NUCLEAR SAFETY REFORM PLAN

FY2018Q4 Progress Report

Tokyo Electric Power Company Holdings, Inc.

May 13, 2019

TEPCO

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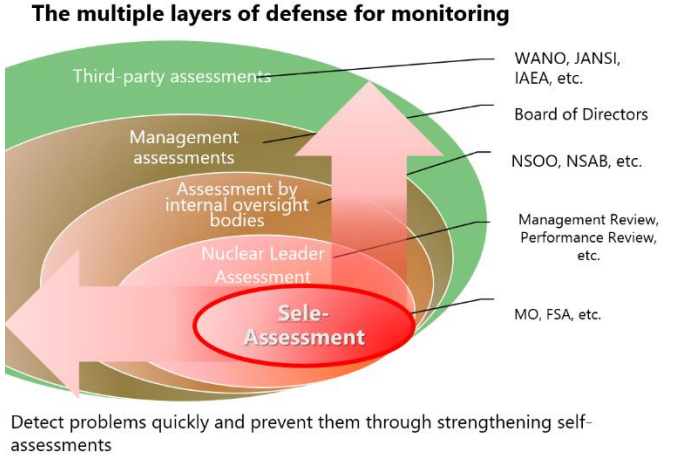
FOREWORD

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 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. Since then we have provided quarterly updates on the progress of these reforms. The following is a report on the progress that we have made during the fourth quarter of FY2018[1](January~March, 2018)

At the 16th meeting of the Nuclear Reform Monitoring Committee[2] held on January 29, while the committee commented that the self-assessment of nuclear safety reforms performed in-house is a, "step forward," it also stated that, "we cannot help but question to what degree of scrutiny TEPCO HD is looking at its own actions." The committee also gave, "many recommendations aimed at further improvements." We will earnestly strive to make improvements based on these recommendations, scrutinize our own actions prior to receiving criticism from external parties, and make further effort to conduct self-assessments that eliminate our weaknesses.



Defence-in-depth for assessments and key self-assessments[3]

1 All dates hereinafter refer to 2019 unless otherwise noted.

2 Nuclear Reform Monitoring Committee: http://www.nrmc.jp/en/index.html

3 January 29 Nuclear Reform Special Task Force press conference: https://www4.tepco.co.jp/library/movie/detail-j.html?catid=61697&video_uuid=hdnsiw9h

To which of the six Nuclear Safety Reform Plan measures the initiative pertains is noted in brackets【 】

An explanation of abbreviations is on the last page of this report

1 REFLECTING ON THE FUKUSHIMA NUCLEAR ACCIDENT

(1) TEPCO Group initiatives

Every year on March 11 we pray for those people who lost their lives during the Great East Japan Earthquake and Tsunami. For us, March 11 is a day to remind ourselves of the terrible inconvenience that we have caused the people of Fukushima and society as a whole. On this eighth anniversary of 3.11 we decided that the Group's motto should be, "pursuing evolution based upon regrets and lessons learned," in order to reflect upon the Fukushima Nuclear Accident and etch into our minds the regrets and lessons learned from it. All Group companies have engaged in retrospection activities based upon this motto.

On this past March 11, the eighth anniversary of the Fukushima Nuclear Accident, TEPCO HD and core company management addressed employees. Furthermore, in order to help employees better reflect upon the accident and preserve the memories and records of the disaster for future generations, we created content entitled, "continuing to remember 3.11," in which employees that were on duty during the Fukushima Nuclear Accident talk about their experiences and conditions at the time. This content has been shared with all group companies.

Moment of silence at time of earthquake

On March 11, all employees gave a moment of silence at the same time that the earthquake occurred and the President, along with Fukushima Revitalization Headquarters President Okura, addressed all the employees at Fukushima Daiichi.

Address by President

Every year all employees participate in departmental group discussions that center on retrospection. During this fiscal year, these discussions were promoted based on the idea of sharing lessons learned and things noticed through training due to the fact that more than 30% of all employees (approximately 80% of management) participated in companywide training on conveying the facts and lessons learned from the Fukushima Nuclear Accident, which is training for all employees that began in FY2017. During these departmental group discussions, departments in all groups created action statements that were conveyed to all Group companies. The purpose of these action statements is to deepen awareness about

coming together as one and fulfilling our responsibilities to Fukushima while also engaging in initiatives based on our regrets and the lessons we have learned.

(2) Nuclear Power Division Initiatives

The following common initiatives being carried out in the Nuclear Power Division stem from the awareness that, "we are not fully aware of why we allowed this accident to happen, what we have learned, and what we have vowed to do."


Listening employees

All employees in the Nuclear Power Division are aware that we must start by reading the Nuclear Safety Reform Plan and the review results from the Nuclear Reform Monitoring Committee, and reflecting once again upon the Fukushima Nuclear Accident. In conjunction with this, nuclear leaders also promoted reflection upon the Fukushima Nuclear Accident through moral discourse, messages sent via the intranet, and direct dialogue with group managers and members.


Chat between President and line workers (Fukushima Daiichi)

At Fukushima Daiichi, the General Manager of the Decommissioning Promotion Office explained the relationship between reflecting upon the Fukushima Nuclear Accident, the Nuclear Safety Reform Plan and the FDEC Reform Plan, and held group discussions. In conjunction with this, the President engaged in dialogue with team leaders during which frank opinions were exchanged about the importance of studying past incidents and sharing information on risk to ensure that the same mistakes are not repeated. The President conveyed that it is important to further improve engineering skill and in-house manufacturing, and told participants that he would like them to move forward with their duties with acceptance and satisfaction.


President Kobayakawa

At Fukushima Daini, employees that were on duty at Fukushima Daiichi at the time of the disaster gave a special lecture on engaging in radiation control duties which added an extra level of reality to reflection upon the Fukushima Nuclear Accident. The lecture was recorded for our in-house disaster archives so that all employees can view it.

At Kashiwazaki-Kariwa, a pamphlet containing a message from the site superintendent and information on Nuclear Safety Reform Plan initiatives was distributed to all contractors that work at the power station in conjunction with the anniversary of March 11 in order to share

a common awareness about “our feelings about Fukushima,” and “thinking about the people and things we cherish.”

Special lecture by station personnel (Fukushima Daini)

Group discussion (Kashiwazaki-Kariwa)

2 PROGRESS WITH SAFETY MEASURES AT NUCLEAR POWER STATIONS

2.1 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

◆ Unit 2

During the internal investigation of the primary containment vessel conducted in January 2018, it was confirmed that there is no significant deformation/damage to existing facilities and that deposits cover the entire floor of the pedestal. During the fourth quarter we implemented an investigation using the investigation unit from the prior investigation that was modified to include a finger mechanism which was used to touch the deposits in order to ascertain the nature (hardness, brittleness, etc.) of these deposits (February 13). During this contact investigation we learned that five out of the six locations at the bottom of the pedestal that were investigated contained pebble-like deposits that could be moved and that it is possible that hard stone-like deposits that cannot be moved may exist. In addition, bringing the investigation unit closer to these deposits enabled us to obtain video and dose level/temperature data that will contribute to estimating the shape and size of these deposits. The results of this investigation shall be used in order to move forward with deliberations of internal investigations to be conducted during the second half of FY2019 and also methods for removing these deposits.

Pebble-shaped deposits

Rock-shaped deposits

(2) Removing fuel from the spent fuel pools

◆ Unit 1

In order to secure an access route to the spent fuel pool, we started removing X-braces from the reactor building on September 19 as part of preparations to protect the spent fuel pool. The removal of these reinforcing steel X-braces was completed on December 20 and the removal of

objects that may hinder access was completed on February 19. Furthermore, we completed covering of the nearby opening (equipment hatch) on March 6 in order to secure an access route from the west work platform and prevent small pieces of rubble from falling in. Removal of small rubble from around the spent fuel pool began on the east side work platform on March 18. As we move forward with work we will continue to carefully assess and manage risks, prevent the dispersion of radioactive substances, and thoroughly implement countermeasures to ensure safety and peace of mind as we aim for the commencement of fuel removal in FY2023.


Prior to covering opening (equipment hatch)


After covering opening (equipment hatch)

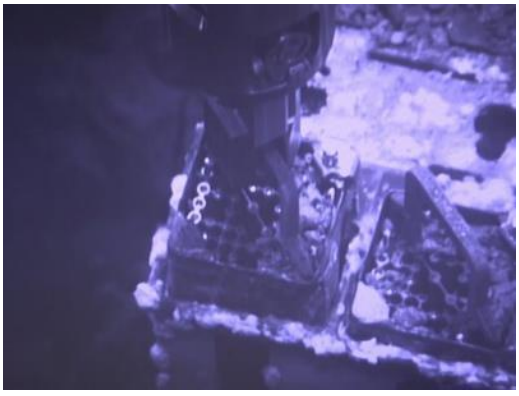
◆ Unit 2

At Unit 2, we plan to perform an investigation of all areas of the operating floor in preparation to propose work plans, such as the dismantling of the top part of the reactor building. The relocation and cleanup of items that remain on the operating floor, which needed to be performed prior to the investigation, was completed on November 6. Thereafter gamma cameras were used to take photographs, and surface and air dose rates were measured in order to create a contamination distribution map and identify hotspots. These investigations were completed on February 1. Analyzing the results of these investigations enabled us to create a contamination density distribution map of the entire operating floor and assess air dose rates. Going forward this information will be leveraged in order to deliberate shielding designs and measures for preventing the dispersion of radioactive substances as we prepare for fuel removal.

◆ Unit 3

Since testing of the Unit 3 fuel handling machine commenced there has been a rash of nonconformances, so safety inspections (operation check, equipment inspection) were implemented and quality management improved in order to identify other hidden problems. During these safety inspections 14 nonconformances were identified and suitable countermeasures that include examining quality management were completed (January 27). Since February 14 we have examined how these nonconformances were rectified and moved forward with fuel removal training that utilizes simulated fuel and transport containers. During training, seven nonconformances were identified. Six of these nonconformances were related to work quality management, such as insufficiencies with work procedures and daily management, etc., so changes will be made to procedures. An investigation into the root cause of the other remaining nonconformances is underway, but the defective location has been identified and parts replaced. Spent fuel pool rubble removal training, which was planned in conjunction with fuel removal training, started on March 15, and after that was completed, fuel removal work began on April 15.

Rubble removal training



Fuel removal work

(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.

◆ Completion of transfer of ALPS-treated water from flange tanks

The Advanced Liquid Processing System (ALPS) is used to remove most radionuclides from contaminated water generated at Fukushima Daiichi, with the exception of tritium, and this ALPS-treated water has been stored in flange tanks, some of which pose a high risk of leaks. Therefore, the transfer of ALPS-treated water stored in flange tanks to more reliable welded tanks was completed on March 27. This has reduced the risk of leaks from flange tanks and enabled us to manage this water in a more stable manner. Furthermore, the completion of this task has enabled us to achieve a milestone of the Mid-to Long-Term Roadmap which was to, "store all water treated with purification equipment in welded tanks by the end of FY2018."

