NUCLEAR SAFETY REFORM PLAN

FY2017Q4 PROGRESS REPORT

TOKYO ELECTRIC POWER COMPANY HOLDINGS, INC.

MAY 16, 2018

TEPCO

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FOREWORD

I would like to offer my deepest apologies for the inconvenience and concern that the Fukushima Nuclear Accident and subsequent troubles have caused the siting community and society as a whole. We will continue to work as one in order to provide compensation quickly and smoothly, accelerate recovery efforts in Fukushima, move steadily forward with decommissioning, and ensure that nuclear safety is our first priority.

On March 29, 2013, TEPCO announced its Reassessment of the Fukushima Nuclear Accident and Nuclear Safety Reform Plan to implement nuclear safety reforms. The following is a report on the progress that we have made during the fourth quarter of FY2017 (January~March, 2017[1]).

Furthermore, in order to wholeheartedly respond to the wishes of the people of the Kashiwazaki-Kariwa region, and Niigata Prefecture, the Niigata Headquarters has created its "*Mamoru* (protect), *Sonaeru* (prepare), *Kotaeru* (respond) Action Plan" (hereinafter referred to as, "Action Plan") in order to convey our basic approach on becoming a company that is rooted in the community. We will operate the company from the perspective of the local community based upon the five tenants of the Action Plan: "*Improve safety*," "*Build management structures*," "*Assist with preparedness*," "*Contribute to the community*," and "*Listen and engage in dialogue*."

[1] All dates hereinafter refer to 2017 unless otherwise noted.

1 PROGRESS WITH SAFETY MEASURES AT NUCLEAR POWER STATIONS

1.1 PROGRESS OF REACTOR DECOMMISSIONING

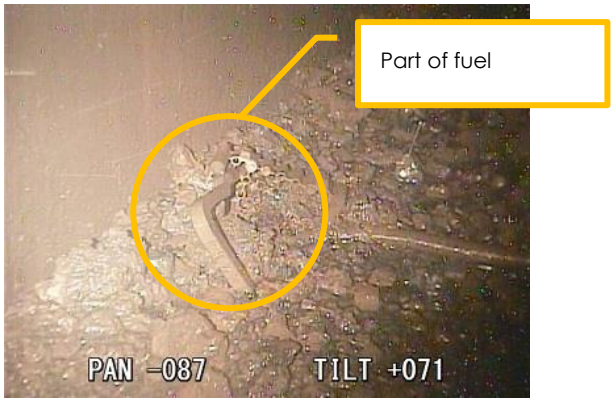
At Fukushima Daiichi, we are moving steadily and safely forward with decommissioning in accordance with the TEPCO Holdings, Inc. Mid-and-Long-Term Roadmap Towards Decommissioning of Fukushima Daiichi Nuclear Power Station Units 1 to 4 (September 26 revision).

(1) Fuel Debris Removal

In preparation for fuel debris removal we conducted investigations of the Unit 1-3 primary containment vessels (PCV) utilizing robots and muons. In preparation for fuel debris removal from the reactor prioritized for this process, we are examining removal methods based on a step-by-step approach that consists of removing the fuel in the open air and from the side. We shall start small and gradually enlarge the scope of operations in accordance with the Fuel Debris Removal Plan.

- Unit 2
  On January 19th we conducted an investigation of the inside of the pedestal where it is assumed that molten fuel debris fell. Compared with Units 1 and 3, the water level inside the primary containment vessel of Unit 2 is lower, so instead of using a submersible remotely operated vehicle (submersible ROV) the method of investigation consisted of inserting a camera-mounted survey unit through guide pipe that had been inserted into a PCV penetration seal. The extendable tip of the guide pipe was inserted into the pedestal and the camera-mounted survey unit was lowered down from this point. From this investigation we learned that a part of a fuel assembly, which is a reactor internal structure, had fallen and that the bottom of the pedestal was littered with pebble and clay-like deposits. The observed reactor internal structures are assumed to have fallen inside the pedestal after molten fuel ruptured the pressure vessel, and it is hypothesized that the deposits observed around the structures is fuel debris. Dose rate and temperature readings were also taken at four locations inside the pedestal. The temperature inside the pedestal is approximately 21°C and dose rates were between approximately 7~8Gy/h. the images obtained during this investigation shall be analyzed and dose rate/temperature data assessed in order to deliberate methods for fuel debris removal.

Camera-mounted survey unit



Observed reactor structures

(2) Removing fuel from spent fuel pools

◆ Unit 1

Since the construction of a wind break fence to prevent the dispersion of dust during the removal of rubble has been completed (December 19, 2017) the removal of rubble from the north side of the reactor building operating floor using a suction device began on January 22nd. In preparation for the removal of rubble from the south side of the operating floor (spent fuel pool side) the spent fuel pool will be protected in order to prevent rubble from falling into the spent fuel pool and damaging fuel. Before this is done, however, we will remove some of the surrounding steel frame to make it easier to work. We will continue to diligently assess risks and control dust as we proceed with this task in order to prevent the dispersion of radioactive substances and ensure that safety measures are implemented as we aim to begin fuel removal in FY2023.

Insertion of rubble suction equipment into Unit 1

◆ Unit 3

In preparation to remove fuel from the spent fuel pools we moved forward with the installation and adjustment of running rails and installed the fuel handling machine (November 12, 2017), crane (November 20, 2017) and all eight sections of the domed roof (February 23) following the construction of fuel handling machine girders and the work floor. The domed roof has dedicated receptacles that can be used to inject cooling water into the Unit 3 spent fuel pool from outside using concrete pump trucks in the event of an emergency. Now that the domed

roof has been completed, training on using concrete pump trucks to inject cooling water into the spent fuel pool was conducted on March 20th and it was confirmed that the series of operations to inject cooling water can be done quickly. Going forward we will enhance the skills of workers required to remove fuel and conduct training with real equipment on fuel handling and rubble removal as we aim to commence fuel removal during FY2018.

Completed domed roof for fuel removal

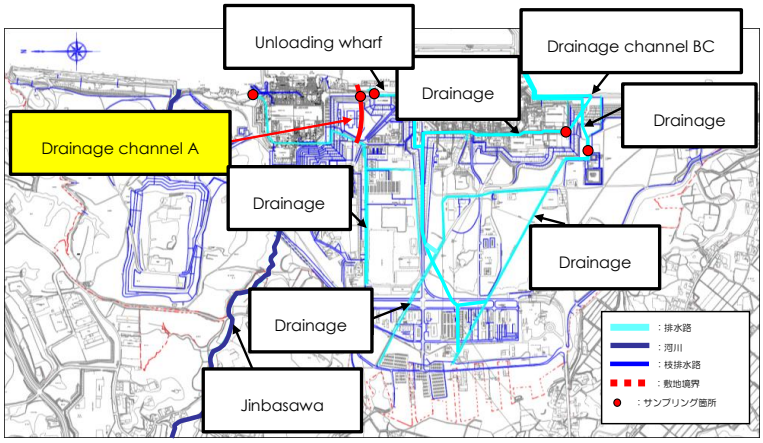
Unit 3 coolant injection receptacle

Concrete pump truck

(3) 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 continues 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.

- Replacing the section of drainage channel A that leads into the ocean
  The Fukushima Daiichi NPS site has drainage channels A, BC, K and the unloading wharf drainage channel, which were built prior to the Fukushima Nuclear Accident, as its major drainage channels. However, now that ALPS equipment is present upstream of drainage channel A we have diverted the channel outlet from the ocean to inside the port in consideration of the possible leak of contaminated water from the ALPS equipment. To accomplish this, we have newly built a 265m long extension that leads into the port. Construction began on November 21, 2016 and has been completed so the channel was opened on March 26th. The sampling point for drainage channel A was moved and drain water is sampled and analyzed everyday as before.



Drainage channel A location

Added extension to drainage channel A

(4) Initiatives to reduce exposure doses

According to the revised Mid-and-Long-Term Roadmap, radioactive substances that pose potential risks are to be prioritized and subject to optimal countermeasures in consideration of the conditions surrounding these substances. Based upon this approach, at Fukushima Daiichi, whether or not to implement a certain task is being decided upon by estimating the potential exposure dose before the work is implemented and also assessing increases/decreases in risk. Furthermore, in order to further reduce exposure doses, we have benchmarked with nuclear operators in the United States and introduced a remote monitoring system that enables the indirect exposure doses of workers, such as radiation control officers, to be reduced by remotely monitoring work tasks. This system is being proactively used inside reactor buildings and for work in high dose environments in the vicinity.

Furthermore, for use in highly radioactive areas we are using a multicopter[2] (RISER: Remote Intelligent Survey Equipment for Radiation) that can contribute to dose rate surveys performed to formulate work plans and to confirm the effect of dose reduction measures. This multicopter is also being used to perform dose rate surveys in locations where workers cannot access, such as high-dose areas and locations high off the ground. On February 27th we used to the multicopter to check conditions inside the Unit 3 reactor building that are difficult to access and learned that maximum dose rates on each floor are between 10~15mSv/h. We will continue to implement surveys in this manner in order to accumulate knowledge one piece at a time as we move steadily ahead with decommissioning.

[2] Drone mounted with a dose measurement device and device for displaying these readings in three dimensions.

Photo 1(Facing north from the 3rd floor opening)

Photo 3(Facing north from the 3rd floor opening)

Photo 5(Facing north on the 1st floor)

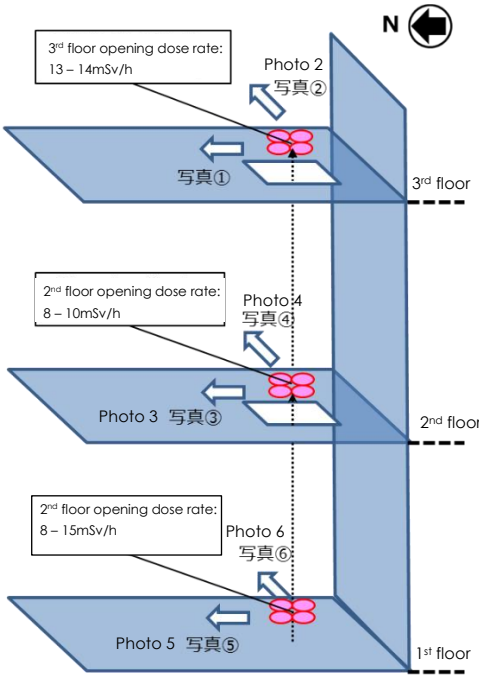
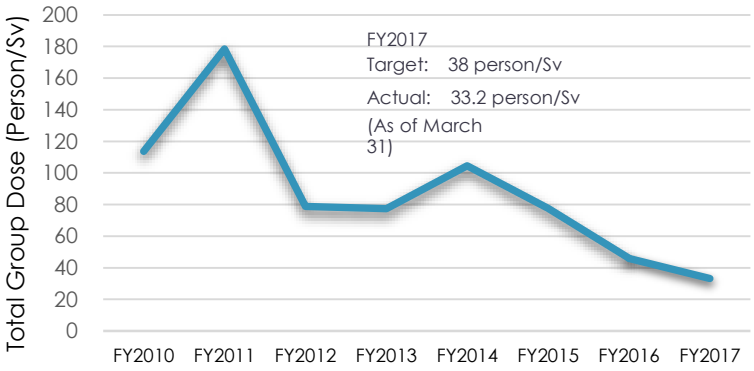


Photo 2(Facing east from the 3rd floor opening)

Photo 4(Facing east from the 2nd floor opening)

Photo 6(Facing east on the 1st floor)

Survey of the Unit 3 reactor building performed with the multicopter (RISER)



Annual trends in total group dose

1.2 PROGRESS OF SAFETY MEASURES AT KASHIWAZAKI-KARIWA

(1) Progress with safety measures

At Kashiwazaki-Kariwa, safety measures are being implemented with a focus on Units 6 and 7 based upon the lessons learned from the Fukushima Nuclear Accident.

<Progress with Safety Measure Renovations>

Safety Measures (※: Measures independently implemented by TEPCO		Unit 6	Unit 7
Preparations for tsunami and internal inundation	Tidal wall (seawall) construction	Completed	
	Installation of tidal walls for buildings (including flood barrier panels)	No openings below 15m above sea level	
	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
	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	Installation of filtered venting equipment (aboveground)	Underway	Underway
	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

Safety Measures (※: Measures independently implemented by TEPCO		Unit 6	Unit 7
PCV pressure and prevent a hydrogen explosion]	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	
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 in 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 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 (installation 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	

Safety measure progress that has been made during the fourth quarter is as follows:

◆ Enhancing residual heat/cooling functions

- High-Pressure Substitute Cooling System installation

In order to prevent core damage, a steam turbine-driven high-pressure substitute cooling system has been additionally added to the reactor core isolation cooling (RCIC) system, which is the existing high-pressure cooling system, in order to diversify reactor cooling equipment. Installation of the high-pressure substitute cooling system pumps has completed at both Unit 6 and Unit 7. At Unit 6, pipe and support installation, and cable laying his underway. At Unit 7, installation has been completed and trial operation using site steam has begun. At current time we are making improvements to equipment, such as improving the performance of steam drains, based upon the results of this trial operation.

◆ Enhancing seismic resistance

- Renovations to enhance seismic resistance

  In order to improve the seismic resistance and safety of equipment, pipes, and supports, etc., that have low seismic resistance, we are assessing the seismic resistance to standard seismic motion Ss of these components. Measures to improve seismic resistance (including measures for liquefaction) shall be implemented as necessary based upon the results of these seismic resistance assessments.

(2) Industry safety training center construction

We have gained much experience from responding to the Fukushima Nuclear Accident, the Niigata-ken Chuetsu-Oki Earthquake, equipment troubles and also worker accidents. In order to prevent this experience from fading with time we have newly built a industry safety training center in which workers can learn about and train for emergencies/accidents by actually experiencing these events under controlled conditions. The first floor of the industry safety training center (two-floor structure with a floor area of approximately 1700m²) is used for experiencing accidents under controlled conditions, and the second floor is an exhibit space used to teach about troubles.

The training floor is used to subject field workers to dangers under controlled conditions in order to give them the ability to recognize, predict, and avoid work-related risks. The exhibit space on the second floor employs movies, explanatory panel boards, actual pieces of equipment and models to teach the lessons learned from past accidents in order to cultivate safety awareness and prevent these accidents from happening again.

