Nuclear Safety Reform Plan

FY2017Q1 Progress Report

Tokyo Electric Power Company Holdings, Inc.

August 4, 2017

TEPCO

Foreword

I would like to offer my deepest apologies for the inconvenience and concern that the Fukushima Nuclear Accident continues to cause the siting community, and society as a whole, even today, six years after the accident.

On March 29, 2013, TEPCO announced its Reassessment of the Fukushima Nuclear Accident and Nuclear Safety Reform Plan in an effort to reaffirm our commitment to the never-ending improvement of nuclear safety, which has no bounds. Based on our deep regret over the Fukushima Nuclear Accident we shall rid ourselves of overconfidence and conceit about safety and continue to implement nuclear safety reforms. The following is a report on the progress that we have made during the first quarter of FY2017 (April through June 2017).

On June 23, I took over as president and head of the Nuclear Reform Special Task Force. By leading through example, I shall push forward with nuclear safety reforms and engage in efforts to improve the operation and management of TEPCO so that we may become a nuclear operator that can boast the world's highest levels of safety based upon three common values: never compromising when it comes to safety and quality, strengthening our ability to train individuals and the ability of departments to learn, and building trust with stakeholders.

In conjunction with the handing over of the reigns to new management at TEPCO a new management policy has been announced. The three keywords of "open," "create," and "accomplish" are common to both the management policy and nuclear safety reforms. In its handling of such issues as obscure information disclosure, its nuclear power business, the Niiza cable tunnel fire, and the delayed invoicing of consignment fees, TEPCO has failed to sufficiently address these issues from the perspective of its customers and society, thereby causing distrust amongst the people. Therefore, we will create a corporate culture based on the universal ideas of "prioritizing safety," "prioritizing the local community," and "standing in the shoes of our customers," in order to "look at issues from the perspective of society and our customers, create transparency and regain the trust of society."

In TEPCO's Revised New Comprehensive Special Business Plan (Third Plan), which was approved on May 18, it was made clear that we shall engage in nuclear power

generation and reactor decommissioning while prioritizing safety and the local community. We have widely conveyed our intentions to the siting community and society as a whole and are making great efforts to restore trust in TEPCO through repeated dialogue with stakeholders aimed at improving understanding.

The report on the findings of the Nuclear Reform Monitoring Committee held on June 5 included two expectations:

- "We hope to see safety culture permeate through every corner of the organization without dependency on specific leaders or monitoring by this committee, and become a part of the DNA of Tokyo Electric Power Company Holdings."
- "We would like the new management at Tokyo Electric Power Company Holdings to continue to push strongly forward with nuclear reforms."

I and the other members of new management at TEPCO will fulfill our responsibilities as the main party responsible for the Fukushima Nuclear Accident and shall meet the expectations of the Nuclear Reform Monitoring Committee. Furthermore, we will listen carefully to the opinions of external review agencies, such as the IAEA, WANO, INPO and JANSI, and examine the gap in excellence between us and other nuclear operators both domestic and abroad while benchmarking with excellence in other industries as we aim for even higher levels of safety. That being said, there are still many issues that TEPCO needs to resolve, so reforms and improvements must be accelerated even further. In order to achieve this, I shall clarify internal responsibility and authority, and improve communication and governance, such as the way decisions are made.

In order to prevent the experience with and the lessons learned from the Fukushima Nuclear Accident from being forgotten and ensure that a severe accident never occurs again, I shall promote nuclear safety reforms under the resolution to, *"**keep the Fukushima Nuclear Accident firmly in mind; we should be safer today than we were yesterday, and safer tomorrow than today; we call for nuclear power plant operations that keeps creating unparalleled safety**."*

July 2017

小早川 智明

Tomoaki Kobayakawa
President and Head of the Nuclear Reform Special Task Force

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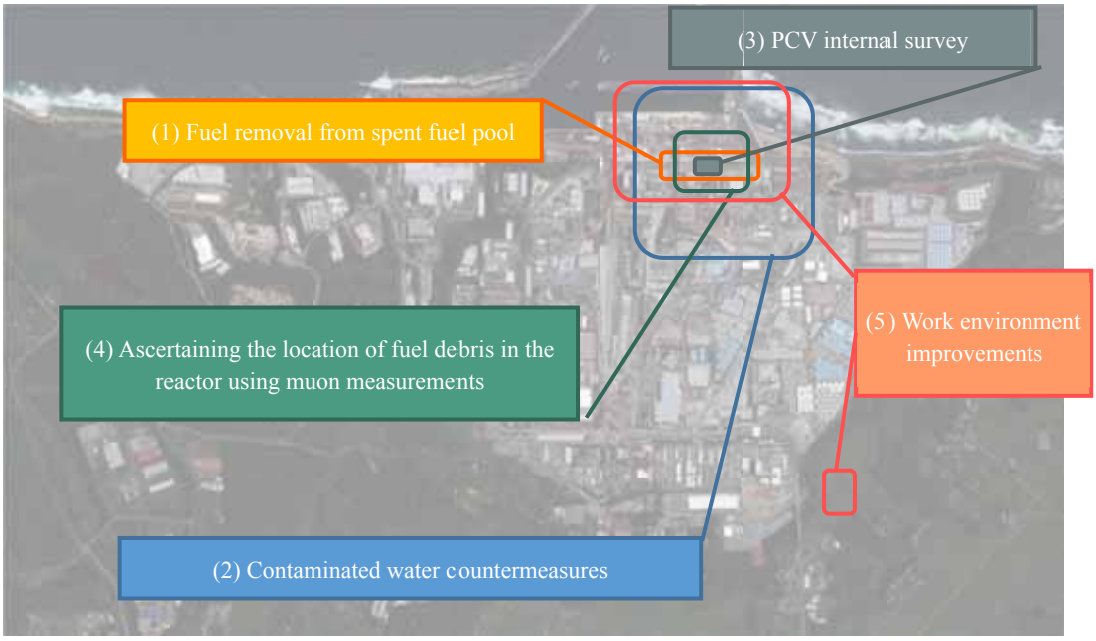
1. Progress with Safety Measures at Nuclear Power Stations

1.1 Progress of Reactor Decommissioning

The decommissioning of the TEPCO Fukushima Daiichi Nuclear Power Station (NPS) is proceeding steadily in accordance with the Mid-and-Long-Term Roadmap Towards Decommissioning of Fukushima Daiichi Nuclear Power Station Units 1 to 4 (June 12, 2015 revision)



Progress of work at the Fukushima Daiichi NPS

(1) Removing fuel from the spent fuel pools

♦ Unit 1

Removal of the pillars and beams from the building cover commenced on March 31, 2017[1] and was completed on May 11. Renovation of pillars and beams (including wind protection tarps) is underway. In order to devise a work plan for removing debris, additional debris condition surveys were implemented and dose rates above the well

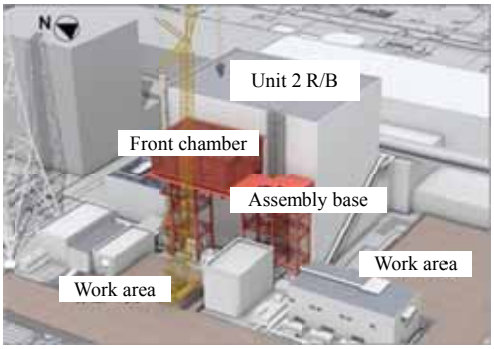
Conditions after removal of pillars and beams

[1] Dates hereinafter refer to 2017 unless otherwise specified.

plug were measured from May through July in order to ascertain conditions in the vicinity of the well plug. Debris removal work will continue while ensuring that measures are in place to prevent the dispersion of dust.

♦ Unit 2

In preparation to remove fuel from the spent fuel pool, plans are being made to open up a hole in the outside wall on the west side of the reactor building (R/B) in order to access the refueling floor (uppermost floor of the reactor building) and preparations have been completed. We're currently deliberating how to make work (surveys, removal of remaining equipment, etc.) on the refueling floor as efficiently as possible after opening of the hole.

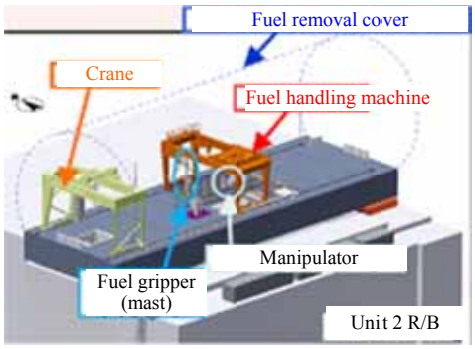


Concept drawing of completed R/B platform and anteroom

Platform and anteroom construction (Photographed on May 9)

♦ Unit 3

Fuel handling machine (FHM) girders and work floor construction began on March 1. After completion of the fuel handling girders and work floor, running rails will be installed and adjusted. On June 27, the domed roof of the fuel removal cover was transported to the unloading dock of the Fukushima Daiichi NPS port. Installation of the domed roof will commence during the summer of this year.



FHM inside the cover (concept drawing)

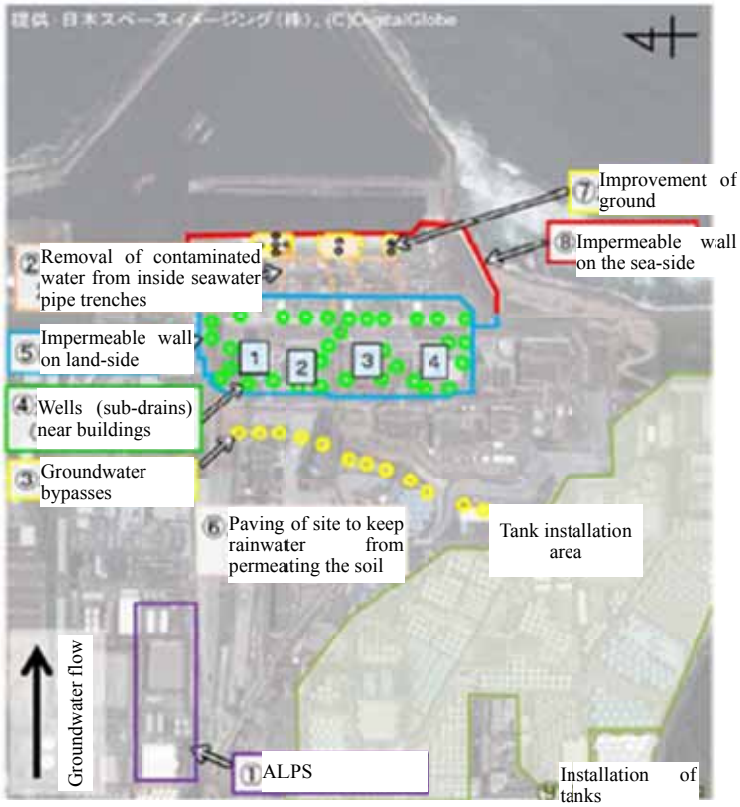
Concept drawing of the fuel removal cover

Unloading of the domed roof of the fuel removal cover

(2) Contaminated Water Countermeasures

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

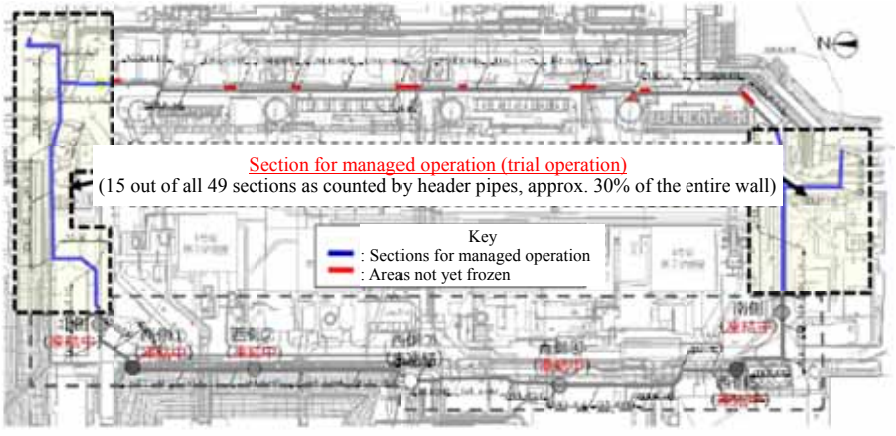
Measures to remove contamination sources		
Cleaning up contaminated water using the advanced liquid processing system (ALPS)	Diagram (1)	Completed May 2015
Removal of contaminated water from inside seawater pipe trenches	Diagram (2)	Completed December 2015
Measures to isolate water from contamination sources		
Drawing up groundwater through groundwater bypasses	Diagram (3)	Operation commenced April 2014
Drawing up groundwater through wells (sub-drains) near buildings	Diagram (4)	Operation commenced September 2015
Installation of frozen-soil impermeable wall on land-side of units	Diagram (5)	Operation commenced March 2016
Paving of site to keep rainwater from permeating the soil	Diagram (6)	Completed for the most part except the area where scattered debris is stored
Measures to prevent the leakage of contaminated water		
Improvement of ground with soluble glass	Diagram (7)	Completed March 2014
Installation of impermeable wall on the sea-side of units	Diagram (8)	Completed October 2015
Installation of additional tanks (replacement with welded tanks)	Diagram (9)	Work ongoing



Primary contaminated water countermeasure work

♦ Status of Freezing of the Land-Side Impermeable Wall

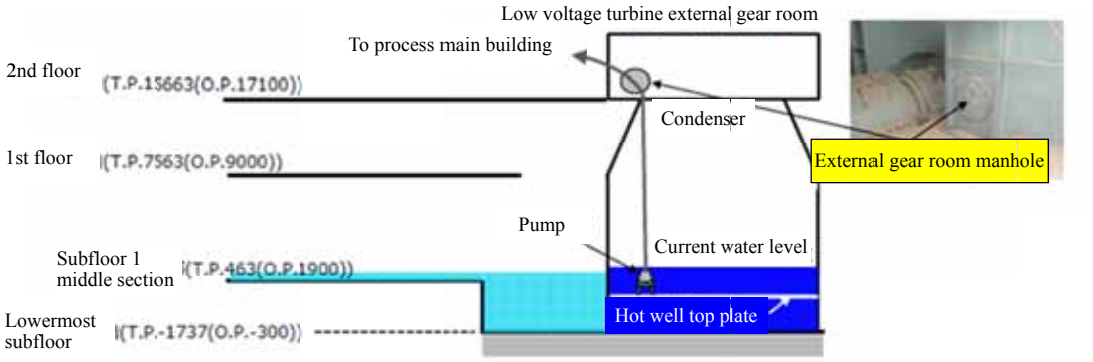
The frozen soil of those sections of the land-side impervious wall that we have continued to freeze since March 2016 has reached an adequate thickness so managed operation commenced on May 22, 2017 on the north and south sides to maintain the thickness of the ice wall (repeatedly starting and stopping circulation of freezing medium). The managed operation will be implemented while monitoring groundwater levels and subterranean temperatures.



Overview of frozen sections of impermeable wall

♦ Draining water from Unit 1-3 condensers

Immediately following the accident, the Unit 1-3 condensers were filled with highly concentrated contaminated water. In order to continue treating accumulated water inside buildings, the concentration levels of water inside condensers must be reduced as soon as possible in effort to reduce the amount of radioactive substances in accumulated water in buildings. At Unit 1, water was drained/diluted down to the top of the hot well top plate inside the condenser in November 2016. Preparations are currently underway to drain the water below the hot well top plate. At Unit 2, water was drained out of the condenser down to the top of the hot well top plate in April 2017 and transferred out. At Unit 3, the draining of water down to the top of the hot well top plate inside the condenser began on June 1, 2017 and the transfer of the water was completed on June 6. At current time, remotely operated cameras are being used to survey the structures inside the Unit 2 and Unit 3 condensers as we examine methods for draining water below the top of the hot well top plate.