(4) Preparations to dismantle the Unit 1/2 exhaust stack

In order to ensure the seismic resistance tolerance of the Unit 1/2 exhaust stack, the top of the steel frame that supports the stack, which is damaged, will be dismantled using remotely operated equipment. In order to ensure that the dismantling work goes smoothly, a mockup of the major parts of the exhaust stack that is approximately 18m high has been built off-site and used to examine dismantling procedures (completed in April). On-site at Fukushima Daiichi, large cranes that will be used to dismantle the exhaust stack have been used since the beginning of April to perform pre-dismantling investigations during which dosimeters and cameras are lowered into the stack to identify obstructions and examine contamination conditions inside the exhaust stack. As we move forward with this project, dismantling equipment will be moved on-site and assembled in order to commence dismantling of the exhaust stack during the middle of May.

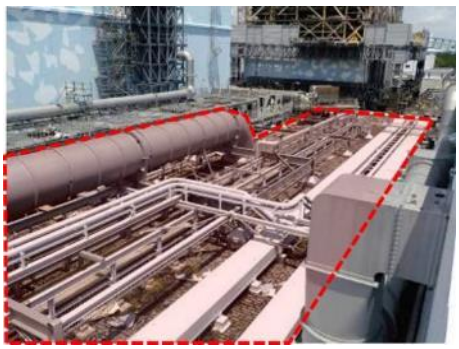
Dismantling exhaust stack mock-up

Roofed safety passage

Furthermore, in light of the fallen scaffolding that was found around the Unit 3, 4 exhaust stack on January 9, the decision was made to erect roofed safety passages to ensure safety when walking around the four exhaust stacks on site. These safety passages were completed on March 25. Furthermore, drones were used to inspect the location where the fallen scaffolding was found around the Unit 3, 4 exhaust stack and also locations of suspected degradation that were identified during extraordinary inspections (March 8, 15). From the results of these investigations we hypothesize that the fallen scaffolding was old scaffolding left over from construction that had fallen as a result of corrosion. Furthermore, when investigating locations of suspected degradation, whereas nothing is in immediate danger of falling, there are locations where scaffolding does not exist and where corrosion has spread. Going forward drones will be used to perform investigations of other exhaust stacks and we shall deliberate countermeasures for reducing risks associated with falling objects.

(5) Ocean contamination prevention measures in the vicinity of Unit 2

As part of environmental improvements in the vicinity of Unit 2, we plan to remove roof blocks and contaminated pipes from the basements of the turbine building and the reactor building, and also the Unit 1/2 waste processing building. Work in the basement of the turbine building commenced on March 25. In addition to dispersing dispersion prevention agents prior to engaging in work, dust monitors are used to monitor dust during work in order to move steadily forward while prioritizing safety.



Planned location of turbine building basement countermeasures (outlined in red)

(6) Initiatives Aimed at Reducing Exposure Doses

In accordance with the revised Mid-to Long-Term Roadmap, optimal countermeasures shall be implemented for radioactive substances that pose risks after prioritizing these substances based upon current conditions. At Fukushima Daiichi, we are striving to reduce exposure doses by predicting work-related exposure doses prior to commencing any task and determining whether or not the task can be implemented upon assessing the increases or decreases in risk based upon this approach.

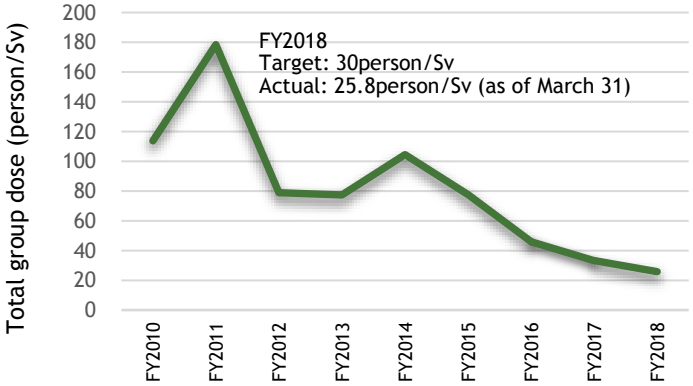
At Unit 2, exposure reduction measures are being implemented for the following series of tasks by using a remote monitoring system that enables worker exposure to be monitored all at once from a remote location when workers are engaged in high-dose work.

- Radiation dose measurements around reactor building openings
- Investigations that use gamma cameras to determine the condition of remaining objects
- Relocation/clean-up of objects remaining on the reactor building operating floor
- Investigations of deposits at the bottom of the pedestal

The number of remote monitoring systems has been increased for high-dose work at Unit 2 since an approximate 10% reduction in exposure doses, which is approximately the same amount seen

at Unit 3 at which work commenced earlier, was achieved. Up until now these systems could only be used at two worksites, but with the additional equipment as many as six worksites can now be monitored. Furthermore, in addition to being able to monitor worker doses all at once, we have added functionality that enables each and every worker to be able to check his/her dose by giving them dose display units to wear on their arms. These systems will be proactively leveraged during future work inside the reactor building and surrounding high-dose work environments.

Remote monitoring system dose display unit



Trends in total group dose by year

2.2 Progress of Safety Measures at Kashiwazaki-Kariwa

(1) Progress with safety measures

On December 27, 2017, permission to modify the reactor installation permits for Kashiwazaki-Kariwa Units 6 and 7 was received from the Nuclear Regulation Authority (NRA). As a result, a basic design plan has been established and in accordance with this plan, detailed designs for various pieces of equipment, as well as safety measures, are being implemented at mainly Unit 6 and Unit 7 by leveraging the experience and 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	Additional deployment of air-cooled gas turbine power supply cars	Underway	Underway
	Installation of emergency high voltage distribution panels	Completed	

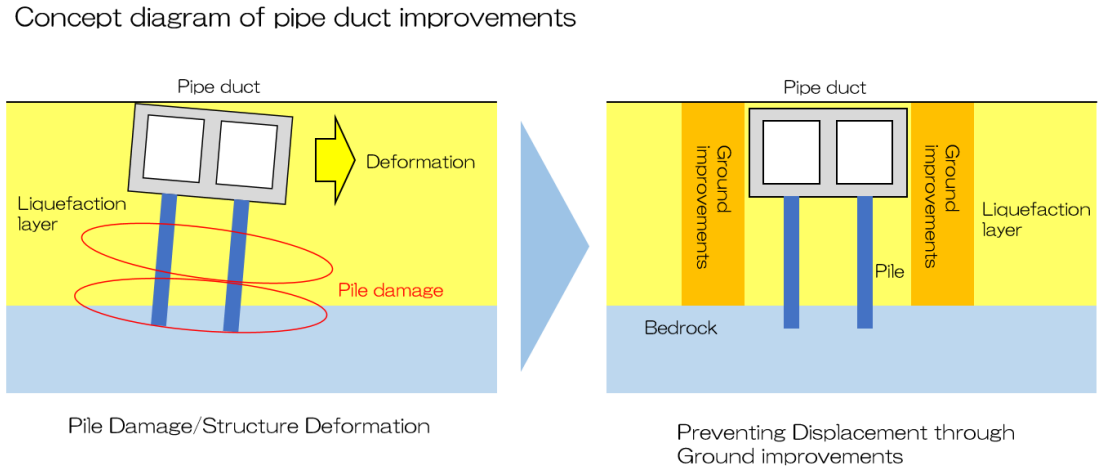
[Augmenting power sources]	Laying of permanent cables from emergency high-voltage distribution panels to reactor buildings	Completed	Completed
	Preparation of substitute DC power sources (batteries, etc.)	Completed	Completed
	Reinforcement of transmission tower foundations※ and strengthening of the seismic resistance of switchyard equipment※	Completed	
Preparing for damage to the reactor core or spent fuel [Augmenting heat removal and cooling functions]	Preparation of large volume water pump trucks and installation of 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 to the PCV and hydrogen explosions]	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
	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 bug 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	
	Construction of emergency materials and equipment warehouse on high ground※	Completed	
	Construction of Emergency Response Center in Unit 5	Underway	

Strengthening seismic resistance (including ground improvement measures to prevent liquefaction)	Seismic resistance assessment/renovations of outside equipment and piping	Underway	Underway
	Seismic resistance assessment/renovations of indoor equipment and piping	Underway	Underway

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

◆ Completion of ground improvements for Unit 7 fuel transport system pipes

Ground improvements to prevent ducts (steel reinforced concrete rectangular conduits) that house emergency diesel generator fuel transport pipes from being damaged by liquefaction are underway. In particular, we are making liquefaction harder to occur by solidifying the surrounding ground using cement-based materials and the ducts have been designed to prevent deformation and pile damage. We will continue to diligently implement countermeasures as we aim to achieve the highest levels of safety. (The planned completion date of this project is the end of March 2020).



【Liquefaction Countermeasure】Unit 7 fuel transfer system pipe duct

◆ Ground improvements for the seawater retention pool and seawall connections

The seawater retention pool is a dammed pool that has been constructed on the seafloor in front of the intake in order to retain seawater that would be required for reactor cooling in the event that the water recedes as a result of a standard tsunami. Since this seawater retention pool needs to remain functional in the event of a tsunami/earthquake, we are implementing ground improvements behind locations where the seawall connects to the seawater retention pool to prevent deformation of the seawall (the boundary between the ocean and land) during an earthquake. The ground is being improved by injecting liquid hardening materials into the soil at high pressure and mixing them with the soil. This work

is being done very carefully by first fully investigating the work area for buried objects, of which there are many, to prevent damaging these objects.