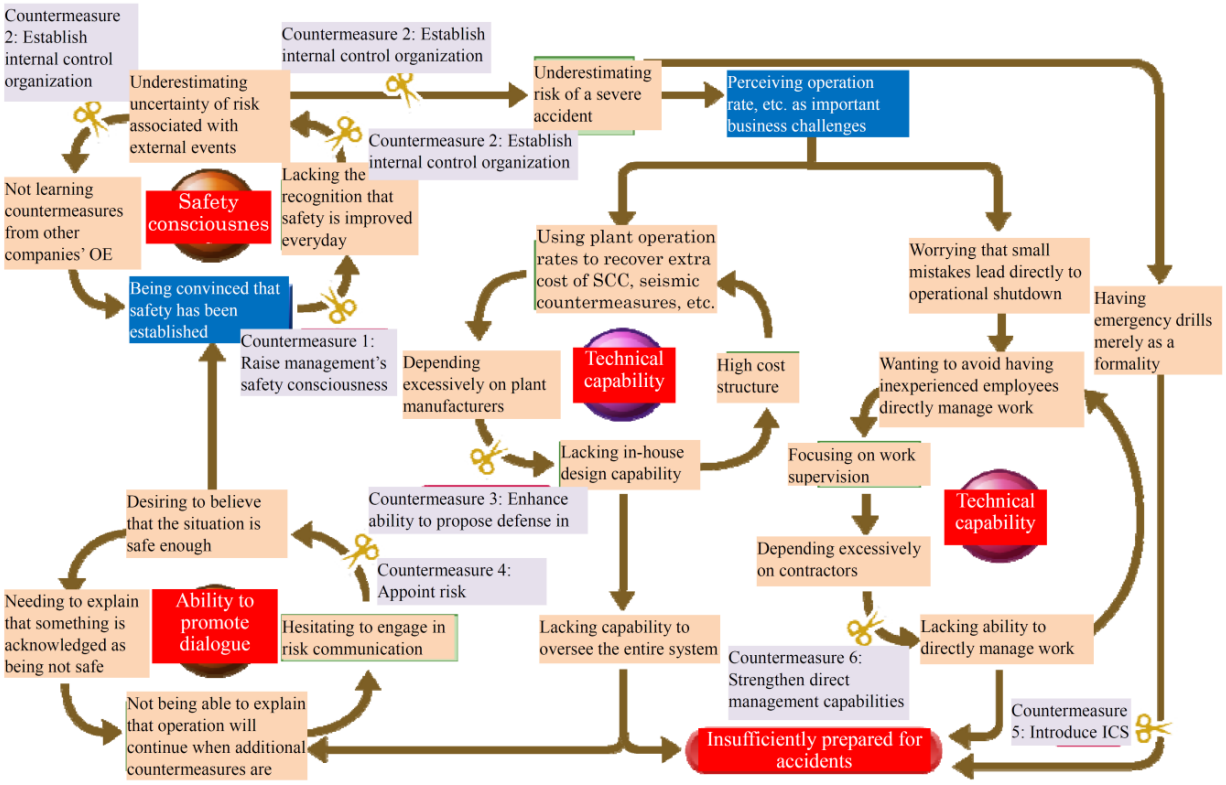

1st floor training center (Left: Training on predicting dangers when working in high places. Right: Workers experiencing hanging from safety belts)


2nd floor trouble exhibit space
(Right: Power distribution panel that caught on fire as a result of a short. Left: Part of a transform er that was damaged by the Niigata-ken Chuetsu-Oki Earthquake)

2 THE PROGRESS STATUS OF THE 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 FY2017Q1 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 Monitoring Committee" and the "progress of future initiatives."

2.1 INITIATIVES TO ENHANCE GOVERNANCE BY NUCLEAR 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). As a result of these initiatives we have created the Management Model and Fundamentals, and have achieved improvements in the quality of management observation, introduced the corrective action program (CAP) and further developed training programs.

The Management Model Project (Phase II) concluded in March 2018, but management reform initiatives will continue from FY2018 as part of CFAM[3]/SFAM[4] activities.

(1) Development and permeation of the management model

A management model was created to enable all employees in the Nuclear Power & Plant Siting Division to engage in their duties with a common understanding of the objectives of the division and each other's roles (June 22, 2017). The Management Model is being leveraged more and more throughout the organization with work plans being revised based upon it and nuclear leaders using the model to assess performance.

One of the compositional elements of the Management Model is "Fundamentals" which have been compiled to convey the ideal behaviors desired of each position that each individual should be aware of when engaging in their daily duties. CFAM/SFAM are revising the expressions of these Fundamentals to be more appropriate and adding fields for which Fundamentals should be created based upon how they have been leveraged to date.

Initiatives to enable the Fundamentals to permeate and take root are being implemented based upon the change management guide. More than 80% of the responses to a questionnaire about the Fundamentals implemented last October were positive, and it was confirmed that the Fundamentals are permeating and taking root, therefore the change management process concluded. Effectiveness assessments and

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[3] 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

[4] Site Functional Area Manager : CFAM counterpart at power stations

necessary revisions shall be completed by June 2018, which will mark a year since the creation of the Management Model.

(2) Improvement activities by CFAM/SFAM

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.

During the third quarter the areas to which CFAM/SFAM are assigned to keep consistent with the Management Model. Objectives to achieve during FY2018 and three years from now, and important factors for success, were formulated for each area, and measures to create detailed action plans for each area commenced. During the fourth quarter, these initiatives were reflected in midterm plans and in work plans for the next fiscal year, and performance indicators for each area were revised and further developed. From FY2018, CFAM/SFAM will spearhead activities to achieve the world's highest levels of safety in each functional area based upon this plan.

Furthermore, we also perform self-assessments of risk management, and analyzed common factors of human error.

- Self-assessments of risk management
  - Under the guidance of overseas experts, we compared TEPCO risk management procedures and processes with excellence in the nuclear power industry and followed up with those issues that have been pointed out in the past during third-party reviews.
  - As a result, areas for improvement in some risk management procedures and in the process for classifying/quantifying risk were identified, however strengths were also found, such as the fact that the power station is quite aware of risk management and human safety management during plant shutdown.
- Common factor analysis of human error
  - Since April 2016, performance improvement CFAM have been working together with representatives from operations, maintenance, and radiological protection, to perform a multifaceted common factor analysis of human error nonconformances that occurred at the Fukushima Daini NPS using standardized methods from the United States under the guidance of overseas experts.
  - As a result, it was discovered that human performance tools created to prevent human error are not being sufficiently leveraged nor have permeated through the organization sufficiently.
  - Therefore, we plan to repeatedly implement education and training on human performance tools, and provide similar education and training for contractors.

2.1.2 Initiatives Aimed at Developing Internal Communication

(1) Initiatives for promoting internal communication

Based upon the analysis of gaps between ideal states implemented during the third quarter, internal communication CFAM/SFAM are in the process of creating a mechanism that enables nuclear leaders to convey a consistent message with the aim of putting this mechanism into trial use in April.

Furthermore, the Headquarter communications team held a communications event for the purpose of creating an opportunity for employees in different departments to interact (February 26). Under the supervision of the TEPCO Research Institute, participants learned tips for engaging in smooth communication that involved learning about their own strengths and weaknesses, and about the communication styles of themselves and the people with whom they are communicating. A wide cross-section of employees, from nuclear leaders to new hires (approximately 30 people) participated. Participants commented that, "when communicating with people now I think not just about myself but also observe the actions and emotional responses of the person I'm communicating with," and expressed the desire to hold similar events in the future. During FY2018, more opportunities to interact shall be created in order to foster a climate in which everyone knows each other, what they do, and helps each other.

Communication event (HQ)

In addition, chatting spaces have been created to increase opportunities to exchange information and initiatives have been implemented in order to improve and strengthen communication, such as the briefing about the temporary injunction on the Ikata NPS, lectures by external experts, and a panel discussion about the 3.11 Fukushima Nuclear Accident. These initiatives will be continually developed as we gain more experience.

Chat space (HQ)

Briefing on the temporary injunction put on the Ikata NPS

At the Fukushima Daiichi, communication improvement programs were held during the third and fourth quarters. Retrospection was conducted in January for the third quarter. During the fourth quarter, a lecture and discussion about success cycle models was held on January 24th, a lecture and discussion on solving problems in the workplace was held on February 5th, dialogues with other companies were held on February 13th and retrospection was conducted in March. Participants commented that the events were useful and provide, "opportunities to reaffirm the necessity for communication skills." Programs will be revised and issues, such as the training of lectures, deliberated based upon the opinions of participants as we continue to implement such programs in the future.

Team discussion following the lecture

Dialogue with the Nakoso Thermal Power

Communication improvement program (Fukushima Daiichi)

Furthermore, in order to cultivate a sense of unity within the site sports competitions have been held with contracting companies to enable interaction that transcends the boundaries of departments and companies. In FY2018 more of these opportunities will be created since participants commented that the event gave them an opportunity to learn about each other.

At Fukushima Daini, internal communication teams and new hire motivation working team members continue to engage in their activities. During the group discussion that was held as part of retrospection on the March 11th Fukushima Nuclear Accident, all power

station personnel broke into 37 teams and talked about their thoughts and experiences. Food grown in the local area was incorporated into the cafeteria menu as part of communication activities that involve the region.

Looking back on the Fukushima Nuclear Accident (Group Discussion)

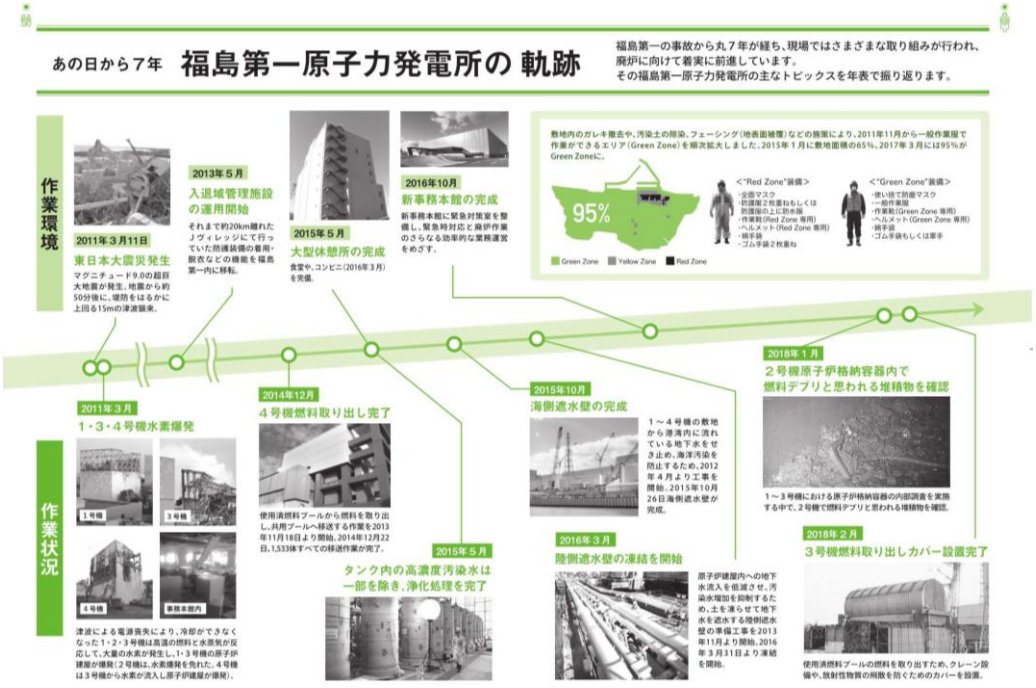
At Kashiwazaki-Kariwa, a discussion between the Nuclear Power & Plant Siting Division General Manager and power station personnel (approx. 50 people) was held to discuss mainly how to prevent regret about, and lessons learned from, the Fukushima Daiichi Nuclear Power Station accident from fading, and how to improve nuclear safety. The purpose of this dialogue was to utilize face-to-face communication in order to convey the thoughts and sense of values of nuclear leaders to power station personnel, and directly hear from power station personnel about their concerns and worries in order to provide assistance with finding a solution. Meetings such as these will be held periodically every year.

(2) Using in-house media to share information on nuclear power

In-house media is being used as follows to share information amongst core operating company employees.

- Company intranet videos
  - "Fukushima Daiichi Safety Rally" (Held on January 18, video uploaded on February 8)
  - "Decommissioning Promotion Strategy Forum" (Held on January 26, video uploaded on February 13)
  - "Fukushima Daini Preparedness Training" (Held on February 2, video uploaded on February 21)
  - "Lecture by Chief Nuclear Engineer Anegawa entitled 'Reflecting upon and Learning from the Fukushima Daiichi Accident'" (Given on February 23, video uploaded on March 11)
  - "Silent prayers and words from President Kobayakawa and Fukushima Recovery HQ President Okura on March 11" (Video uploaded on March 11)
  - Explanation of news coverage about TEPCO (4Q videos: 1)

◆ TEPCO Group News Letter
- Using automated EV buses at the Fukushima Daiichi site (distributed on January 29)
- Progress of the last seven years of initiatives aimed at the decommissioning of Fukushima Daiichi (distributed on March 28)



Group News Letter (Progress of the last seven years of initiatives)

(3) Enhancing the sharing of information on important tasks in the Nuclear Power Division

Since July 2016, site superintendents and Headquarter 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. Results from electronic questionnaires designed to gather opinions about the messages that were conveyed and also confirm the level of understanding[5] of these messages and whether or not they were received, show that during the fourth quarter response rate was 55.5% (target: over 70%), and the level of understanding was 2.4 points (target: more than 2.5 points). Response rate increased by +3.9 points and the level of understanding increased by +0.07 points over the third quarter showing continued increases for both categories since the first quarter.

Furthermore, in regards to sharing information, during FY2018, methods for conveying messages and performance indicators (PI) shall be revised in order to match them with actions implemented based upon the results of gap analysis by internal communication CFAM.

[5] Assessed on a four-step scale ranging from "well understood" to "not understood at all"

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. During the fourth quarter we continued to engage in dialogue with contractors (February 1, 9). During these dialogues we conveyed to contractors that performing work of high-quality leads to nuclear safety.

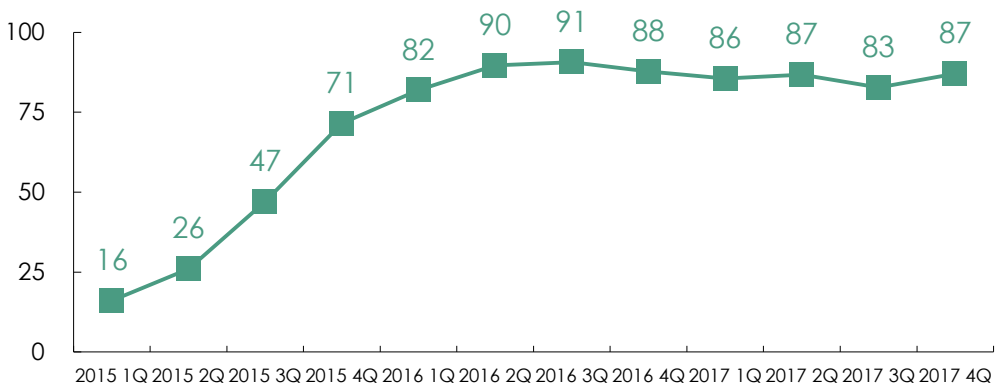
During FY2017, TEPCO's Nuclear Safety Culture Cultivation Secretariat focused its attention on dialogue with contracting company headquarters and workers at factories from which products are procured. And, at power stations, superintendents and other executives engaged in dialogue with companies on-site in order to prevent human error. During FY2018 we will further reach out to those workers on the front lines at nuclear power stations.