Cross-sectional diagram of Unit 3 turbine building

(3) PCV Internal Survey

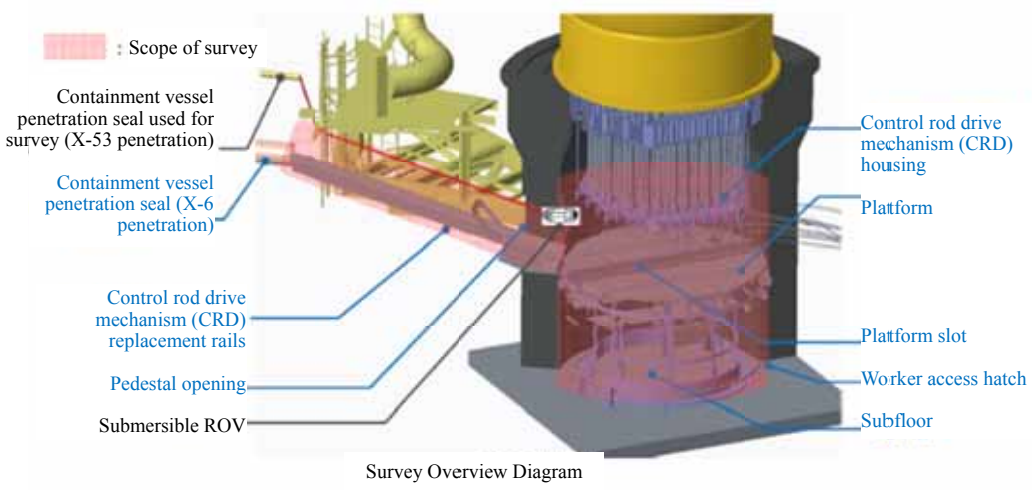
♦ Unit 1

Deposits seen inside the primary containment vessel (PCV) (during the April 2015 survey) were sampled on April 6, 2017. A simple fluorescent x-ray analysis of the sampled deposits revealed that they are composed of elements found inside the PCV such as iron and nickel, which is found in the stainless steel used for reactor internals and insulation, zinc found in paint, and lead found in shielding, such as shielding curtains. Since the analysis performed was only a simple one, a more detailed analysis will be performed to look for other elements and measure concentrations.

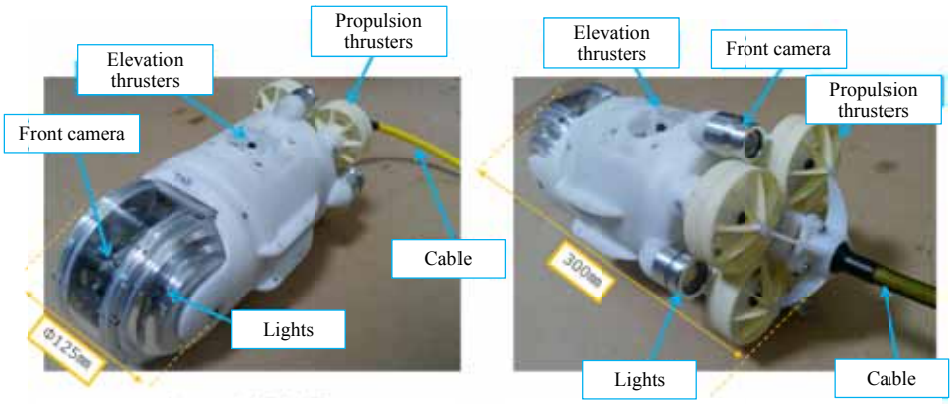
Deposit sampling

♦ Unit 3

Compared to Unit 1 and Unit 2, the water levels inside the Unit 3 PCV are high, so a underwater remotely operated vehicle (underwater ROV) was used to perform the survey (Commenced on July 19).



Survey Overview Diagram



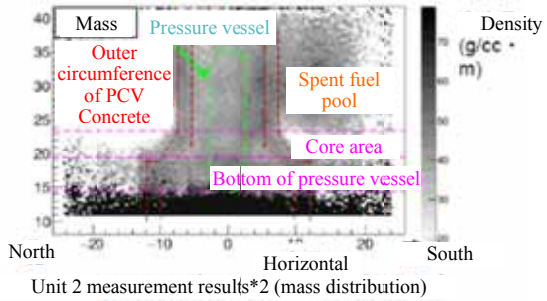
External view of underwater ROV (bow)　　External view of underwater ROV (stern)

Photos provided by International Research Institute for Nuclear Decommissioning (IRID)

(4) Ascertaining the location of fuel debris in the reactor by measuring muons

In order to ascertain the location of fuel debris in the reactors of Unit 1 and Unit 2, the muon penetration method has been used to measure muons. A survey of the Unit 3 reactor using the muon penetration method began on May 2.

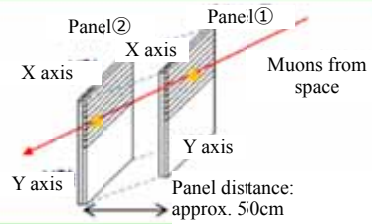
Miniature muon measurement device*1
(Unit 3 turbine building 1st floor)
(approx. 1m x 1m x H:1.3m)



Unit 2 measurement results*2 (mass distribution)

<Muon penetration method measurement principle (concept drawing)>

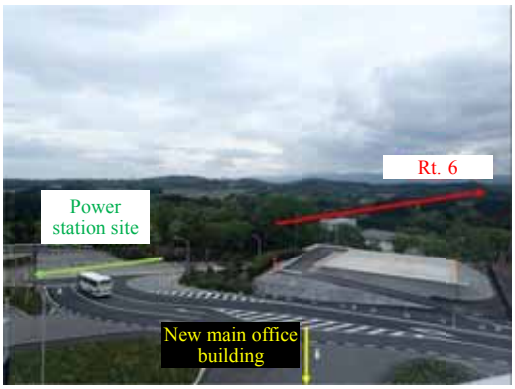
Muons from space are detected by two detector panels inside the device (plastic scintillators) allowing the trajectory of the muons to be calculated by the points where they pass through each panel.



*1: Developed as part of "Development of Technology for Detecting Fuel Debris in Reactors" subsidized by the FY2013 Supplemental Budget for Decommissioning and Contaminated Water Countermeasures Projects
*2: From "Using Muon Measurements to ascertain the location of fuel inside the Fukushima Daiichi NPS Unit 2 Reactor" (July 28, 2016)

(5) Work Environment Improvements

A heliport was built at the Fukushima Daiichi NPS to enable helicopters to land and airlift sick or wounded parties, and put into use on May 9. Training on landing/takeoff of helicopter ambulance was conducted on June 20 and it was confirmed that compared to the conventional method of evac (transporting sick or wounded parties to a helicopter on the coast of Koriyama, Futaba Town, or at the Fukushima Daini NPS), seriously sick or injured parties requiring treatment at external medical centers can be transported quicker.



Heliport (near the entrance to the main building)

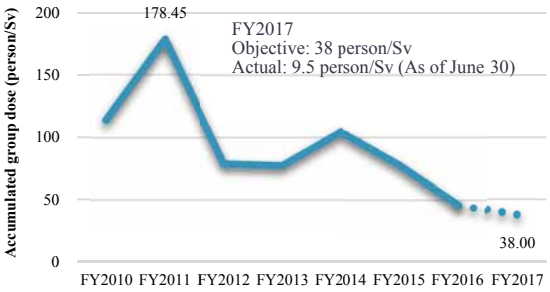
Training on meeting helicopter ambulance

(6) Initiatives aimed at reducing radiation exposure

The Mid-and-Long-Term Roadmap for the decommissioning of the Fukushima Daiichi NPS prioritizes tasks by comparing radiation risk reductions for the environment with worker exposure and the increase in labor safety risks. Whether or not the task will be implemented is determined upon assessing risk increases/decreases after predicting the anticipated exposure from the task.

- Work planning stage: If it is predicted that the group dose will exceed 1 man-Sv, or the individual maximum dose will exceed 20mSv/year, an ALARA meeting will be held at the power station to deliberate and examine the effectiveness of countermeasures implemented to reduce radiation exposure.
- Work implementation stage: When implementing work with high group doses or individual doses, the deputy superintendent who is in charge of radiation protection shall be the first to perform on-site observation in order to gather and convey information to different departments about best practices, and also give advice on making improvements.

Furthermore, since it has been deemed that the remote monitoring system observed during the benchmarking of nuclear operators in the United States is effective for reducing radiation exposure, this system is introduced. The remote monitoring system enables radiation protection officers to indirectly reduce the exposure doses of workers through the remote monitoring of work. This system will be used primarily for work done inside the reactor building.



Fiscal yearly trends in group exposure dose

Remote monitoring system

1.2 Progress with Safety Measures at the Kashiwazaki-Kariwa Nuclear Power Station

(1) Progress with safety measures

At the Kashiwazaki-Kariwa NPS, an application has been made to modify the installation permit based on the lessons learned from the Fukushima Nuclear Accident. And, safety measures are being implemented with a focus on Units 6 and Unit 7.

<Progress with Safety Measure Renovations>

	Safety Measures	Unit 6	Unit 7
Preparations for tsunami and internal inundation	Tidal wall (sea wall) construction	Completed	
	Installation of tidal walls for buildings (including flood barrier panels)	For Units 1-4	
	Installation of water-tight doors in reactor building, etc.	Completed	Completed
	Installation of tidal walls at switchyards*	Completed	
	Installation of tsunami monitoring cameras	Completed	
	Improving the reliability of flooding prevention measures (interior flooding measures)	Underway	Underway
	Dyke construction	Completed	Completed
	Flooding prevention measures for the Heat Exchanger Building	For Units 1-5	
	Installation of permanent bilge pumps in rooms housing important equipment	Completed	Completed
Preparations for power loss [Augmenting power sources]	Additional deployment of air-cooled gas turbine power supply cars	Underway	Underway
	Installation of emergency high voltage distribution panels	Completed	
	Laying of permanent cables from emergency high-voltage distribution panels to reactor buildings	Completed	Completed
	Preparation of substitute DC power sources (batteries, etc.)	Underway	Completed
	Reinforcement of transmission tower foundations* and strengthening of the seismic resistance of switchyard equipment*	Completed	
Preparing for damage to the reactor core or spent fuel [Augmenting heat removal and cooling functions]	Installation of substitute submersible pumps and substitute seawater heat exchanger equipment	Completed	Completed
	Installation of high pressure substitute for water injection systems	Underway	Underway
	Building of water sources (reservoirs)	Completed	
	Enhancement of the seismic resistance of pure water tanks on the Oominato side*	Completed	
Preparing for damage to the primary containment vessel or the reactor building [Measures to prevent damage due to excessive PCV pressure and prevent a hydrogen explosion]	Installation of filtered venting equipment (aboveground)	Performance tests completed[2]	Performance tests completed
	Installation of filtered venting equipment (below ground)	Underway	Underway
	Installation of substitute circulation cooling system	Underway	Underway
	Installation of equipment for keeping the top of the PCV filled with water	Completed	Completed
	Installation of H2 control and hydrogen detection equipment in reactor buildings	Completed	Completed
	Installation of top vents in reactor buildings*	Completed	Completed
	Installation of corium shields	Completed	Completed
Preventing the dispersion of radioactive materials	Deployment of large volume water dispersion equipment	Completed	

[2] Work in the vicinity is ongoing (at both Units 6 and 7)

Preparing for fires [Countermeasures for external and internal fires]	Construction of fire belts	Underway	
	Installation of fire detectors in parking lots on high ground	Completed	
	Installation of fire detectors and buildings	Underway	Underway
	Installation of fixed firefighting systems	Underway	Underway
	Installation of cable wrappings	Underway	Underway
	Construction of fire resistant barriers	Underway	Underway
Addressing external hazards	Countermeasures for building openings	Underway	Underway
	Removal of objects that could turn into flying debris as a result of a tornado	Underway	Underway
	Installation of spare book filter for ventilation and air conditioning systems	Completed	Completed
Improvements to Main Control Room and Emergency Response Center environments	Measures to reduce operator exposure in the event of a severe accident	Underway	
Strengthening emergency response	Construction and reinforcement of multiple access routes	Underway	
	Enhancement of communications equipment (in relation of satellite phones, etc.)	Completed	
	Enhancement of environment monitoring equipment/additional deployment of monitoring cars	Completed	
	Erection of emergency materials and equipment warehouse on high ground*	Completed	
	Construction of Emergency Response Center in Unit 5	Underway	

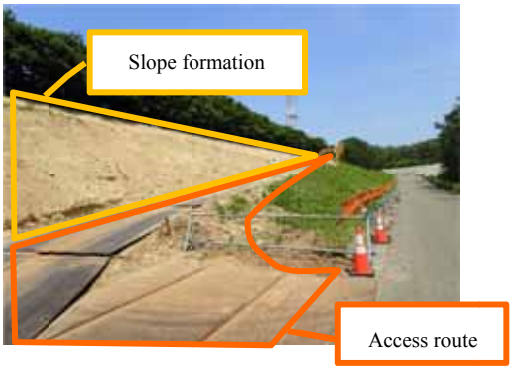
*Countermeasures implemented as part of voluntary initiatives on behalf of TEPCO

Safety measure progress that has been made to during the first quarter is as follows

♦ Enhancing emergency response

- Construction and reinforcement of multiple access routes

  In order to make access routes redundant and to consider liquefaction of the ground under the seawall on the Arahama side, a new access route (1.9km in length) for traveling from the main building to the Unit 5 Emergency Response Center will be built on ground that is higher than design standard tsunami height (at least 12m above sea level). A firebreak at least 20m in width will also be created in order to protect this new access route from forest fires. Mortar will be used to create the firebreak in order to make it resistant to fires and the area will be paved to prevent vegetation from growing. Construction of the access route and the fire belt began in April and work is underway to fell trees and build slopes.



Before asphalt paving　　During asphalt paving (slope formation)

Before construction of fire belt　　During construction of fire belt (after felling of trees)

(2) Status of New Regulatory Requirement compliance inspections

On September 27, 2013, an application was made to subject Kashiwazaki-Kariwa Units 6 and 7 to New Regulatory Requirement compliance inspections and these inspections are currently being conducted by the Nuclear Regulation Authority.

However, during the inspection meeting held on February 14 of this year, the failure on behalf of TEPCO to give an accurate explanation of the validity of seismic resistance analyses performed in the past for the main anti-earthquake building caused questions about the reliability of TEPCO's explanations. Furthermore, on December 28, during a meeting of the Nuclear Regulation Authority, the chairman directed the president of TEPCO to review inspection documents for reliability and to submit inspection materials along with the results of the aforementioned document inspection.

In light of these events, TEPCO re-examined the points of discussion in regards to the inspections being performed at prior applied nuclear power plant, revised the application to modify its reactor installation permit to reflect the comprehensive review

of all inspection documents from all departments, and submitted the results of initiatives implemented to improve the reliability of inspection documents to the Nuclear Regulation Authority on June 16.

The major changes between the original application and the revised application are as follows:

Major Change	Original Application	Revised Application
Addition of design basis earthquake ground motion	-	In light of the seismic motion witnessed during the earthquake that occurred in Rumoi, Hokkaido after the original application was submitted, a new design basis earthquake ground motion Ss-8 (seismic motion with no specific hypocenter) was added to reflect new knowledge about underground structures.
Change to standard tsunamis (Arahama side (Unit 1-4 side))	・ Front of water intake: 6.0m ・ Maximum run-up height: 8.5m	・ Front of water intake: 6.8m ・ Maximum run-up height: 7.6m ・ Run-up height on Arahama side of site: (added): 6.7m
Change to equipment subject to natural phenomenon design standards	・ Maximum wind speed of design basis tornadoes: 69m/sec. ・ Standard temperature (low temp.): -15.2°C (24-hour operation) ・ Standard rainfall:- ・ Height of volcanic ash deposits: 30cm	・ Maximum wind speed of design basis tornadoes: 92m/sec. ・ Standard temperature (low temp.): -2.6°C (173.4-hour continuous operation) ・ Standard rainfall: 101.3mm/h ・ Height of volcanic ash deposits: 35cm
Changes to filtered vent design	-	・ Installation of remotely operated manual operating equipment ・ Installation of iodine filters (removes at least 98% of gaseous iodine (organic iodine)) ・ Installation of the vent line bypass line
Addition of substitute circulation cooling system	-	In addition to filtered events, a substitute circulation cooling system has been added as a means of removing heat from the primary containment vessel (PCV)
Changes to filtered vent-related sections of the application	・ The application mentions installation of PCV pressure relief equipment and substitute PCV pressure relief equipment as equipment for preventing damage to the primary containment vessel caused by over-pressurization ・ The application clearly states that in accordance with requests from Niigata Prefecture, rules for using filtered venting equipment will abide by evacuation plans for the local community and the equipment shall not be used without receiving permission in accordance with the Safety Agreement.	・ Addition of substitute circulation cooling system (deletion of substitute primary containment vessel pressure relief equipment (underground filtered vents)) ・ The revised application clearly states that the superintendent has the authority to vent the PCV using PCV pressure relief equipment and that s/he shall take responsibility for such action (whereas discussions at the inspection meeting resulted in the deletion of the original statement, the conditions put forth by Niigata Prefecture shall be complied with)
Addition of substitute PCV spray system	-	Addition of measures to inject cooling into the PCV using fire engines

