcasts to the emergency response headquarters so that personnel are able to quickly verify the status of damage within the site during an emergency as well as the routes necessary for recovery work. TEPCO will continue to conduct training while incorporating originality and ingenuity so that we may respond flexibly under a variety of conditions.

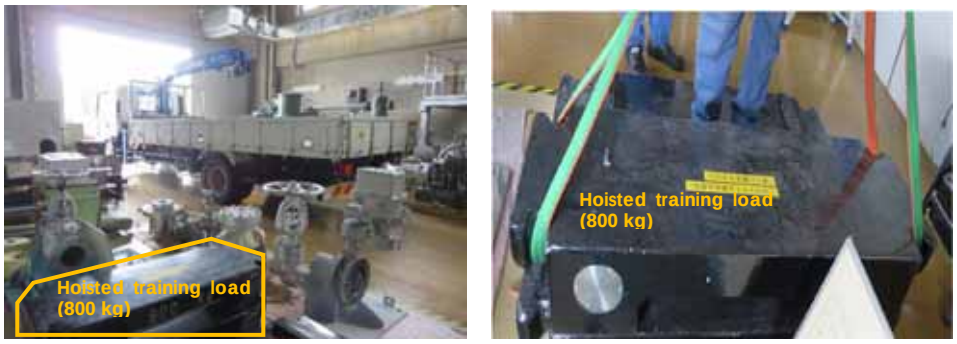
Training in disassembling pump bearings while workers wear full-face masks

Training in operating drones (left: indoors; right: outdoors)

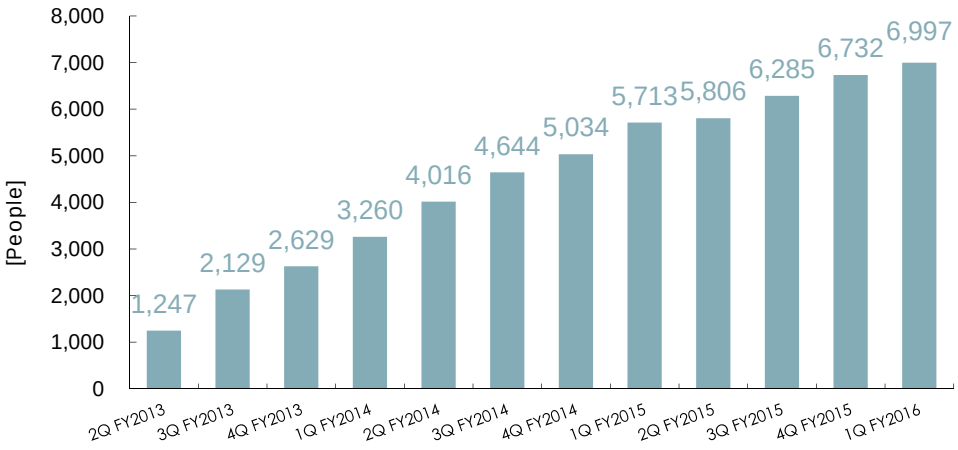
- Kashiwazaki-Kariwa NPS

  Kashiwazaki-Kariwa NPS has continued to conduct training through direct management of projects. So that personnel are able to handle whatever sort of damage may result at any location, personnel have constantly trained in setting up scaffolding, operating cranes to lift and put down objects using a unic crane vehicle for transporting materials and equipment, dealing with failures of gas-turbine power generating vehicles, and other such tasks. In addition, TEPCO has conducted training in spraying water from a single fire engine as well as from two connected fire engines. TEPCO will continue to conduct repetitive training to maintain and improve our technical capabilities.

Training in spraying water from a fire engine



Training in using a unic crane vehicle to lift and lower heavy objects



Change in the number of maintenance personnel undergoing direct-management training
(Total for Fukushima Daiichi NPS, Fukushima Daini NPS and Kashiwazaki-Kariwa NPS)

- Activities of Operators
  - Fukushima Daiichi NPS

    In FY2014, operators at Units 5 and 6 started training on fire engines and power supply cars. As of the end of June 2016, in contrast to a goal of 34 personnel (80% of the 42 field personnel), 40 operators (enrollment ratio: 117% which indicates neither an increase nor decrease since FY2015 4Q) have been trained and certified as skilled in operating power supply cars and 41 (enrollment ratio: 120% which indicates neither an increase nor decrease since FY2015 4Q) in operating fire engines. Operators at Units 1-4 have prioritized the acquisition of skills related to operation management for

facilities such as the contaminated water treatment facility and spent fuel common pool.

- Fukushima Daini NPS

  Fire engine and power supply car training began in FY2014. As of the end of June 2016, in contrast to a goal of 24 personnel (80% of the 29 field personnel), 25 have been trained and acquired such certification (enrollment ratio: 104% or a decrease of 3 trainees in comparison to FY2015 4Q). Training in operating power supply cars began in the second quarter of FY2015 and 25 personnel have acquired such skills (enrollment ratio: 104% or a decrease of 2 trainees in comparison to FY2015 4Q).