Dialogue with contractors about nuclear safety culture (February 9)

(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 an effort to improve safety awareness.

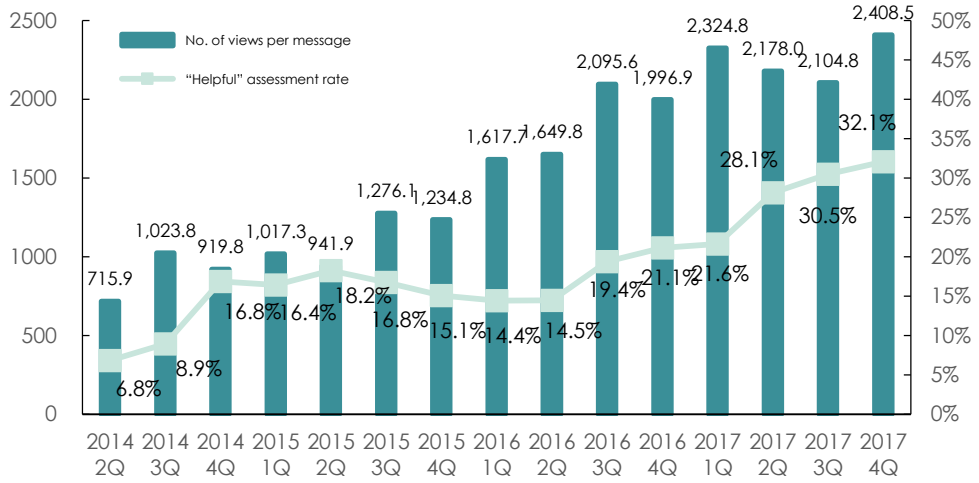
The rate of self-retrospection during the fourth quarter was approximately 93% (-1 point compared with FY2017Q3) and efforts will continue to ensure that this activity is engaged in. The implementation rate of group discussions, which are used to share the results of individual self-retrospection, learn from each other, and take notice of new issues, was 87.0% (+4 points compared to FY2017Q3). During FY2018, we will improve this mechanism so that group discussion will enable things noticed to evolve into improvements in behavior.



2.2.2 Other initiatives

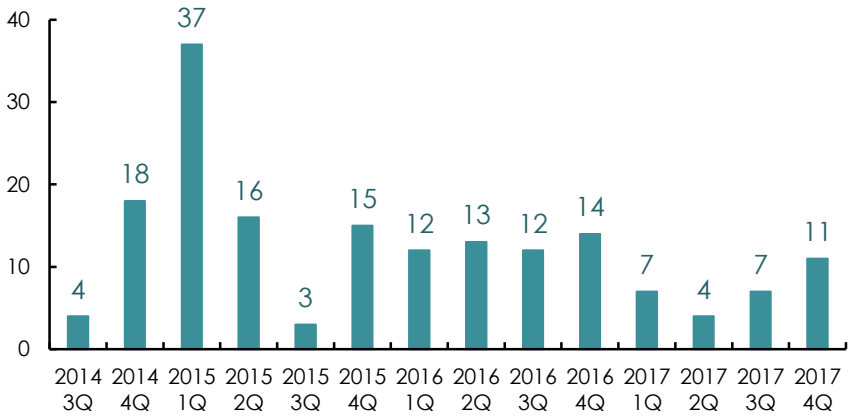
(1) Increase Safety Awareness throughout the Entire Organization and Management

- ◆ Direct dialogue between nuclear leaders
  - Since the fourth quarter of FY2015, nuclear 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. As part of this initiative, every month a review meeting attended by HQ leaders is held to discuss improvements and measures to solve problems in an effort to improve power station performance. During this fiscal year the Nuclear Power & Plant Siting Division General Manager and other HQ general managers attended almost every review meeting held at Kashiwazaki-Kariwa and Fukushima Daini, and engaged in discussions.
- ◆ Messages from nuclear leaders
  - In order to promote nuclear safety reforms, nuclear 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 leaders are leveraging video messages, intranet messages, email, meetings and morning briefings as opportunities to convey their expectations.
  - The following graph shows the number of times that messages by nuclear leaders have been read by employees via the intranet.



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

- During the fourth quarter, the number of employees that read each message was approximately 2,400, and the percentage of these people that felt that the messages were "helpful" rose to 32.1%. During the next fiscal year nuclear leaders will continue to send messages that "sink in."
- 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 and this initiative is being continued by the new Nuclear Power & Plant Siting Division General Manager who was appointed in June last year.



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

◆ 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 & 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 & Plant Siting Division and the president of the Fukushima Daiichi Decontamination & Decommissioning Engineering Company

Period	HQ	1F	2F	KK
FY2015	24(2)	47	19	24
FY2016	25(1)	19	14	25
FY2017				
Q1	4(1)	2	4	10
Q2	4	0	4	4
Q3	6	1	3	2
Q4	7(1)	2	4	6
FY2017 total	21(2)	5	15	22

(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 (core meltdown issue countermeasures)
  - 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 FY2017.

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

- ◆ Safety Steering Council[6]
  - At the 6th Safety Steering Council a discussion was held on the topic of "self-assessments of safety culture by Headquarter general managers and site superintendent/architectural superintendents, and the FY2018 safety culture cultivation action plan." (March 6).
  - In the self-assessment by Headquarter nuclear leaders, "communication" was chosen across the board as a strength of each department from amongst the 10 Traits. On the other hand, leadership was identified across the board as a weakness of each department.
  - In regards to FY2018 safety culture cultivation activities, in addition to continuing the initiatives from this fiscal year the decision has also been made to have nuclear leaders participate in group discussions (something that has been done voluntarily in some departments) throughout the entire Nuclear

[6] The Council is comprised of the Nuclear Power & Plant Siting Division General Manager, FDEC President, the Head of the Nuclear Safety Oversight Office and other HQ general managers

Power Division in light of discussions of the results of the self-assessment by nuclear leaders.

- Assessing the status of nuclear safety culture
  - During FY2017, we have been assessing the state of safety culture at the Fukushima Daiichi NPS in cooperation with the field diagnostic initiatives conducted by the Japan Nuclear Safety Institute (JANSI).
  - By leveraging the interviews conducted by JANSI in order to assess the status of safety culture at Fukushima Daiichi we learned that many workers feel that out of the 10 Traits of safety culture, "*identifying and resolving problems*," and "*education and training*" are weak for such comments as, "*considering the fact that similar troubles keep occurring it feels like we aren't sufficiently ascertaining the causes*," and, "*in regards to new skills, at current time these skills are only passed on when needed, so the efforts are half measures*."
  - Based on the results of this status assessment during FY2018 nonconformance management processes will be improved and efforts made to reduce nonconformances.
- Sharing information on nuclear safety improvement initiatives
  - During the 14th meeting of the Nuclear Power Subcommittee of the Electricity and Gas Industry Committee of the Advisory Committee for Natural Resources and Energy[7] a discussion was held about "voluntary efforts in the nuclear power industry to improve safety."
  - During this discussion, Nuclear Safety Oversight Office (NSOO) General Manager Dr. John Crofts (head of nuclear safety oversight) gave a lecture entitled "*Self-Motivated Nuclear Safety Improvement*." Dr. Crofts emphasized that, "*if executives don't promote safety improvements, no one else will lift a finger*," and stressed the importance of the role of leaders will also explaining TEPCO's nuclear safety reforms and the function and role of the Nuclear Safety Oversight Office.

[7] http://www.meti.go.jp/committee/sougouenergy/denkijigyou/genshiryoku/014_haifu.html

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) Oversight activities by the Nuclear Safety Oversight Office

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 fourth quarter that were reported to the executive officer committee on April 25th and the Board of Directors on April 26th.

NSOO Quarterly Report
Nuclear Safety Oversight Office (NSOO) Quarterly Report
2017 Quarter 4 Report

Foreword

This report summarises the Nuclear Safety Oversight Office (NSOO) assessment results for 2017, Quarter 4 (January through March). 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.

1. Safety Performance

Reports of NSOO assessment teams and the Senior Reactor Engineers (SRE) on site continue to indicate steady improvement in safety in many areas.

1.1 Fukushima Daiichi

The evaluation team has the following results in the observation under themes of operational management and design management.

- Start of voluntary improvement on work management

Recently there were several non-conformances due to insufficient coordination between Operations Department and Maintenance/Construction Work Department such as poor sharing of work risk information. The 1F site established a structure to solve these issues in February, embarking on reviewing the whole business process relating to work management. NSOO will evaluate the voluntary initiatives for improvement and continuously monitor the effectiveness of the actions once implemented

- Rigorous management of organizational change

  During the observation of the status of coordination between Operations Department and Maintenance/Construction Work Department, NSOO confirmed that some departments do not strike a good balance between work volume and responsible personnel as a result of reorganization last November. Although FDEC grasped issues of the reorganization with the effectiveness review, the issues have not been adequately addressed yet. The site should implement its change management in an effective manner.

- Strengthening design management of temporary structures

  The decommissioning work of Fukushima Daiichi has a uniqueness in that even temporary facilities may have safety important functions. NSOO confirmed cases where there was an ambiguity in the judgment whether temporary facilities are in the scope of design management or not. The site should pay attention to avert or mitigate risks caused from temporary facilities, so that all facilities are controlled at a proper design management level.

SREs developed an observation result table for bthe site executives. They focused on the following items in particular:

- Thorough non-conformance management

There were some examples of poor non-conformance management; delayed development of corrective action plans and failure to report to the regulators. Nonconformance management is a fundamental process to improve nuclear safety so that its steady implementation should be reinforced again.

- Review of items necessary to secure safety of Units 5-6

  After 7 years from the Fukushima accident, it is time to fundamentally review and redefine items necessary to ensure safety of Units 5-6. The assumptions for Units 5-6 right after the accident have been changed, (e.g. the progress of cooling of the spent fuels). It is important to update the implementation plan by augmenting necessary items to maintain the safety or deleting others that are no longer mandatory.

1.2 Fukushima Daini

The evaluation team observed the status of continuous improvement of emergency trainings as follows.

- Using lessons from past trainings to improve further

  To raise the site's capabilities to respond to emergency, improvement has been progressed in a series of training exercises with demanding scenarios. Deputies have been trained to broaden the skills base and information sharing tools have been improved. However, NSOO confirmed that some of the lessons are repetitively raised in the exercise critiques. The site should establish a process to extract and utilize lessons learned from their training (goal setting, extract issues and share them, and develop countermeasures) as a "mechanism" for continuous improvement. It also should clarify action owners who are responsible to ensure implementation of the measures.

The site SREs have prepared for the site management a matrix of detailed performance evaluation in each of the functional areas. In particular they highlight:

・Maintenance management

An air leak occurred from the radiation control zone to the non-control zone at the inspection door of Unit 2 MCR ventilation room. The underlying causes were 1) lack of awareness to safety important components that are in the boundary of radioactive control, 2) poor risk management over the inspection work for the ventilation duct, and 3) lack of understanding of regulations and Tech Specs. The site should train the personnel about nuclear/radiation/environmental safety, strengthen barriers as the organization against risks, and also involve the responsible senior managers in the work at each phase from planning to actual installment.

1.3 Kashiwazaki Kariwa

The KK Evaluation team observed progress control of safety enhancement for Units 6-7, emergency preparedness and enhancement of operators' capabilities to respond to emergencies. The oversight observation is summarized as follows.

・Thorough management of design changes for Units 6-7

On safety measures of Units 6-7, a lot of engineering work is progressing from the basic design to the detail design. During the work, people should be particularly careful for cases where a single area or facility have to meet multiple safety requirements like fire protection, internal flooding and accessibility. When a design change is required, the impact on all the safety aspects should be reviewed at an early stage of the consideration. NSOO is encouraging the responsible group to strengthen their assurance on this matter.

・Strengthen the function to send emergency information to external stakeholders

To strengthen the emergency preparedness, emergency trainings have been regularly conducted and the activities are proactive to raise competence of the emergency personnel. However, there is room for improvement in the coordination between the site and the HQ concerning sending information to external

stakeholders. When they share information, they should also state the background, including; rationale of strategy or tactics the site selected or interpretation and anticipation of the trend of reading values of instruments. This will ensure HQ's emergency response to provide support to the general public for their prompt evacuation and smooth collaboration with the NRA.

・Strengthen coordination between HQ and the site to improve the Operations Department

To create a station led by the Operations department in the field, the department rolls out good initiatives, especially being active to improve behaviors of the operating staff during emergencies. However, instructions to the operators sometimes are understood differently between the HQ and the site, indicating that the governance is not effectively functioning. The HQ and the site should progress improvement measures with a common understanding to ensure the permeation to the operators.

The site SREs have prepared for the site management a matrix of detailed performance evaluation in each of the functional areas. In particular they highlight:

・Management and Governance

While fulfilling their own missions, departments are more and more coordinated in the task-force team, so that the site-wide activities have become more harmonized. Having said that, there remains such challenges as follows:

-To prevent recurrence of nonconformance events, it is necessary to establish a mechanism to regularly review past events and actions so as to permeate important "lessons learned" in the site.

-The site's actual events should be source of the data when near-miss events are utilized so that any people in the site can understand the value added.

-When responding to issues, managers should be mindful at an early stage that their attempt to promote cross-functional communication among groups should reflect

purpose of their operations (They need to break walls between organizations.) On the other hand, when managers are set to cascade their instructions down to the front line personnel, they should carefully convey their message to ensure that their intention and main problem-awareness would not be diluted in the middle. (They have to strengthen governance of their own organization)

・Passion to nurture human resources

The HR Development Center and site line departments should turn the PDCA of talent development from the viewpoint that how far individual personnel have actually gained their competence, instead of just arranging formalistic programs which was often seen in the past.

・Emphasis on risk management

The site has focused on extracting nuclear risks hidden in the fields and share the information among the site since last November. The initiative is widely accepted among GM and members, as it has risen their risk awareness. Going forward, the site should have more engagement of senior managements, regular check of the status of operation, and sophistication of risk management activities so that more personnel, not limiting to highly specialised people, will attain the capability to detect risks in a voluntary and continuous manner.