(portable)		
Installation of corium shields	-	Corium shields will be installed to lower the possibility that PCV function is impacted from molten fuel that has eaten through the concrete at the bottom of the PCV
Deployment of large volume water dispersion equipment	-	Large volume water dispersion equipment will be installed to prevent radioactive substances from the reactor buildings from dispersing (preventing dispersion into the atmosphere by dispersing large volumes of water (900m^3/hour))
Changes to Main Control Rooms	-	An evacuation room will be built in the Main Control Rooms to reduce operator exposure in the event of reactor core damage
Major changes made in relation to the Emergency Response Center	The original application mentions that the Emergency Response Center will be located inside the Main Anti-Earthquake Building	・ Preparations are being made to construct the Emergency Response Center inside the Unit 5 reactor building (in conjunction with this and access route from the Main building and fire belt will also be constructed) ・ Methods for effectively using the main anti-earthquake building, such as a place for non-emergency response personnel on standby to wait, etc., will be deliberated.
Design changes to other severe accident evacuation location equipment	・ Fire engines: 11 ・ Gas turbine generator: 3	・ Additional fire engines:17 ・ Additional gas turbine generator trucks: 4 (two each in different locations) ・ Installation of reactor building H2 control equipment operation monitoring temperature gauge. ・ Preparation of small radiation monitoring boat on the sea side. ・ Improvement of heat resistance of material used for the primary containment vessel top head flange seal
Major changes made to technical capabilities during severe accidents	-	The new application states that in the event of a simultaneous disaster at both Units 6 and 7, the response to a severe accident shall be implemented under the direction of the operation shift team assistantship supervisor on duty at each unit. (The shift supervisor shall be in charge of communicating and coordinating with the Emergency Response Center and coordinating between units)
Revision of emergency response personnel exposure assessments	-	Setting severe conditions for, and assessing, severe accidents has shown that it will be possible to contain an accident without exceeding the maximum exposure limit (100mSv)
Changes to the major assessment conditions for severe accident countermeasure effectiveness assessments	-	・ Predicted accident scenarios resulting in a total loss of all AC power were subdivided (into three subdivisions), and it was confirmed that in all of these scenarios the reactor core would not be damaged. ・ The case of using the alternate circulation cooling system was added to the “reactor coolant loss (major LOCA) + Emergency Core

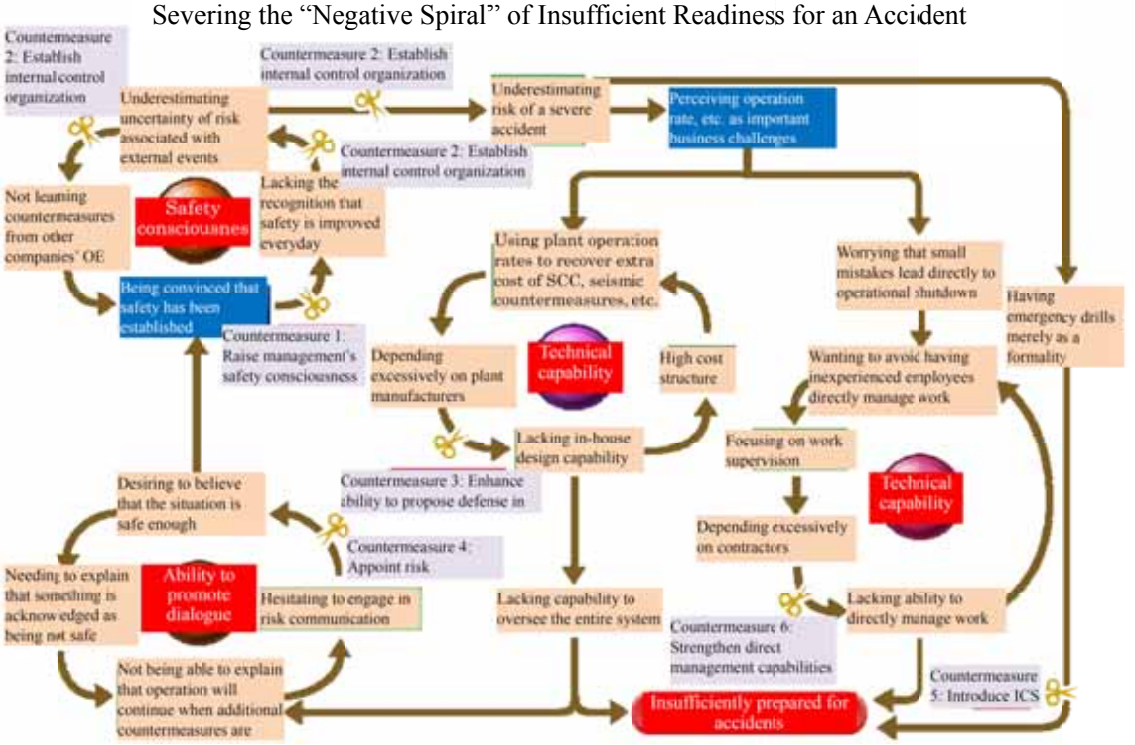
		Standby Cooling System (ECCS) cooling water injection function loss + total loss of AC power" scenario ・ The amount of time until the commencement of PCV venting in the "reactor coolant loss (major LOCA) + Emergency Core Standby Cooling System (ECCS) cooling water injection function loss + total loss of AC power" scenario was extended from 25 hours after the accident, to 38 hours after the accident. (reflects improvements to skill and management through training) ・ The amount of radioactive substances discharged was assessed under extremely severe conditions in order to assess worker exposure and it was confirmed that the amount of Cesium 137 released would fall below assessment guidelines (100TBq or less)(total release rate is approximately 16TBq)

We shall continue to be meticulous in our handling of Nuclear Regulation Authority inspections and strives to further improve safety based upon the lessons learned from the Fukushima Nuclear Accident.

2 The Progress Status of Nuclear Safety Reform Plan (Management)

TEPCO has been making progress with six measures for stopping the "negative spiral" that has exasperated structural issues faced by the Nuclear Power Division based upon the Nuclear Safety Reform Plan.

Severing the "Negative Spiral" of Insufficient Readiness for an Accident



Since the FY2017 first quarter progress report, we have formulated initiatives to tackle "enhancing governance (including developing internal communication)," which was an area that was deemed as requiring improvement as a result of the self-assessment of the Nuclear Safety Reform Plan that TEPCO conducted in FY2016. Additionally, we've also formulated initiatives for Measures 1-6 in the form of "stronger initiatives in light of suggestions from the Nuclear Reform Monitor Committee" and the "progress of future initiatives."

We give reports on the plans and progress of these initiatives at the 13th Nuclear Reform Monitoring Committee meeting (June 5) and were told by the committee that the efforts we are making to respond to the proposals are taking shape.

2.1 Initiatives to Enhance Governance by Nuclear Power Leaders

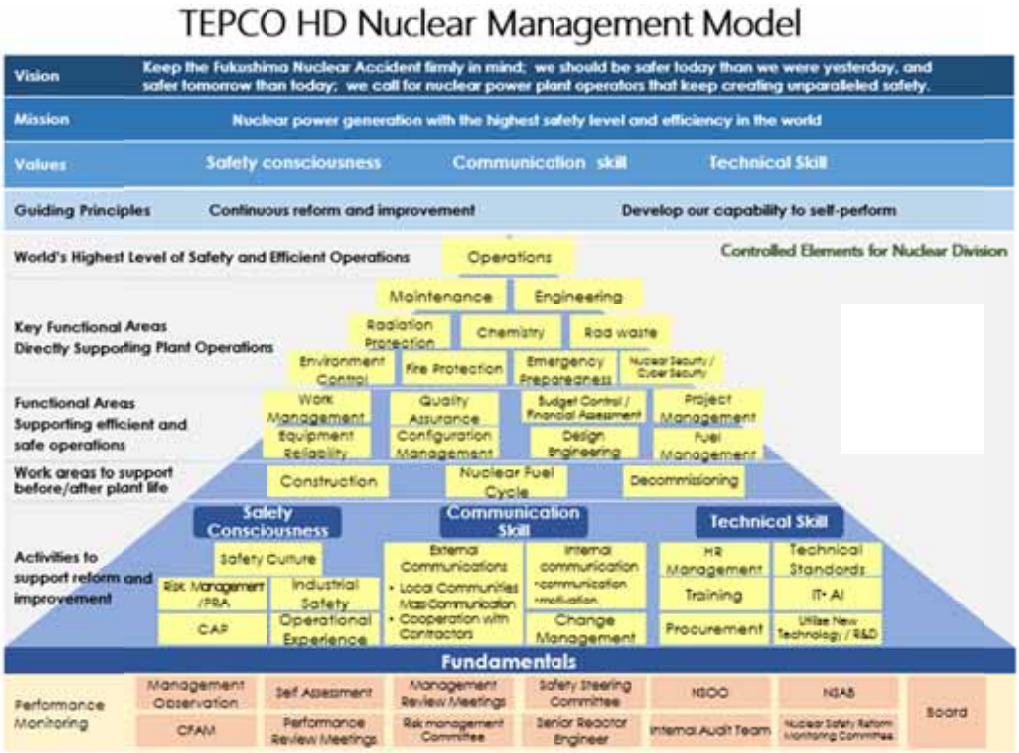
2.1.1 Initiatives Aimed at the Creation and Permeation of the Management Model

In order to promote management reforms in the Nuclear Power Division, the management model project was used to analyze the gap between TEPCO and the world's highest levels of safety, and improvement measures were deliberated and proposed (Phase I (July-August 2016)). We are currently engaged in implementing the improvement measures proposed during Phase I while also making improvements to the method in which departments are run, the structure of departments, as well as processes and procedures (Phase II: September 2016-March 2018).

(1) Status of creation of the management model

The management model is being created to enable all employees to engage in their duties with a common understanding of the objectives of the division and each other's roles.

Based upon the management model framework formulated by nuclear power leaders, and management model with each of the compositional elements of the management model diagram, namely "goals," "important factors for success,", and "achievement level indicators." (June 22)



Nuclear Power & Plant Siting Division Management Model Diagram

At a briefing for managers held by the General Manager of the Nuclear Power & Plant Siting Division (June 13) the general manager directly conveyed his intentions concerning creation of the management model. Power stations are also engaged in their own initiatives such as briefings given by the site superintendent to power station managers, and also study sessions for personnel. These initiatives will be developed within the Nuclear Power Division through the process of, for example, work plan revisions in accordance with the management model.

Briefing on the management model given by head office management to Nuclear Power & Plant Siting Division Personnel

General manager of the Nuclear Power & Plant Siting Division

(2) The development and permeation of fundamentals

The ideal behaviors desired of each individual and position have been compiled as "fundamentals" for each business area of the management model, and activities to foster understanding of these fundamentals throughout the Nuclear Power Division have begun in the form of a pamphlet distribution.

Each individual can use these pamphlets to refer to the fundamentals on a daily basis, and managers can use them to provide guidance to subordinates and perform on-site observation (management observation (MO)). Since April, issues pointed out during management observation are being linked with fundamentals when they are being entered in the MO database. As a result, weaknesses with operating procedures and the use of human performance tools[3] were identified, so improvements are being deliberated and implemented.

[3] Check methods for preventing human error

Fundamentals pamphlet

Checking fundamentals during morning meetings (Kashiwazaki-Kariwa)

(3) Improvements by CFAM[4]/SFAM[5]

Since April 2015, CFAMs and SFAMs have been ascertaining excellence achieved in other countries, identifying key issues to be resolved, and formulating and implementing improvements for each field of expertise. Furthermore, management model project members and CFAM have been working together in those fields focused on by the management model thereby resulting in such achievements as improvements to CAP[6] and MO, as well as the introduction of a radiation remote monitoring system (Fukushima Daiichi NPS).

At the Fukushima Daini NPS, SFAM are giving periodic activity status reports to the site superintendent and power station executives in order to improve insufficiencies in the understanding of power station executives in regards to CFAM/SFAM activities. Continually giving periodic reports will deepen the understanding of power station executives about these activities and foster cooperation and support thereby further vitalizing the activities. This has been deemed as a best practice and opportunities for SFAM to give reports to executives will be created at other power stations.

2.1.2 Initiatives Aimed at Developing Internal Communication

(1) Initiatives for promoting internal communication

[4] Corporate Functional Area Manager: Leader at the Head Office that aims to achieve the world's highest level of excellence for each aspect of power station operation
[5] Site Functional Area Manager: CFAM counterpart at power stations
[6] Corrective Action Program

In the wake of the main anti-earthquake building problem, we are engaging in initiatives aimed at fostering better relationships between people within the organization in order to enable the smooth conveyance of information both horizontally and laterally within the Nuclear Power Division.

On March 24 two core members were chosen and in the first quarter internal communication teams were formed at the Head Office and each power station.

During the first quarter, each team engaged in activities to discuss the intentions of the team and the reasons for its establishment, such as the main anti-earthquake building problem, as well as discussions about internal communication problems that each department faces. As a result, common problems were identified, such as the inability to accurately share information between departments and positions, and a tendency to not be interested in the work of departments other than one's own. At the same time, the internal communication teams of each department are working together to plan and share information in an effort to formulate initiatives, and invite external experts to help with specific problems that need to be solved based upon the understanding that underlying contributors and priorities differ depending on the department.

(2) Enhancing the Sharing of Information about Important Work Issues in the Nuclear Power Division

Since July 2016, each site superintendent and Head Office general managers have been sending e-mails to all members of the Nuclear Power Division about important work issues in order to share information on these matters. Since October 2016 we have been conducting electronic questionnaires designed to gather opinions about the messages that were conveyed and also confirm the level of understanding[7] of these messages and whether or not they were received. During the first quarter response rate was 39.7% (objective: 70% or more), and the level of understanding was 2.4 points (objective: 2.5 points or more). Compared to the fourth quarter, response rate increased by 4.3 points, and there was no change in the level of understanding.

The results of the questionnaire and opinions about messages are being provided

[7] Measured on a four-step scale with 1 being "well understood" and 4 being "not very well understood"

as feedback to the sender in order to improve subsequent messages.

(3) Change Management

Change management is a systematic method for preventing risks from manifesting and achieving expected goals by identifying those parties that'll be affected by organizational and operational changes and responding in a planned manner, such as by giving detailed briefings, to anticipated risks.

During the first quarter, revisions of the change management guide created in 2014 began. Up until now the guide had only applied to large-scale organizational restructuring and tasks changes, but the scope of the guide has been expanded to include issues (large-scale improvements, etc.) that affect many employees. In conjunction with this, efforts are being made to deepen understanding of change management as an effective tool for developing internal communication and enable it to permeate through business tasks.

2.2 Measure 1 REFORM FROM TOP MANAGEMENT

2.2.1 Initiatives Related to Suggestions from the Nuclear Reform Monitoring Committee

(1) Activities to develop communication and understanding amongst contractors

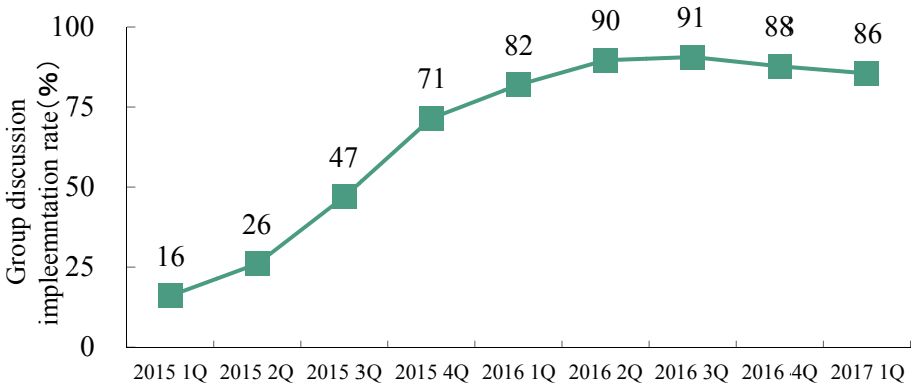
In order to improve nuclear safety at TEPCO's nuclear power stations, contractors must have an understanding of nuclear safety reforms and cultivate nuclear safety culture. In continuation from FY2016Q4, representatives of management from the Head Office and the Head Office Safety Culture Cultivation Activity Secretariat have been visiting the headquarters of contractors in order to exchange opinions on nuclear safety with contractor executives at power stations. (April 26: one company, May 29: two companies, June 23: two companies). Through these opinion exchanges the efforts of each contractor to foster the 10 traits and 40 behaviors of robust nuclear safety culture were examined. At the same time, since the 10 traits are conceptual, it was realized that the 10 traits should be linked to actual duties and explained in an easy-to-understand manner to enable more workers to accept the concept. We will continue to engage in dialogue with contractors in order to deepen mutual understanding of nuclear safety.