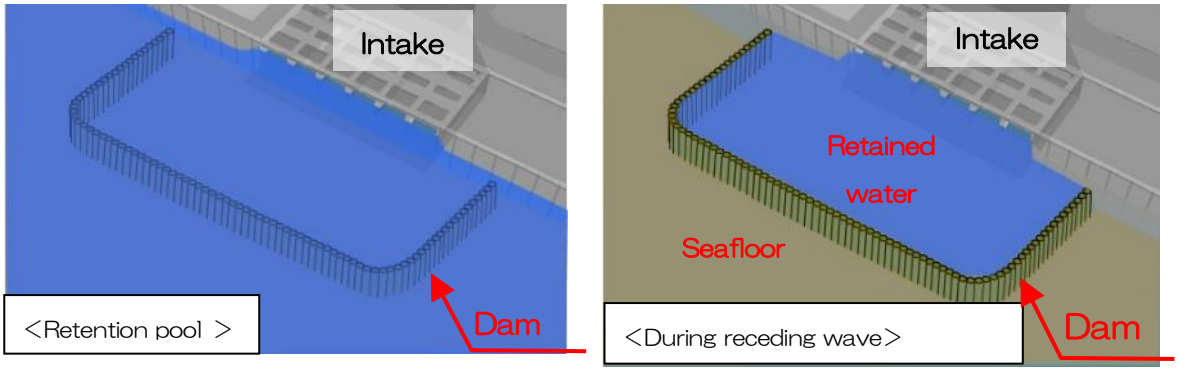
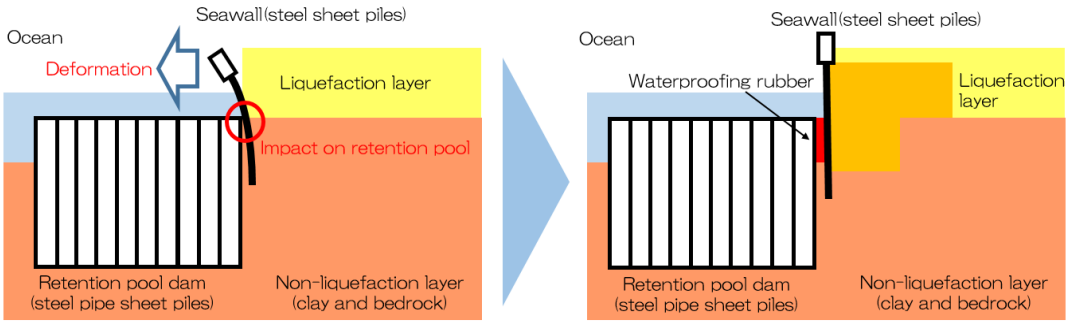


Diagram of construction at connection between retention pool dam and the seawall

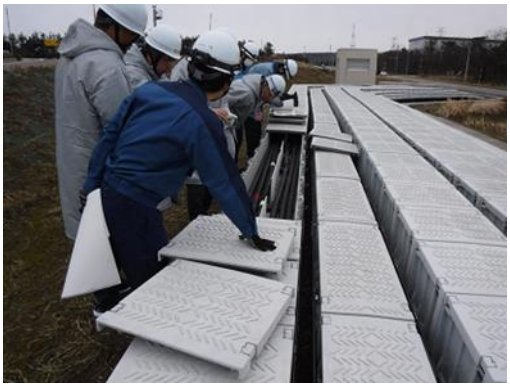


Diagram

(2) Cable tunnel fire

◆ Promoting fire countermeasures

As a countermeasure for the cable splice fire that occurred in the cable tunnel on November 1, 2018, we have affixed brackets to both ends of 99 splices that are the same as the splice where the fire occurred in order to prevent the cable sheath from shrinking as a result of temperature changes. This countermeasure will be implemented for all live splices during 2019 with brackets to be attached to the remaining locations by the end of FY2020. A detailed deliberation of methods for securing each splice is currently underway and after that concludes a work schedule for when these brackets are to be installed will be created.



Cable splicing investigation

Visual inspections of these places continue to be implemented and we have not found any abnormalities, such as burn marks or significant deformations. We are also deliberating re-laying cable in order to reduce the number of splices.

- Promoting countermeasures for the delay in notifying local governments and media organizations

As countermeasures for the delay in notifying local governments, initial response procedures for a fire have been rewritten to make them easier to understand, and a fax transmission check sheet has been created in order to keep track of facsimiles that have been sent. In regards to the delay in notifying media organizations, since the cause of this delay was a mistake made when setting fax addresses, all fax addresses were reset and test facsimiles sent in order to confirm that the faxes arrive and that there are no errors. When addresses are changed in the future test faxes will be sent in order to confirm that the facsimiles arrive in order to prevent similar delays from happening in the future.

In order to confirm the effectiveness of the aforementioned countermeasures and to obtain/improve skill, shift managers who are responsible for giving notifications of troubles that occur during night and on holidays have been subject to more realistic training during which actual telephones and fax machines are used to give notice of such events. (This training has been implemented a total of 20 times between November 2018 and the end of March 2019)

Additionally, during post-training reviews problems were identified with the initial response flow improvements and being able to quickly share accurate information. Therefore, the initial response flow was immediately revised and all shift managers were informed of these revisions in order to make improvements. (A total of four flow revisions were made between November 2018 and the end of March 2019)

Sharing information during notification training

Sending FAX during notification training

◆ Progress of countermeasures for problems related to sharing information with the Kashiwazaki City Fire Department

In order to rectify problems related to the sharing of information with the Kashiwazaki City Fire Department, the reasons for the insufficient sharing of information were analyzed and countermeasures, such as providing additional information by making more calls to the fire department ("119 calls"), using whiteboards and blueprints to provide easy-to-understand information about a fire, etc., were proposed. During joint firefighting training held with the Kashiwazaki City Fire Department on December 18, 2018 and March 6, 2019 it was confirmed that these countermeasures are effective.

Search by in-house fire brigade

Sharing information at joint field command center

During the training held on December 18, the aforementioned countermeasures were found to be effective when setting up a joint field command center for the in-house fire brigades and the Kashiwazaki city Fire Department and it was found that both parties now closely share information and coordinate better. Furthermore, during training held on March 6, a training scenario similar to the event that occurred on November 1 was used in the tunnel in which the fire occurred and it was confirmed that information was shared appropriately amidst conditions where the location of the fire differed from the location of accumulated smoke, which was an issue that needed to be addressed. The Kashiwazaki City Fire Department commented that, "we were given a good explanation of the conditions in the field as we made our way to the location of the fire," and that, "information was shared at the field command center in easy-to-understand manner which increase the feeling of unity when running the field command center." Going forward we will implement individual training and firefighting training that envisions various fire scenarios along with continuing joint training with the Kashiwazaki City Fire Department an effort to improve our fire response ability.

2.3 ANNOUNCEMENT OF THE AOMORI ACTION PLAN AND ENHANCING OUR PRESENCE IN AOMORI PREFECTURE

(1) Announcement of the Aomori Action Plan

In order to steadily move forward with our projects and contribute to the future as a member of the community, we announced the Aomori Action Plan "Create, Nurture and Continue Moving Forward" (March 28).

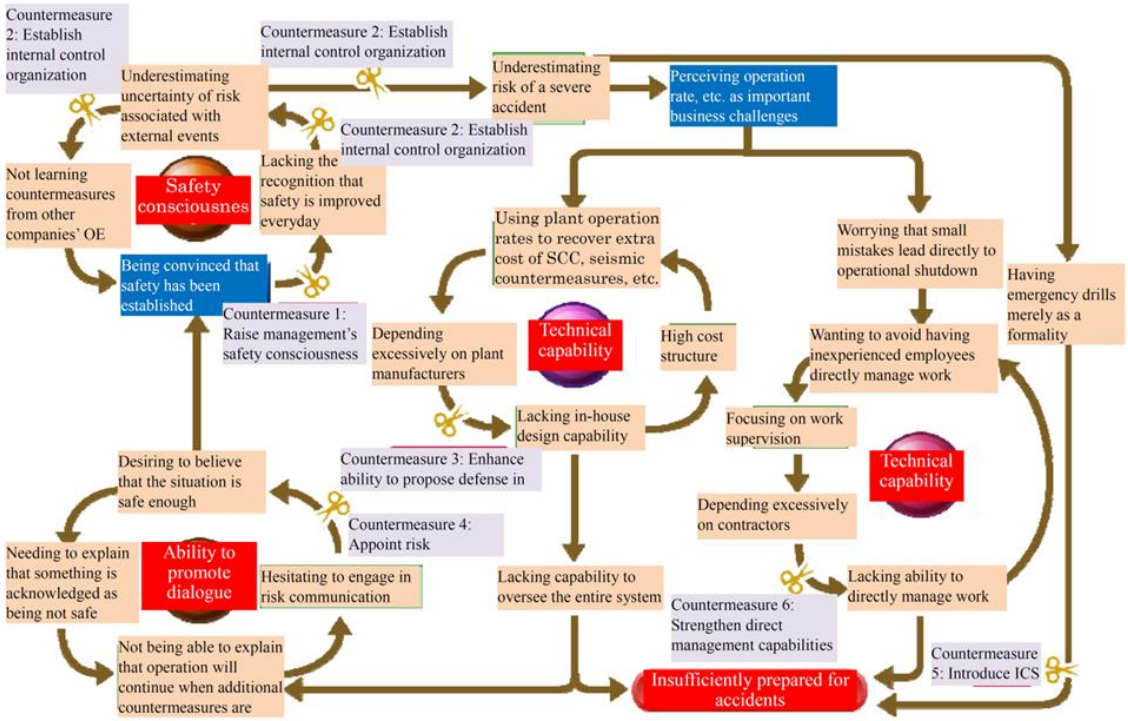
The Aomori Action Plan puts forth six basic guidelines (pursuing safety, promoting our nuclear power business, constructing systems for promoting businesses rooted in the community, co-creation of a sustainable region, training and securing nuclear human resources, and passing down/developing technological skill, proactively disseminating information and engaging in dialogue, and enhancing company-led initiatives) that TEPCO shall follow as it conducts its business activities in the region. Based on these guidelines we shall engage in an unparalleled pursuit of safety as we aim to be on the world's cutting edge of nuclear power station construction and operation, and contribute as a member of the community to creating a sustainable region that is safe, easy to live in, and provides peace of mind while moving forward with our nuclear power endeavors.

(2) Enhancing our presence in Aomori Prefecture

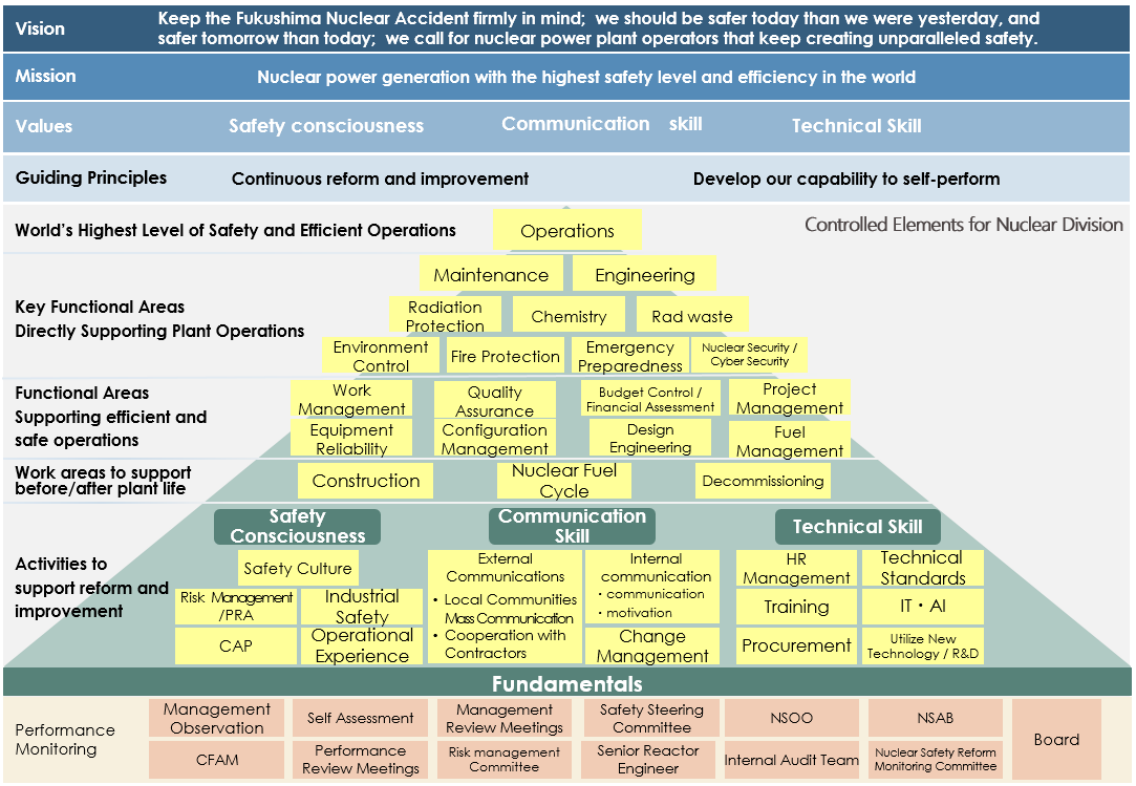
In conjunction with the announcement of the Aomori Action Plan we also announced that we will be establishing an Aomori Office during the first half of FY2019 in order to further develop the Action Plan. In addition to further strengthening our fiduciary relationship with the region we shall take more of a leading role and responsibility in the construction and management of the TEPCO Higashidori Nuclear Power Station, and support the nuclear fuel cycle as much as possible. We also plan to open up a Higashidori head office in Higashidori Village to ensure that we are managing our business from the perspective of the local community. Members from the Headquarters engineering department in charge of the Higashidori Nuclear Power Station will be assigned to the office in order to promote the project in unity with construction contractors. In conjunction with this we shall further enhance our means for disseminating information by establishing a satellite office in Mutsu City (Mutsu Office) and an Aomori Office that shall serve to strengthen the current functions of the Aomori Branch currently located in Aomori City. This is all part of our efforts to strengthen our fiduciary relationship with the members of the local community.