1.4 Corporate

As a part of the initiative to raise NSOO's oversight ability, the evaluation team received guidance of Dr. Dahlgren, former IAEA Industrial Psychology expert, and learned the following:

・In addition observing gaps, it is necessary to perform an analysis of organizational factors with help of experts to gain deep understandings and findings about possible areas for improvement of nuclear safety.

・It is necessary to standardize and utilize "a list of organizational factors" (which was tentatively developed this time) to categorize interpretations of findings or viewpoints employed when analyses was conducted.

NSOO will aim to increase their skill to provide high quality findings and proposals by recognizing organizational factors in the future oversight observations. We will improve and use the list of organizational factors

Footnote to Section 1

NSOO reiterates that all these and other detailed observations have been discussed with line managers and actions for improvement are already taken in many areas.

2. CNSO Insights from Assessments

Nuclear safety continues to improve across the whole range of topics, although improvements are still needed in every field on our journey to excellence. The continuing improvements in leadership are strong motivators for these improvements.
Efficiency and cost cutting are very necessary. However they continue to represent the biggest potential threat to nuclear safety standards in TEPCO.
At this end of year report I will highlight the continuing need to improve Governance in order to maintain and improve nuclear safety and to maintain the balance between safety and efficiency.

2.1 Governance

Good Governance requires;

・Clear expectations and priorities.

・The resource, competence and tools to respond.

・The processes to manage, control and monitor the work, the technical performance and the effectiveness.

Without strong governance;

・Managers' expectations are not met.

・Priorities and responsibilities are not clear.

・Staff become overburdened, confused and demoralized.

・Safety problems result.

I encourage all mangers to strengthen their focus on governance issues this coming year.

In particular I will highlight the following issues relating to Governance from the recent oversight observations;

2.2 Staffing Vulnerabilities

Despite previous comments I still see potential safety issues resulting from staff rotation. As we rely more and more on the technical skills and knowledge of our teams we need to more carefully manage the annual staff rotation so that we do not jeopardize our competence to do safe work.
In addition succession planning is required for safety important posts vulnerable to resignation.
Leadership must pay close attention to the imminent staff rotation ensuring they maintain the necessary technical competence.

2.3 Processes and Process Management

Having robust processes and mandating compliance to them is necessary for good safety. In the new more technically demanding world of TEPCO some of our processes important to safety are immature and weak.
In the coming year senior management, and in particular the CFAMs, need to have a renewed focus on ensuring our processes are robust and mandating compliance.

2.4 Learning

Whereas learning from others and ourselves has improved markedly over the last few years, the introduction and use of the Corrective Action Plan (CAP) process is proving

difficult and slow. This process is fundamental to learning which is fundamental to improving our safety.

Corporate and Site leadership need to pay close attention to CAP. They must assess the process to make it fit for TEPCO's purpose, identify and fix the problems and then mandate compliance to the resultant process.

2.5 Management of Organizational Change

Management of Change in general continues to be weak with no process and only weak guidance, particularly on identifying risks associated with the change. But in particular this quarter I see weaknesses in the Management of Organizational Changes.

The creation of the Nuclear Power Company must be managed by a robust risk based process to protect the nuclear safety standards.

2.5.1 Design basis for Organizational Change

When managing any change of equipment, plant or organization, it is important to know the current design and the design basis.

A proper description of the current management structure and responsibilities, the design basis and the staffing and competence requirements (Safety Management Prospectus / Nuclear Baseline) are needed in order to properly assess and manage organizational changes.

2.5.2 Prominence of Nuclear safety in Organizational Change

To maintain the importance of nuclear safety in the face of efficiency and cost measures, the Nuclear Power Company has created the position of Vice President for Nuclear Safety.

The new CDO should consider appointing a Vice President for Safety in the Decommissioning Business.

3. NSOO Performance – Closure of NSOO Recommendations

The line continued to demonstrate good performance in closing NSOO recommendations: unmodified

- Of the 152 recommendations raised prior to this quarter, 125 are closed. 8 actions closed this quarter.
- In this quarter 6 new recommendations were raised.

4. Benchmarking and Training

NSOO received guidance on the following point from a former inspector of the UK regulatory authority.

- When an operator conducts reorganization, restructuring and outsourcing, there is an increasing chance to affect the nuclear safety by losing competence of people who execute safety important activities, or to lose knowledge and skills of the entire company in specific fields. As an intelligent customer*, it is particularly crucial for an organization to define a nuclear baseline** and a change management process for the organization.

*Note: Intelligent customers are operators who recognize what are important in terms of the nuclear safety and have ability to identify requirements, supervise works, and perform technical reviews on deliverables and installment of works as an organization.

**Note* A Nuclear Baseline defines the necessary staff structure, particularly of safety related staff, and the number of personnel and their competence requirements.

End of document

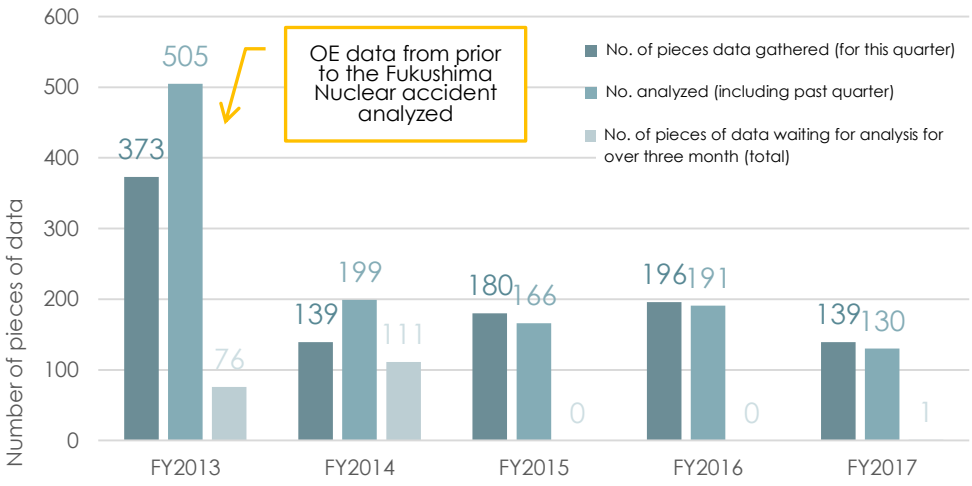
2.4 MEASURE 3 ABILITY TO PROPOSE DEFENCE IN DEPTH MEASURES

2.4.1 Initiatives Related to Nuclear Reform Monitoring Committee Proposals

(1) Leveraging operating experience (OE[8]) 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 Division to leverage this information.
- During the fourth quarter, 40 pieces of new OE information were gathered and 25 pieces of OE information, that include information gathered in the past, were analyzed. There was one piece of OE data that has been waiting to be analyzed for more than three months, so this will be completed during FY2018Q1.



OE data gathering and analysis performance trends

- 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 and the viewing rate of new OE information during the third quarter for the entire Nuclear Power Division was 61%.

[8] Operating Experience

- SOER[9] and severe accident information study sessions
  - Focused study sessions on OE information of particular significance[10] (severe accidents from both within and outside of Japan and SOER) are being held to provide an overview of these accidents and troubles, and understand the lessons learned from them.
    - During the fourth quarter, Chief Nuclear Engineer Anegawa taught a course on "The Lessons Learned from the Fukushima Nuclear Accident" (February 23). The lecture was videotaped so that all personnel in the Nuclear Power Division, including general workers, could watch it. This video will continue to be used in the future.

The Lessons Learned from the Fukushima Nuclear Accident lecture (HQ)

    - Overview study sessions using the current SOER continue to be held for all employees in the Nuclear Power Division, including general workers, in order to promote understanding of significant OE information over a wider cross-section of personnel. At Kashiwazaki-Kariwa, lectures were held on the organizational factors that contributed to the Davis-Besse NPS reactor head corrosion incident in the US (March 19, March 23). The same lectures will be given at Fukushima Daiichi and Fukushima Daini.

(2) Promoting improvements through CAP[11]

- 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, third-party review results, near-miss information, etc.), in a unified manner.
  - At Kashiwazaki-Kariwa, we provided focused trading on the details of CAP to each department's performance improvement coordinator (PICO [12]) (February 21, March 19, March 29). During this training, TEPCO performance improvement CFAM gave training is important basic knowledge such as the history and objective of CAP, and attributes of excellent CAP.

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[9] Significant Operating Experience Report by WANO

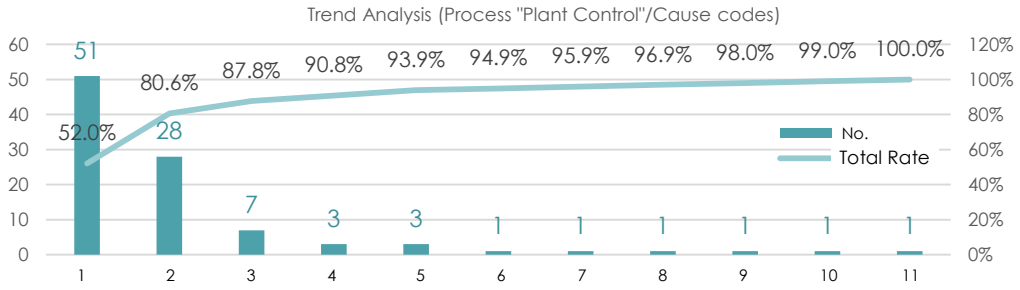
[10] 22 accidents and troubles including the cable fire at the Browns Ferry Nuclear Power Plant

[11] Corrective Action Program (performance improvement program)

[12] Performance Improvement COordinator

CAP training for PICO (Kashiwazaki-Kariwa)

- Performance improvement training for power station upper managers was held at Kashiwazaki-Kariwa (March 30). During this training participants learned about the objective and merits of the performance improvement field and were given an overview of major processes such as CAP, OE, self-assessments, and management observation (MO).
- During the fourth quarter PICO in each power station department attempted to analyze data. In particular, they began to analyze condition reports (CR), which are pieces of information about symptom levels prior to the occurrence of an event, and MO results.



1. Lack of attention to small areas
2. Insufficient application of appropriate skills or knowledge
3. Bored/Lack of attention
4. Insufficient questioning attitude/Inability to stop when uncertain
5. Lack of looking at the big picture, narrow-sighted, lack of attention to surrounding conditions
6. Insufficient house-keeping
7. (Blanc)
8. Inappropriate or lack of use of protective equipment
9. Insufficient or failure to implement pre-work briefings
10. Incorrect assumptions about situation or incorrect way of thinking
11. Failure to give notice when work has begun/concluded

Example of analysis of information from CR (Kashiwazaki-Kariwa)

- From the first quarter of FY2018, PICO's from each the power station department shall spearhead activities to identify and correct common weaknesses through this analysis.

◆ 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.

- Initiatives to manage the scale of those that engage in MO began during the fourth quarter, as well as the awarding of "black belts" to those management observers that have achieved a certain level of skill.
- Management observation implemented during the fourth quarter is as follows:

	HQ	1F	2F	KK
No. of times implemented	22	218	864	1,838
No. of times per person/month	0.17times/month/person	0.52times/month/person	4.24times/month/person	6.07times/month/person
Good MO rate	–	–	51%	59%

2.4.2 Other Initiatives

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

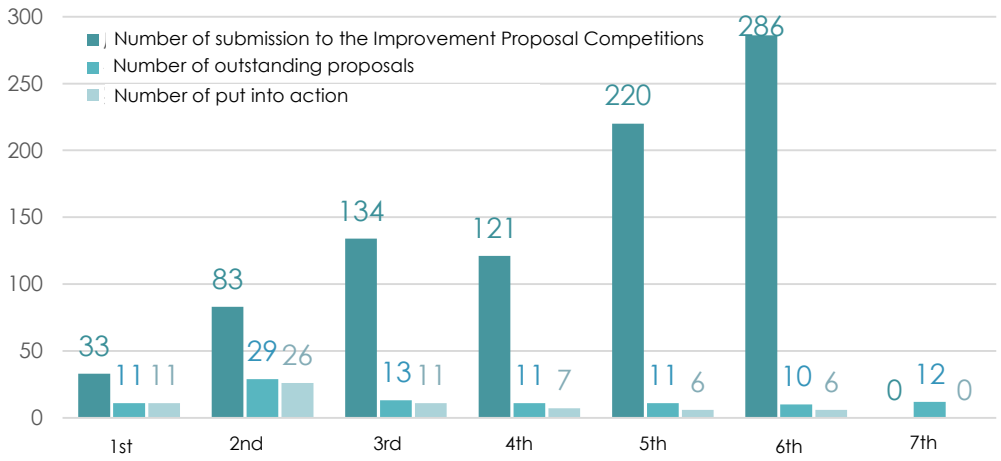
TEPCO has been holding Safety Improvement Proposal Competitions so that personnel may, in addition to conducting multi-faceted reviews from the perspective of defence in depth, acquire the technical ability to propose cost-effective safety measures and have these proposals put promptly into practice.

- During past competitions (3rd competition and after) outstanding proposals were selected by vote and also by a panel of judges, and the number of outstanding proposals selected was set at a maximum of approximately three for each power station because the focus was putting these proposals into practice. However, as a result of this, it is possible that there may be outstanding proposals that could contribute to improving nuclear safety lying in wait in the approximate 900 proposals that were not selected in the past. Therefore, during the 7th competition held in FY2017 we conducted a repechage for unselected proposals that were deemed as effective countermeasures during past competitions.
- On February 5th a panel of judges at Kashiwazaki-Kariwa selected seven outstanding proposals (judging panels were convened at Fukushima Daiichi on December 18th and at Fukushima Daini on December 7th).

  <Primary outstanding proposals from Kashiwazaki-Kariwa>

  - Improve name labels on building connection ports
  - Improve the visibility of area radiation monitors
  - Accurately ascertain radioactive substance discharge conditions by employing portable continuous dust monitors
  - Strengthen means for determining core damage in the event that the containment vessel atmospheric monitoring system cannot be used

- During FY2018, new proposals will be invited for the 8th competition that will be held, just like they were for the 6th competition.
- The following chart shows the number of outstanding proposals as of the 7th competition that were put into practice



Number of submissions to the Safety Improvement Proposal Competitions/Number of outstanding proposals[13]/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: Two more of the 11 outstanding proposals have been put into practice since the last report (Cumulative total: six proposals

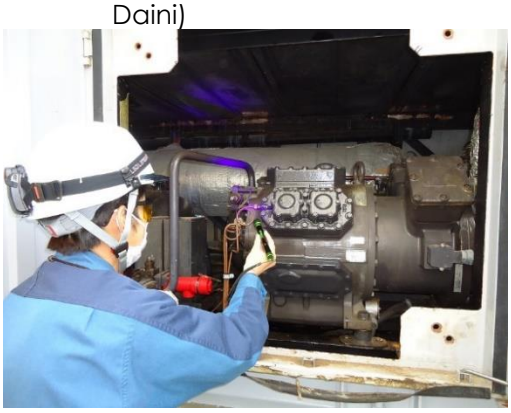
<5th Competition>

  - Signs indicating the grid number of areas in the Fukushima Daiichi site were posted. This will enable the locations of equipment nonconformances or malfunctions to be reported/identified easily when discovered. (Fukushima Daiichi)

[13] After a detailed examination of one of the outstanding proposals from the 3rd competition ("hydrogen countermeasures/diversification of blowout panel release mechanism drive source") it was discovered that this would interfere with the installation objective of reactor building hydrogen processing equipment (PAR) (i.e., it would be impossible to determine whether conditions were good or bad in the event of an unintentional opening of the reactor building), so the proposal was rescinded.