- Kashiwazaki-Kariwa NPS

  Mentors have been fostered within operation shift organizations, and training has continued to be provided in starting up power supply cars and connecting fire engines. As of the end of June 2016, in contrast to a goal of 118 personnel (80% of the 147 field personnel), 132 have been trained and certified for fire engines (enrollment ratio: 112% or an increase of 1 trainee compared to FY2015 4Q) and 132 for operating power supply cars (enrollment ratio: 112% or an increase of 8 trainees compared to FY2015 4Q) and. In addition to ordinary startup of power supply cars, training has also been conducted in manually opening and closing air intake and exhaust dampers when such equipment has failed. Furthermore, TEPCO has also worked to foster leaders with skill certifications within the operator training teams, and 109 personnel have been so trained as of the end of June 2016 (increase of 43 compared to FY2015 4Q).

  Along with augmenting (increasing) the number of operators for emergency response, TEPCO has strived to improve the skills of not only maintenance personnel, but also operators so that they are able to diagnose equipment. These personnel have been acquiring in-house certification and qualifications in equipment diagnosis, and are in the process of collecting data through direct management of such tasks for approximately 140 pieces of rotating equipment at Unit 7. This has improved our field capabilities through the acquisition of a broad range of knowledge about equipment and facilities and a heightened interest in equipment status.

Activities for improving operators' direct-management technical capabilities
(number of personnel acquiring skill certification)

Power station	Fire engine		Power supply cars	
	No. of personnel obtaining skill certification (increase/decrease from previous quarter)	Enrollment ratio*	No. of personnel obtaining skill certification (increase/decrease from previous quarter)	Enrollment ratio
Fukushima Daiichi NPS	41 (±0)	120%	40 (±0)	117%
Fukushima Daini NPS	25 (-3)	104%	25 (-2)	104%
Kashiwazaki-Kariwa NPS	132 (+1)	112%	132 (+8)	112%

【Measure 6-2: Improve Operational Specialization】

- Training and Assignment of System Engineers
  - In order to promptly and safely stabilize a reactor when there is an emergency, personnel need to quickly understand the accident

circumstances and make appropriate determinations. For this reason, engineers are being trained to be proficient in design, laws & regulations, standards, operation, maintenance and other areas pertaining to facilities important for safety.

- System engineers formulate system monitoring programs which are an arrangement of monitoring items and guidelines to watch for any deterioration in system performance, and they monitor whether or not the performance of important plant systems satisfies design requirements. Also, through these monitoring activities, they are also expected to identify areas for further enhancing facility reliability and make such improvements.
- In the first quarter, the results of monitoring of 18 systems each at Kashiwazaki-Kariwa NPS Units 6 and 7 (increase of three systems over the previous period) were compiled in a system soundness report, which confirmed that there were no issues with system performance. In the future, TEPCO plans to develop system monitoring programs for approximately 40 systems per reactor unit.
- Under the training program for system engineers, after trainees undergo orientation training to acquire a basic knowledge, they then carry out operation-specific training[25] for each system. When their skills have been verified, they are given responsibility for a system as the system engineer. Currently, there are three system engineers, and each one is responsible for a system[26], but operation-specific training is being conducted to further expand the systems that system engineers may take charge of. Also, TEPCO will continue to secure and train the required personnel so that five system engineers may be assigned to each reactor.

【Measure 6-3: Maintain and Improve Technical Skills Necessary for Operations】

- New Employee Training
  - The CNO of Nuclear Power and Plant Siting Division has been giving lectures to the 109 new employees assigned to the Nuclear Power Division (59 at Fukushima Daiichi NPS and Fukushima Daini NPS; 50 at Kashiwazaki-Kariwa NPS) in order to have them become more aware of what working in the Nuclear Power Division entails and share the significance of working to reform nuclear safety.

[25] Operation-specific training refers to a series of proficiency training that personnel undergo through actual operations on specific systems, such as constructing system monitoring programs, conducting monitoring operations, and simulator training.

[26] Emergency diesel generator system, reactor core isolation cooling system and standby gas treatment system.

Lecture by Anegawa, the CNO of Nuclear Power and Plant Siting Division, to new employees

- Improvement Activities by CFAMs[27] & SFAMs[28]
  - CFAMs and SFAMs began to conduct activities in their respective areas of specialization whereby they ascertain excellence achieved in other countries, identify key issues to be resolved, formulate improvement measures and implement them (April 2015). Since mid-FY2015, TEPCO has invited expert teams from overseas, which have been providing advice and guidance about operations that permanently-posted CFAMs and SFAMs perform, such as monitoring, problem-solving and personal development, and TEPCO has been working to accelerate improvement activities.

【Measure 6-4: Understand the Basics of Nuclear Safety】

- Formulating Curriculums
  - As part of our new training to have personnel acquire a basic understanding of nuclear safety, TEPCO has planned training on the Rules Concerning the Standards for the Position, Structure and Equipment of Commercial Power-Generation Reactors and Auxiliary Facilities (establishment permit standards and rules), which provide the basic rules for establishing a nuclear power station, as well as training to learn about important past OE data.

- Furnishing Experts
  - TEPCO has been furnishing experts who are well-versed in the design requirements and technical guidelines for safety systems across a total of 20 areas, including fire protection, seismic design, electrical separation and main control rooms (18 assigned to the Head Office and 44 to the power stations)[29]. While continuing to verify their skills, TEPCO is considering moving forward with developing experts in 50 areas by the first half of the current fiscal year.