3 THE PROGRESS STATUS OF THE NUCLEAR SAFETY REFORM PLAN

In addition to the six measures for stopping the "negative spiral" that has exasperated structural issues faced by the Nuclear Power Division implemented based upon the Nuclear Safety Reform Plan announced in March 2013, TEPCO is engaged in initiatives to strengthen governance and develop internal communication after these areas were identified as needing further improvement.



As an initiative to strengthen governance the FDEC has created a Decommissioning Promotion Strategy (September 2016). And, in the Nuclear Power & Plant Siting Division, all duties are being carried out in accordance with the Nuclear Power Division Management Model, which was created in June 2017. The Nuclear Safety Reform Plan Progress Report gives updates on "Better Aligning the Vectors of the Organization (Strengthening Governance)," Decommissioning Promotion Strategy quality policies and on "safety awareness," "the ability to promote dialogue," and "technological capability," which are the main values of the Management Model.



3.1 ACTIVITIES TO BETTER ALIGN THE VECTORS OF ALL DIVISIONS

3.1.1 Strengthening Governance

(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 2017). During FY2018 we engaged in activities that aim for excellence upon creating a business plan based on the Management Model.

During the fourth quarter the issues that each department need to address during FY2019 were identified and work plans created based upon key issues for FY2019 identified by nuclear leaders as well as the results of FY2018 workplan retrospection carried out by each department. When creating the FY2019 workplans, internal division interviews were conducted in order to strengthen governance and cross-departmental initiatives, and Nuclear Power Division executives shared information on the individual plans of each department in order to discuss and further develop these plans. An overview of the FY2019 workplans will be given by nuclear leaders to division personnel starting in April 2019.

(2) Improvement activities by CFAM/SFAM

CFAMs and SFAMs have been assigned to each field of the Management Model to ascertain excellence achieved in other countries, identify key issues to be resolved, and formulate and implement improvements. Progress reports are periodically given to sponsors

and the CNO, and activities are being furthered while receiving advice and guidance from these parties (since April 2015).

During the fourth quarter a workplan for FY2019 was created based upon gap analysis performed for each functional area by CFAM in coordination with line departments (power station/Headquarters). Furthermore, during FY2019 we shall continue to strengthen risk management, enable the concept of operational focus to permeate throughout the organization, improve corrective action programs (CAP), and further develop human error prevention tools as part of activities to achieve excellence based upon the Management Model.

Furthermore, duties are being carried out based upon a revised and further detailed version of the Fundamentals, which put forth the attitude that employees should have and the basic principles that should be followed when engaging in daily duties, and which all employees engaged in Nuclear Power Division-related duties should understand. Currently, CFAM are using videos, etc., to explain the details of these revisions to employees that were not able to attend briefings given on the revisions in accordance with the communication plan designed to deepen understanding about the revised Fundamentals and help them permeate throughout the organization. Also, we continue to give briefings to contractors and distribute "Fundamentals for Contractors" booklets, which put forth the fundamentals that contractors should adhere to.

The following explains the status of initiatives engaged in during this quarter to address key issues facing the entire division based upon the results of third-party assessments and self-assessments.

◆ Enhancing risk management

In order to further improve nuclear safety, activities (pre-work TBM-KY, protection of important equipment by operators, etc.) for each functional field, such as operations, work management, and engineering, etc., are being improved to ensure that foreseen risks for the entire Nuclear Power & Plant Siting Division, including power stations, are identified, assessed and addressed in a systematic manner and by the same ruler. During the fourth quarter we created a user's guide based upon improvements to date that we have made with risk management and created links to documents related to manuals which serve as the basis for risk management thereby constructing a mechanism for promoting organized and systematic risk management. Furthermore, in order to spread this information to employees, briefings have been held on the improvements made to risk management. This systemization of risk management shall be improved based upon how it is being used. And, next fiscal year we shall improve each individual's sensitivity to risk through education and training in order to make risk management more effective.

Briefing at HQ

Q&A

◆ Permeation of operational focus

In order to support operations, which is the most important functional field of the entire organization, the concept of "operational focus" is being spread while strengthening existing mechanisms to ensure that the requirements of the Operations Division are considered when making operations-related decisions and when setting work priorities.

Since it is expected that workers in the operations field will lead by example and become role models for other functional areas, education that will help the idea of operational focus to permeate continues to be provided. We are also continuing to provide human performance tool training and Operations Management Division managers engage in management observation (MO) to check to see if these tools are being leveraged in the course of daily duties. By observing and giving feedback in regards to weaknesses during education, training, and the application of these tools, we aim to systematically improve operator performance.

We've also engaged in activities to help spread the concept of operational focus amongst employees that do not work in the field of operations. This is being done by providing briefings on operational focus for non-operations field employees given by power station executives and operations CFAM, and engaging them in group discussions that explain the relationship between their duties and operational focus. Furthermore, operational focus-related items have been added to the Fundamentals so that employees can use these operational focus fundamentals as reference when reflecting upon their daily duties thereby cultivating an organization that revolves around operations.

◆ Improving corrective action programs (CAP)

We aim to make efficient and effective improvements by using CAP to completely manage not only nonconformance and OE information, but also information useful for improving performance that can contribute to nuclear safety (such as management observation (MO) results, benchmarking results, third-party assessment results, near-miss information, etc.), and formulate even more fundamental countermeasures. Attempts were made in the operations and maintenance fields to analyze information inputted into CAP and make corrections after identifying weaknesses, and during the fourth quarter, quarterly performance assessments continued in major areas at Kashiwazaki-Kariwa and Fukushima Daini. Furthermore, when the importance level of nonconformance information is being determined, in addition to nonconformance management, attempts to classify this

information while focusing on nuclear safety continue as we aim to further promote improvements to nuclear safety.

◆ Developing Human Error Prevention Tools

In addition to promoting activities that deepen employees understanding about human performance tools, which serve to prevent human error, we are also analyzing the causes of human error and implementing departmental countermeasures in order to minimize errors. During the fourth quarter, we created a guide to human error prevention for the entire Nuclear Power Division and contractors, and set up an interdepartmental review committee comprised of representatives from the Nuclear Education and Training Center in addition to representatives from core departments, such as operations and maintenance, etc., in order to develop detailed plans for providing education.

(3) Permeation of the Decommissioning Promotion Strategy

The Fukushima Daiichi Decontamination & Decommissioning (D&D) Engineering Company (FDEC) is carrying out its responsibilities based on the Decommissioning Promotion Strategy (initial version issued in September 2016) that stipulates the general direction and basic policies needed to move quickly forward with decommissioning in a safe and steady manner. Like the Management Model in the Nuclear Power & Plant Siting Division, the goal of the strategy, which is to improve safety, has not changed, but a different approach is employed due to differences in the background of issues and projects, and differences in the relationship with stakeholders.

In light of the second revision made to this strategy on December 20, a Decommissioning Promotion Strategy Forum was held at Fukushima Daiichi on January 31, and at Headquarters on February 4 during which FDEC president and other company executives engaged in discussions with employees about the long-term decommissioning plan. In questionnaires distributed after the forum, participants commented that, “it was worthwhile to directly here from executives,” and, “I have a better understanding of the long-term direction of the FDEC.” Also, during the forum held at Headquarters a first attempt at using graphic recording, which uses illustrations, etc. to visualize the discussion unfolding in real time, was made and many participants commended the initiative saying that, “it was easier to conceptualize what was being said compared to printed minutes,” and, “it made things easier to understand.”

Six mini-forums were also held at Fukushima Daiichi between February and March during which discussions on different topics, such as contaminated water countermeasures, debris removal, and quality management, etc., were held each time. Limiting the discussion topics and the number of participants made it possible to engage in deeper discussions and allowed more participants to speak out. Furthermore, a discussion leader was chosen for each topic. This leader created a plan for the discussion content and how the discussion was to proceed, and was also responsible for letting people know about the discussion. This resulted in very intricate discussions and all of the discussions received high praise from participants.

Since these forums and mini-forums are very effective at helping spread the content of the strategy and elicit opinions from employees they will be continued into the future and we will leverage various means, such as graphic recording, etc., for improving the quality of these discussions.

Decommissioning Strategy Forum (Graphic recording)

Mini-forum (Fukushima Daiichi diorama)

3.1.2 Internal Communication

(1) Initiatives for promoting internal communication

In order to widely share information, such as the important initiatives of each department, problems and knowledge, etc., within the company, we have increased the number of opportunities for in-house briefings. At Headquarters, one of the activities of the internal communication team is to hold briefings on topics that are thought to be of great concern and importance to many employees. During the fourth quarter we held briefings in March on overseas projects related to nuclear power, such as the horizon project in the UK. Many participants commented that they would like to have more of these briefings in the future so going forward we will create more opportunities to hold them.

In order to show the thinking and character of nuclear leaders, in January 2019 we posted interviews with nuclear leaders on the intranet bulletin board during which they were asked to reflect upon FY2018 and talk about their aspirations for FY2019. Readers commented that they enjoyed the opportunity to understand what each leader is thinking, were able to get a sense of the character of leaders with which they have not had an opportunity to speak with directly, and that it enabled them to become more familiar with these people.