(2) Reflecting on the 10 traits of individuals and the organization (enabling nuclear safety culture to permeate the organization)

In the Nuclear Power Division, we have stipulated the, "individual, leader and organizational traits needed to embody robust nuclear safety culture (10 traits and 40 behaviors for robust nuclear safety culture)." By using these traits to reflect on and compare one's own actions with ideal behavior on a daily basis, we are encouraging employees to notice the differences in efforts to improve safety awareness.

The rate of self-retrospection during the first quarter was approximately 93% (+1% compared with FY2016 Q4) and efforts will continue to ensure that this activity is engaged in.

The implementation rate of group discussions, which are used to share the results of individual self-retrospection, learn from each other, and take notice of new issues, was 86% (-2% compared to FY2016 Q4), so efforts will need to revitalize this activity.



Group discussion implementation rate (2015 Q4-2016 Q4 data has been revised)

(3) Nuclear power leader training

Nuclear power operator management must be strongly aware of the special risks associated with nuclear power and committed to bearing that responsibility. Therefore, our new executive officer was subjected to training aimed at increasing his knowledge of nuclear safety and deepening understanding of primarily nuclear safety design, nuclear safety management, and nuclear preparedness (June 17).

Executive officer training

2.2.2 Other initiatives

(1) Increase Safety Awareness throughout the Entire Organization and Management

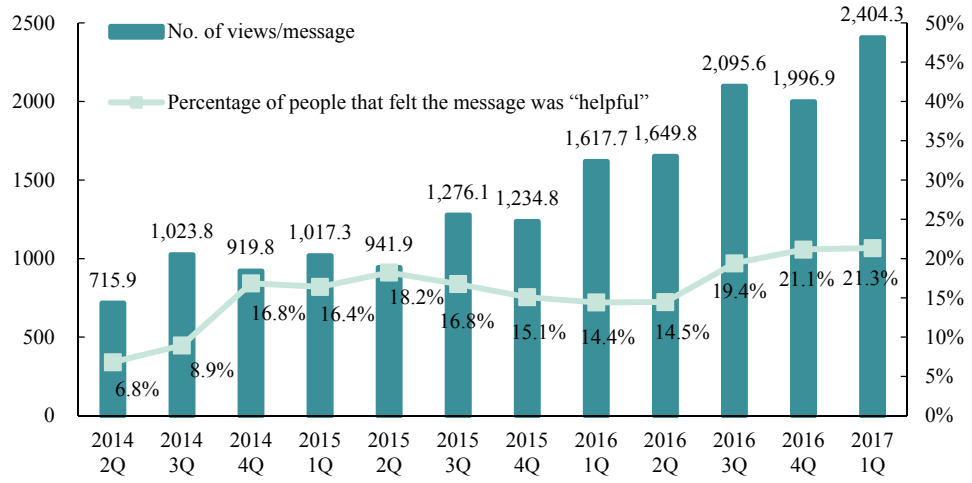
♦ Direct dialogue between nuclear power leaders

- Since the fourth quarter of FY2015, nuclear power leaders at headquarters (General Manager of the Nuclear Power & Plant Siting Division and other Head Office General Managers) have been visiting power stations to engage in direct dialogue with power station executives (site superintendent, unit

superintendents, Nuclear Safety Center director, power station general managers) in order to improve the safety awareness of the entire organization. During the first quarter, discussions were held on the topics of looking at issues from the perspective of the local community and communication with the region. (Kashiwazaki-Kariwa: April 26, June 28, Fukushima Daini: May 18).

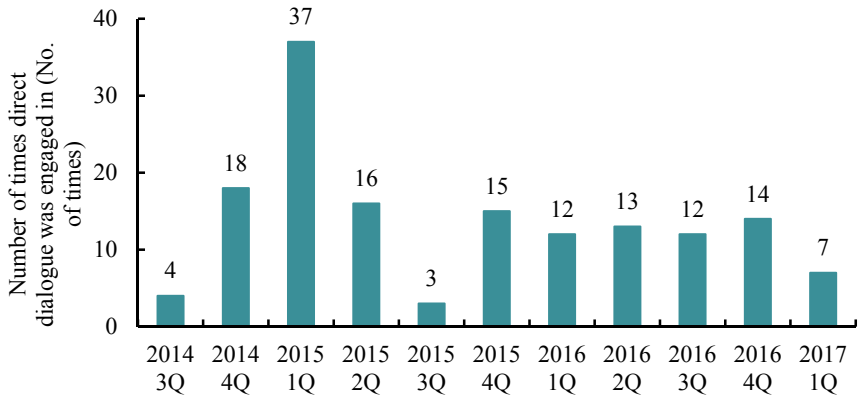
♦ Messages from nuclear power leaders

- In order to promote nuclear safety reforms, nuclear power leaders must accurately convey their expectations, and the reasons for those expectations, so that they permeate throughout the entire organization. In order to do this, nuclear power leaders are leveraging video messages, intranet messages, email, meetings and morning meetings as opportunities to convey their expectations.
- The following graph shows the number of times that messages by nuclear power leaders have been read by employees via the intranet. During the first quarter, the number of employees that read each message rose to 2,400 and the percentage of people who rated the message as “helpful” rose to 21.3% thereby showing a slowly increasing trend.



Number of views per message sent via the intranet/”Helpful” assessment rate

- In order to convey “thoughts” that cannot be completely conveyed through written messages over the intranet, the General Manager of the Nuclear Power & Plant Siting Division has been engaging in direct dialogue with power station personnel and headquarter employees since February 2014.



Number of times direct dialogue was engaged in between the General Manager of the Nuclear Power and Plant Siting Division and workers

♦ Commendations given by the General Manager of the Nuclear Power & Plant Siting Division and the president of the Fukushima Daiichi Decontamination & Decommissioning Engineering Company

- Since FY2015, the General Manager of the Nuclear Power and Plant Siting Division and the president of the Fukushima Daiichi Decontamination & Decommissioning Engineering Company have given awards to those people that have led the way and taken on great challenges, and people who have achieved high objectives in regards to the Nuclear Safety Reform Plan and other missions. The following chart shows the number of commendations that were given.

Commendations given by the General Manager of the Nuclear Power and Plant Siting Division and the president of the Fukushima Daiichi Decontamination & Decommissioning Engineering Company

Period	Head Office	Fukushima Daiichi NPS	Fukushima Daini NPS	Kashiwazaki-Kariwa
FY2015	24(2)	47	19	24
FY2016	25(1)	19	14	25
FY2017				
Q1	4(1)	2	4	10

(Numbers in parentheses indicate the number of commendations given at Higashidori)

♦ Gathering information on notifications that were given and information that was disclosed during the accident

- Many facts about the accident have been revealed by the government's Investigation and Verification Committee. However, in order to improve nuclear safety going forward and contribute to improving how events are reported and disclosed to the public, employees are being encouraged to

proactively report anything that they find to be missing from these investigation reports via an intranet site that has been set up for that purpose (June 21, 2016). No information or opinions were provided through the site during the first quarter.

(2) Enabling nuclear safety culture to permeate throughout the entire organization

♦ Safety Council Meetings

- In June 2016, a Safety Council[8] was established to enable the Nuclear Power & Plant Siting Division to discuss safety with Fukushima Daiichi Decontamination & Decommissioning Engineering Company (FDEC) management, share problem awareness, and promote the quick implementation of common countermeasures.
- During the 4th Safety Council meeting, a discussion was held on the topic of activities to cultivate safety culture amongst contractors (June 2). The discussion reaffirmed the necessity to continue dialogue with contractors and develop activities for cultivating safety culture, such as conveying the importance of not only work safety, but also nuclear safety.

♦ Assessing the status of nuclear safety culture

- During FY2016, TEPCO's Safety Culture Promotion Secretariat spearheaded an assessment of the status of safety culture at Fukushima Daini through interviews and field observation. Fukushima Daini used the results of this assessment as input and began a safety culture cultivation campaign in April 2017 with the cooperation of contractors that focuses on "complying with rules and procedures," which was an issue identified as being far from ideal.
- During FY2017, An assessment of the state of nuclear safety culture at the Fukushima Daiichi NPS is being planned/implemented in cooperation with the field diagnosis initiatives[9] implemented by the Japan Atomic Nuclear Safety Institute (JANSI). During the field diagnosis, JANSI interviewed 53 Fukushima Daiichi NPS personnel (May 15-19). The results of these interviews will be analyzed and TEPCO and JANSI will assess the status of safety culture at the Fukushima Daiichi NPS.

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[8] The Council is comprised of the General Manager of the Nuclear Power & Plant Siting Division, FDEC President, power station site superintendents, and Head Office general managers.

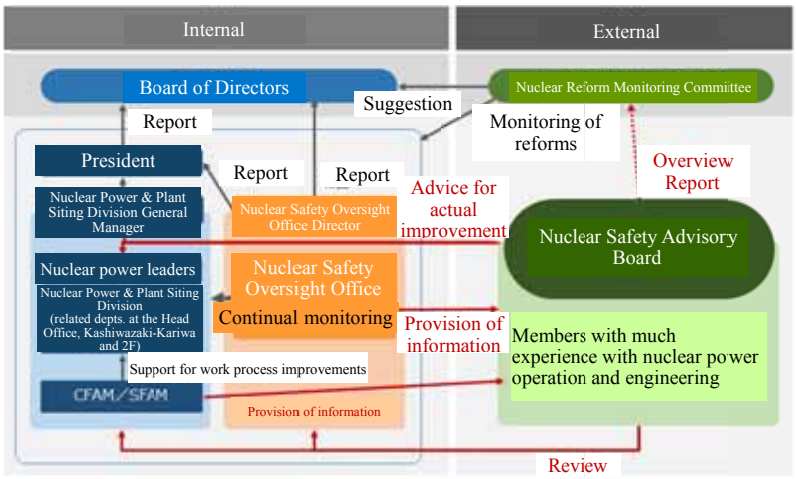
[9] Field diagnosis: employees from JANSI's Safety Culture Cultivation Support Department conduct interviews with everyone from general employees to the site superintendent in order to ascertain the state of awareness of power station personnel and point out "things noticed" from the perspective of an outside party thereby providing support for safety culture cultivation.

2.3 Measure 2 ENHANCEMENT OF OVERSIGHT AND SUPPORT FOR MANAGEMENT

2.3.1 Initiatives Related to Suggestions from the Nuclear Reform Monitoring Committee

(1) Establishment of a Nuclear Safety Advisory Board (NSAB)

The Nuclear Reform Monitoring Committee has recommended that experts with a plethora of experience and knowledge about nuclear power operation should be invited to transcend the scope of regulatory requirements and conduct reviews of nuclear power station safety and equipment reliability. TEPCO has benchmarked with nuclear operators in the United States and has created a Nuclear Safety Advisory Board (NSAB)[10] for the purpose of providing advice and instructions on organization operation and management in general to Nuclear Power Division leaders. A meeting on board preparations was held from May 29 through the 31. The five overseas experts invited to be members of the NSAB were briefed on TEPCO's situation and drafted a future review plan.



Nuclear Safety Advisory Board (NSAB) structure

[10] Nuclear Safety Advisory Board

Meeting on Nuclear Safety Advisory Board (NSAB) preparations

(2) Monitoring by the Nuclear Safety Oversight Office (NSOO)

The following are the opinions of the Nuclear Safety Oversight Office (NSOO) about observations made during several months with a focus on mainly on the first quarter that were reported to the executive officer and the Board of Directors on July 28.

Nuclear Safety Oversight Office (NSOO) Quarterly Report

(2017 Quarter 1 Report)

Foreword

This report summarises the Nuclear Safety Oversight Office (NSOO) assessment results for 2017, Quarter 1 (April through June). Recommendations, advice and observations have been discussed with the relevant management as they arose and have already been accepted and acted on (or actions are planned). They are not repeated in this summary.

The amount of assessment done in this quarter was less than normal as several key staff assisted with performing an independent check of safety documentation before submission to NRA. This was seen as an important oversight activity and within the NSOO remit.

1. Safety Performance

The Assessment Team and the Senior Reactor Engineers (SRE) on site reports continue to indicate steady improvement in safety in many areas.

There are still areas for improvement and the following summarizes the observations made and advice given.

1.1 Fukushima Daiichi

The assessment teams have looked at Unit 1 SFP Removal, Emergency Preparedness and Human Resource Development, and made the following observations;

- As for the Unit 1 SFP Removal project, in order to achieve efficient decision making by the project manager, the middle managers should clarify their responsibilities and reinforce their ability of execution and management both for the individual technical study and intra-group coordination.
- There is room for improvement in the development of procedures for the Restoration team as an emergency response organization and the level of effectiveness of their trainings. Head of the Restoration team should instruct his Group Managers in charge of facility and execute their responsibilities, while Nuclear Disaster Prevention Group should strengthen its accountability including verification and the Nuclear Human Resources Development Center should solidify its support to improve the education.

- The Nuclear Human Resources Development Center launched a new system that reinforces the governance of top managements on the improvement of the training program. aContinuous improvement is expected going forward by clarifying input and output of meetings and establishing process to capture emerging training needs.

The Senior Reactor Engineers on site have provided a matrix of detailed performance data for the site management against the new Fundamentals. In particular they highlight:

- The need to install instruments to directly monitor the Spent Fuel Pools water levels and temperature.
- Improvements needed to the design change process with respect to modifications and temporary work
- The need to shorten inspection periods of the Emergency Diesel Generators to reduce the time with reduced back up.

1.2 Fukushima Daini

The Assessment Team has focused on Emergency Preparedness and, although there has been good training to improve emergency preparedness, it is necessary to re-confirm the role assignments of each functional team through family drills and also re-confirm the details and adequacy of frequency of individual drill items.

The Senior Reactor Engineers on site have provided a matrix of detailed performance data for the site management against the Functional Areas. In particular they highlight:

- Many of challenges in the field are related to contractors, so their awareness and behaviours as well as TEPCO employees should be improved.

- The causal and trend analysis in the non-conformance management should be improved and strengthened. In addition, the current practice of non-conformance management meetings should be reviewed for its purpose and aims with ensuring PDCA cycle to improve overall performance.
- Many findings from the recent JANSI Peer Review are similar to those raised during the past reviews. When the site takes improvement actions, they need to pay close attention to the effectiveness and sustainability of the actions, as well as benchmarking the world's excellence. In addition, it is important to get CFAM at the Headquarters involved in the

activities.

1.3 Kashiwazaki Kariwa

The assessment teams have looked at Re-start, emergency preparedness, Operations management, and long term engineering capabilities, and made the following observations;

- The KK6/7 Re-start Project is a good initiative, although some of the basic design operation at HQ was delayed due to NRA document submission priorities. Actions are being taken to remedy earlier observations by NSOO.
- Good work continues on emergency preparedness although there is room for improvement for the Restoration Teams in the sense that they need to develop comprehensive and effective procedures and conduct individual training.
- To reinforce operators' Fundamentals Conduct of Operations in the field it is necessary to improve the management of change with current manuals and guides. We observed lack of coordination between Corporate and the Site and poor leadership by Corporate in particular.
- Differences were identified between design reviews conducted by TEPCO and those by plant manufacturers and the information was provided to reform the DR system.

The Senior Reactor Engineers on site have provided a matrix of detailed performance data for the site management against the Functional Areas. In particular they highlight:

- Activities derived from the Business Plan are effectively checked and implemented. Respective departments analyze weakness and take actions to achieve targets of the site. As a result, for instance, the number of significant non-conformances have become halved year on year in FY2016.
- The non-conformance in the penetration survey following Shika NPS event clearly raised shared-awareness for the significant challenge on "organizational barriers in communication." In order to have the behavior of good project managers deep-rooted, it is necessary to clarify the sponsorship and respective roles of senior managers and permeate them, as well as ensuring the follow-up of the state of execution.
- General Managers have repeatedly provided instructions to control deadlines of requests for equipment repairs and to rectify the practice of insufficient lighting in the plant. Front-line operators are often poor at voluntary management of their field. Management

observations and Fundamentals should be employed as effective tools so that operators are promoted to act in a self-governing manner.

1.4 Corporate

Enhancing emergency response capability of the HQ personnel

As a preparation for the case of emergencies, the responsible personnel needs to undertake trainings to maintain required emergency response capability. However, the result of participation to the emergency drills last year indicated that there are multiple personnel who failed to show up the drills. It is necessary to strictly control personnel in their training results and competence to enhance their emergency response capacity.

Footnote to Section 1

NSOO re-iterates that all these and other detailed observations have been discussed with line managers and actions and improvements are already underway in many areas.