[27] Corporate Functional Area Manager: Leader at Head Office that aims to achieve the world's highest level of excellence for each area of work at the power station

[28] Site Functional Area Manager: CFAM counterpart at a power station

[29] Multiple personnel may be assigned to one field, or each person put in charge of multiple fields.

【Measure 6-5: Improvement of Management Ability】

- Since FY2015, TEPCO has been providing training for middle managers from the standpoint that middle-managers need to be aware of and have the ability to thoroughly fulfill their responsibilities jointly with nuclear power leaders as well as be sufficiently aware of their own responsibility for nuclear safety.
- Group Manager Training
  - A total of 53 personnel have undergone training for group managers and shift supervisors (managerial level) so that they may understand and acquire the behaviors embodying a nuclear safety culture as well as the values which are to be steadfastly maintained as a leader and necessary for improving nuclear safety. A total of two sessions of the training were held on June 10 & 11 and June 17 & 18 attended by total of 53 people.
  - In the previous fiscal year, only newly appointed group managers underwent such training, but the plan for this fiscal year is to broaden the range of people eligible for such training to include current group managers as well as those who are newly appointed.
- Training for Power Station General Managers
  - Training has been provided to power station general managers to have them once again heighten their awareness of their role and mission as a “general manager” leading an organization of up to around 250 people and accelerate nuclear safety reforms.
  - In a follow-up after the training that 35 power station general managers underwent at the end of 2015, management and nuclear power leaders reviewed the action plans that each general manager established individually after the training and the progress made in executing these plans. The reviews were conducted in an interview format with executive management, nuclear power leaders, as well as the unit superintendent, who ranks as a power station general manager’s direct superior, and the deputy general manager in attendance. Interviews were completed with all power station general managers in April. Also, in the second quarter, reviews are also scheduled to examine any subsequent progress.

【Measure 6-6: Improve Systems for Personnel Development and Education & Training】

- Reconstructing Education and Training Programs Based on the Systematic Approach to Training (SAT)
  - The Nuclear Personnel Training Center (provisional name) will be central in working to develop personnel and improve education and training. Currently, with Fukushima Daini NPS as a base, the Nuclear Personnel Training Center is securing the necessary personnel and advancing preparations to commence education and training.

Staff of the organization preparing the Nuclear Personnel Training Center (provisional name)

- TEPCO is moving forward in its efforts so that education and training programs will be reconstructed within the current fiscal year particularly for the operations and maintenance fields.
- In the operations field, while referencing the manner in which SAT-based education and training programs are administered by nuclear operators in the United States, TEPCO has been working to make improvements, including adding data about actual equipment at each plant to the training content as well as clarifying which should be acquired in training as pertains to plant facilities. So far, improvements have been made with regard to 37 facilities at Kashiwazaki-Kariwa NPS Units 6 and 7.
- In the maintenance field, while similarly referencing the manner in which SAT-based education and training programs are administered by nuclear operators in the United States, TEPCO has prepared a menu of training items that trainees should acquire for each operation as well as a training map surveying the maintenance field. In the future, based on the training menu, TEPCO will create new programs and reassess existing programs.

(2) Principal Future Plans

【Measure 6-2: Improve Operational Specialization】

- TEPCO will proceed to train system engineers, and we plan to have each current system engineers be responsible for five systems by the end of March 2017 (currently, each is in charge of one system). Also, we will provide orientation training and operations-specific training for two new personnel. Our plan is to have each of these two new system engineers be in charge of one system each by the end of March 2017. Accordingly, we are planning to train system engineers for a total of 17 systems by the end of March 2017. Furthermore, our plan is to have trained system engineers (total of 10) on approximately 40 systems by the end of FY2017.

【Measure 6-3: Maintain and Improve Technical Skills Necessary for Operations】

- TEPCO will improve the systems for skill certification in accordance with the following basic policy after education and training programs have been reconstructed at the Nuclear Personnel Training Center (provisional name).
  i. Personnel shall receive training from a person who skills are maintained as an instructor
  ii. Training will always be conducted separate from actual operations as off-the-job training (regardless of whether the training venue is the classroom or the field)
  iii. When the training ends, the level achieved by trainees will be confirmed (using written tests and/or skill tests)
  iv. Personnel who have not been certified as having achieved a designated level or personnel who do not have the necessary qualifications will not be allowed to take charge of the actual operations
- In addition to improvement activities carried out by CFAM/SFAM, TEPCO has decided to construct a management model for advancing improvement activities more efficiently and effectively. In July, we organized specialized teams comprised of several TEPCO and US experts, and initiated these activities.