From February through March 2019, the General Manager of the Nuclear Power & Plant Siting Division (CNO) engaged in dialogue a total of eight

New year's Interview with CNO

times with group managers at Headquarters from each department in order to enable group managers to empathize and learn things through hearing the thoughts, and basis for these thoughts, of the CNO, affiliated department managers and other group managers. Approximately 50 group managers participated in these lively exchanges of opinions about such topics as technological capability, communication, and project scrap and build. Many participants commented that they were able to reaffirm the direction of measures for safety and self-assessments in their own departments and the necessity for delving deeper into these topics. Some participants also commented that the discussions were extremely easy to understand and satisfying, and that the statements made by other group managers enable them to become aware of things they had not noticed, so going forward some opportunities for discussion will be created.

Dialogue between CNO and managers

At Fukushima Daiichi, decommissioning information exchange sessions have been held since June to provide an opportunity for station personnel to exchange opinions about projects that station personnel should know about. Most recently opinion exchanges were held about topics varying from the removal of fuel from the Unit 3 spent fuel pool, and PCV internal investigations. There was a lively exchange of opinions about current problems and future countermeasures and both the participants and of the parties giving presentations commented that the opportunity was worthwhile so these types of exchanges will be continued into the future.

Information exchange session

At Kashiwazaki-Kariwa, a group manager newsletter has been sent out since January 2019 as part of internal communication activities. The purpose of this letter is to create an atmosphere within the power station in which personnel can talk freely without pressure by having them pass information to each other about each manager, group projects, and selling points. Even though this initiative has just begun, station personnel have already commented that, "hearing about the hobbies and background of each manager has made them easier to talk to," so this initiative will be continued as it is a good form of communication.

(2) Using in-house media to share information

In-house media is being used as follows to share information between TEPCO HD and core company employees.

- Company intranet videos
  - Investigating deposits in the Fukushima Daiichi Unit 2 PCV (January 29)

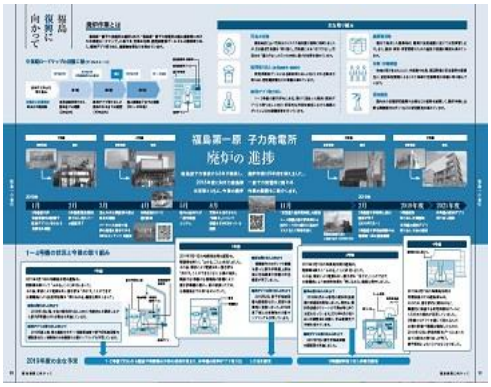
- President Kobayakawa's Determination to bring Reform ~Nuclear Reform Monitoring Committee~ (February 5)
- 6th Kaizen Grand Prix ~Decommissioning Preliminaries~ (February 7)
- 6th Kaizen Grand Prix Nuclear Power Division Preliminaries ~Kashiwazaki-Kariwa takes 1st place~ (February 7)
- Safety Rally ~Fukushima Daiichi vows to prevent accidents and disasters~ (February 13)
- Follow and overtake FP/PG!! Nuclear Power Division and Decommissioning Division Challenge (February 18)
- Decommissioning Promotion Strategy Forum ~Setting Mid-Term Goals and Long-Term Scenarios~ (February 19)
- Special Advisor Uchikawa "Kaizen is Takuto Time" ~Kashiwazaki-Kariwa~ (March 1)
- First investigation to touch deposits in the Fukushima Daiichi Unit 2 PCV (March 6)

◆ TEPCO Group News Letter
- 11th Decommissioning Project Report (Issued in January)
- The TEPCO Decommissioning Archive Center: Conveying the accident and the current state of decommissioning (Issued in January)
- 12th Decommissioning Project Report (Issued in March)
- On the frontline of decommissioning at the Fukushima Daiichi Nuclear Power Station (Issued in March)

◆ "Messages from Management" sent via the intranet
- On the eve of the anniversary of 3.11 (February 10 from the president)
- Continuing to learn from and talk about the accident (February 27 from the Vice-Chairman

Going forward we will disseminate information that fulfills the desires of employees and leverage the advantages of different types of in-house media, such as videos and the group newsletter, in order to share information through an effective media mix.

Videos posted to company intranet
(Investigating deposits in the Fukushima Daiichi Unit 2 PCV)



TEPCO Group Newsletter
(Fukushima Daiichi NPS Decommissioning Progress)

(3) Sharing of information on important tasks

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. An effectiveness assessment conducted during the second quarter of this year showed that issues are not being identified sufficiently so improvements were made to lower barriers to information dissemination and create as many opportunities as possible to share information on work issues.

Just like the third quarter, during the fourth quarter we achieved our monthly goal for the frequency of these messages of four times a month. The following are examples of the content of some of these messages.

- Community activities at Fukushima Daini (Fukushima Daini Superintendent)
- General preparedness training at Fukushima Daini (February 5) (Fukushima Daini Deputy Superintendent/Safety Center Superintendent)
- Opinions from community members (Plant Siting & Regional Relations Dept. General Manager)

As you can see from these examples, messages about important topics in various departments were even sent by parties not required to send messages, such as the Power Station Deputy Superintendent, Safety Center Superintendent and CFAM. This shows that the barriers to information dissemination are being lowered and that there are more opportunities to learn about departmental issues. Also, reader questionnaires sent along with the messages are being used to collect information on the issues that employees want to hear about and share information on. During the fourth quarter we had five requests from readers to hear about certain departmental issues. This two-way information sharing will be continued into the future.

3.2 INITIATIVES TO IMPROVE SAFETY AWARENESS

3.2.1 Cultivating Nuclear Safety Culture

(1) Improving Safety Awareness【Measure 1】

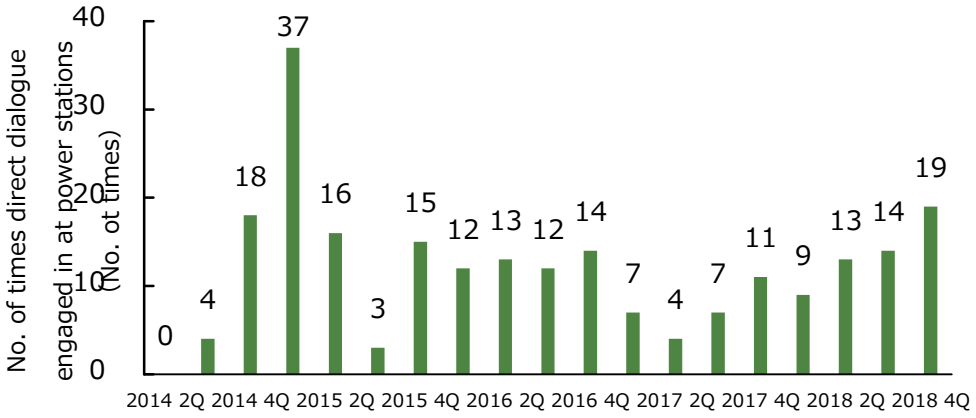
◆ Direct Dialogue between Nuclear leaders

Since the fourth quarter of FY2015, nuclear leaders at Headquarters (CNO and other Headquarter 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. Prior to this year's anniversary of 3.11 during the fourth quarter the power station executives and Headquarters managers discussed about such issues as having executives give advice to group managers so as to be able to reflect upon the origins of the Nuclear Safety Reform Plan and engage in constructive discussions. (Kashiwazaki-Kariwa: February 27, Fukushima Daini: January 31, March 26 (tentative))

During discussions to reflect upon the origins of the Nuclear Safety Reform Plan, group managers were given advice about explaining the relationship between the Nuclear Safety Reform Plan and the tasks of each group, including problems being faced in the workplace,

and also about conveying their own experience as a manager on duty during the disaster to new employees that joined the company after the accident, the number of which is growing.

Going forward, in light of the advice given to group managers by power station executives, power station executives will follow up with station personnel to ascertain to what extent their attitude towards, and the way in which they engage in, their own tasks has changed based upon the Nuclear Safety Reform Plan.



No. of times Nuclear Power & Plant Siting GM engaged in Dialogue with Workers

◆ 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 is an example of messages sent by nuclear leaders via the intranet.

January 23, 2019

A Breath of Fresh Air (Decommissioning Promotion Office General Manager

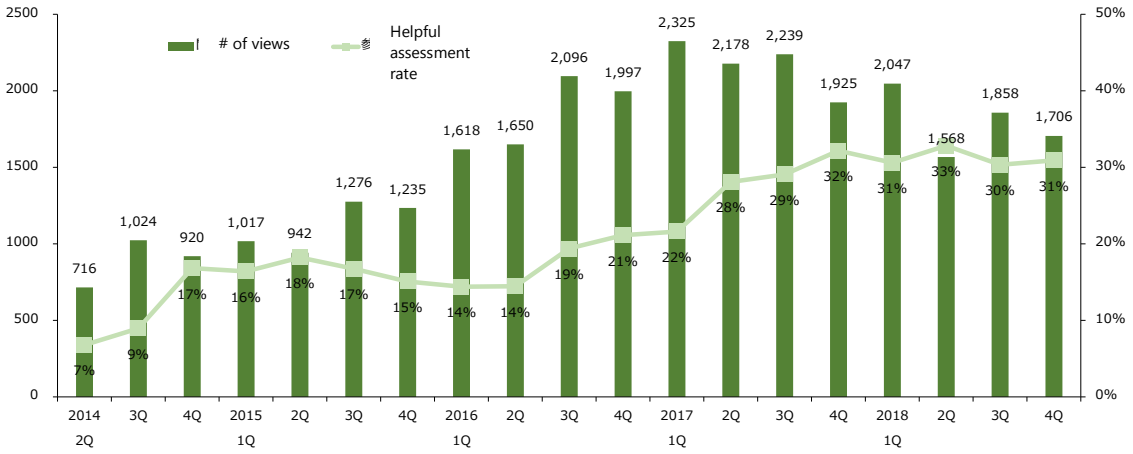
In the February 2019 issue of Bungeishunju, author Nanami Shiono wrote about his impressions after visiting the Fukushima Daiichi site. For those of you who have not already read the article, I urge you to have a look.

What was unique about this article is the fact that Mr. Shiono didn't mention one word about how much the site of the accident has changed, or the forest of treated water tanks. Instead, he spoke of two young people he met at the power station and also of four students from Tohoku University that plan to do work related to decommissioning upon graduation. It makes sense that the author of such novels as "A Roman Story," which focus on characters that have survived turbulent times, would pay attention to and notice things different from other people.

(Omitted)

Personally, I am not sure of what Mr. Shino means by, "letting yourself go," or how this should be done. Mr. Shino used a certain famous athlete as an example, and I think he was trying to say that there is a limit to what you can do based solely on your sense of duty and mission. I think it's like what President Kobayakawa said in his New Year's address. "The best way to improve at something is to enjoy it."

Perhaps he was talking about changing the atmosphere in a workplace. Whatever the case for me it was like a breath of fresh air. Hopefully this breath of fresh air can revitalize us and lead to new changes.