Grid identification signs at the Fukushima Daiichi site (Left: Road sticker, Right: Sign)

- The freon gas used as a refrigerant for air-conditioning freezers is colorless and odorless thereby making it difficult for patrols to detect leaks by merely a visible inspection, and many of the leaks to date have been discovered as a result of changes to the operating status of equipment, such as the issuing of alarms. Therefore, a florescent agent has been added to freezers on a trial basis in order to enable detection of refrigerant leaks during visible inspections by shining an ultraviolet (UV) light on the equipment. (Fukushima Daini)



Detecting refrigerant leeks by injecting a florescent agent into air-conditioning freezers (Left: Checking for freezer coolant leaks, right: Goggles and UV light used to check for fluore scent agent leaks)

- Since the third quarter "increases in the number of proposals and increases in the number of outstanding proposals put into practice" has been used as a performance indicator. This performance indicator will be applied to the 8th competition for which new proposals are being invited.
- 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.

(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. A review of the topics selected by each power station has been conducted to identify problems. Going forward we will make improvements to

rectify these problems and deliberate rational methods for performing safety reviews based upon our experience this fiscal year.

- Fukushima Daiichi: "Risk Management Process Effectiveness Assessment"
  During last fiscal year progress was made with formulating a detailed method for assessing the effectiveness of risk management processes and a review was conducted while referring to good practices both within and outside of Japan. There were no large problems with risk management mechanisms or processes, however issues, such as being aware of changes in relative risk as a result of the progress with countermeasures and clarifying methods for managing risk overall, etc., which must be addressed as we continue to manage risk, were identified. Going forward we shall ensure that risk is managed by, for example, examining any changes to risks when countermeasures are proposed and when the progress of these countermeasures are examined.
- Fukushima Daini: "Reliability of Pool Cooling Equipment"
  The fact that large risks were identified indicated that there are latent weaknesses with the physical protection and fire protection of important equipment, so these conditions were reviewed. In accordance with the guide, factor analysis based on foreseeable risk ("Y analysis") and excellence from overseas, etc., were referenced in order to examine whether or not measures required to avoid latent risk have been incorporated. And, walk downs were performed for areas in question in the field.
- Kashiwazaki-Kariwa: "The Impact of Fieldwork on Plant Safety Design"
  In order to deepen the understanding of those that use the *Guide for Assessing the Impact on Plant Safety Design*, which was created to prevent the recurrence of inappropriate cable separation, guide study sessions will be switched from a lecture format to a group discussion format. Indoor renovations were examined by participants who considered possible repercussions and compiled a conclusion in their own groups after which the groups gave presentations and shared their findings with all participants. Many participants commented that the study session was helpful so going forward we will make improvements by including materials and equipment used for outside renovations and creating tools for sharing information on cases that have been found to date to have an impact.

(3) Using hazard analysis to construct improvement processes

We are creating approaches to, and mechanisms for, accidents and hazards that have high "cliff-edge potential[14]" and for which there is great uncertainty in regards to the frequency of occurrence, and efforts are being made to propose and implement countermeasures under the assumption that these accidents will happen.

- At Kashiwazaki-Kariwa, the analysis of approximately 30 identified hazards was completed in FY2014 and countermeasures are being deliberated in accordance with the created plan.

[14] Potential for a calamitous situation resulting from a simultaneous and wide-scale loss of function caused by common factors

- Hazards identified since FY2015 (electromagnetic pulse caused by high-altitude nuclear explosion) will be additionally deliberated.

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

- Joint training for 40 RC is held once every six months. During the fourth quarter technical writing seminars given by an external expert were held in order to strengthen the ability to disseminate information through documents (February 16, February 23, March 16). During these seminars the theory and examples of technical writing were given and participants deepened their understanding through group discussion of the examples.
- A post-seminar questionnaire elicited such comments as, "*the seminar reaffirmed the importance of technical writing*," and "*developing the habit of predicting the social response based on the timing of disclosure is necessary, and I'll use this skill going forward*."

  <Discussion topics>

  - Handling an electromagnetic pulse attack
  - Disclosing information on the insufficient fortification of holes in firewalls at Kashiwazaki-Kariwa


Group discussion during risk communicator training

2.5.2 Other Initiatives

(1) Engaging in risk communication

◆ Communicating with the siting community

- Activities in the Fukushima area
  - The sixth installment of *Hairomichi*, which provides information to the residents of the local community on the decommissioning of Fukushima Daiichi, was issued on February 10 (20,000 copies).

- The Monthly 1F newsletter which provides information to workers and their families was distributed in January, February and March (20,000 copies each). The March issue included messages of encouragement from former AKB member Mogi, former Yomiuri Giants baseball player Suzuki and a comedian Nasubi. The 1 FOR ALL JAPAN website was also rebuilt in March to make it easier to view on smartphones.

The latest issues of *Hairomichi* (Issue 6) and Monthly 1F (March issue)

- At the meeting of the Fukushima Council on Decommissioning and Decontamination Measures, an explanation was given of work to remove rubble from Unit 1 and countermeasures to prevent the dispersion of radioactive substances during the removal of protective covers on the roof of Unit 2, which are issues of great concern to the people of Fukushima (February 5).
- The disclosure of information on nonconformances and Fukushima Daiichi was recommenced on August 1st, 2018 and during the fourth quarter 75 nonconformances were reported (cumulative total for FY2017:198).
- Minister of Economy, Trade and Industry Seko inspected the installation of the Unit 3 fuel removal cover and was given an explanation of the progress status of decommissioning at Fukushima Daiichi (January 18). After his tour of the power station site, Minister Seko attended the safety rally and offered words of encouragement to site personnel and contract workers.
-

Inspection by Minister Seko and participation in safety rally

・ US Ambassador to Japan Bill Hagerty was given a tour of the site to see the status of efforts aimed at removing fuel from the Unit 3 operating floor as well as an explanation of the status and progress of work over the seven years since the accident (March 16). After his tour Ambassador Hagerty offered words of encouragement to site personnel that had assembled in the center hall of the new main administrative building.


Tour and words of encouragement from Ambassador Hagerty

・ During the fourth quarter, 3,593 people were given tours of the Fukushima Daiichi nuclear power station (cumulative total for FY2017: 12,489)

• Activities in the Niigata area

・ An advertisement conveying the "conviction to safety" of Kashiwazaki-Kariwa personnel and the safety measures implemented at KK was created and run in magazines sold in the prefecture. In order to gain a reader's perspective, a popular freelance TV announcer from Niigata Prefecture, Emiri Nakata, was asked to serve as the interviewer. Installments one through four (1. flooding countermeasures, 2. power source countermeasures, 3. cooling countermeasures, 4. response capability) of the series have already been run. Since residents have commented that the content is friendly, easy-to-understand and from the perspective of the prefectural residents, we have decided to continue to have Emiri Nakata conduct interviews in FY2018 as well and publish the content not only in magazines but also through other forms of media such as the Internet and pamphlets, etc.

Advertisement

・ Niigata Headquarters President Kitta held a press conference and explained the following:

- Enhancement of "dialogue" activities by the Niigata Headquarters (January 29)
- Niigata Headquarters' *Mamoru (protect), Sonaeru (prepare), Kotaeru (respond)* Action Plan and the expansion of the Niigata Headquarters' function for assisting with evacuations (March 30).

Niigata Headquarters President Kitta (Left)

- At the meeting of the "Community Council on Ensuring Transparency at the Kashiwazaki-Kariwa Nuclear Power Station" (held on the first Wednesday of each month), reports were given on safety measure renovations at Kashiwazaki-Kariwa and the progress of communication activities after which opinions were elicited from the Council (January 10, February 7, March 7). Reports will continue to be given and efforts made to make improvements based upon elicited opinions. At the community meeting held on February 7th, representatives from the national and local governments as well as operators attended for their yearly information sharing meeting. President Kobayakawa attended as TEPCO's representative.
- Awareness reform efforts have been conducted for the purpose of directly feeling the uneasiness that the local residents harbor towards nuclear power and TEPCO (Headquarter Nuclear Power Division managers have been participating in the following activities). During the fourth quarter all seven people in general manger positions or higher from the HQ Nuclear Power Division engaged participated in the following activities:
  - Attending meetings of the "Community Council on Ensuring Transparency at the Kashiwazaki-Kariwa Nuclear Power Station"
  - Visiting opinion leaders in Niigata Prefecture
- Participants commented that they, "understand how uneasy community residents feel about nuclear power generation and fully realize the need to give detailed and sincere explanations from the perspective of the community. "(Community meeting participant), and they "learned the importance of moving forward with cooperative efforts with local companies with the knowledge that we are a company that is rooted in the Kashiwazaki-Kariwa region" (opinion leader visit participant).
- We hold briefings for the local community in order to disseminate information to local residents about the results of New Regulatory Requirement compliance inspections, future inspection plans, and the progress status of safety measures at an appropriate time and in an

appropriate manner (Kashiwazaki: January 30, Kariwa: January 31; total number of attendees: 150).

Regional briefings for community residents

- "*Fureai Talk Salons*" have been opened at the Kashiwazaki Shimin Plaza and TEPCO PR facilities to engage primarily women in the siting community and hear their opinions (held twice during the fourth quarter; 13 participants. The number of participants decreased as a result of record snowfall).
- TEPCO Communication Booths have been set up (Niigata City, Joetsu City, Nagaoka City) to provide an opportunity for TEPCO to tell prefectural residents about the fact that approval was received in December 2017 to modify the reactor installation permits for Kashiwazaki-Kariwa Units 6 and 7, and are being used to give explanations and distribute the TEPCO Newsletter (within the prefecture).
- 1,669 people visited the Kashiwazaki-Kariwa NPS during the fourth quarter (total for FY2017:12,615).


Explanations given at communications booths

◆ Communication initiatives on behalf of management
  - In the Fukushima area, Fukushima Revitalization Headquarters President Okura and FDEC President Masuda continue to hold regular press conferences at the end of each month in order to give updates on the activities of the Fukushima Revitalization Headquarters and progress with Fukushima Daiichi decommissioning and contaminated water countermeasures.

◆ Results from questionnaire about communication activities
  - We distributed a questionnaire on TEPCO's communications activities in order to obtain an objective assessment by society of these activities. We

expanded the breadth of this questionnaire since last fiscal year and ask for responses from the metropolitan area, Fukushima, Niigata, Aomori local governments, commerce organizations, consumer organizations, the press and employees of various foreign embassies in Japan, which are the parties to which information is disseminated.

<Questionnaire overview>

- Responses were given anonymously
- Response period: November 1 through December 9, 2017
- Total number of responses received: 172 (response rate: 74%)

【Assessment results】

- Respondents rated TEPCO's communications activities as a whole on a seven-step scale ranging from-3 to +3 (with a response of "0" indicating no change) from the perspective of, "*Compared to one year ago, to what extent do you think TEPCO's approach to and awareness of communication, and the quality and quantity of the information disseminated, has improved?*"
- The average response for both, "*the quality and quantity of information disseminated*" and, "*the approach to and awareness of information disclosure*" was +1.0 thereby indicating an improving trend. A positive assessment has been received for the fourth consecutive year.

No. of response (Response rate)	Quality/quantity of information disseminated	Approach to and awareness of information disclosure
172 (74%)	**+1.0**	**+1.0**

【Breakdown】

- The average rating for all areas of the quantity and quality of information disseminated concerning Fukushima Daiichi decommissioning, nuclear safety reforms, and accident/troubles, etc., was +1.0 thereby indicating an improving trend.

	Metropolitan Area	Fukushima	Niigata	Overseas	All Areas
Total assessment	+0.9	+0.9	+1.3	+0.8	**+1.0**
No. of respondents	47	69	54	2	172

・ The average rating for all areas of the awareness and approach to corporate communications by TEPCO was +1.0 thereby indicating an improving trend.

	Metropolitan Area	Fukushima	Niigata	Overseas	All Areas
Total assessment	+0.7	+1.0	+1.3	+0.5	**+1.0**
No. of respondents	47	69	54	2	172

・ Some of the comments made about TEPCO's communications activities in the *Free Comment* space on the questionnaire are below.
  - *"It is clear from Hairomichi and the videos that efforts are being made to explain information to the general public in an easy-to-understand manner."*
  - *"I'd like to see more information given at places where regional residents gather."*
  - *"I like to get an update on the overall picture using easy-to-understand words."*

・ We will deliberate how to make the information disseminated even easier to understand based upon the results of this questionnaire.

◆ Communicating with overseas parties

• We are proactively inviting foreign journalists to see the progress of decommissioning and the conditions here in Japan so that they will have a correct understanding of the situation. During the fourth quarter the following stories were written and published:
  - Interviews and coverage of Fukushima Daiichi by the Associated Press (January 25, March 2). The coverage was used as the basis of an article printed on January 31.
  - Coverage of Fukushima Daiichi and interviews about TEPCO's objective of increasing the number of visitors to Fukushima Daiichi by the L'Agence France-Presse (January 31). An article based on the coverage was printed on February 2.
  - Coverage by Taiwanese television station on the eve of the seventh anniversary since the disaster (February 1)
  - Coverage of Fukushima Daiichi by Argentinian television (February 3)
  - Joint coverage by overseas media (February 14, February 19) which was used as the basis for an article printed by Taiwanese Internet media on March 7.
  - Interviews at Fukushima Daiichi by German television station ARD (February 27)
  - Coverage of Fukushima Daiichi by German magazine *MOVE36* (March 20)

• Information continues to be disseminated to overseas news agencies and experts through e-mail magazines and Facebook/twitter accounts (fourth

quarter results: e-mail magazine: five articles, Facebook posts: 28 posts, Twitter accounts: 34 tweets, YouTube videos: 1).