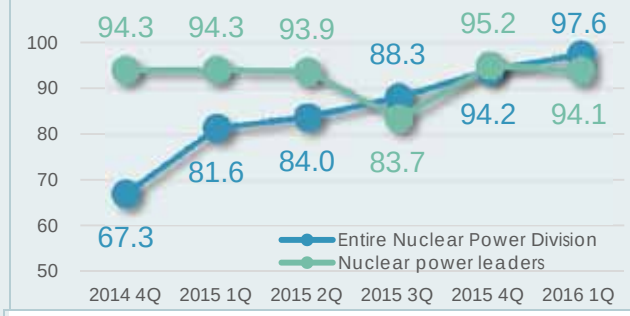
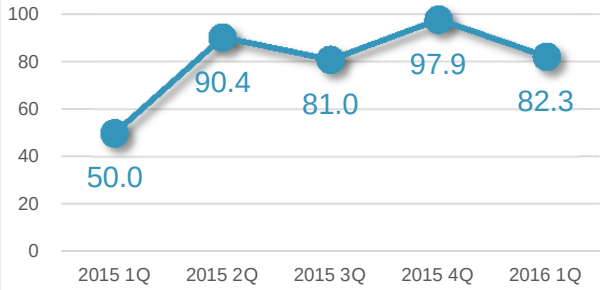
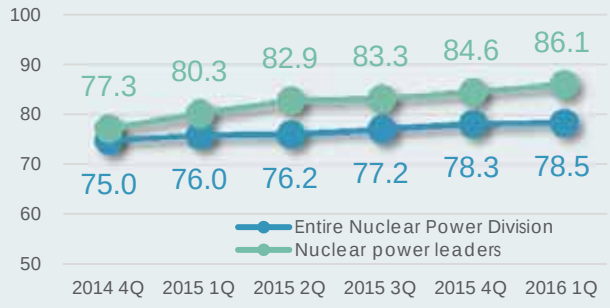
Meeting discussing preparations for constructing a management model

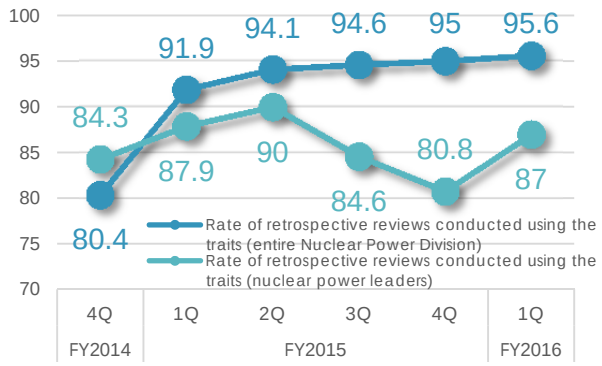
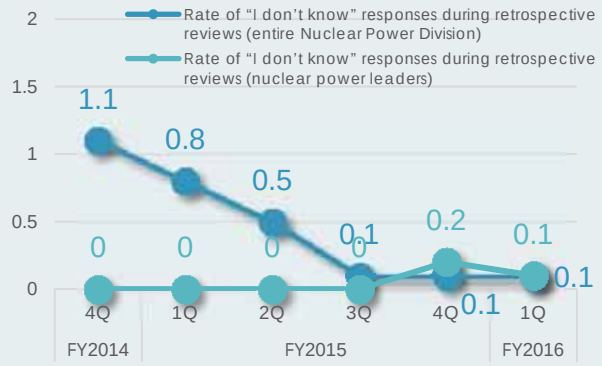
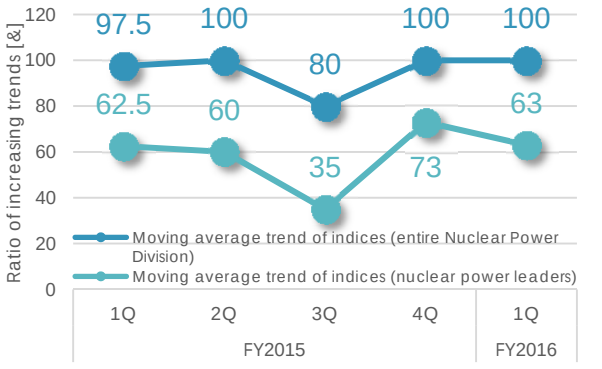
【Measure 6-6: Improve Systems for Personnel Development and Education & Training】

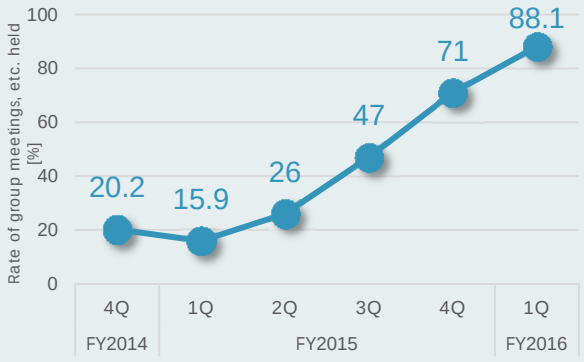
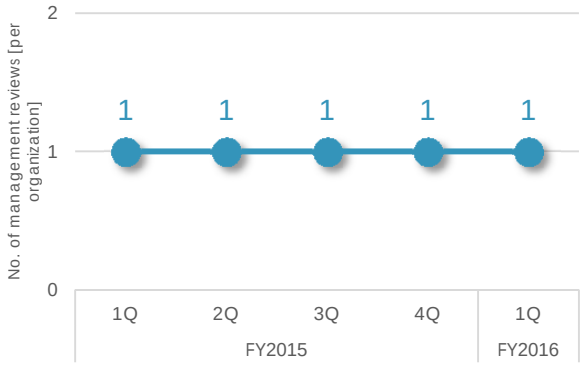
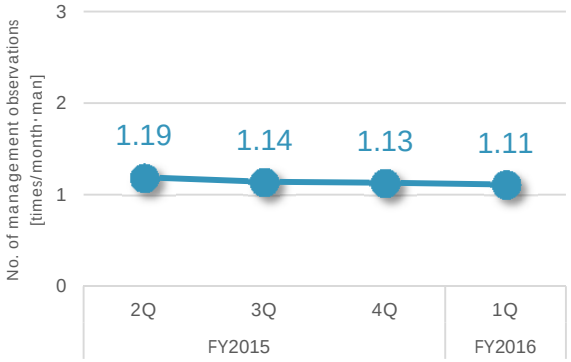
- TEPCO will steadily advance the procedures for establishment of the Nuclear Personnel Training Center (provisional name).
- The Nuclear Personnel Training Center (provisional name) will reconstruct education and training programs. In addition to accelerating efforts so that new programs may be applied to the operations and maintenance fields within the current fiscal year, programs will begin to be constructed in three other fields as well: radiation protection, fuel, and engineering.