Number of views per message sent via the intranet/"Helpful" assessment rate
(2018Q4 does not include result for March, which was shorter than the viewing period of one month)

◆ Commendations given by CNO and the President of the Fukushima Daiichi Decontamination & Decommissioning Engineering Company (CDO)

Since FY2015, CNO and CDO 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 CNO and CDO

Period	HQ	Fukushima Daiichi	Fukushima Daini	Kashiwazaki-Kariwa
FY2015	24(2)	47	19	24
FY2016	25(1)	19	14	25
FY2017	21(2)	5	15	22
FY2018				
Q1	4	0	6	3
Q2	5(1)	4	4	4
Q3	5(1)	9	3	4
Q4	2		3	4

Numbers in ( ) indicate the number for Higashidori from the total

Commendations given by CNO

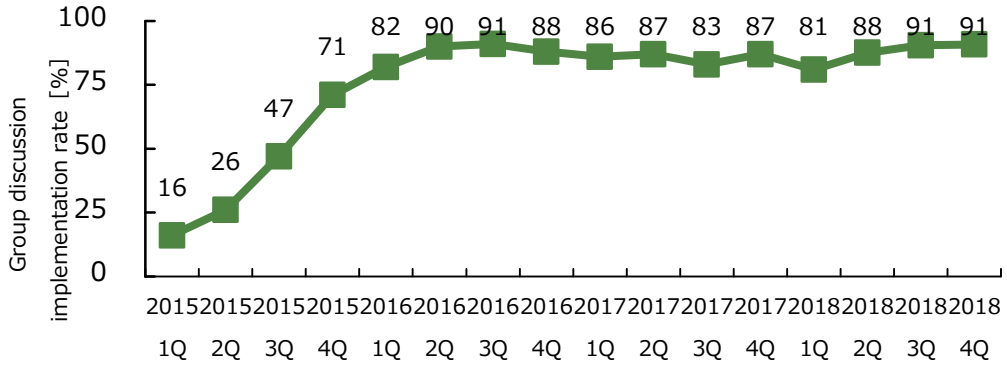
CDO Awards

(2) Training for Management【Measure 1】

Training is being provided for management so that they are strongly aware of the special risks associated with nuclear power and are deeply conscious of their responsibilities, and also to provide them with the technical knowledge required in the event of a nuclear disaster. Manager training for new executives that took office in April 2019 will be held during the first quarter of FY2019.

(3) Reflecting on the Traits of individuals and the organization【Measure 1】

The Nuclear Power Division engages in activities aimed at making the act of reflecting upon the 10 traits and 40 behaviors (10 Traits) for robust nuclear safety culture a natural occurrence. All Nuclear Power Division personnel use the intranet system to reflect on whether or not they are embodying the Traits. Group discussions are held once every two weeks based on these results and recent performance information in order to deliberate and implement improvement actions as we continually strive to fill in the gaps between the Traits and our own behavior. After deliberating the future direction of retrospection activities that leverage the Internet and also daily retrospection activities, including group dialogue, etc., the Safety Council has decided that these activities will be continually used as tools for introspection.



Implementation rate of group discussion

(4) Enabling nuclear safety culture to permeate throughout the entire organization 【Measure 1】

◆ Safety Council

The seventh meeting of the Safety Council was held on March 18 as the FY2018 Headquarter safety culture management review. Discussions about assessing FY2018 safety culture and the direction of daily retrospection activities were held at this meeting attended by CNO, Chief Executive of Decontamination and Contaminated Water Countermeasures and Headquarter GMs. When assessing FY2018 safety culture, GMs discussed the strengths and weaknesses of safety culture in their own departments and the conclusion was reached that, "when managing duties, it is necessary to monitor and list the things that need to be done, and GMs need to leverage IT tools and vitalize communication in order to better motivate subordinates." In regards to the direction of daily retrospection activities, the conclusion was reached that, "daily retrospection activities will be continued, GMs shall encourage group managers to convey the importance of introspection, and the Secretariat shall deliberate revisions to tools and how they are used to make introspection easier." Based on the discussions by the Safety Council FY2019 safety culture activity plans will be created and daily retrospection activities leveraged in order to incorporate the idea of safety culture into one's work and actions.

(5) Dialogue with contractors and activities to deepen understanding

In order to improve nuclear safety at power stations it is imperative that contractors share the same understanding as TEPCO in regards to nuclear safety reforms and cultivate nuclear safety culture. We have created a contractor version of the Fundamentals to enable contractors working on site to work as one with TEPCO employees. These Fundamentals will be used to spread these concepts throughout the organization.

During the focused self-assessment of safety culture cultivation implemented at Kashiwazaki-Kariwa (December through January), contractors were interviewed and field inspections were performed in order to ascertain the state of safety culture. The 10 Traits and 40 Behaviors for Robust Nuclear Safety Culture created by TEPCO were referenced to incorporate action examples that are applicable to work in the field in order to help field workers better understand safety culture. This is a good example of how the behaviors expected by TEPCO are being embodied in the field.

3.2.2 Performance Improvements (CAP)

(1) Promoting improvement through CAP【Measure 3】

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 (MO) results, benchmarking results, third-party review results, near-miss information, etc.), in a unified manner, and implement fundamental countermeasures.

During the fourth quarter we continued to analyze/assess information inputted into CAP and make corrections after identifying common weaknesses. In particular, we continued to conduct quarterly performance assessments of major areas at Kashiwazaki-Kariwa and Fukushima Daini. And, in addition to nonconformance management, attempts to classify nonconformances based on nuclear safety, which began during the third quarter, continue at Kashiwazaki-Kariwa.

(2) Improvements through Management Observation【Measure 2】

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.

Issues pointed out during MO at Fukushima Daini and Kashiwazaki-Kariwa have been inputted into CAP in order to create condition reports and make improvements to the problem, and this data analysis is being continued. MO results for the fourth quarter are as follows:

	Fukushima Daiichi	Fukushima Daini	Kashiwazaki-Kariwa
# of times implemented	1,066	800	1,153
# of times per month per manager	3.68 times/month/person	4.37 times/month/person	3.53 times/month/person
Good MO rate*	–	80%	62%

＊Good MO rate: Percentage of MO that PICO (performance improvement coordinator) have deemed to be good practices. However, this was not done at Fukushima Daiichi.

(3) Improvement through benchmarking

In March 2019, the Deputy CNO visited Arizona Public Service's Palo Verde Generating Station and Exelon's Three Mile Island Nuclear Generating Station to benchmark nuclear safety culture and configuration management (design schematic management).

At the Palo Verde Generating Station executives stay in close communication with station personnel in order to cultivate nuclear safety culture. And, at both stations the operators manage almost all design schematics and operation, and maintenance of the power stations is led by the operators based upon the basis for design. We shall reconstruct our management system and good examples of employee education and awareness reforms will be proactively employed at TEPCO.


Palo Verde Generating Station (left: Opinion exchange with station executives; right: Field tour)


Three Mile Island Nuclear Generating Station　　Discussion with station executives

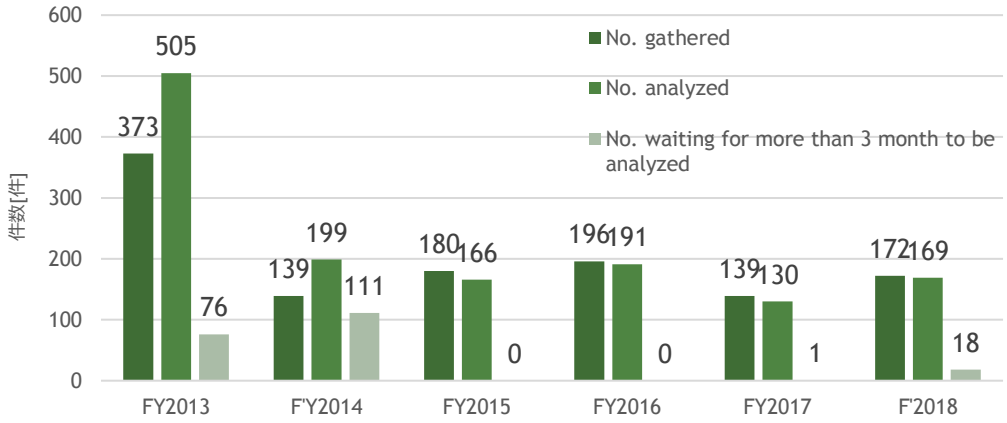
3.2.3 Leveraging Operating Experience【Measure 3】

In regards to leveraging operating experience, at its meeting held on April 3, NRA determined that insufficiencies with preventive measures at Headquarters identified at the Fukushima Daini Nuclear Power Station during the third safety inspection of FY2018 constitute a safety regulation infraction. More details on this can be found in Section 4.5 Comments, Guidance and Assessment by Nuclear Power-Related Agencies.

(1) 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, 54 pieces of new OE information were newly gathered and 65 pieces of OE information, that include information gathered in the past, were analyzed. There were 15 pieces of OE data that waited for more than three months to be analyzed.



OE data gathering and analysis performance trends

(Note: The reason why there were so much data gathered in FY2013 is because OE data from pri or to the Fukushima Nuclear Accident was analyzed)

(2) SOER and Study Sessions on Domestic and Overseas Severe Accidents

Focused study sessions on accidents and troubles that have been selected as SOER and information on serious accidents from both within and outside of Japan, such as the cable fire at the Browns Ferry Nuclear Power Plant, are being held for all Nuclear Power Division personnel, including regular employees, to provide an overview of these accidents and troubles, and understand the lessons learned from them.

During the fourth quarter, the seminar on learning the lessons from the Chernobyl accident that was implemented during the third quarter was held at Kashiwazaki-Kariwa. The third quarter seminar consisted of a lecture by an expert from the US who was intimately familiar with the accident, but during the seminar in the fourth quarter TEPCO executives led the seminar and conveyed what they learned during the third quarter seminar. During the seminar, group discussions about safety culture, risk management, and human performance were held based on the topic of "what kinds of things should we do at TEPCO," thereby enabling participants to learn the lessons from the accident and what measures should be implemented at TEPCO based on those lessons.

Furthermore, in addition to this study session, the latest OE information from within and outside the company, and information on the safety regulation infraction to be discussed in section 4.5 is, for example, being posted on in-house bulletin boards and shared amongst relevant parties in an effort to quickly share information.