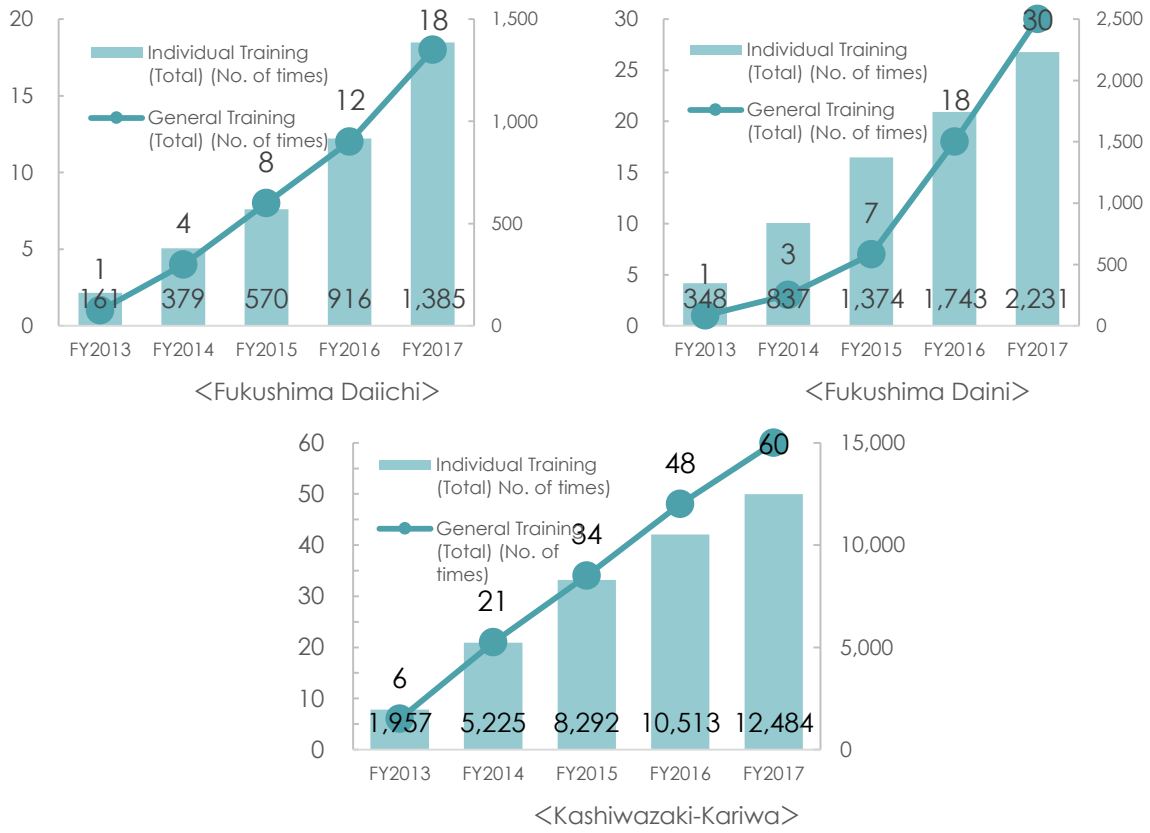
- ◆ Leveraging social network services and disseminating information in an easy-to-understand manner
  - We continue to create and post videos that explain nuclear power-related technology and the progress of decommissioning in an effort to deepen understanding.
    - Exploring the bottom of the containment vessel ~Unit 2 Primary Containment Vessel Internal Investigation (January 26)
    - Beginning rubble removal ~Unit 1 reactor building (February 23)
    - Installation of fuel removal cover ~Unit 3 reactor building (March 30)
  - Dose data for the power station site and the surrounding area is continuously posted on the TEPCO website in both Japanese and English.
  - Information continues to be disseminated using the TEPCO Facebook page.
    - Fukushima Daiichi decommissioning progress and work environment improvements (Fourth quarter: 8 posts)
    - Introduction of the safety measures at Kashiwazaki-Kariwa (Fourth-quarter: 1 post)

2.6 MEASURE 5 ENHANCEMENT OF POWER STATION AND HEADQUARTER EMERGENCY RESPONSE CAPABILITIES

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

Training is being implemented in a planned manner in consideration of the assessment of FY2016 training programs and basic plan, and based on the Mid- to Long-Term Plan that was revised in April, 2017. Since it was deemed that Fukushima Daini, Kashiwazaki-Kariwa and Headquarters have almost achieved the emergency response capability goals of the basic plan (STEP-1: establish the ability required to sufficiently handle a nuclear accident), the decision was made to move to STEP-2 (achieve the world's best levels of emergency response). At the Fukushima Daiichi NPS we have been unable to implement training in a planned manner as a result of prioritizing contaminated water countermeasures and renovations to improve the site environment so it has been deemed that the objectives of the basic plan concerning the ability of the plant to respond to emergencies (STEP-1) has not been achieved. Therefore, we will continue to implement training on events that have a large social impact. We shall assess the achievements of FY2017 and reflected in the Mid- to Long-Term Plan after which we shall formulate training plans for FY2018 and further enhance our ability to respond to emergencies.

Training results for each power station are as follows:



◆ Fukushima Daiichi

- Individual training was held on February 16th, February 26th, March 12th and 23rd.
- On February 26th, training was held based on a scenario where the site experienced multiple fires and a loss of all external power as a result of collisions with flying objects in order to improve skills for responding to troubles that have the large social impact. Deciding on repair priorities and assigning repair personnel to the multiple fire locations, and securing power sources amidst limited emergency diesel generator operating time caused by the light oil tank fire, went smoothly. However, there was a lack of consideration for worker safety and preventing workers from being hit by flying objects, so this aspect will be improved during the training sessions.
- On February 16th, March 12th, and March 23rd individual training was held simulating reactor cooling injection system equipment troubles in order to improve coordination between operators and the Emergency Response Center and also improve communication with relevant parties both inside and outside of the company. Communication between relevant parties within and outside the company ensued relatively quickly. However, in regards to coordination between operators and the Emergency Response Center, a problem that must be addressed is the great amount of time that was required to share detailed information about the event.
- In regards to coordination between operators and the Emergency Response Center, piping and instrument schematics and design drawings shall be used to enable detailed information about events to be shared quickly and more effectively in an effort to make an improvement.

Training on sharing information inside the new main administrative building

◆ Fukushima Daini

- General training was held on January 18th, February 2nd, and March 29th.
- The joint training on February 2nd between Headquarters and the Fukushima Headquarters was based on an earthquake scenario and implemented to confirm that the power station Emergency Response Center can give commands, share information with related parties, formulate repair plans and decide on priorities appropriately in the event of a nuclear disaster. Furthermore, a situation where a truck carrying radioactive substances overturned on site and radiation was detected was also simulated.
- Information was shared relatively smoothly between the power station and Headquarters, however the content of the situation report about the leak of radioactive substances and the convergence of occurrence times differed from the information shared at Headquarters and the power station in regards to the Emergency Action Level (EAL) set when radiation was detected within the power station site thereby causing confusion.
- The discrepancy on the situation report was caused by a lack of awareness that the accident occurred while radioactive substances were being transported, so education will be provided in a planned manner.

Left: Superintendent Ishii taking charge at the power station Emergency Response Center
Right: Plans being formulated inside the power station Emergency Response Center

◆ Kashiwazaki-Kariwa

- General training was held on February 15th, March 2nd, and March 11th.
- The joint training on March 2nd between Headquarters and the Niigata Headquarters was based on a scenario where an earthquake caused the shutdown of both Unit 6 and Unit 7 and it was implemented to confirm that the power station Emergency Response Center can give commands, share information, formulate repair plans and decide on priorities appropriately.

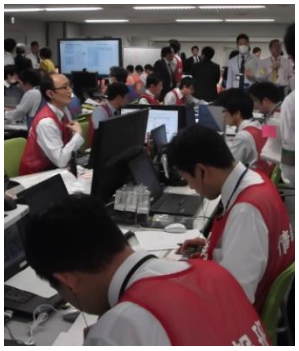
Particularly harsh conditions caused by the earthquake at Unit 6, such as the loss of external power, the loss of cooling function, and core damage, were simulated.

- Information was shared relatively smoothly between the power station and Headquarters, however with plant conditions fluctuating dramatically, there was insufficient sharing of main plant parameters so improvements to the mechanisms for sharing information shall be made as well as the way the training scenarios are constructed and the methods by which information is presented to trainees.


Left: Superintendent Shitara taking command at the power station Emergency Response Center
Right: Power Station Emergency Response Center

◆ Headquarters

- Joint training was held with Fukushima Daini on February 2nd, and with Kashiwazaki-Kariwa on March 2nd.
- During the joint training held with Fukushima Daini on February 2nd, repair strategies for power station risks that were determined in advance as possibilities were examined and information was shared relatively smoothly. However, when the simulated leak of radioactive substances on site caused by the overturning of a truck carrying radioactive substances occurred, a lack of awareness in regards to the aforementioned Emergency Action Level (EAL) and the discrepancy between information in the situation report and information coming from the power station made it impossible to smoothly explain the situation to the Nuclear Regulatory Agency, so it was decided to prioritize the information shared between the Headquarters Information Team and the power station information liaisons.
- During joint training with Kashiwazaki-Kariwa on March 2nd, how information is shared was examined based upon a scenario that utilized the Safety Parameter Display System (SPDS) and the Emergency Response Support System (ERSS). Compared with joint training with Fukushima Daini, information from the power station was shared relatively easily within Headquarters, however information converged after the SPDS and ERSS broke down, so improvements will be made.
- Furthermore, in response to the discrepancies between information from the power station and that in the situation report that was seen during joint training with Fukushima Daini (February 2), during training at Kashiwazaki-Kariwa, it was confirmed that prioritizing only the information from the power station information liaison is not sufficient, so efforts will be made to improve the accuracy of situation reports.

Left: Deputy Emergency Response Center Director (Nuclear Power & Plant Siting Division General Manager) Right: Reporting on the accident at the power station within the He adquarters Emergency Response Center (Information Team)

2.7 MEASURE 6 CULTIVATION 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[15]

- 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.
- In order to continually improve education and training we have created three tiers of review bodies consisting of the Nuclear Power Division Education and Training Committee, Power Station Education and Training Committee, and Curriculum Review Board. These three bodies effectively put education and training programs through the PDCA cycle based upon SAT.
- During the fourth quarter we started offering training to operators on the basics of probabilistic risk assessments (PRA) which is important for understanding power station risk information. This training utilizes examples of PRA from both within and outside of Japan and o teach about maintenance management both during plant operation and plant shutdown, and also the benefits of, and methods for, leveraging risk information for operation management. This training will be continually offer going forward in order to increase the knowledge that operators have about risk.

Tiered review bodies

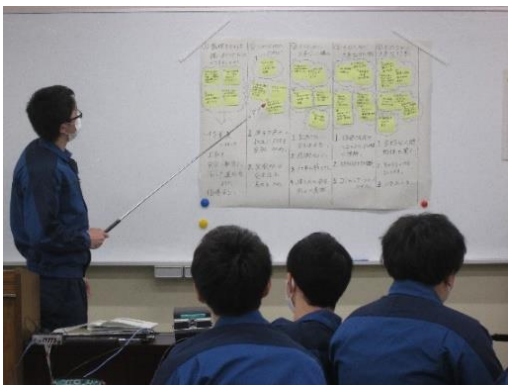
[15] Systematic Approach to Training : Standard education training method advocated by the IAEA

Probabilistic risk assessment (PRA) training for operations (Kashiwazaki-Kariwa)

- Human factor and human performance tool training began for maintenance department team leaders at Kashiwazaki-Kariwa that are responsible for field work supervision. (Training for the maintenance department at Fukushima Daini concluded during the third quarter).

Human factors/human performance tool training for maintenance (Kashiwazaki-Kariwa)

- Furthermore, the work supervisor training that was commenced in FY2017 for new employees was also held at Kashiwazaki-Kariwa (January 29 through February 2) in order to give an overview of the duties of work supervisors, and the mental attitude and communication skills that they should have. (This training was implemented at Fukushima Daiichi and Fukushima Daini in October).



Work supervisor training for new maintenance department employees (Kashiwazaki-Kariwa)

- At Kashiwazaki-Kariwa and Fukushima Daini, *Kashiwazaki-Kariwa Unit 6/7 reactor installation modification permit training* was held as part of training on the New Regulatory Requirements in order to give an overview of the installation modification permit and deepen understanding about the finer points of safety inspections.


Kashiwazaki-Kariwa Unit 6/7 reactor installation modification permit training
(Kashiwazaki-Kariwa/Fukushima Daini)

◆ Soft skill training for team leaders

- In FY2017 we began "soft skill" training in order to give Nuclear Power Division team leaders the necessary leadership and communication skills that they require to identify and solve even the smallest issues in the workplace with awareness about their role as a leader and an increased sense of responsibility. A total of 81 team leaders participated in this training during three sessions that were held between January and March. This training will continue to be offered in FY2018.


Left: message from nuclear leaders to trainees,
Right: communication training between fellow participants)

◆ Establishment of Industry Safety Training Center at Kashiwazaki-Kariwa

- The Industry Safety Training Center has been built at Kashiwazaki-Kariwa to improve the ability of TEPCO employees and contractors to predict danger and also increase their safety awareness.

- This facility has an exhibit room with actual pieces of equipment that were sources of trouble in order to "learn from past failures," and shall be used as a facility for providing safety education to TEPCO employees and contractors.
- Going forward we shall leverage this facility to the fullest in order to improve individual skill through effective education and training as we put more effort than ever into the safety measures implemented for the entire power station.


Education and training at the Industry Safety Training Center (example)
Left: Experience working in elevated locations
Right: Experiencing hanging from safety harnesses

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

- Maintenance personnel initiatives
  - Fukushima Daiichi
    We are continually implementing training to develop in-house technological capability (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. During the fourth quarter we repeatedly implemented training on the basic operation of power trucks and heavy equipment to improve the overall ability of personnel newly transferred as a result of company reorganization to operate such equipment and increase their level of mastery of it. The focus of training during FY2017 was to provide personnel that have been newly transferred as a result of the large-scale company we are organization with basic technical skills, so in FY2018 the training will center on increasing the level of mastery of the skills.


Repetitive training on heavy equipment

- Fukushima Daini

  In order to improve the ability to respond to emergencies we are conducting repetitive training drills with four teams (① rubble removal/road repair, ② generator replacement, ③ temporary cable connecting, ④ coolant pump repair). Efforts were made to further improve the level of skill of the rubble removal/road repair team by conducting training that combined the use of heavy equipment during night as well as the donning of radiation protection equipment to be prepared for working in a high-dose areas. Heavy equipment was also used to during the record snowfall on January 23rd. In addition, general training was implemented after team members were changed and both the former members and new members did a mutual assessment of the achievements of training to date in addition to confirming training procedures and skills. During this general training session, a new attempt was made to train workers on laying 100m cables in order to be prepared to source power from far removed transformers in the wake of the tsunami, etc.