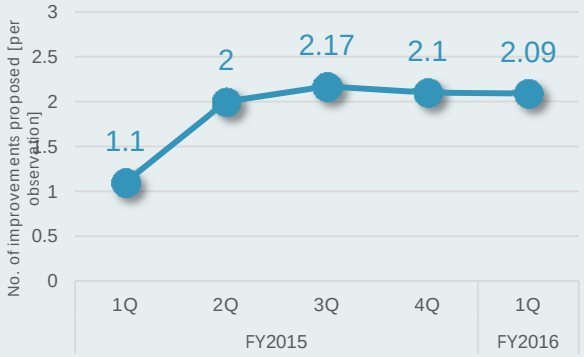
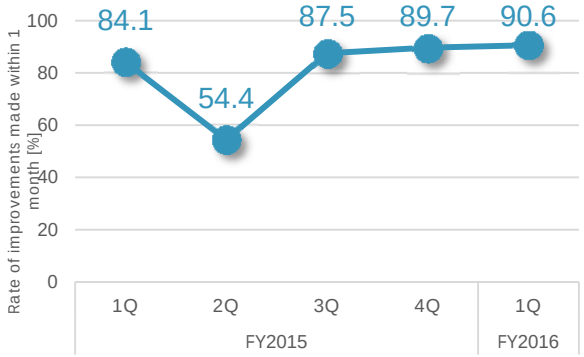
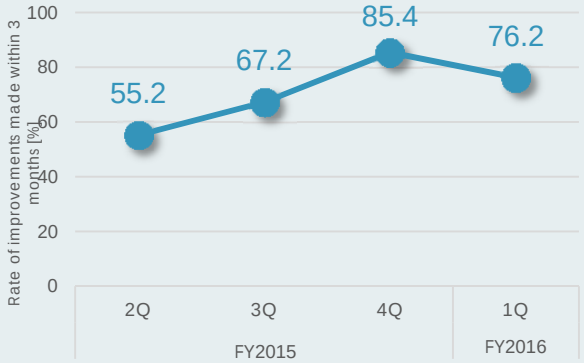
3.7 Assessment of the Degree to which Nuclear Safety Reform has been achieved

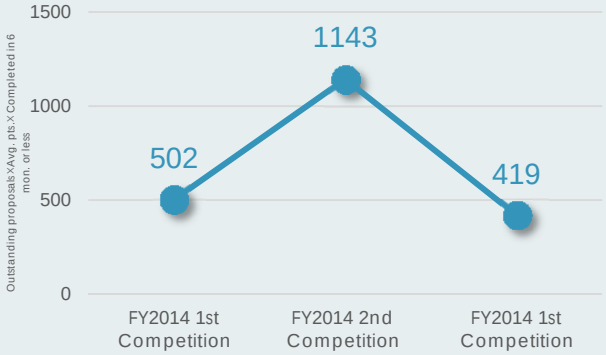
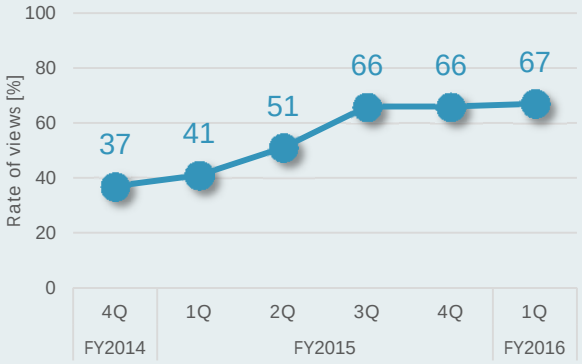
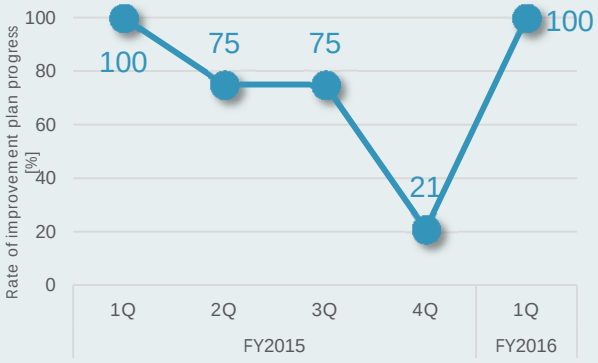
(1) Status of Nuclear Safety Reform KPIs and PIs