2. CNSO Insights from Assessments

2.1 Governance

In general, the Governance of the training of the Restoration Teams in the Emergency Response Centres needs improvement, though levels are different by site and corporate. This is caused by poor implementation, exacerbated by poor accountability, responsibility, authority and prioritization. Improvements are needed in the following areas;

- **Drill Priority sharing among the entire organization**
- **Clear Accountability, Responsibility and Authority for drill**
- **Establishment of systems for managing drill implementation**
- **Permeation of expectations on capability of emergency response**

CNSO further suggests that this problem may be common to other Cross-Functional projects.

CNSO suggests that TEPCO should improve the structural aspects to make sure that people have the tools and the mechanisms to both manage and deliver all cross functional projects.

2.2 Nuclear Business Acumen of the Board.

CNSO suggests that the Board should assess, and if necessary improve, its abilities in the area of nuclear technology and nuclear safety.

2.3 Nuclear Risk and Efficiency Initiatives.

The Executive should ensure that the current efficiency initiatives do not disturb the balance between safety and delivery and that nuclear safety is not jeopardized.

2.4 Past Recommendations to the Executive and Board

As this is a new executive team, in particular the President and CNO (including the CNO's immediate team), CNSO takes this opportunity to remind them of some of the more important ongoing issues raised by NSOO over the last 2 years. Including for example, the Management of Radiation Dose, Nuclear Risk Management, Nuclear Baseline and Staff Rotation, Learning and Contractor Safety Culture.

3. NSOO Performance – Closure of NSOO Actions

There has continued to be good performance by the line in closing out NSOO recommendations;

- Of the 131 actions raised prior to this quarter, 102 are closed. And there are 5 actions closed in this quarter.
- In this quarter we raised 7 new recommendations

4. Benchmarking and Mentoring

NSOO conducted a benchmarking to Nuclear Independent Oversight (NIO) of Sellafield in the UK this quarter. We learnt from the NIO significantly as they perform a wide range of activities, including reviews on management leadership and Independent Nuclear Safety Assessment (INSA) as well as oversight activities similar to what NSOO does.

End

(3) Initiatives to Enhance Self-Assessments

Performance Improvement (PI) field gap analysis performed during FY2016 as part of the management model project identified self-assessments as an area that is not functioning effectively. In light of these results, since FY2017 efforts have been

made to formulate self-assessment guidelines as a Phase II initiative for the PI field. In the process of formulating self-assessment guidelines, nuclear operators in the United States were referenced under the guidance of overseas experts to compile procedures that were put to trial use.

These self-assessments of nuclear safety reforms conducted during FY2016 also revealed the necessity to enhance the skill of evaluators so improvements are being made in coordination with the management model project.

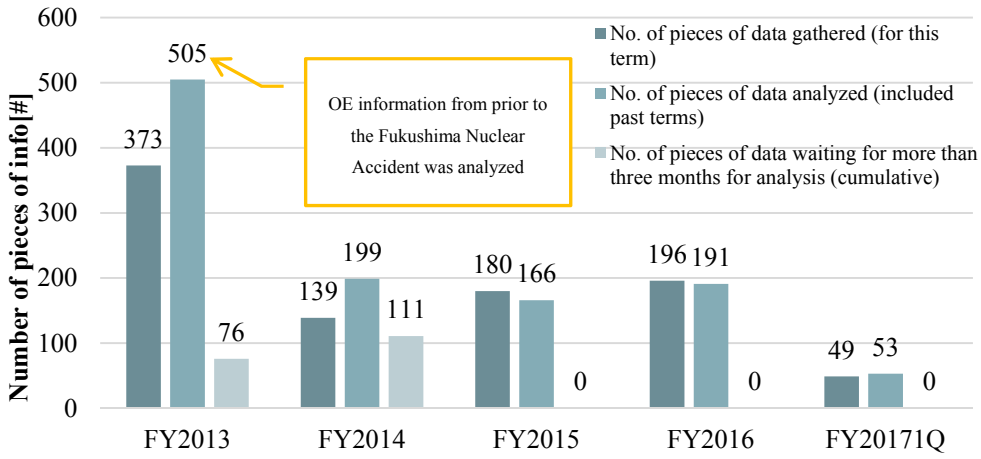
2.4 Measure 3 ABILITY TO PROPOSE DEFENSE IN DEPTH/CAPABILITY FOR PROPOSING DEFENSE-IN-DEPTH

2.4.1 Initiatives Related to Nuclear Reform Monitoring Committee Proposals

(1) Leveraging operating experience (OE)[11] from within and outside of Japan

♦ Gathering and sharing OE information

- One of the lessons learned from the Fukushima Nuclear Accident is that we must "learn from the failures of others." Lessons to be learned are being identified and countermeasures deliberated/implemented under the premise that something that has occurred somewhere else in the world can also occur at TEPCO power stations.
- Prior to the Fukushima Nuclear Accident, the gathering of operating experience from within and outside of Japan, and the deliberation of countermeasures, were put off. Therefore, efforts are being made to promptly engage in these activities and enable everyone in the Nuclear Power Vision to leverage this information.
  - During the first quarter 49 pieces of the new OE information were gathered and 53 pieces of OE information, that includes information gathered in the past, were analyzed. We will continue to analyze this information in a planned manner to ensure that no information waits to be analyzed for more than three months.



Trends in OE information gathering and analysis

[11] Operating Experience

- Recent OE information is posted on the company's intranet thereby providing an environment in which all Nuclear Power Division personnel can easily access OE information.
  - The viewing rate of new OE information during the first quarter for the entire Nuclear Power Division was 73%.

♦ SOER[12] and severe accident information study sessions

- Focused study sessions on OE information of particular importance[13] (severe accidents from both within and outside of Japan and SOER) are being held and efforts are being made to provide an overview of these accidents and troubles and understand the lessons learned from them.
  - During the first quarter, a total of 199 employees (Fukushima Daiichi NPS: May 19 (37 employees), Fukushima Daini: May 9 (30 employees), Kashiwazaki-Kariwa NPS: May 16, May 17 (97 employees), Head Office: May 10 (35 employees)) participated in a lecture on "SOER2003-2 Davis-Besse Nuclear Power Plant Reactor Pressure Vessel Head Degradation" given by overseas experts. Management commented that, "I can see how organizational factors led to the accident. It was a good learning experience," and that "I'd like to share the lessons I learned with other members to improve nuclear safety."

SOER study sessions (left: Kashiwazaki-Kariwa; right: Head Office (group discussion))

  - The participation rate of managers in OE study sessions was measured

[12] Significant Operating Experience Report compiled by WANO
[13] 22 accidents and troubles including the cable fire at the Browns Ferry Nuclear Power Plant

to determine whether or not management is “taking a proactive attitude towards learning about important OE information and not just getting preoccupied with superficial causes.” During the first quarter, participation rates were as follows:

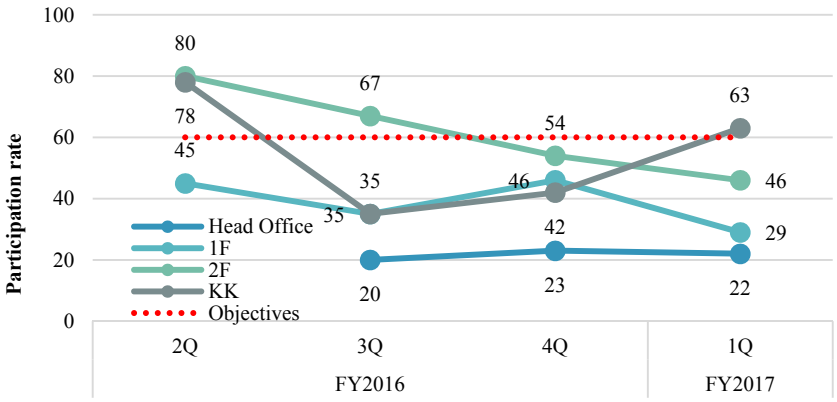
Head Office: 22%

Fukushima Daiichi NPS: 29%

Fukushima Daini: 46%

Kashiwazaki-Kariwa: 63%

- Participation rate did not increase last fiscal year in part because planned tasks conflicted with planned study sessions, but this fiscal year initiatives will commence to incorporate management improvement programs for managers into OE study sessions and promote discussions between group managers and members.



OE study session participation rate by managers

(2) Promoting improvements through CAP[14]

♦Enhancing CAP processes

- We aim to make efficient and effective improvements by using CAP to manage not only nonconformance and OE information, but also information useful for improving performance that can contribute to nuclear safety (management observation results, benchmarking results, external review results, near-this information, etc.), in a unified manner.
- At the KK performance improvement meeting (May 16) the role of these bodies and the activities in which they engage in the United States were introduced thereby increasing the knowledge that power station management has about CAP and performance improvements.

[14] Corrective Action Program (performance improvement program)

- Each power station department has a performance improvement coordinator (hereinafter referred to as, "PICO[15]") that screens daily nonconformance data and also data used for making improvements, monitors trends, and provide support for cause analysis in order to prevent the recurrence of accidents and nonconformances.

♦ Activities for improving nuclear safety (inputted into CAP)

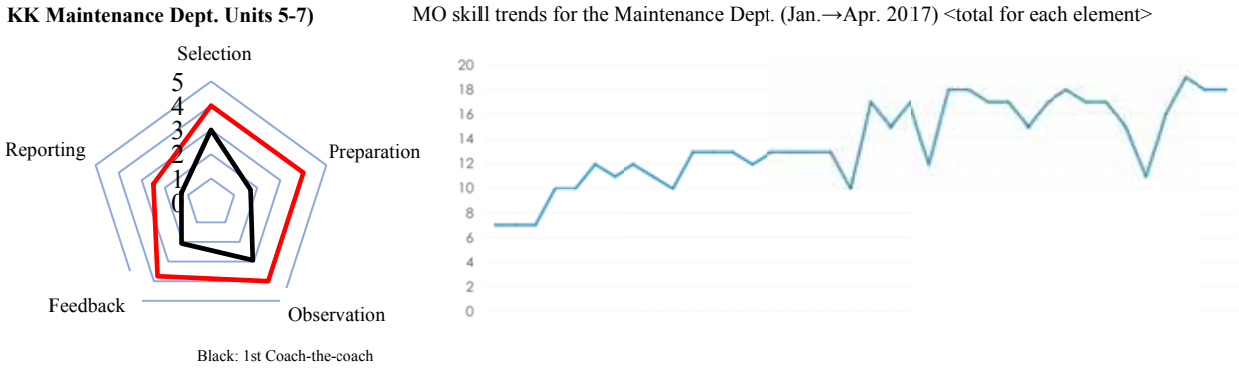
- Management Observation (MO)
  - In order to promote nuclear safety reforms and improve nuclear safety, TEPCO engages in management observation (MO), which is proactively employed by the best nuclear operators overseas. Through MO managers can observe actual conditions in the field and accurately identify problems.
  - At the same time, in order to implement good MO, it is necessary to improve the skills of managers engaging in the process. Those people engaging in MO receive individual coaching (coach-the-coach) by overseas experts. During the first quarter, training was implemented for Operations Department, Maintenance Department, and Radiation Protection Department managers and group managers (approximately 70 people). This has resulted in improved MO skills and whereas MO to date has had a tendency to focus on worker safety, the MO being implemented now is based on fundamentals and has improved to focus on a wide variety of areas, such as nuclear safety, radiation safety, and worker safety.

Coach-the-coach training on management observation for Maintenance Department managers (Kashiwazaki-Kariwa)

[15] Performance Improvement COordinator

Coach-the-coach training on human performance tools for work supervisor education instructors (Nuclear Education and Training Center)

- MO coach-the-coach is used in every department and department managers have commented that, “the actual focus of MO skills became clear and it helps to improve skill.” Attempts to make the results of assessments of skills obtained through MO coach-the-coach more “visual” have begun. This will be used going forward as an indicator for improving MO skill.



MO skill radar chat and skill trends

- An MO database system was developed in order to efficiently gather and analyze the results of management observation at each power station and put into use on April 1. PICO analyze fundamentals-related weaknesses from the results of MO inputted into the system and enhance activities to make improvements before these weaknesses manifest into troubles or human errors.
- Management observation implemented during the first quarter is as follows.

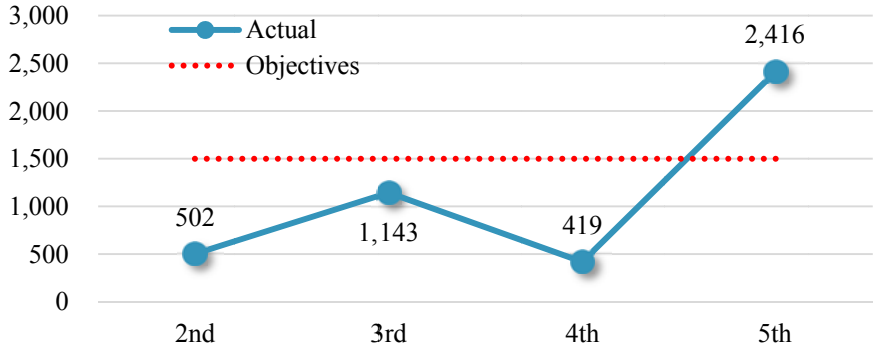
Items	Head Office	Fukushima Daiichi NPS	Fukushima Daini NPS	Kashiwazaki-Kariwa
No. of times implemented	28	366	823	1,199
No. of times per person/month	0.20 times/month/person	0.84 times/month/person	4.03 times/month/person	3.96 times/month/person

2.4.2 Other Initiatives

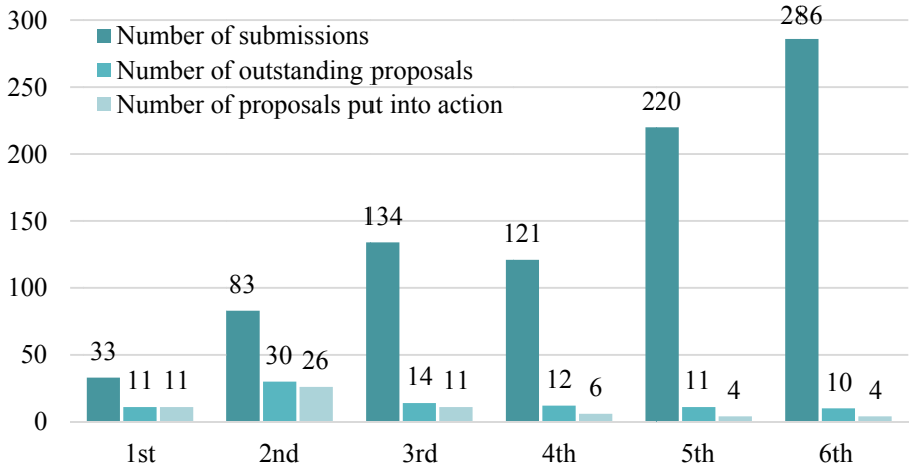
(1) Competitions to Enhance the Ability to Propose Safety Improvement Measures

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 put promptly into practice.

- Safety Improvement Proposal Competition PI calculate:
  (the number of proposals) x (average assessment) x (number of outstanding proposals that were implemented within six months).
  The results from the 5th competition exceeded objectives (1,500 points or more) since the beginning of these competitions. However, rather than be satisfied with this result we plan to further develop and improve methods for implementing this competition and also deliberate revising how PIs are calculated. Furthermore, in order to improve motivation to participate in the competition we will continue to give commendations to those people who have submitted outstanding proposals and also those departments that have implemented outstanding proposals that have been submitted in past competitions.



Safety Improvement Proposal Competition PI (2nd[16] - 6th competition)



Number of submissions to the Safety Improvement Proposal Competitions/Number of outstanding proposals/Number of proposals put into action

- The outstanding proposals to date that were put into practice during the fourth quarter are as follows:
  - 5th competition: Out of the 11 outstanding proposals submitted, one has been put into practice since the last report (cumulative total: four[17] proposals).
  - 6th competition: Out of the 10 outstanding proposals submitted, four have been put into practice.

<5th Competition>

[16] Methods for selecting outstanding proposals differ during the first competition so the results are not included here

[17] This is a correction because in the last progress report (FY2016Q4) one of the outstanding proposals put into practice during the fourth competition was counted as being from the fifth competition.