  During FY2017, training on the use of drones, heavy equipment for dismantling work, and model RHRC pumps was provided to acquire new technical skills and improve the ability of workers to adapt, so going forward in FY2018 training will be provided to help workers master these skills and produce new skilled workers in order to improve the ability of the power station to respond to emergencies.


Left: Heavy equipment operation training (envisioning working at night and in high dose areas) Right: Snow removal training


General training (Left: motor replacement training, Right: cable laying training)

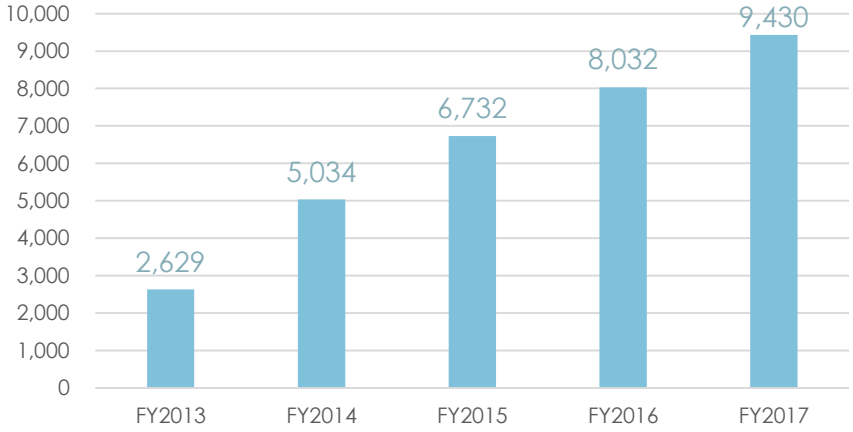
- Kashiwazaki-Kariwa
  In order to improve in-house technological capability and thereby prevent severe accidents from occurring, we are conducting various types of training such as on assembling and disassembling scaffolding, welding/thermal cutting/grinding training, bucket truck operation, valve/pump disassembly inspection training, pipe/duct repair training and forklift operation training. We also shared information on our emergency in-house response training with the Chubu Electric Hamaoka Nuclear Power Station, and exchange opinions on our approach to, and mechanisms and methods for initial responses during emergency in order to expand our ability to respond to emergencies.
  During FY2017 we newly implemented mobile crane operation training and exchanged opinions with other electric utilities in order to expand our abilities, so going forward in FY2018 we will continue training and expand our abilities in effort to maintain and improve technical skill.


Left: Welding/thermal cutting/grinding training
Right: Valve/drive mechanism inspections (hoisting drive mechanism)

Pump disassembly inspection (motor hoisting)

Bucket truck training

As has been done to date, during FY2018 we shall continue to plan and implement training at each power station in order to improve in-house technical skill, but we will also deliberate the construction of training programs that provide in-house technical skills common to all power stations so as to enable personnel to be dispatched to other power stations (mutual support).



Trends in the number of maintenance personnel in-house training participants (Fukushima Daiichi, Fukushima Daini, Kashiwazaki-Kariwa)

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

- Operator initiatives
  - Fukushima Daiichi
    Unit 5 and 6 operators have engaged in fire engine and power supply truck training since FY2014. As of the end of March, 40 operators had been certified on the operation of fire engines thereby exceeding our 32-operator target (80% of the 40 operators in the field) (fill-rate: 125%, no change over Q3), and 40 operators had been certified on the operation of power supply cars (fill-rate: 125%, no change over Q3). The priority for operators working at Unit 1~4 and with water treatment equipment is to

acquire skill in operation management, such as the use of reactor coolant injection equipment and contaminated water treatment equipment, etc.

- Fukushima Daini
  Training on fire engines and power supply cars commenced in FY2014. As of the end of March, 28 operators have been certified on the operation of fire engines thereby meeting our 23-operator target (80% of the 28 operators in the field (decrease of one operator since Q3)) (Fill-rate: 122%, increase of one operator from Q3), and 26 operators had been certified on the operation of power supply cars (fill-rate: 113%, increase of one operator over Q3).
- Kashiwazaki-Kariwa
  Fire engine and power supply car operation training commenced during FY2013. As of the end of March, 120 operators have been certified on the operation of fire engines thereby exceeding our 96-operator target (80% of the 120 operators in the field (no change over Q3)) (Fill-rate: 125%, no change from Q3), and 114 operators had been certified on the operation of power supply cars (fill-rate: 119%, increase of 3 operators over Q3). 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 March, 156 instructors (increase of two operators from Q3) 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 Trucks	
	Number of skill certifications (compared with the last quarter)	Fill rate	Number of skill certifications (compared with the last quarter)	Number of skill certifications (compared with the last quarter)
1F	40 people (±0)	125%	40 people (±0)	125%
2F	28 people (+1)	122%	26 people (+1)	113%
KK	120 people (±0)	125%	114 people (+3)	119%

(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 Headquarters 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.
- When the center is to be opened will be determined based upon the safety regulation modification application, so during the fourth quarter discussions were repeatedly held between relevant parties in regards to proposals for revising related internal manuals and plans for assigning group personnel in addition to making revisions to action plans and personnel assignments as needed.
- During FY2018 we will continue to diligently make the required preparations, such as revising manuals, and engaging in awareness activities, etc.

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 other 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 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 leads to overall improvements.
  - Currently 22 systems at Kashiwazaki-Kariwa Units 6 and 7 subject to monitoring are being continually monitored and it has been confirmed that there are no performance abnormalities. We will continue to develop our system monitoring initiatives and make improvements.
  - During the fourth quarter one more system engineer was certified thereby bringing the total number of system engineers at Kashiwazaki-Kariwa to six. Also, one certified system engineer was also certified to monitor one more additional system thereby expanding the number of systems monitored by system engineers to a total of 21[16].
  - Going forward we shall continue education and training to increase the number of systems monitored and continually train personnel in order to reach our objective of having five system engineers for each reactor.

[16] Two systems were added, the fuel pool cooling and cleaning system, and the substitute reactor auxiliary cooling system.

System engineer skill certification consult

- 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.
  - The design standards document for the residual heat removal system, which has been prioritized for the creation of said document, is still being deliberated. The functions (functional requirements) and performance (performance requirements) required of the residual heat removal system are being reassessed, and we are in the process of identifying those specification attributes that operators should focus on in order to satisfy these requirements.
  - In regards to configuration management process, a detailed review of the work manual, which puts forth process procedures, is underway and we're currently writing detailed procedures and identifying with whom responsibility lies.
  - In regards to the development of a system for supporting configuration management processes, we have completed removing system bugs that has been ongoing since the third quarter and completed all development processes. During the fourth quarter we began trial operation tests and we will continue to look for system function problems in the months ahead. We shall also expand training for system operators in preparation for the establishment of the Engineering Center.
  - In regards to engineer cultivation, a pilot education program is underway for personnel at Headquarters engaged in design work. Opinions from those that have taken part in the pilot program are being gathered and used to revise

the content of educational materials. A full-scale cultivation program for power station personnel will begin after next fiscal year.

Pilot education program for engineers

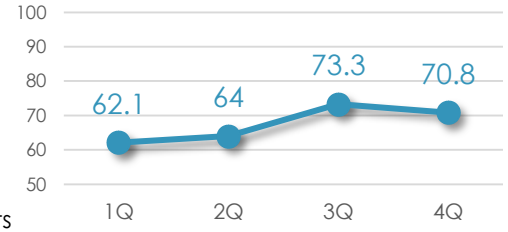
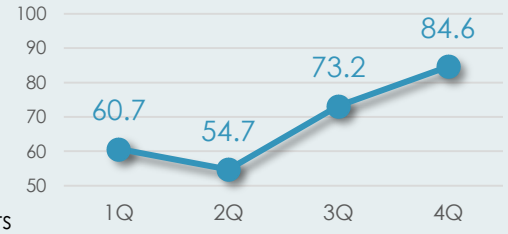
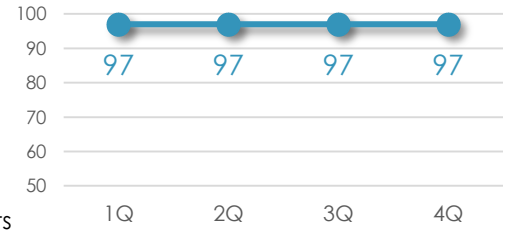
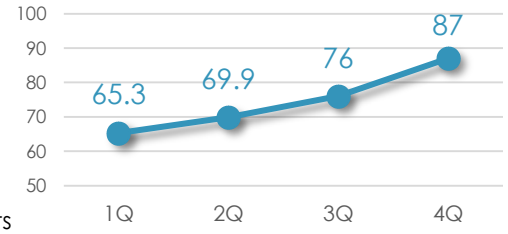
◆ Improving project management skills

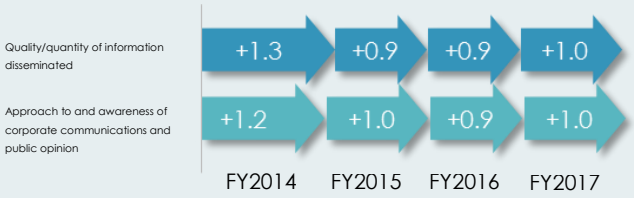
- We have created a project for resolving safety measure-related problems that exist across all departments at Fukushima Daiichi and Kashiwazaki-Kariwa. Project managers in charge of these projects must be able to comprehensively manage the project while optimizing the three elements of risk, resources, and time.
- In order to resolve the problems we are currently facing, and also identify other potential problems, we have invited experts from outside the company to spearhead educational programs for project managers to teach them about their roles, expected behavior, and the project management-related duties and processes in which they must engage. To date approximately 145 project managers have undergone this training.

2.8 KPI/PI Performance and Self-Assessment Plans

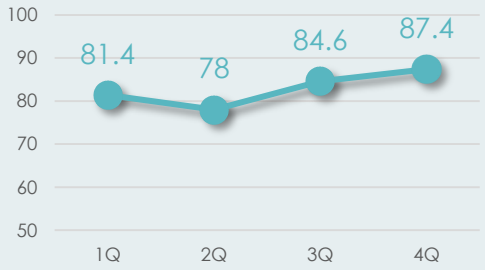
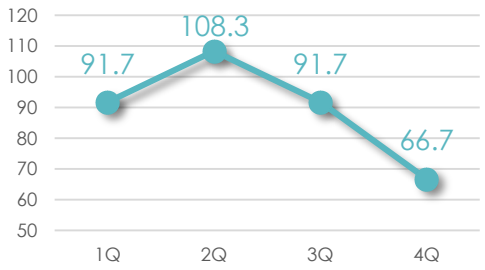
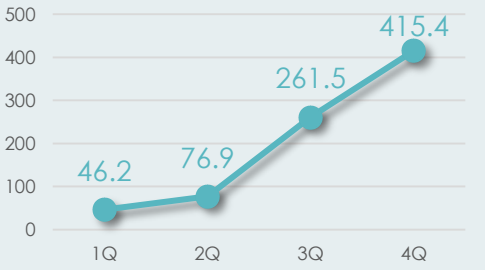
2.8.1 KPI/PI Performance

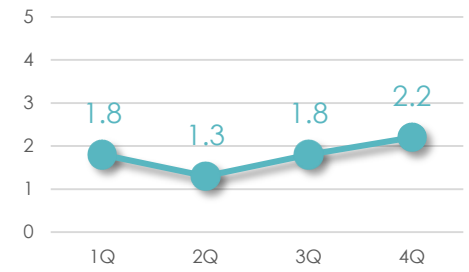
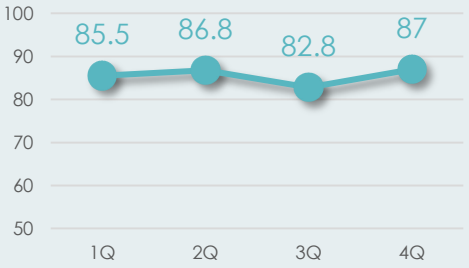
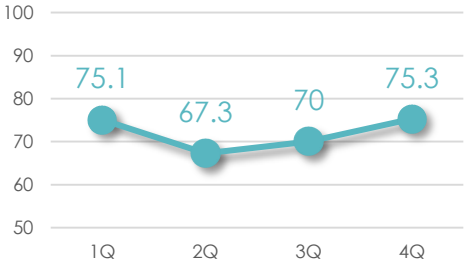
(1) KPI Performance (FY2017Q4)

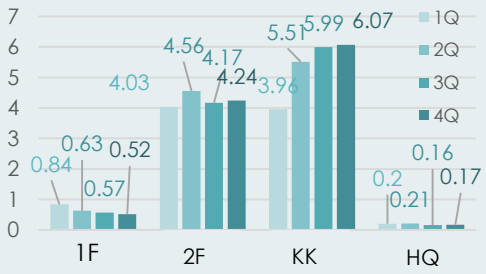
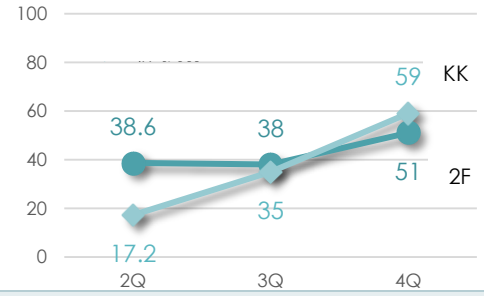
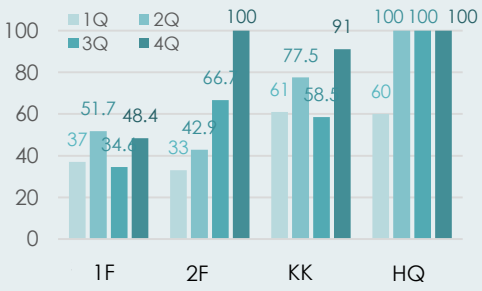
KPI	Target	Performance
Safety awareness		
Safety awareness KPI (nuclear leaders)	70 points	 70.8 points
Safety awareness KPI (entire Nuclear Power Division)	70 points	 84.6 points
Technological Capability		
Technological capability (in times of normalcy)	100 points	83 points (FY2017 average)
Technological capability (in times of normalcy)	100 points	 97 points
Ability to promote dialogue		
Ability to promote dialogue (internal)	70 points	 79.8 points

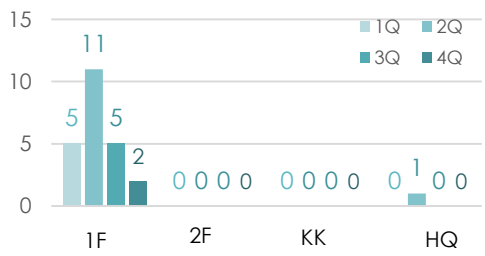
Ability to promote dialogue (external)	Increase over last fiscal year	 Quality/quantity of information disseminated: +1.0 points Approach to and awareness of corporate communications and public opinion: +1,0 points