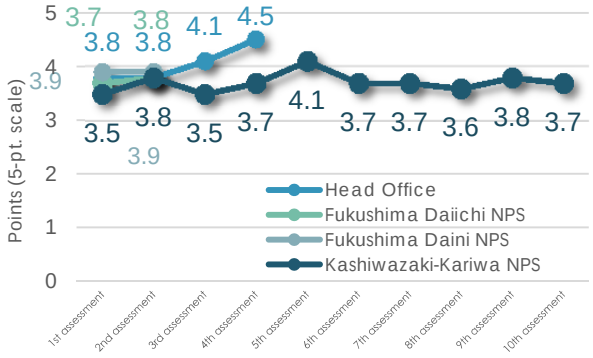
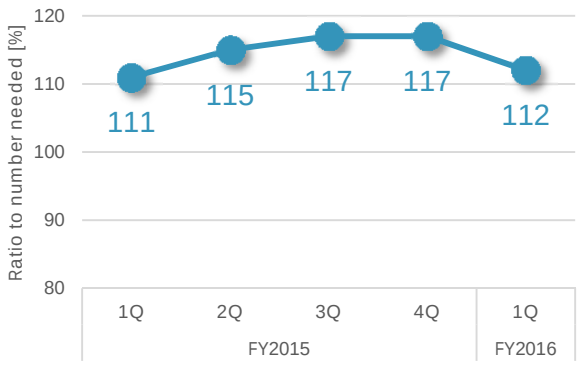
Nuclear Safety Reform KPI		FY2016 1Q Achievement
Safety awareness KPIs	Behavior of nuclear power leaders (new) 【Target: Increasing trend】	46.7 points
	Improve safety awareness throughout the entire Nuclear Power Division (new) 【Target: Increasing trend】	60.9 points
	Reference: Traits【Target: 70 points or higher】 	97.6 points (entire Nuclear Power Division) 94.1 points (nuclear power leaders)
	REF: M&M【Target: 70 points or higher】 	82.3 points
Technical capability KPIs	During non-emergency times (new) 【Target: 100 points or higher by end of FY2016】	77.2 points
	During emergency times (new) 【Target: 120 points by end of FY2016】	112 points
Ability to promote dialogue KPIs	Internal 【Target: Increasing trend】 	78.5 points (entire Nuclear Power Division) 86.1 points (nuclear power leaders)
	External 【Target: Positive in comparison to the previous fiscal year】 FY2015 (compared to FY2014) Quality and quantity of information communicated +0.9 points Stance and awareness of listening to and providing information to the public +1.0 point	Assessed in fourth quarter

Nuclear Safety Reform KPI	FY2016 1Q Achievement *1	Target
Measures 1, 2		
1. Rate of retrospective reviews conducted using the traits 	Overall: 95.6% Nuclear power leaders: 87%	100% (excluding deployments, temporary transfer or long-term recuperation)
2. Rate of "I don't know" responses voiced during retrospective reviews 	Overall: 0.1% Nuclear power leaders: 0.1%	10% or less
3. Moving average trend of indices (percentage of indices showing an increasing trend) 	Overall: 100% Nuclear power leaders: 63%	Increasing trend

Nuclear Safety Reform KPI	FY2016 1Q Achievement *1	Target
4. Ratio of groups discussing the results of retrospective reviews 	88.1%	Increasing trend (Retrospective review results discussed once or more per cycle)
5. Number of reviews conducted by management regarding results of retrospective reviews 	1 time/quarter・organization	1 time/quarter・organization (Power station unit)
6. Communication of messages about nuclear safety by nuclear power leaders	2 times or more/month	2 times or more/month
7. Number of readers per message (amended)	Increasing trend/1671.7 readers (52%) (as of end of May)	Positive increase in number of readers per message/1,600 or more
8. Average percentage of readers finding message “helpful” (amended)	Decreasing trend/14.1% (as of end of May)	Positive increase in average percentage finding message “helpful”/50% or more
9. Number of power station management observations conducted by management 	1.11 times	Numerical target set for each organization

Nuclear Safety Reform KPI	FY2016 1Q Achievement *1	Target
10. Number of good practices or key issues identified through management observations 	2.09/observation	1 or more/ observation
11. Rate of good practices extended laterally or issues improved within one month 	90.6% (as of end of May)	70% or more
12. Rate of good practices extended laterally or issues improved within three months 	76.2% (end of May)	100%
13. Ratio of action plans under operation plans that are linked to Measures 3, 5 and 6, or PO&C and for which quarterly quantitative targets are set	70.2 points	70 points or more
14. Ratio of action plan targets achieved under operation plans	Assessed in second quarter	50 points or more (50 points for progress as planned)
15. Ratio of MO feedback provided (new)	50.5% (end of May)	100%
16. Ratio of organizations reviewing observation results from management observations (new)	20% (end of May)	1 time/quarter・organization (power station unit)