- Groundwater has continued to flow into the Unit 5/6 reactor building since the Great Eastern Japan Earthquake and operators have continued to drain this water. In order to enhance countermeasures for preventing the flooding of emergency power panels, a drainage header was installed in the wall of the power panel room thereby enabling the automatic drainage of groundwater that flows into the building. (Fukushima Daiichi NPS)

Installation of automatic groundwater drainage line

<6th Competition>

- Up until now accumulated water levels and subdrain water levels have been monitored by comparing trends to the daily data sheets, but a system (concentrated monitoring system) has now been created that automatically outputs detailed water level data every hour. (Fukushima Daiichi NPS)

Accumulated water/subdrain water level monitoring

- In order to quickly ascertain if water levels in spent fuel pools have decreased as a result of sloshing caused by an earthquake, it is now possible to monitor the water levels of SFP skimmer surge tanks on

the front panel of the main control room. (Fukushima Daini NPS)

Monitoring of spent fuel pool water levels in the main control room (front panel)

- In order to improve the reliability of power panels by preventing condensation inside cable trays, temperature and humidity gauges have been newly installed in cable tray connections in order to manage temperature and humidity levels. In conjunction with this, decisions on when to start up and shut down air conditioning equipment refrigerators is now based upon temperature/humidity correlation charts. (Fukushima Daini)

Installation of temperature and humidity gauges in cable tray areas

- In order to enable operators to remain calm and perform operations under conditions of poor visibility caused by smoke from a fire and dust turned up by earthquake, we have started implementing training in smoke-filled rooms so that operators can practice actually performing operations and experience the visual limitations imposed by the self-breathing apparatus (air tanks). (Kashiwazaki-Kariwa)

Operator training in smoke-filled rooms

- During the second quarter, we will continue to monitor the process by which outstanding proposals are put into practice and follow-up in instances where proposals are not put into practice smoothly. Furthermore, before the end of the year we will hold the 7th competition during which we plan to re-examine proposals that were not selected as being outstanding during past competitions to look for proposals that could contribute to improving nuclear safety.

(2) Improving periodic safety assessment processes (safety reviews)

In order to proactively and continually improve nuclear safety, TEPCO is not only engaging in improvements to respond to nonconformances and issues pointed out during safety inspections and third-party reviews, but also implementing safety reviews that examine underlying contributors.

- In order to effectively implement power station safety reviews in an organized manner, we deliberated systematic topic selection processes and created a safety review guide (periodic safety assessment process improvement) (June 21).
- The status of safety reviews at each power station are as follows:
  - Fukushima Daiichi NPS
    A work group was established to focus on, and quickly find a solution to, the continuing problem of oil leaks from vehicles. Furthermore, countermeasures have been formulated for risks identified as potentially having an impact outside site boundaries which focus on liquids and gases that contain radioactive materials. After risks are identified a check is performed to guarantee that no

risks have been overlooked, however in light of risk reduction measures and changes to the environment in conjunction with the progress of reactor decommissioning, risks that have the potential to have an impact outside of site boundaries were once again looked for. Furthermore, deliberations on the unified management of risks that address not only radioactive material but also hazardous materials and equipment aging, continue.

- Fukushima Daini
  In light of the fact that reactors are currently shut down, we are in the process of formulating a review plan in order to identify areas for improvement upon identifying latent weaknesses and selecting topics for FY2017.
- Kashiwazaki-Kariwa NPS
  During FY2016 the effectiveness of “mechanisms for confirming the impact that field work has on plant safety functions” was examined and improvements made to this mechanism. The results were then reflected in the work guide to confirm the impact on plant safety design. During this fiscal year we will commence initiatives to confirm the suitability of checks by managing departments in accordance with the aforementioned guide, and examine the effectiveness of this improved mechanism. Furthermore, we will draft a review plan for identifying areas for improvement upon selecting topics for FY2017.

2.5 Measure 4 ENHANCEMENT OF RISK COMMUNICATION ACTIVITIES

2.5.1 Initiatives Related to Suggestions from the Nuclear Reform Monitoring Committee

(1) Initiatives to improve risk communication skill

♦ Training to maintain and improve the skill of risk communicators

- As of June 30, there were 42 active risk communicators. In order to accurately explain the details of the revised application for Kashiwazaki-Kariwa to the members of the local community, study sessions run by internal instructors were held on topics such as geology, seismology, and seismic resistance design. (three times in total).
- Dartmouth College professor, Paul Argenti, the world's foremost authority on corporate communication, was invited to examine to what degree TEPCO's corporate communications, and communication as a whole, has improved compared to what it was like at the time of the Fukushima Nuclear Accident. Professor Argenti exchanged opinions with management, took a tour of the Fukushima Daiichi site, and gave special lectures to risk communicators and corporate communication staff (54 participants). Prof. Argenti commented that compared to when the accident occurred, there have been drastic improvements with communication and that TEPCO's communication is still getting better. Furthermore, we learned from Prof. Argenti that upper management is the best communicator and that communication strategies can be fulfilled using simple messages.

Instruction by Professor Argenti

(Left: Exchanging opinions with Fukushima Daiichi D & D Engineering Company (FDEC) president Masuda; Right: Special lecture for risk communicators)

♦ Improving the risk communication ability of employees

- Simulated risk handling training for corporate communication staff was held referencing incidents that have occurred at other companies and the response was assessed by external instructors (32 participants during the first quarter)
- We continue to issue “social opinions you should know about” reports to mainly FDEC employees that serve to share information on concerns voiced to TEPCO by the local governments of Fukushima Prefecture, the media, and customers, and issues related to TEPCO that have been brought up on SNS (once a month).

2.5.2 Other Initiatives

(1) Engaging in risk communication

♦ Communicating with the siting community and overseas parties

- Activities in the Fukushima area
    - We continue to offer tours of the Fukushima Daiichi NPS in an effort to deepen understanding by having people see the power station with their own eyes (first-quarter: 2,956 people). We will continue to offer tours with the objective of reaching approximately 20,000 people, double that of 2016, by FY2020.
    - On April 1, we released the first issue of *Hairo Michi*, an informational magazine intended to introduce the people engaged in reactor decommissioning and convey their feelings, as well as give updates on the progress of decommissioning at the Fukushima Daiichi NPS to the people in the community (approximately 10,000 copies issued). The second issue was released on June 10. We plan to publish issues approximately once every two months and make efforts to improve the ease of reading of the magazine based upon opinions from readers.

First issue of *Hairo Michi*　　Second issue of *Hairo Michi*

- 1 FOR ALL JAPAN website set up to provide information to the approximate 6,000 workers at the Fukushima Daiichi NPS and their families continues to get approximately 28,000 hits per month. And, every month we distribute approximately 2,000 copies of the Monthly 1F newsletter to workers on site and people that tour the Fukushima Daiichi NPS facility. These initiatives were covered by both the Kyodo News Service (April 12) and NHK (June 18). We'll continue to look for issues of great concern to workers and include them in the contents of these media tools.
- At the 13th meeting of the Fukushima Council on Decommissioning and Decontamination Measures (May 29), representatives of Fukushima Minyu/Fukushima Minpo newspapers in attendance said in regards to the information being conveyed by the government and TEPCO that, "the information should be easier to understand," and that it "should be more transparent." We will continue a dialogue with these parties to make improvements.
- At the first meeting of FY2017 of the Prefectural Council on Ensuring the Safety of Decommissioning of Fukushima Nuclear Power Stations, diagrams and photographs were used as much as possible to give explanations on the status of handling of contaminated water and fuel debris/fuel removal in light of requests from people in Fukushima Prefecture break down the discussions held by experts, such as members of government committees, and make the details easier to understand (May 17).


Explanations given at the Prefectural Council on Ensuring the Safety of Decommissioning of Fukushima Nuclear Power Stations

- Activities in the Niigata Area
  - The number of people that toured the power station during the first quarter is as follows: from Niigata Prefecture: 1,423 people (cumulative total: 41,967[18] people); Kashiwazaki-Kariwa region: 322 people (cumulative total: 16,012 people).
  - In order to enable people to become more familiar with Kashiwazaki-Kariwa, Golden Week events were held at Service Hall (the power stations PR facility) from May 3 through May 7, and tours of the power station were given (total number of tour participants: 1,812).
  - "*Fureai* Talk Salons" have been opened at Service Hall, TEPCO Fureai Salon Ki-na-se, and Energy Hall to engage primarily women in the siting community and hear their opinions (held a total of 4 times, 85 participants). At these salons, explanations are given of the safety measures being implemented at the Kashiwazaki-Kariwa NPS based upon the lessons learned from the Fukushima Nuclear Accident, opinions are exchanged, and cultural seminars given.
  - A booth was set up inside commercial facilities in Kashiwazaki City to directly explain to the community residents the details of the Kashiwazaki-Kariwa main anti-earthquake building seismic resistance issue (April 22-28, number of visitors: 144). Also, since May 29, TEPCO employees have been visiting the homes of community residents in Kashiwazaki City and Kariwa Village for

[18] Cumulative total since of the Fukushima Nuclear Accident

the third time since the accident. These visits present us an opportunity to directly engage in dialogue with residents, apologize for, and explain, the main anti-earthquake building issue, and listen to their fears and concerns as well as their opinions about the power station.

- Conveying information through press conferences by management
  - In the Fukushima area, Fukushima Revitalization Headquarters President Ishizaki and Fukushima Daiichi Decontamination & Decommissioning Engineering Company (FDEC) President Masuda hold regular press conferences at the end of each month to give updates on the status of activities at the Fukushima Revitalization Headquarters and explain the status of progress with decommissioning and contaminated water countermeasures at the Fukushima Daiichi NPS. Fukushima Revitalization Headquarters President Ishizaki also made remarks in conjunction with his retirement. The new president of the Fukushima Revitalization Headquarters, Mr. Okura, also attended the press conference and conveyed is determination to continue to fulfill the organization's responsibility to help Fukushima recover under new management (May 30th).

Last press conference by Fukushima Revitalization Headquarters President Ishizaki
(Left: New president of the Fukushima Revitalization Headquarters, Mr. Okura; Right: Fukushima Revitalization Headquarters President Ishizaki)

  - At the regular press conference held at Niigata Headquarters, Niigata Headquarters President Kimura explained initiatives to establish a new Niigata Headquarters in conjunction with his

retirement, as well as issues surrounding the seismic resistance of the main anti-earthquake building. The new Niigata Headquarters president, Mr. Kitta, expressed his determination to run the company while prioritizing the local community through improving communications in light of the main anti-earthquake brought (May 25).

(Left: New Niigata Headquarters president Kitta; Right: Niigata Headquarters president Kimura)

- Conveying information in an easy-to-understand manner, and leveraging social media
  - We continue to use videos to give explanations in order to deepen understanding of various technical issues and initiatives related to nuclear power.
    - The current state Working Conditions at the Fukushima Daiichi Nuclear Power Station (April 27)
    - The Fukushima Daiichi Nuclear Power Station Today ~From that day into tomorrow~ (June 28)
  - Radiation data for inside of the power station and the surrounding area is updated on a daily basis on both the Japanese and English websites.
  - The information on “work area safety improvements” within the FAQ section “I will answer your questions” and the section on “Unit 1/2 Primary Containment Vessel (PCV) Internal Surveys” have been updated. (May 19)
  - TEPCO continues to convey information via Facebook
    - Status of progress of Fukushima Daiichi reactor decommissioning and work environment improvements (first-quarter posts: 6)

- Introduction of Kashiwazaki-Kariwa safety improvements (first-quarter posts: 2)
- Risk communicator commentaries (first quarter posts: 5)

- Gathering knowledge from overseas
  - From May 1 through May 6, Fukushima Revitalization Headquarters president Ishida and Head of Social Communications Office Enomoto visited the United States to give presentations and exchange opinions with experts in communications. They gave presentations on TEPCO and the recovery efforts in Fukushima at Harvard University and participated in a panel discussion. Many of those in attendance commented that they expect us to continue to disseminate information and engage in direct dialogue. In conjunction with this, they exchanged opinions about the preparations that TEPCO is making for the 2020 Tokyo Olympics and also about the communication in which nuclear operators in the US engage in with the local communities. President Ishida and Manager Enomoto also receive advice in regards to how TEPCO shouldn't disseminate information and engaging communication.

Presentation at Harvard University　　Exchanging opinions with Harvard University professor Gulati

- Disseminating information overseas
  - In light of the fact that Korea is currently prohibiting the import of all seafood from eight prefectures, including Fukushima Prefecture, reporters from branches of Korean newspapers located in Tokyo did stories on the impermeable wall on the ocean side at Fukushima Daiichi and the stringent measurement/analysis of radiation concentrations that TEPCO performs (June 9).

- A public television station from the Ukraine, where the Chernobyl Nuclear Power Plant is located, did a story on the steady on-site improvements that have been made to the work environment at the Fukushima Daiichi NPS and on the factor that in most areas workers may now wear normal workloads. The story will be aired in 16 Russian-speaking regions.
- In order to do a special article on the robots being used for reactor decommissioning, the New York Times visited the Fukushima Daiichi and the JAEA Naraha Remote Technology Development Center, and also gathered information on the International Research Institute for Nuclear Decommissioning's (IRID) robots to be used for the internal survey of the Unit 3 primary containment vessel (PCV).
- We also continue to disseminate information via e-zines and Facebook/Twitter to media outlets abroad and overseas experts (first quarter: e-zine: 1; Facebook: 25 posts; Twitter: 42 posts)

- Interaction with foreign embassies in Tokyo
  - An explanation of the progress of reactor decommissioning at the Fukushima Daiichi NPS was given to the Canadian Embassy. And, a tour of the Fukushima Daiichi NPS site was given to representatives from the UAE and Australian embassies.
  - United States Secretary of Energy, Rick Perry, also visited the Fukushima Daiichi NPS to look at equipment in place for treating contaminated water and maintaining the ice wall. Secretary Perry also gave a message of support for all the workers (June 4).

Message of support received from Secretary Perry

Site tour for Secretary Perry

♦ Internal Communication

- Sharing nuclear power-related information through utilization of internal media and trainings
  - In conjunction with his replacement, Nuclear Power & Plant Siting Division General Manager Anegawa posted a message on the company's intranet entitled, "A Look Back at the Nuclear Safety Reform Plan and a Message to All Employees" on May 18. GM Anegawa expressed his gratitude for the progress with the reform plan that has been made over the last four years and urged everyone to reaffirm the importance of moving steadily forward with reforms. GM Anegawa's successor, Nuclear Power & Plant Siting Division General Manager Makino, will continue in this role and send out messages to employees in the future.
  - On June 27, a video of the briefing given to employees on the nuclear management model, which was created on June 13, was posted on the company's intranet.
  - Videos that explain to employees what type of media coverage TEPCO is getting and the status of reactor decommissioning work have also been posted (first quarter: four videos).
  - Since April, digital signs have been used to air media stories related to TEPCO and convey information about the siting community in a timely manner to everyone in the company.
  - Articles on the status of reactor decommissioning at Fukushima Daiichi have also been included in the TEPCO Group newsletter. The third article focused on the work environment improvements that have been made in conjunction with enlargement of the area in which workers can wear normal work clothes (issued on May 30).
  - Risk communicators are giving briefings to group companies. On June 19, a study session was offered for approximately 30 TEPCO Fuel & Power managers and site superintendents on Fukushima Daiichi reactor decommissioning and nuclear preparedness. Going forward, the details of these study sessions will be further developed based upon the results of questionnaires distributed to participants and of the needs of group companies.

2.6 Measure 5 ENHANCEMENT OF POWER STATION AND HEAD OFFICE EMERGENCY RESPONSE CAPABILITIES

(1) Enhancement of Power Station and Head Office Emergency Response (Organizational) Capabilities

♦ Implementing Improvements Based upon the Mid- to Long-Term Plan

- In April, the Mid- to Long-Term Plan was revised based upon the results of training implemented last fiscal year and an assessment of basic plan.
- Since it has been deemed that Fukushima Daini, Kashiwazaki-Kariwa and the Head Office have almost achieved the emergency response capability goals of the basic plan (STEP-1), the decision was made to move to STEP-2. In accordance with the results of the assessment, the frequency of training shall be increased based upon a plan that reorganizes environmental conditions, such as unidentified hazards and initiators that should be predicted.
- Since it has been deemed that the Fukushima Daiichi NPS has not achieved the emergency response objectives of the basic plan (STEP-1), the current objectives (STEP-1) will remain in place. In accordance with the results of risk analysis, some parts of the basic plan will be revised and training will be implemented on newly identified nuclear disaster events and troubles that have a large social impact.
- In order to further improve our emergency response capability, we shall analyze the gaps between our current state of skill and our objectives as we aim to become an organization that has the world's highest level of emergency response capability.

♦ Training at Power Stations and the Head Office

- In order to improve the ability of the organization to engage in an emergency response in the event of an emergency, individual training and general training sessions are being repeatedly implemented.
  - Fukushima Daiichi NPS
    Since the number of training scenarios up to now has been insufficient, during the first quarter a new scenario deliberation team was formed and comprehensive training scenarios for nuclear disaster risks and troubles that have a large social impact were created. Starting in the second quarter general training sessions will be implemented based upon the revised Mid-to Long-Term Plan.
  - Fukushima Daini NPS

- A general training session was held on May 25. During the accident scenario, which consisted of troubles caused by an earthquake escalating into fires and eventually into a loss of AC power, personnel transitioned from trouble-handling status to emergency response status and practiced handling an emergency with surrogates in the absence of the general manager. In the emergency response center, information was shared through briefings and objective determination meetings and notification of predicted EAL[19] were also given suitably.
- Training was conducted using surrogates in the absence of the general manager, however since it was noticed that these parties were not used to speaking out, individual training on speaking out will be newly planned and implemented in addition to monthly general training in order to improve the skill.