In-house bulletin board on sharing the latest OE information both within and outside the company

3.2.4 Improving the Ability to Propose Defence-in-Depth Measures (Risk Management)

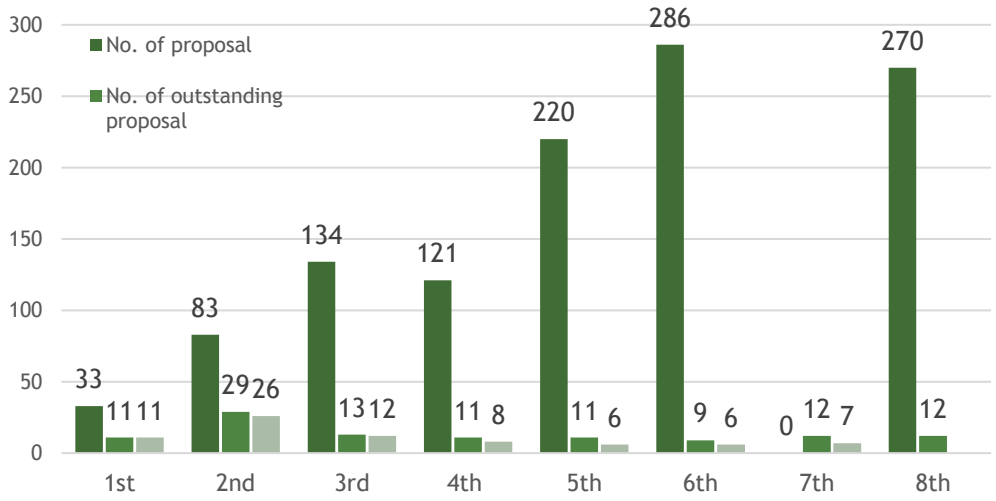
(1) Competitions to Enhance the Ability to Propose Safety Improvement Measures【Measure 3】

◆ 8th Competition

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 FY2018 the 8th competition to newly gather suggestions from the field and input on risks was held and a total of 270 proposals were received from not only power stations and the Headquarter Nuclear Power Division, but other departments as well. The proposals were reviewed by the Secretariat, voted on by all of the employees in the Nuclear Power Division and then reviewed by nuclear leaders. As a result, 12 outstanding proposals were selected. Deliberation on how to put these outstanding proposals into practice is underway.

The following chart shows the number of proposals that were submitted and put into practice as of the 8th competition.



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

(Note 1: During the 7th competition we conducted a repechage for unselected proposals so the number of new proposals submitted was 0. Note 2: One of the outstanding proposals from the 6th competition ("Enhancing fire countermeasures by installing initial fire extinguishing ball-type hydrants") was withdrawn because it was not applicable to power stations due to management issues)

◆ Outstanding proposals that have been put into practice

During the fourth quarter five out of the 12 outstanding proposals from the 7th competition were put into practice as noted below.

- Enhancing feedwater options in the event that Kito River intake equipment cannot be used (Fukushima Daini)

In order to enhance feedwater options in the event that Kito River intake equipment cannot be used, procedures were written to enable water from deep well pumps to be transferred to road sprinkler trucks (6.5t X 2) using fire hydrant hoses and supply it to water treatment equipment.

- Making improvements to cooling water injection connection port signs on the outside of buildings (Kashiwazaki-Kariwa)

In order to improve the reliability of repair work during the handling of an emergency, the design of signs for external connection ports for portable equipment (fire trucks, power supply trucks, etc.) located on the exterior walls of buildings was changed to make them more visible. Connection port signs will be gradually replaced with this newly designed sign.

- Enhancing methods for determining core damage in the event that CAMS is rendered unusable (Kashiwazaki-Kariwa)

In order to diversify the means for determining core damage when handling an emergency, using portable dosimeters to measure doses at the entrance way to the double doors of the reactor building, and leveraging a chart that estimates core damage based upon these measurements, can now be employed as an alternate method for determining core damage in the event that function is lost to CAMS (Core Atmosphere Monitoring System).

- Enhancing equipment used for checking field conditions after a tsunami (Fukushima Daiichi, Kashiwazaki-Kariwa)

Chest waders have been put inside buildings and offices for use when responding to an emergency after a tsunami in order to prevent workers from being contaminated by radioactive substances and improve work efficiency.

- Implementing emergency response training that considers site assistance (Fukushima Daiichi, Fukushima Daini, Kashiwazaki-Kariwa)

In order to further improve our emergency response, the level of experience of emergency response personnel was improved and issues that cannot be addressed during classroom study were identified by implementing training during which personnel and material/equipment were actually relocated to provide site assistance.

Enhancing feedwater options in the event that Kito River intake equipment cannot be used

Installation example

As seen at night

Making improvements to cooling water injection connection port signs on the outside of buildings

Enhancing methods for determining core damage in the event that CAMS is rendered unusable

Enhancing equipment used for checking field conditions after a tsunami


Implementing emergency response training that considers site assistance

(2) Using hazard analysis to construct improvement processes【Measure 3】

We are creating approaches to, and mechanisms for, accidents and hazards that have high "cliff-edge potential"[4] and efforts are being made to propose and implement countermeasures. During the fourth quarter the cold wave that attacked Hokkaido on February 8 was assessed as an example of a recent natural phenomenon. It was confirmed that since the aforementioned cold wave is a phenomenon that may occur once every couple of decades, design standards address events that are even rarer.

(3) Risk Information-based Decision Making (RIDM)

Appropriately deliberating and installing safety equipment, and operating that equipment suitably, is indispensable to ensure plant safety. In particular, considering risk information during the safety equipment design/deliberation stage leads to plant safety improvements. For example, it is important to consider risk information, such as equipment reliability, etc., create equipment that is effective at maintaining nuclear safety, and consider risk, such as core damage, when appropriately maintaining systems that should be maintained for nuclear safety, including the aforementioned equipment. Therefore, we are promoting the use of risk information during the design management process and safety management processes during shutdown, and constructing these processes so that risk information can be fully utilized.

During the design management process risks pertaining to design activities that should be addressed in order to properly consider risk related to nuclear safety were enumerated. It was also decided that the Safety Division will refer to design activities and leverage this list in order to comprehensively consider risk information.

In the course of managing safety during reactor shutdown, criteria for managing core damage risks were deliberated and clarified in manuals based upon current and future plant status. The level of importance of these risks is assessed in accordance with the degree of escalation of these risks based on these criteria, and risk reduction measures are implemented accordingly (schedule changes or alternate measures). These assessment results are shared internally as risk predictions.

Risk information will be further leveraged in the course of other duties as well. For example, equipment and operations vital for nuclear safety shall be identified from the results of probabilistic risk assessments (PRA), and used to educate operations and maintenance division personnel in

4 Cliff-edge potential: Potential for a calamitous situation resulting from a simultaneous and wide-scale loss of function caused by common factors

order to help improve technological capability. In addition, improving the reliability of operations by adding information about important operations into procedures shall be considered. Furthermore, the latest risk information shall be leveraged during equipment maintenance, and maintenance shall be performed with a focus on important equipment.

3.3 IMPROVING THE ABILITY TO PROMOTE DIALOGUE

Although initiatives to improve the ability to promote dialogue are ongoing, we have still been unable to prevent operational mistakes and insufficiencies. The root causes of this problem are a lack of professionalism and a lack of awareness about conveying information that is easily understood, so we have begun initiatives aimed at making improvements.

3.3.1 Improving Risk Communication Skills【Measure 4】

(1) Communication with the Siting Community【Measure 4】

◆ Activities in the Fukushima region

- Providing information that is easily understood

Creating videos that explain decommissioning work

Deposits thought to be fuel debris have been seen during internal investigations of the Unit 2 primary containment vessel (PCV) and on February 13, 2019 an investigation to intentionally touch these deposits in order to ascertain their hardness/brittleness, etc. was implemented. This was the first time that an attempt has been made to touch deposits and the investigation was a topic of great interest to society, so we created two videos. The video prior to the investigation explained investigation methodology and safety measures (released on January 21), and the video created after the investigation explained the results of the investigation (released on February 28). The video includes interviews with contractors involved in the work during which they speak about their feelings towards this investigation. Those who have seen the video have commented that, "the CG animation and actual investigation video make it easy to watch," and, "the easy-to-understand explanation makes it easy to comprehend the details of the investigation." Furthermore, the video taken during the prior internal investigation (January 2018) has been re-edited (panorama composite) to make it easier to get a grasp of the entire primary containment vessel. This reedited version was released on February 28.

Information on decommissioning initiatives is being disseminated via released documents and social networking platforms, but we have created a time sequence video entitled, "Fukushima Daiichi Nuclear Power Station ~A Look Back at the Eighth Year Since the Accident~" that looks back at the past year (released on March 7) in order to give a comprehensive overview of current conditions on site and the initiatives underway.

At TEPCO we feel that having society learn that decommissioning is steadily progressing is progress in itself, and we will continue to strive to create content that explains the initiatives

of great social concern in an easy-to-understand manner in an effort to disseminate information that is easily understood.

Explanatory video:
Unit 2 PCV Internal Investigations

Video:
Fukushima Daiichi Nuclear Power Station ~A Look Back at the Eighth Year Since the Accident~

- Communication with stakeholders

Fukushima Daiichi tours

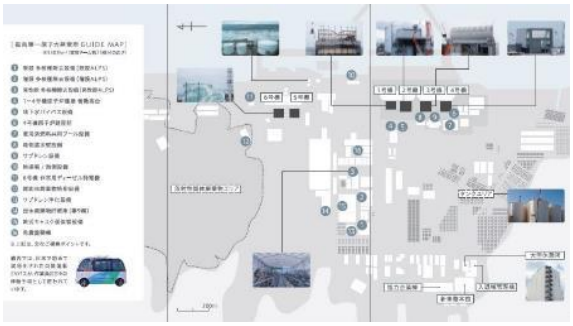
During the fourth quarter we had many visitors from the siting community, educational institutions and overseas were able to deepen their understanding of the decommissioning process, fuel debris, and the work environment on site for their visit. On February 25, 25 professors and education ministry related officials from Asian nations, including Tokyo University Professor Takeshi Iimoto, were given a tour of the Fukushima Daiichi decommissioning site and the TEPCO Decommissioning Archives Center as part of the IAEA's Asia-Pacific Region Technical Cooperation Programme. After the tours a participant commented that, "when I get home, I want to tell everyone that we were able to get close to the building where the explosion occurred without a mask."

After a visit to the Decommissioning Archives

Creating a pocket guidebook for Fukushima Daiichi visitors

During visits to Fukushima Daiichi, tour participants are given A4 size documents that provide an overview of decommissioning. Cameras are also prohibited from being brought on site in order to protect nuclear material, and tour participants have commented in the past and that, "the documents are too big to carry," and, "I wish I could've taken pictures to put on SNS." So, as part of our initiative to convey information that is easily understood and make improvements in regards to these opinions, we have created a pocket-size guidebook that visitors to Fukushima Daiichi can take home with them in order to show their family and friends. Distribution of this guidebook began on March 26, 2019. The guidebook explains the

tour route, equipment used for decommissioning, and the status of initiatives underway. The guidebook also contains a QR code that can be used to download pictures of the Fukushima Daiichi from the Internet. We will continue to make improvements to the guidebook based on opinions from tour participants.