Nuclear Safety Reform KPI	FY2016 1Q Achievement *1	Target
Measure 3		
1. Number of proposals entered in the Safety Improvement Proposal Competition times the average points assessed times the ratio of outstanding proposals completed within 6 months 	1st competition in FY2015: 419 points	1,500 points or higher
2. Rate of important OE training undergone (new)	Assessed in second quarter	60% or more for management
3. Rate of views of new OE data 	67%	60% or more
4. Implementation of hazard analyses	Completed	Complete for Kashiwazaki-Kariwa NPS (Hazard analysis scheduled to commence in 2Q for Fukushima Daiichi NPS)
5. Rate of progress made in hazard improvement plans 	100%	Ratio of plan progress: 100%

Nuclear Safety Reform KPI	FY2016 1Q Achievement [*1]	Target
Measure 4		
1. Assessment of quality and quantity of information communicated about Fukushima Daiichi NPS decommissioning work, nuclear safety reforms, accidents/problems, etc.	Assessed at end of fiscal year	Positive trending change over time
2. Assessment of TEPCO's perception and stance toward public relations and public hearings	Assessed at end of fiscal year	Positive trending change over time
Measure 5		
1. Self-assessments based on PO&C emergency response areas (EP. 1-3) 	Fukushima Daiichi NPS: June 3.8 points Fukushima Daini NPS: May 3.9 points June 3.9 points Kashiwazaki-Kariwa NPS: April 3.7 points May 3.6 points June 3.8 points, 3.7 points	Average of 4 or more points assessed on a 5-point scale [*2]
Measure 6		
1. Number of emergency responders acquiring in-house skill certifications for fire engines, power supply cars, cable connecting, radiation surveying, wheel loaders, unic cranes, etc. 	112% [*3]	Secure 120% of number needed for each power station by end of FY2017
2. Number of system engineers certified	Assessed at end of fiscal year	5/reactor
3. Number of engineers trained in seismic resistance, PRA, fire protection, chemical management or other specializations	Assessed at end of fiscal year	Rate of training plans achieved: 100%
4. Number of personnel acquiring in-house skill certifications for operations, maintenance, safety, etc.	Assessed at end of fiscal year	Rate of training plans achieved: 100%
5. Number of personnel acquiring external certifications specified as essential by TEPCO, including class 1 electrician, class 4 hazardous material handling, oxygen deficiency, etc. (approx. 15 certifications)	81%	Rate of all personnel or number needed in each field by the end of FY2017

Nuclear Safety Reform KPI	FY2016 1Q Achievement *1	Target
6. Number of personnel acquiring external certifications recommended by TEPCO, including high-pressure gas production safety, construction machinery operation, etc. (approx. 15 certifications)	39%	30% or higher for each field by the end of FY2017
7. Number of personnel acquiring external certifications, including licensed reactor engineer, class 1 radiation senior operator, technician (reactor and radiation fields), etc.	Assessed at end of fiscal year	Rate of training plans achieved: 100%

*1: Information is the actual value as of the end of June 2016 unless otherwise noted.

*2: Assessments corresponding to the degree of training difficulty.

*3: The difference between conditions at Fukushima Daiichi NPS and those at Fukushima Daini NPS and Kashiwazaki Kariwa NPS have been taken into account, and Fukushima Daiichi NPS is not included in this tabulation as the necessary figures are under review.

(2) Reassessment of Nuclear Safety Reform KPIs and PIs

The Nuclear Safety Reform KPIs and PIs have been reassessed as follows for FY2016 and thereafter.

- Safety Awareness KPIs

  The composition of the safety awareness KPIs has been changed from the two KPIs, “Traits” and “M&M,” to the two KPIs, “behavior of nuclear power leaders for raising awareness of safety” and “degree of improvement in safety awareness throughout the entire Nuclear Power Division.” For each of these KPIs, the average of the achievement of five PIs, which are each shown below, will be converted to 100 points. Previously, a target has been set for each PI and the degree to which the target achieved has been converted into a numeral, but, now, the type of employee that personnel want to be or should be will be used as the guideline, and the target will be to have the KPI/PI increase toward attaining that target.

  - Safety Awareness KPIs (Behavior of Nuclear Power Leaders)

PI	Guideline (denominator)
1. Rate of retrospective reviews conducted based on the traits (Nuclear power leaders) (Measures 1, 2 PI 1)	100%
2. Ratio of organizations where management conducts reviews of the results of retrospective reviews based on the traits once or more per quarter (Measures 1, 2 PI 5)	100%
3. Rate of messages read (Measures 1, 2 PI 7・Amended)	3,200 people (Entire Nuclear Power Division)
4. Rate of messages found to be “helpful” (Measures 1, 2 PI 8・Amended)	100% of readers
5. Ratio of organizations reviewing observation results from management observations once or more per quarter (Measures 1, 2 PI 6・New)	100%

- Safety Awareness KPIs (Raising Safety Awareness Throughout the Entire Nuclear Power Division)

PI	Guideline (denominator)
1. Ratio of trait indices showing an increasing trend (Measures 1, 2 PI 3)	100%
2. Ratio of groups discussing retrospective reviews based on traits once or more per cycle (Measures 1, 2 PI 4)	100%
3. Rate of messages read (Measures 1, 2 PI 7・Amended)	3,200 people (Entire Nuclear Power Division)
4. Number of power station management observations conducted by management (Measures 1, 2 PI 9)	8 times/month
5. Rate of feedback provided during management observations (Measures 1, 2 PI 15・New)	100%

- Technical Capability KPIs

  The KPIs were reassessed to directly measure whether or not an organization possesses the necessary capabilities for performing daily operations and executing an emergency response, and whether or not the education and training of personnel to that end is proceeding in a planned manner.