Training for surrogates (right) on handling the duties of the general manager

・ Kashiwazaki-Kariwa

- During the general training session held on May 31, an area simulating the Unit 5 reactor building emergency response center (ERC) was set up inside the main anti-earthquake building in order to examine whether the actions taken in the main anti-earthquake building up to now could also be implemented in the ERC. In conjunction with this, training on assembling the initial responders at the emergency response center in the Unit 5 reactor building was also implemented.
- Whereas the Unit 5 reactor building emergency response center is smaller than the main anti-earthquake building, the closer physical proximity of each unit and workers allowed information to be shared without the use of microphones thereby resulting in smooth communication.
- During assembly training it was learned that priorities for the first people to arrive at the ERC must be set due to the fact that responders arrive at different times depending on where they were originally

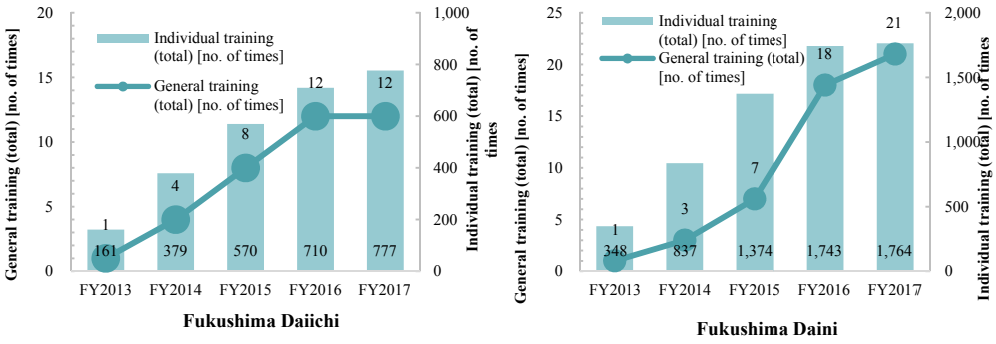
[19] EAL: Emergency Action Level

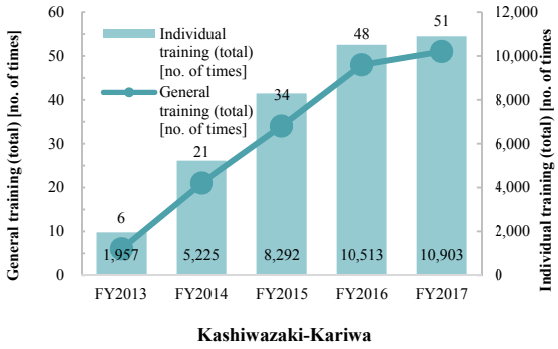
engaged in their duties.

- Going forward, we will continue to make improvements to the environment of the Unit 5 reactor building emergency response center, such as determining priorities for the first responders to arrive at the center and also using walls and whiteboards to post information that should be shared.

Training that simulates the Unit 5 reactor building emergency response center (left: simulated area, right: training)

- Results for each power station are as follows:





- Head Office
  - Training for the newly appointed general managers and command personnel was implement (June 14-22).
  - Guides and videos from past training sessions were used to explain the methods for holding objective setting meetings and the correct methods for speaking out. Diagrams are also used to explain how communication is engaged in within the response center and trainees practiced actually using the various tools used when responding to an emergency.
  - Going forward into the second quarter and beyond general training will be implemented in order to improve skill.

Training for new appointees

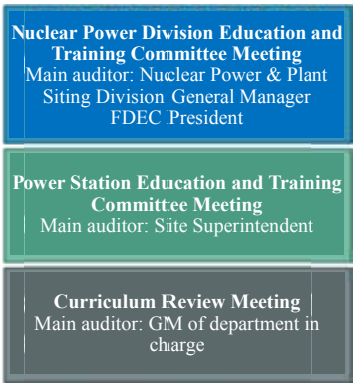
2.7 Measure 6 DEVELOPMENT OF PERSONNEL FOR ENHANCING NUCLEAR SAFETY

2.7.1 Initiatives Relating to the Suggestions Given by the Nuclear Reform Monitoring Committee

(1) Initiatives to improve individual technological capability

♦ Reconstructing education and training programs based on SAT

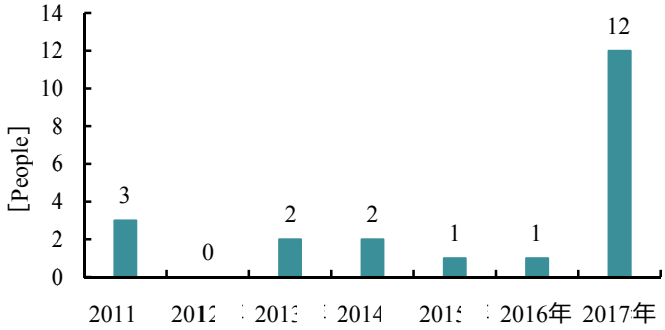
- The Nuclear Human Resources Training Center has adopted the Systematic Approach to Training (SAT), which is recognized internationally as a best practice, and is providing education and training programs necessary for personnel development throughout the entire Nuclear Power Division.
- Education and training programs that focus on the skill certification system have been revised or newly developed in the fields of operations, maintenance, nuclear safety, radiation protection, radiation & chemical control, and fuel management, training was commenced this fiscal year. In the field of Nuclear Engineering (Safety), an education/training program to which the skill certification system was applied was newly prepared and training commenced this fiscal year in order to maintain high levels of skill related to nuclear safety and also cultivate human resources that can serve as instructors for the younger generation.
- Since sharing information on problems and deciding on countermeasures for such problems is important in order to continually improve education and training programs, we have introduced an organized and hierarchical review process.
- Continual improvements will be made to training materials and test problems while incorporating the opinions of line departments through curriculum review meetings for each field, etc.
- The first power station education/training committee meetings (Fukushima Daiichi: April 25, Fukushima Daini: April 25, Kashiwazaki-Kariwa: April 21) and Nuclear Power Division education/training committee meetings (May 10) have been held as we have commenced initiatives for effectively utilizing education/training PDCA based on SAT that



Hierarchical review meeting

span the entire Nuclear Power Division. The objectives of these committee meetings are to report on the results of education/training programs that have been developed since last fiscal year, revise training content/implementation periods, accelerate the pace of education and make further improvements to the productivity of education and training.

- Initiatives to create education programs aimed at acquiring advanced expert knowledge are underway and in FY2016 these initiatives were enhanced by establishing study sessions for acquiring licensed reactor engineer certification and leveraging external training. As a result, 12 workers passed the 59th Licensed Reactor Engineer Certification Exam (held in March 2017).



Number of people that has passed the Licensed Reactor Engineer Certification Exam

- In order to develop education and training programs this fiscal year, we plan to continue offering study sessions for acquiring certification as chief electrical engineers and for learning from past nonconformances in order to leverage lessons learned from past operating experience, as well as develop educational and training programs such as Technical Deliberation Form Recording Basics, which is the foundation for technical deliberations.

Maintenance field “human performance tool” training

♦ Introduction of a Human Resource Development Management System

- In order to manage the data that will be the foundation for long-term human resource development we have introduced a new nuclear human resource development management system for recording the results of education and training and managing the certifications and skills of individuals. The system was put into use in April after setting system functions and preparing data.

♦Middle management training

- 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 while remaining sufficiently aware of their own responsibilities to nuclear safety.
- Group manager training
  During the first quarter, a follow-up was performed for the action plan created by group managers and shift supervisors that took part in training last fiscal year (total: 178 people). Group manager training for this fiscal year will be held during the second quarter.
- Power station manager training
  During the first quarter, follow-ups were performed for the action plans created by the new department managers (15) and department managers that underwent second and third-year department manager training (25 managers) last fiscal year. Department manager training for this fiscal year will be held during the second quarter just like group manager training.

♦ Status of initiatives to improve in-house technological capability of power stations (maintenance/operation field, etc.)

- Maintenance personnel initiatives
  - Fukushima Daiichi NPS
    We are continually implementing training to develop in-house technical ability (training on the operation of power supply cars, temporary laying and connecting of hoses, and training on the use of heavy equipment, etc.) in order to improve the ability to respond to emergencies

Power supply car operation training

- Fukushima Daini NPS

  In order to improve the ability to respond to emergencies we are conducting repetitive training drills with four teams (① debris removal/road repair, ② generator replacement, ③ temporary cable connecting, ④ coolant pump repair). In April, the members of the training teams were rotated in an effort to acquire new skills. In June, we will hold a skill competition (third time) to give workers an opportunity to display the skills they have learned through daily training and compare their skills to the skills of others. We will continue training to develop creativity and innovation so as to be able to flexibly deal with a variety of circumstances.

Drone piloting training

Debris removal, road repair training

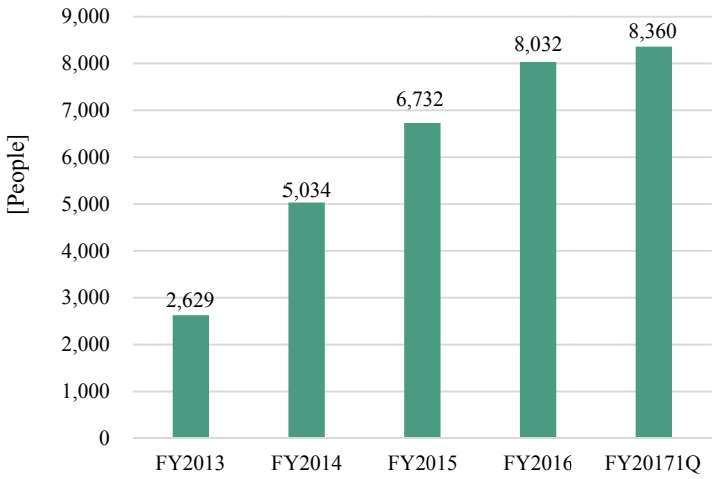
Pump bearing replacement training　　Motor replacement training

- Kashiwazaki-Kariwa

  In order to improve in-house technological capability and thereby prevent severe accidents from occurring, we are conducting various types of training such as on assembling and disassembling scaffolding, welding/cutting/grinding, gas turbine generator truck/power supply car operation, and duct repair. We're also making efforts to expand the scope of emergency response skills by newly commencing training on rope work, pipe repair, and using wire to lash down gas turbine generator trucks. We will continue to implement repetitive training to maintain and improve technical capability.

Training on setting up emergency lighting (left: assembly, right: completed assembly)

Rope work training　　Wire lashing training



Trends in the number of maintenance personnel participating in in-house training (Total for 1F, 2F, and KK)

- Operator initiatives
  - Fukushima Daiichi NPS

    Unit 5 and 6 operators have engaged in fire engine and power supply truck training since FY 2014. As of the end of June, 41 operators had been certified on the operation of fire engines thereby exceeding our 34-operator goal (80% of the 41 operators in the field) (fill-rate: 120%, no increase or decrease over FY2016Q4), and 41 operators had been certified on the operation of power supply cars (fill-rate: 120%, no increase or decrease over FY2016Q4). The priority for Unit 1-4 operators is to acquire skill in operation management, such as the use of contaminated water treatment equipment, and spent fuel common pool equipment, etc.
  - Fukushima Daini NPS

    Training on fire engines and power supply cars has commenced in FY2014. As of the end of June, 25 operators have been certified on the operation of

fire engines thereby meeting our 25-operator goal (80% of the 31 operators in the field) (Fill-rate: 100%, increase of five operators from FY2016Q4), and 31 operators had been certified on the operation of power supply cars (fill-rate: 124%, increase of four operators over FY2016Q4).

- Kashiwazaki-Kariwa

  Fire engine and power supply car operation training commenced during FY2013. As of the end of June, 111 operators have been certified on the operation of fire engines thereby exceeding our 104-operator goal (80% of the 130 operators in the field) (Fill-rate: 106%, decrease of five operators from FY2016Q4), and 120 operators had been certified on the operation of power supply cars (fill-rate: 115%, increase of seven operators over FY2016Q4). During power supply car training, in addition to the normal start-up of power supply cars, training was also implemented on manual switching in the event of an intake exhaust damper malfunction. Efforts have also been made to cultivate certified instructors within operator training teams and as of the end of June, 158 instructors (increase of eight operators from FY2016Q4) had been trained. Efforts are also being made to improve the ability of not only maintenance personnel but also operators to diagnose equipment troubles in conjunction with the increase in the number of operators that has occurred in order to handle emergencies. These operators have obtained internal certification on equipment diagnostics and are now continually sampling data for approximately 140 pieces of rotating equipment at Unit 7. This has led to an improvement in the abilities of field workers, such as the acquisition of a wide variety of knowledge related to equipment and also an increased interest in equipment status.

Initiatives to improve the in-house technical skill of operators (number of skill certifications)

Power Station	Fire Engine		Power Supply Truck	
	Number of skill certifications (compared with the last quarter)	Fill rate	Number of skill certifications (compared with the last quarter)	Fill rate
Fukushima Daiichi	41 people (0)	120%	41 people (0)	120%
Fukushima Daini	25 people (+5)	100%	31 people (+4)	124%
Kashiwazaki-Kariwa	111 people (-5)	106%	120 people (+7)	115%

(2) Initiatives to Improve the Technological Capability of the Organization

♦ Deliberation of the Establishment of a Nuclear Engineering Center

- By integrating the engineering functions of the Head Office and power stations to create a Nuclear Engineering Center under the direct supervision of the General Manager of the Nuclear Power & Plant Siting Division, we will be able to take responsibility for engineering work required to design and maintain plant functions thereby enabling us to make improvements.

The Main Roles of the Nuclear Engineering Center

Design	Establish a process for taking responsibility for the management of design by enhancing the company's ability to design as well as the ability to manage design work consigned to the companies
Plant Management	Enhance the process for managing plant systems and equipment and improve the reliability of equipment.
Procurement	Guarantee a high level of reliability of procured items by ascertaining the skill of suppliers, and establishing a process for receiving and guaranteeing procured items
Nuclear safety	Re-examine internal/external hazards and risks based upon the latest knowledge and establish a process for continually improving plant safety
Fuel management	Maximize the amount of energy that can be safely extracted from fuel, and handle the fuel and operate the plant so as not to damage fuel. Ensure that security measures for nuclear fuel material are in place.

♦ Cultivating system engineers

- In order to promptly and safely stabilize a reactor when there is an emergency, personnel need to quickly ascertain the circumstances of the accident and make accurate decisions. Therefore, engineers are being trained to be proficient in design, laws and regulations, standards, operation, maintenance and other areas pertaining to facilities important for safety.
- System engineers formulate system monitoring programs, which stipulate monitoring targets and standards for monitoring system performance degradation, in order to monitor whether or not primary plant systems are fulfilling design requirements. These monitoring activities also serve to identify areas in which reliability can be improved, which lead to overall improvements.
- During the first quarter, 18 systems subject to monitoring were continually monitored and events that can impact system integrity were identified/assessed. Through this process it was deemed that one of these systems must be carefully watched[20]. Whereas the required flow rate for this system is being maintained, flow rate can be reduced by the accumulation of sea creatures in the heat converter heat transfer pipe, therefore it was decided to quickly formulate an inspection plan while continuing monitoring.

[20] Reactor auxiliary cooling seawater system

- What we currently have five system engineers (Kashiwazaki-Kariwa). Going forward, we shall implement education and training to expand the scope of expertise of existing engineers and maintain their skills, while at the same time making preparations to open the Nuclear Engineering Center in order to train personnel and achieve our goal of having five system engineers for each reactor.