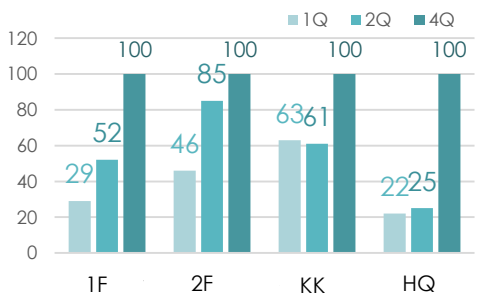
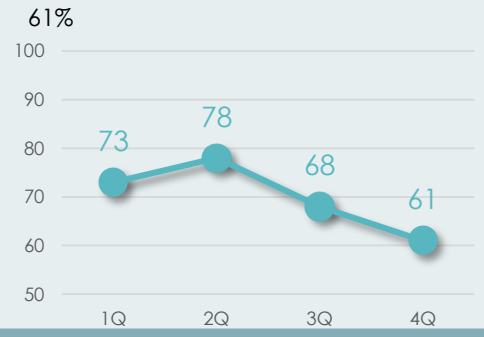
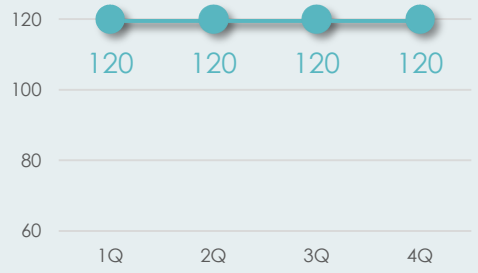
(2) PI Performance (FY2017Q4)

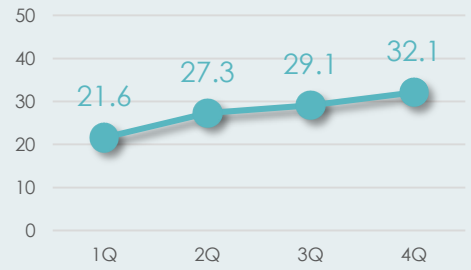
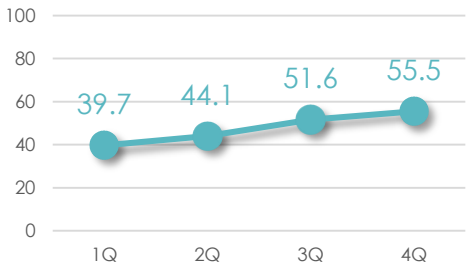
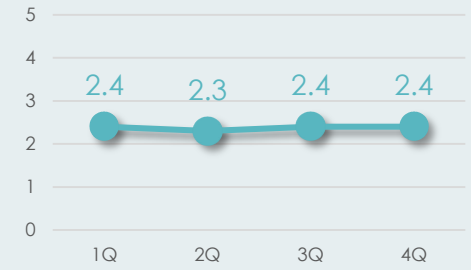
PI	Target	Performance	Notes
Safety Awareness			
Nuclear leaders			
<Safety-1> Rate of implementation of retrospection leveraging the traits	100%	87.4% 	
<Safety-2> Number of times emails have been sent by nuclear leaders in order to share information	More than once a week	8 times in 12 weeks（66.7%） 	
<Safety-3> Number of times nuclear leaders participated in preparedness training	More than twice a year	27 times（415.4%） 	

PI	Target	Performance	Notes
<Safety-4> Number of times nuclear leaders went into the field (to engage in MO or exchange opinions with workers)	More than twice a month	2.2 times/month 	
<Safety-5> Number of benchmarked issues for which nuclear leaders are responsible for putting into practice that have been put into practice	More than four a year	– Performance management using the CAP system was originally planned, however MO and third-party review management was prioritized. This will begin in FY2018.	
Entire Nuclear Power Division			
< Safety-6 > Percentage of groups that discuss the results of trait retrospection	100%	87.0% 	
< Safety-7 > Percentage of messages from nuclear leaders that have been read	80% or higher	75.3% 	
<Safety-8> Number of times managers engaged in management observation	Target values to be set by each organization	1F: 218 times (0.52times/month/person) 2F: 864 times (4.24times/month/person) KK: 1,838 times (6.07times/month/person) HQ: 22times (0.17times/month/person)	No. of times per person per month

PI	Target	Performance	Notes
			
< Safety-9 > Good MO rate (Percentage of reports that include things that PICO has pointed out as being good MO from MO results)	50% or higher	2F: 51% KK: 59% 	
< Safety-10 > Percentage of corrective measures completed before deadline	100%	1F: 48.4% 2F: 100% KK: 91.0% HQ: 100% 	At Fukushima Daiichi human error-related nonconformances were measured
< Safety-11 > Number of recurring GII or higher nonconformances	0	1F: 2 2F: 0 KK: 0 HQ: 0	

PI	Target	Performance	Notes
			
Technological capability			
During times of normalcy			
< Engineering-1 > Number of skilled workers trained in the Operations Department	More than 100% of the number required	112%	
< Engineering-2 > Number of skilled workers trained in the Maintenance Department	More than 100% of the number required	80%	
< Engineering-3 > Number of skilled workers trained in the Engineering Department	More than 100% of the number required	To be measured after establishment of the Nuclear Engineering Center	
< Engineering-4 > Number of skilled workers trained in the Radiation and Chemistry Department	More than 100% of the number required	114%	
< Engineering-5 > Number of skilled workers trained in the Fuel Department	More than 100% of the number required	142%	
< Engineering-6 > Number of skilled workers trained in the Safety Department	More than 100% of the number required	100%	

PI	Target	Performance	Notes
＜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.	More than 100% of the number required	62%	
＜Engineering-8＞ Participation rate in significant OE training	More than 60% of managers	100% 	During the fourth quarter all personnel watched a training video in conjunction with the anniversary of 3.11
＜Engineering-9＞ View rate of newly arrived OE information	More than 75%	61% 	
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	More than 120% of the necessary number at each power station	120%※ 	

PI	Target	Performance	Notes
surveys, wheel loaders, and unic trucks			
＜Engineering-11＞ Percentage of “A” assessments given during emergency response training	More than 80%	75.5% 【Breakdown】1F: 72.7% (8/11 categories) 2F: 76.9% (10/13 categories) KK: 76.9% (10/13 categories)	FY2016 assessment
Ability to promote dialogue			
Internal Communication			
＜Dialogue-1＞ Percentage of employees that feel that messages from nuclear leaders are “helpful”	More than 50%	32.1% 	
＜Dialogue-2＞ Response rate to questionnaire on the information conveyed by nuclear leaders	More than 70%	55.5% 	
＜ Dialogue-3 ＞ Degree of understanding of information conveyed by nuclear leaders	More than 2.5 points	2.4 points 	
External Communication			

PI	Target	Performance	Notes
< Dialogue-4 > Questionnaire results on the quality/quantity of disseminated information	Increase over last fiscal year	+1.0 points over last fiscal year	
< Dialogue-5 > Questionnaire results on the approach to and awareness of, public relations and public opinion gathering	Increase over last fiscal year	+1.0 points over last fiscal year	

※Required numbers are being reexamined in light of the differing conditions between 1F, 2F and KK, and are therefore not included

2.8.2 Reassessing KPI/PI

We have reviewed KPI/PI measurement and monitoring results for this fiscal year and have decided to make revisions in order to better monitor the degree of rooting of improvement/reform initiatives. Therefore, nuclear safety reform KPI/PI shall be revised as follows. Trend monitoring of these KPI/PI shall begin in FY2018Q1.

(1) Nuclear safety reform KPI

KPI	Configuring Elements	Target
Safety Awareness	Nuclear leaders: Calculated using<Safety-1~5> of the Nuclear Safety Reform PI Entire Nuclear Power Division: Calculated using <Safety-6~10 and 12~14> of the Nuclear Safety Reform PI	Nuclear leaders: 80 points Entire Nuclear Power Division: 80 points
Technological Capability	Times of normalcy: Calculated using <Engineering-1,2> of the Nuclear Safety Reform PI Times of emergency: Calculated using <Engineering-3~5> of the Nuclear Safety Reform PI	Times of normalcy: 110 points Times of emergency: 110 points
Ability to promote dialogue	Internal: Calculated using <Dialogue-1~3> of the Nuclear Safety Reform PI	Internal: 80 points External: 80 points

	External: Calculated using <Dialogue-4~7> of the Nuclear Safety Reform P	

(2) Nuclear safety awareness PI

PI	Target	Notes
Safety Awareness		
Nuclear leaders		
<Safety-1> Rate of implementation of retrospection leveraging the traits	100%	
<Safety-2> Number of times emails have been sent by nuclear leaders in order to share information	More than once a week	
< Safety-3 > Number of times nuclear leaders participated in preparedness training in accordance with plans	More than twice a year per person	
<Safety-4> Number of times nuclear leaders went into the field	More than twice a month	
<Safety-5> Number of benchmarked issues for which nuclear leaders are responsible for putting into practice that have been put into practice	More than 4 times per year per department	
Entire Nuclear Power Division		
< Safety-6 > Percentage of groups that discuss the results of trait retrospection	100%	
< Safety-7 > Percentage of messages from nuclear leaders that have been read	80% or higher	
<Safety-8> Number of times managers engaged in management observation	Targets set by each department	
<Safety-9> Good MO report rate	50% or higher	
<Safety-10> Percentage of corrective measures (GII or higher) completed before deadline	100%	
< Safety-11 > Number of recurring GII or higher nonconformances	0/month	
< Safety-12 > Rate of achievement during nonconformance voucher period	80% or higher	Discovery to discussion should take less than

PI	Target	Notes
		three business days
<Safety-13> View rate of new OE information	75%	
<Safety-14> Participation rate in significant OE training	More than 60% of managers	
Technological capability		
During times of normalcy		
< Engineering-1 > Number of workers with external certifications or skilled workers trained in operations/maintenance/engineering/radiation and chemistry/fuel/safety	Set for each field	
<Engineering-2> Rate of reflection of improvements to education and training programs requested by line departments	80%	
During emergencies		
< Engineering-3 > Number of internally certified emergency personnel (the firetrucks, power supply trucks, cable splicing, radiation surveys, wheel loaders, Unic trucks, etc.)	120%	
< Engineering-4 > Rate of A assessments by Nuclear Regulation Agency of preparedness training assessment items	80% or higher	Frequency: Once a year
<Engineering-5> Training participation rate	90%	
Ability to promote dialogue		
Internal		
<Dialogue-1> Percentage of employees that feel that messages from nuclear leaders are "helpful"	50% or higher	
<Dialogue-2> Response rate to questionnaire on the information conveyed by nuclear leaders	70% or higher	
<Dialogue-3> Degree of understanding of information conveyed by nuclear leaders	2.5 points or higher	
External		
< Dialogue-4 > Questionnaire results on the quality/quantity of disseminated information	Increase over last fiscal year (0.9 points)	Frequency: Once a year

PI	Target	Notes
<Dialogue-5> Questionnaire results on the approach to and awareness of, public relations and public opinion gathering	Increase over last fiscal year (0.9 points)	Frequency: Once a year
< Dialogue-6 > Questionnaire assessment of various dialogue activities	Target achievement rate: 80% or higher	
<Dialogue-7> Number of opinions received from the local community	Increase over last fiscal year	

During the assessment KPIs and PIs, as has been done to date, KPIs and PIs will not only be 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, KPIs and PIs reassessed and target values increased as necessary.

2.9 SELF-ASSESSMENT OF IMPORTANT ISSUES

During FY2016 we implemented a self-assessment of our progress with the Nuclear Safety Reform Plan that was subsequently reviewed by the Nuclear Reform Monitoring Committee[17]. One of the expectations expressed by the committee is that TEPCO, "*continues to perform self-assessments that will yield significant input for nuclear safety reforms as part of its initiatives to achieve the world's highest levels of nuclear safety*." And, at the 14th Nuclear Reform Monitoring Committee meeting held on November 20th the committee commented that, "*forming the habit of performing self-assessments is extremely important to enable a culture of self-improvement and learning to permeate throughout the entire organization*." In this regard, the committee requested that an assessment and report be compiled on the status of improvements made to dat. TEPCO

[17] http://www.nrmc.jp/report/__icsFiles/afieldfile/2017/07/31/01_4J.pdf

http://www.nrmc.jp/report/__icsFiles/afieldfile/2017/07/31/01_5J.pdf

has performed a self-assessment of the following five issues and will report the results to the Nuclear Reform Monitoring Committee during FY218.

<Five important issues>

1. Enhancing Organizational Governance
2. Enhancing Education and Training
3. Improving communication
4. Stronger nuclear safety culture
5. Strengthening internal oversight functions

CONCLUSION

Decommissioning of Fukushima Daiichi is proceeding safely and steadily based upon the Mid-and-Long-Term Roadmap Towards Decommissioning of Fukushima Daiichi Nuclear Power Station Units 1 to 4. In particular, we have completed the domed roof which was installed in preparation for the removal of fuel from the Unit 3 spent fuel pool during FY2018, and are moving forward steadily with operational training and testing of the fuel handling machine. Furthermore, on April 1st, Akira Ono replaced Naohiro Masuda as Fukushima Daiichi Decommissioning & Decontamination Engineering Company (FDEC) president/Decommissioning & Contaminated Water Countermeasures CEO. Mr. Ono will continue to engage in dialogue with stakeholders and consider the concerns of the community as he fulfills the company's responsibility for the decommissioning project.

At Kashiwazaki-Kariwa, we are moving safely and steadily ahead with safety countermeasure renovations as we aim to enhance our engineering and emergency capabilities. After receiving permission in December of last year to modify the reactor installation permits for Units 6 and 7 in order to comply with the New Regulatory Requirements we continue to move forward with detailed design. We shall prioritize safety while sincerely and carefully handling inspections as we aim to improve safety, not merely by complying with regulations, but also through the implementation of voluntary measures.

In regards to the Nuclear Safety Reform Plan (management aspects), we shall further implement nuclear safety reforms based upon the management model and the decommissioning promotion strategy. In particular, the comment from the Nuclear Reform Monitoring Committee that, "*rooting the habit of self-assessment is of vital importance for self-improvement and for enabling a culture of learning to permeate throughout the entire organization*," has been set an important goal for FY2018.–

With 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 keep creating unparalleled safety***" we will continue to advance nuclear safety reforms while receiving objective assessments from the Nuclear Reform Monitoring Committee. We are more than happy to hear any comments or opinions you may have about these reforms. Please visit our website[18] for more information.
End of Document

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