  - Technical Capability KPIs (Non-emergency)

    These KPIs measure whether or not personnel development has progressed based on a plan. More specifically, a calculation is made of the ratio of the number of people possessing skills to the number needed to be secured within the fiscal year in question. The fields covered include operations, maintenance, safety, fuel, as well as engineering (design, procurement, PRA), system engineering and experts.

  - Technical Capability KPIs (Emergency)

    These KPIs measure whether or not people possessing the skills to be able to respond during an emergency have been secured. More specifically, a calculation is made of the ratio of the number of people possessing such skills to the number of such people needed who have the skills which the organization in question should secure. The areas covered are emergency responders possessing internal skill certifications and the Head Office emergency responders[30].

- Ability to Promote Dialogue KPIs

  The previous “internal” and “external” KPIs have been reassessed in a manner that respectively adds the indices “internal 2” and “external 2.” (The previous “internal” is renamed “internal 1” and the previous “external” is renamed “external 1.”)

  - Ability to Promote Dialogue KPI (Internal 1) <No change>

    This KPI measures the status of internal communication within the Nuclear Power Division based on the results of retrospective reviews of the “CO: Communication for enhancing safety” of the 10 Traits.

[30] Pursuant to the Head Office Nuclear Accident Organization Skill Management Guide

- Ability to Promote Dialogue KPI (Internal 2) <New: specifics under review>

  Questionnaire surveys are to be conducted of the status of information sharing internally with regard to important reports and key issues. This will be assessed along two axes “degree of information sharing (promptness)” and “degree of cognition.”
- Ability to Promote Dialogue KPI (External 1) <No change>

  This KPI is an index that measures assessments (questionnaire format) by third parties of information communicated by TEPCO (①quality and quantity of information communicated, and ②perception and stance toward public relations and public hearings).
- Ability to Promote Dialogue KPI (External 2) <New: specifics under review>

  Based on comments voiced by people outside toward TEPCO, factors, which are regarded as needing improvement, are identified, and the status of their implementation is assessed at different levels.

(3) Assessment of Nuclear Safety Reform KPIs and PIs

KPIs were reassessed for FY2016. Just as before, the KPI and PI values are not only assessed as high or low, but:

- If they are high (target achieved), then our aim is to make them even higher.
- If they are low (target not achieved), then we analyze the causes and make improvements.
- In both cases, we also assess whether or not the KPI or PI is effective in measuring the degree to which nuclear safety reforms are realized.

In addition, more effective improvement activities will be implemented, and KPIs and PIs reassessed and target values increased as necessary.

Of the PIs comprising safety awareness KPIs, the number of power station management observations conducted by management has stagnated at one per month. So, in addition to working to increase the number of observations conducted, we will intensify improvement activities in conjunction with CAP efforts.

In addition, of the activities for strengthening the ability to propose defense in depth, while the number of proposals entered in the Safety Improvement Proposal Competition has steadily increased, the speed, at which outstanding proposals have been realized, has been slow, so this PI has declined substantially since the previous report. In order to improve this situation, we must make a variety of efforts, including having “nuclear power leaders and power station executives clearly indicate the priority of operations and follow up as is necessary after monitoring the implementation status of outstanding proposals.”

CLOSING REMARKS

Safety measures at the power stations during the first quarter of FY2016 have on the whole progressed satisfactorily in accordance with construction and work plans. TEPCO will continue to steadily proceed with construction while prioritizing safety, engaging in discussions with regulators and listening to the opinions of society.

Meanwhile, as was announced in the FY2015 Q4 progress report, we regard the acceleration of improvements and the enhancement of personnel development to be pressing issues under the Nuclear Safety Reform Plan (Management), and as such will prioritize these issues in FY2016. With regard to the acceleration of improvements, we are preparing to transition from the previous non-conformance management system to CAP. By October of this year, we will be switching over to a program under which confirmed non-conformances will be rectified. With this system non-conformances will not just be corrected and prevented, but a variety of information will also be centrally managed and analyzed to help make improvements.

With regard to the enhancement of personnel development, as of the end of the first quarter, we finished our basic review regarding the launch of the Nuclear Personnel Training Center (provisional name), and we are moving forward with securing personnel and developing education and training programs. As of July 1, a total of 70 personnel have been assigned to this organization (including personnel serving concurrently at power stations), and we began detailed and advance preparations for the development of education and training programs in the operations and maintenance fields at the Fukushima Daini NPS.

In our determination to be "**Never forget the Fukushima Nuclear Accident and become an operator that continues to create unparalleled levels of safety while making each day safer than the last,**" TEPCO will continue to advance nuclear safety reforms while subjecting our organizations to objective assessments by the Nuclear Reform Monitoring Committee. Currently, the Nuclear Reform Monitoring Committee is reviewing the results of TEPCO's self-assessment of the "Nuclear Safety Reform Plan" in which we compiled the results of three years of nuclear safety reform activities. This self-assessment will be made public along with the Committee's review results.

If you have any opinions or comments about these reforms please send them to us via our website.

End