♦ Enhancing configuration management

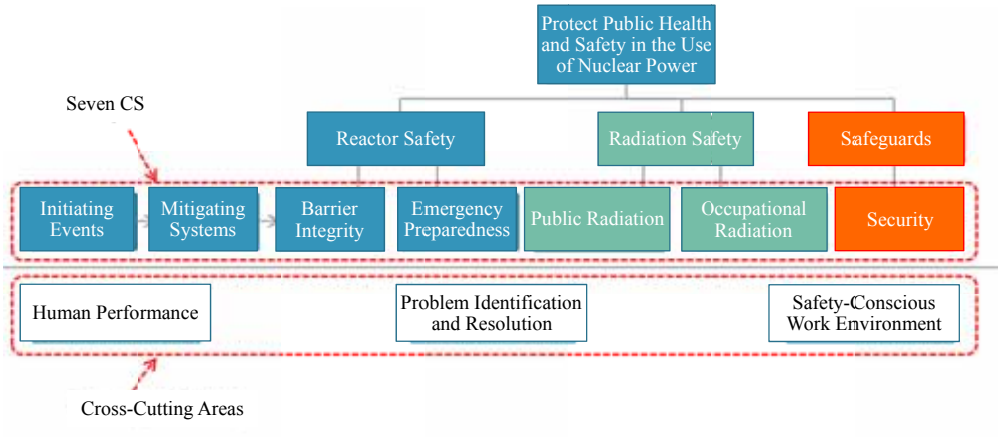
- Configuration management is a process for maintaining the safety of the plant and ensuring that power station equipment has been manufactured, installed, and is being operated as designed. Deliberations continue on constructing a systematic process for maintaining and managing a state in which design requirements, actual equipment, and equipment schematics all match.
- During the first quarter, a draft of the Design Guideline Creation and Management Guide (tentative title) was written based upon the original draft of the design guidelines written in FY2016 and the best practices of operators in the United States. Since there are three types of design guidelines for ① individual systems, ② individual structures/architectural structures, and ③ common specifications, the design guidelines will be written upon stipulating the scope of application and priorities. A draft of the ③ common specifications is being written using Core/Fuel Design as a pilot model.
- In the course of deliberating configuration management processes, the applicability of the processes is being examined by applying past cases to the management procedures that were created last fiscal year. Furthermore, the development of this system to operate these processes is underway and will be introduced in conjunction with establishment of the Nuclear Engineering Center.

♦ Handling revisions to the inspection system

- In the United States, the U.S. Nuclear Regulatory Commission's (NRC's) regulatory framework for reactor oversight (ROP[21]) is a risk-informed, tiered approach to assessing seven cornerstones (CS[22]) that comprise reactor safety, radiation safety, and safeguards, and three cross-cutting areas deeply related to the cultivation of safety culture. If the results of monitoring and inspections performed based upon this process reveal decreases in the performance of a nuclear operator, additional inspections are conducted in accordance with

[21] Reactor Oversight Process
[22] Corner Stones

imports level.



The three cross-cutting areas and seven cornerstones of ROP

- In Japan, inspections have been conducted by making subdivisions for equipment issues, and personnel issues, etc., but the Nuclear Regulatory Agency is planning to introduce monitoring and inspections that are conducted from the same comprehensive viewpoint as in the United States (to be introduced in FY2020).
- In preparation for this, nuclear operators plan to put such systems and trial operation during FY2018 and Kashiwazaki-Kariwa Unit 6/7 will be used as a pilot BWR plant.
- TEPCO will move steadily ahead with improvements made through CAP initiatives underway as well as improvements to configuration management and system monitoring as we strengthen the safety foundation of our plants and the organization as a whole.

2.8 KPI/PI Performance and Assessment

2.8.1 KPI/PI Performance

(1) KPI Performance (FY2017Q1)

KPI	Target	Performance	Notes
Safety awareness			
Safety awareness KPI (nuclear power leaders)	70 points	62.1 points	
Safety awareness KPI (entire Nuclear Power Division)	70 points	60.7 points	
Technological capability			
Technological capability KPI (in times of normalcy)	100 points	To be assessed at the end of the fiscal year	
Technological capability KPI (in times of emergency)	100 points	97 points	
Ability to promote dialogue			
Ability to promote dialogue KPI (internal)	70 points	65.3 points	
Ability to promote dialogue KPI (external)	Increase over last fiscal year	To be assessed at the end of the fiscal yea	

(2) PI Performance (FY2017Q1)

PI	Target	Performance	Notes
Safety awareness			
Nuclear power leaders			
<Safety-1> Rate of implementation of retrospection leveraging the traits	100%	81.4%	
<Safety-2> Number of times emails have been sent by nuclear power leaders in order to share information	At least once a week	11 times in 12 weeks (91.7%)	
<Safety-3> number of times nuclear power leaders participate in preparedness training	At least twice a year	3 times (46.2%)	
<Safety-4> Number of times nuclear power leaders go into the field (to engage in management observation or exchange opinions with workers)	At least twice a month	1.8 times/month	
<Safety-5> Number of benchmarked issues for which nuclear power leaders are responsible for putting into practice that have been put into practice	At least four a year	- To be measured from Q2	
Entire Nuclear Power Division			
<Safety-6> Percentage of groups that discuss the results of trait retrospection	100%	85.5%	
<Safety-7> percentage of messages from nuclear power leaders that are read immediately	At least 80%	75.1%	
<Safety-8> Number of times managers engage in management observation	Target values to be set by the	1F: 0.84 times 2F: 4.03 times	No. of times per person per month

PI	Target	Performance	Notes
	department	KK: 3.96 times Head Office: 0.20 times	
<Safety-9> Good MO rate (Percentage of reports that include things that PICO has pointed out as being good MO from MO results)	At least 50%	- To be measured from Q2	
<Safety-10> Percentage of corrective measures completed before deadline	100%	1F: 37% 2F: 33% KK: 61% Head Office: 60%	
<Safety-11> Number of recurring GII or higher nonconformances	0	1F: 5 2F: 0 KK: 0 Head Office: 0	Numbers for 2F are as of the end of May
Technological capability			
During times of normalcy			
<Engineering-1> Number of skilled workers trained in the Operations Department	At least 100% of the number required	To be assessed at the end of the fiscal year	
<Engineering-2> Number of skilled workers trained in the Maintenance Department	At least 100% of the number required	To be assessed at the end of the fiscal year	
<Engineering-3> Number of skilled workers trained in the Engineering Department	At least 100% of the number required	To be assessed at the end of the fiscal year	
<Engineering-4> Number of skilled workers trained in the Radiation and Chemistry Department	At least 100% of the number required	To be assessed at the end of the fiscal year	
<Engineering-5> Number of skilled workers trained in the Fuel Department	At least 100% of the number required	To be assessed at the end of the fiscal year	
<Engineering-6> Number of skilled workers trained in the Safety Department	At least 100% of the number required	To be assessed at the end of the fiscal year	
<Engineering-7> Number of personnel that have external certifications such as Licensed Reactor Engineer (LRE), Class 1 Chief Radiation Handler, Engineer (Nuclear and Radiation Dept.), etc.	Training objective achievement rate: 100%	To be assessed at the end of the fiscal year	
<Engineering-8> Participation rate in important OE training	At least 60% of managers	1F: 29% 2F: 46% KK: 63% Head Office: 22%	
<Engineering-9> View rate of newly arrived OE information	At least 75%	73%	
During times of emergency			
<Engineering-10> Number of emergency response personnel certified in-house on the operation of fire engines, power supply cars, cable connections, radiation surveys, wheel loaders, and unic trucks	At least 120% of the necessary number at each power station	120%*	

PI	Target	Performance	Notes
<Engineering-11> Percentage of "A" assessments given during emergency response training	At least 80%	75.5%	1F: 72.2% (7/11) 2F: 76.9% (10/13) KK: 76.9% (10/13)
Ability to promote dialogue			
Internal			
<Dialogue-1> Percentage of employees that feel that messages from nuclear power leaders are "helpful"	At least 50%	21.6%	
<Dialogue-2> Response rate to questionnaire on the information conveyed by nuclear power leaders	At least 70%	39.7%	Previously 35%
<Dialogue-3> Degree of understanding of information conveyed by nuclear power leaders	At least 2.5 points	2.4 points	Previously 2.4 points
External			
<Dialogue-4> Quality/quantity of disseminated information, questionnaire results	Increase over last fiscal year	To be assessed by the end of the fiscal year	
<Dialogue-5> Stance on, awareness of, public relations and public hearing	Increase over last fiscal year	To be assessed by the end of the fiscal year	

*Required numbers are being reexamined in light of the discrepancies between 1F, 2F and KK, and are therefore not included.

2.8.2 KPI/PI Assessment

Starting this fiscal year, nuclear safety reform KPI and PI values will be set and measured using the management indicators for each field of the Nuclear Power Division management model. Going forward, the trends of each KPI and PI will be monitored. During the assessment KPIs and PIs to date, KPIs and PIs have not only been assessed as being high or low, but also:

- 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 have been brought to fruition.

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

3. Status of Initiatives to Handle the Main Anti-Earthquake Problem

As result of TEPCO's failure to give adequate explanations and prepare sufficient inspection documents concerning the seismic resistance of the main anti-earthquake building during the course of New Regulatory Requirement compliance inspections for Kashiwazaki-Kariwa Units 6/7, we not only threw the inspections into a state of confusion but also caused concern amongst the residents of Niigata Prefecture and society as a whole.

TEPCO has investigated the causes of this problem, formulated countermeasures, and given reports to Niigata Prefecture (April 19) and at the 451st inspection meeting (March 9). The following is an update on the status[23] of each countermeasure.

3.1 Accelerating Nuclear Safety Reforms

- Enhancing corporate governance
  - In order to enhance corporate governance, we created a management model in June that includes a management model diagram and also gives the objectives, important success factors, and the achievement level indicators for each structural element. This management model will be further leveraged in departments by using it to revise work plans.
  - A fundamentals pamphlet has been created and distributed to all employees of the Nuclear Power Division. This fundamentals pamphlet is being referenced when engaging in management observation and giving instructions to subordinates.

- Human resource development
  - We currently have five system engineers that continually monitor 18 systems. Going forward, we shall implement education and training to expand the scope of expertise of existing engineers and maintain their skills, while at the same time making preparations to open the Nuclear Engineering Center in order to train personnel and achieve our goal of having five system engineers for each reactor.

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[23] Out of the countermeasures reported on during the 451st inspection meeting, those countermeasures with immediate impact (establishment of a regulatory response improvement team, assignment of project supervisors, etc.) have already been completed.

- Establishment of the Nuclear Engineering Center
  - We are planning the establishment of a Nuclear Engineering Center.
  - Deliberations on the development of existing training programs and the creation of new programs has commenced with a focus on plant engineering and design engineering.
- Strengthening configuration management
  - Drafting of the Design Guideline Creation and Management Guide (tentative title) was written based upon the original draft of the design guidelines (① individual systems, ② individual structures/architectural structures, and ③ common specifications) written in FY2016 and the best practices of operators in the United States.
  - In the course of deliberating configuration management processes, the applicability of the management procedures created in FY2016 is being examined and development of this system to operate these processes that will be introduced in conjunction with establishment of the Nuclear Engineering Center, is underway.
- Establishment of internal communications teams
  - Internal communications teams have been formed that the Head Office and at each power station. Each department team has shared information on the reasons for and the intentions of establishing these teams, such as the main anti-earthquake building problem, and has discussed problems faced by each department related to internal communication. As a result, common issues, such as the fact that information that traverses different departments and positions is not being accurately shared, and that employees have a tendency to not be concerned with work underway outside of their department, were identified and improvements are being made.

3.2 Improvement Measures to Respond to the Concerns Expressed by Residents of Niigata Prefecture

[Improvement measure ①] Sharing of information between Head Office inspection handling departments and communications departments (utilization of the newly established inspection plan review meetings)

- Since March 17, communications departments have participated in the daily inspection plan review meetings and inspection information sharing meetings held by the Head Office inspection handling departments in an ongoing effort to share information without delay.

[Improvement measure ②] Implementation of Public Hearing Activities at the Niigata Headquarters by Nuclear Power Division Executives

- In order to directly hear the concerns of the local community in regards to nuclear power and restore faith in TEPCO, since July, Nuclear Power Division managers have started participating in initiatives to visit homes in Kashiwazaki City and Kariwa Village, give explanations at communications booths set up at various locations within Niigata Prefecture, visit residents to hear their opinions, and participate in town hall meetings.

[Improvement measure ③] Reporting on communications initiatives related to Kashiwazaki-Kariwa at town hall meetings

- Reports on communications initiatives at the Kashiwazaki-Kariwa NPS are given and opinions elicited at the town hall meetings held on the first Wednesday of each month. At the town hall meeting held on July 5, a report was given on improvements made to materials that explain the seismic resistance of the Kashiwazaki-Kariwa main anti-earthquake building, and earthquake faults under the Kashiwazaki-Kariwa site to the residence of Niigata Prefecture, local government officials and opinion holders.

[Improvement measure ④] Further Improvements to the Details of Explanations given by TEPCO corporate communications (explaining events that have a social impact in easy-to-understand and timely manner)

- Parties handling inspections and corporate communications representatives participate in daily inspection plan review meetings and inspection information sharing meetings in order to identify those issues that may have a large social

impact and examine how to explain these issues in easy-to-understand and timely manner.

- In addition to giving a report to the mayor of Niigata Prefecture on our regrets and the improvement measures that have been formulated in regards to the Kashiwazaki-Kariwa main anti-earthquake building seismic resistance problem, we also ran a formal apology in the newspaper (April 21) and issued a second edition of the TEPCO News (newsletter distributed along with newspapers) (April 28) in order to quickly notify the residents of Niigata Prefecture.
- TEPCO has posted its opinion to the issues pointed out by the Kashiwazaki-Kariwa NPS Active Fault Problem Review Committee concerning earthquake faults under the Kashiwazaki-Kariwa site on the TEPCO website[24] (May 29). In conjunction with this, a special edition of the TEPCO News was also issued (June 20) in order to convey this information to as many Niigata Prefecture residents as possible.

[Improvement measure ⑤] Continual awareness reforms using information disclosure and communications problems that TEPCO has faced (for the Head Office Nuclear Power Division, Niigata Division and Kashiwazaki-Kariwa)

- Awareness reform training that uses incidents that have occurred at TEPCO in the past related to information disclosure and communications, such as the main anti-earthquake building problem, the drainage channel K problem, and the core meltdown issue, is being planned. This training is planned to start during the second quarter.

[Improvement measure ⑥] Enhancing communication between Niigata Prefecture, Kashiwazaki City and Kariwa Village (giving status updates on inspections as necessary/suitable)

- In light of improvement measures ① and ④, weekly information sharing meetings are being held between the Niigata headquarters and Kashiwazaki-Kariwa in order to identify important issues and examine the details of explanations given to the local government. Reports on the status inspections are also given to the governments of the siting communities. Furthermore, the Niigata Headquarters is also making preparations to develop a framework for disclosing information in a proactive and unified manner.

[24] http://www.tepco.co.jp/niigata/images/SIRYO_201705_01.pdf

Conclusion

During the first quarter of FY2017, we have seen the effects of the operation of subdrains and the land-side impermeable wall (ice wall) at Fukushima Daiichi in the form of a reduction in the amount of contaminated water generated to approximately 1/4 what it was. We have also moved forward with the removal of contaminants from, and purification of, highly concentrated contaminated water that has accumulated in the Unit 1-4 turbine building thereby helping to reduce risks. On June 16, we were finally able to submit the revised application to modify our installation permit in order to comply with the New Regulatory Requirements for Kashiwazaki-Kariwa NPS Units 6 and 7, which we submitted in September 2013, after the application was reviewed at more than 140 inspection meetings. Continuing forward the revised application will be subject to review and we will continue to carefully complete all procedures required.

On July 10, members of our new management team, such as Chairman Kawamura, President Kobayakawa and Nuclear Power & Plant Siting Division General Manager Makino, exchanged opinions with the Nuclear Regulation Authority. The Chairman and members of the committee commented that, “we have not seen any independent decision-making or prioritization when it comes to reducing risks associated with the decommissioning of the Fukushima Daiichi NPS.” Going forward we will continue to provide written responses to the committee, and receive guidance through field inspections and opinion exchanges. We will also make sure to give careful explanations to the residents of the siting community in effort to regain trust and ensure that our conviction to prioritize the local community does not falter.

Furthermore, in regards to the Nuclear Safety Reform Plan (Management Aspects), TEPCO will continue to prioritize the strengthening of governance throughout the entire organization and the development of human resources. It is also indispensable that we work together with contractors to cultivate safety culture in order to further improve the safety of our nuclear power stations. We will continue to develop communication by reaching out (corporate visits) to and exchanging opinions with contractors in light of the sheer diversity of contracting companies and contract workers.

Through our determination to, “**Keep the Fukushima Nuclear Accident firmly in mind; we should be safer today than we were yesterday, and safer tomorrow than today; we call for nuclear power plant operations that keeps creating unparalleled**

safety," TEPCO will continue to advance nuclear safety reforms while subjecting our organization to objective assessments by the Nuclear Reform Monitoring Committee.

We are more than happy to hear any comments or opinions you may have about these reforms. Visit our website[25] for more information.

End of Document

[25] https://www4.tepco.co.jp/ep/support/voice/form.html