Guidebook for Fukushima Daiichi visitors

- Press conferences

	HQ	Fukushima Daiichi		Fukushima Headquarters
Name of Press Conference	Nuclear Safety Reform Plan Progress Report	Regular press conference	Mid/Long-Term Roadmap press conference	Revitalization Headquarter President press conference
Date	Feb. 20	Every Monday and Thursday	Jan. 1, Feb. 28, Mar. 28	Jan. 25, Feb. 27, Mar. 26

- Published Info Magazines

	Hairomichi	Monthly 1F	Fukushima Daini Newsletter
			
Release Date	Feb. 19	Jan. 20, Feb. 20, Mar. 20	Feb. 1
Circulation	Approx. 35,000 copies	Approx. 2,000 copies	Approx. 14,000 copies
Overview	Introduces the remotely operated robots used for decommissioning, feelings of employees that experienced 3.11 first hand, and the establishment of the treated water portal site.	・1F today ・The people that protect 1F ・Dedication to safety	・Pictures from site tours ・Introduction of work underway at the power station ・Info on the Decommissioning Archives

◆ Activities in the Niigata area

- Providing information that is easily understood

The heads of government in the siting community and prefectural residents who visit communication booths have commented that they would like to see more information conveyed about the state of Japan's energy situation. Based on these opinions, we created a magazine advertisement that conveys information related to the state of Japan's energy situation (energy self-sufficiency rate, fuel procurement rate), and had it printed in magazines that targets women in the local community (*Happy Mama, Rainbow Colors, Kuru-ru Niigata Version*).

Since Japan's energy situation is a difficult topic to discuss, we chose to use a manga format in order to convey the information easily. In doing so, magazines commented that, "making it into a manga makes the information easy-to-understand," and, "you should talk about other forms of energy as well." We are planning to create Internet content in order to explain such topics to parents and children and an even easier-to-understand manner.

What's and Why's of Energy

Going forward we shall leverage various opportunities for corporate communication to carefully explain Japan's energy situation to the people of Niigata Prefecture.

- Communication with stakeholders

Events at Kashiwazaki Energy Hall

We are periodically holding various events at Kashiwazaki Energy Hall and Comfy, TEPCO PR facilities located in the center of Kashiwazaki City, in order to create opportunities to engage with members of the community and entice them to come to these facilities. Prior to starting an event, we show corporate communications videos, such as "The Fukushima Daiichi Nuclear Power Station Today," to the attendees to convey the status of progress of decommissioning at Fukushima Daiichi, and the safety measures underway at Kashiwazaki-Kariwa. The event participants that have seen these videos have commented that, "they are very educational."

In order to engage community residents, we held several events at Kashiwazaki Energy Hall during the fourth quarter which include a magic show in January (192 participants), a classical music concert in February (183 attendees), and a movie screening that 803 people attended (held over two days with three screenings each day). The movie screenings had been stopped after the Fukushima Daiichi accident, but members of the community

have asked that they be started again, so we resurrected this event in April 2018. Going forward we will continue to hold events that will enable participants to become more familiar with TEPCO and also contribute to the region based upon opinions from community members.

- Press Conference Stats

	Niigata HQ	Kashiwazaki-Kariwa
Name	Niigata HQ President's press conference	KK Site Superintendent's press conference
Date	Mar. 20	Jan. 10, Feb. 14, Mar. 14

- Info Magazine Stats

	News Atom	TEPCO Newsletter
		
Date of Issue	Jan. 6, Feb. 11, Mar. 10	Feb. 28
Circulation	Approx. 32,000 copies	Appr. 670,000 copies
Overview	Monthly power station news, "Meet the power station workers," Message to the residents of Kashiwazaki City and Kariwa Village	Information on the cable fire

(2) Management communication initiatives【Measure 4】

Executive Vice Chairman Hirose gave a lecture on the lessons learned from the accident and the current conditions in the Fukushima at Stanford University in California (February 25, 26). The lecture, which was given three times (once to business school students, once to engineering students, and once to Japan-related researchers and educators) was attended by a total of 300 people. After the lecture, many questions were asked such as, "what is the future of nuclear power?" "What is the current state of debris/contaminated water treatment?" "What are the nuclear safety measures that have been put in place since the disaster?" "What changes have there been in the relationship between nuclear operators and regulatory agencies?" and, "How do you view the possibility of leveraging AI in the decommissioning process?" and a lively exchange of opinions ensued. University officials commented that, "we had many more attendees than expected." Conveying the conditions in Fukushima to the rest of the world is one of TEPCO's most vital missions, and we will continue to be innovative in how we convey information about Fukushima while considering the countries and regions in which lectures are given, and the concerns and interests of the parties listening.

Lecture by Vice Chairman

(3) Communicating with overseas partners【Measure 4】

- Providing information that is easily understood

Localization of decommissioning contents

We have created English versions of the videos mentioned in (1) and the pocket guidebook. An English version of the treated water portal site (created in December 2018), which gives information on treated water for which the concentration of radioactive substances, with the exception of tritium, has been reduced using various types of equipment, was created in January 2019 for personal computers, and in February of the same year an English version for smart phones was also released. Going forward we shall leverage various content in an effort to disseminate information overseas.

Conveying information via SNS

We continue to send email magazines to media outlets and experts in different nations and post information on Facebook and Twitter in order to proactively disseminate information. During the fourth quarter six email magazines were sent, 22 posts were made to Facebook, and 25 tweets were made on Twitter. The information on the Fukushima Daiichi Unit 2 primary containment vessel internal investigation during which deposits work intentionally touched received twice as many hits on Facebook as other posts. We will continue to disseminate information at appropriate times while playing close attention to stories and issues of concern brought up by overseas media outlets about TEPCO.

Splash page for English version of treated water portal site

Facebook

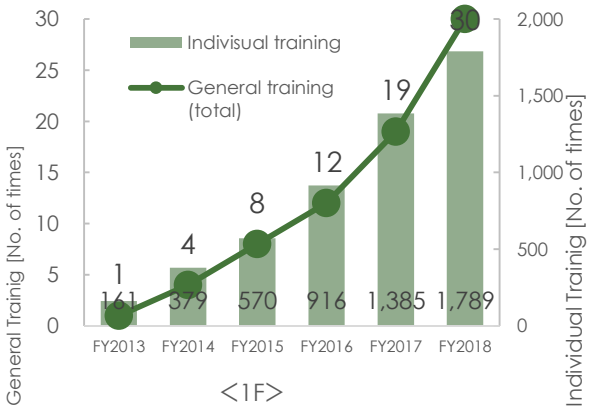
3.4 IMPROVING TECHNOLOGICAL CAPABILITY

Although initiatives to improve technological capability are underway, we have been made painfully aware once again of our inability to examine current equipment and work processes and make improvements on our own, so efforts aimed at further improvement have commenced.

3.4.1 Strengthening Technological Capability (during times of emergency)

(1) Enhancement of Power Station and Headquarter Emergency Response (Organizational) Capabilities【Measure 5】

In the results of training assessments for each nuclear power station by NRA conducted during FY2017, it was pointed out in regards to sharing information with NRA that explanations from TEPCO are insufficient, and that handling in the case that information from the plant data system cannot be transmitted is insufficient. An Emergency Response Improvement Plan, which includes reorganizing experienced teams, assigning personnel responsible for sharing information, and improving the knowledge and skills of personnel, etc., was compiled (disclosed on August 27) in light of the harsh assessment of FY2017 training. Individual and general training sessions were repeatedly held based upon this improvement plan and during the fourth quarter general training at Fukushima Daini (February 5), which was observed by members of NRA, showed improvements have been made in regards to sharing information, so this training will continue into FY2019. Results for each power station are as follows:



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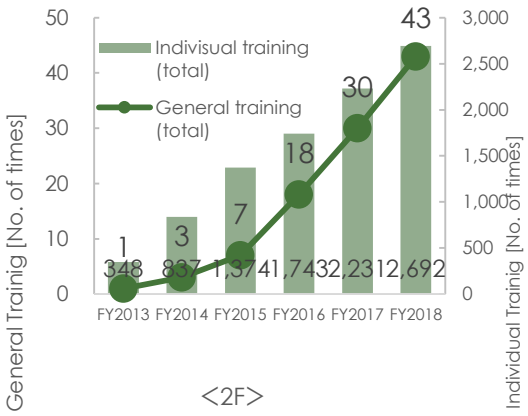
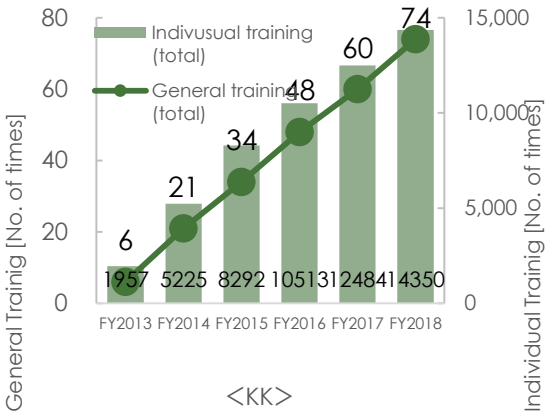




◆ Fukushima Daiichi; Fourth Quarter General Training: January 30, February 21, March 18

Emergency response Center (1F)

The scenario for general training held on March 18 consisted of events caused by a tsunami resulting from an earthquake originating along the Kuril-Kamchatka Trench. During training focus was put on formulating power station recovery plans to ascertain and respond to equipment damage in the midst of a reactor cooling water injection shutdown and increasing accumulated water levels in the basements of reactor buildings, which was caused by a simulated tsunami. There were no problems with formulating plans for ascertaining and responding to equipment damage, however improvements need to be made to tsunami monitor response procedures and equipment repair procedures. Furthermore, in order to improve the skill of personnel who are not part of experienced teams, personnel from experienced teams gave direct guidance to these parties. Since this was effective at improving skill these measures will be continued as we aim to improve the skill of the entire organization.

◆ Fukushima Daini; Fourth Quarter General Training: January 25, February 5, March 28


Emergency response Center (2F)

During general training on February 5 an emergency response exercise was held under the supervision of representatives of NRA. During the exercise, personnel engaged in training on how to deal with decreases in water levels caused by large-scale leaks from the spent fuel pools that were caused by an earthquake. According to the scenario, water accumulated in the reactor building and water levels in spent fuel pools dropped as a result of the large-scale leaks. In response, personnel identified the location of the leaks and predicted the impact of the accumulated water, performed impact assessments of radiation doses, predicted fuel damage, set repair priorities, and determined suitable objectives for repair and waterproofing strategies. It was confirmed during training that such countermeasures could be implemented and that related

information could be shared between the power station and Headquarters. In regards to the sharing of information between the power station and Headquarters, emphasis was put on providing information that is visual and methods revised to better decide on what information to display and use set formats for documents thereby making it easier to look back at the information. As a result, information from the power station was shared within the power station response center and with Headquarters better than ever before. Representatives from the Nuclear Regulation Authority commended participants on how they engaged in briefings, focused on objective setting meetings, spoke out during meetings, and organized information. However, they also pointed out that there was too much time between emergency measure overview reports. Since the training scenario employed involved a disaster at a single plant, going forward we shall employ scenarios in which disasters occur at multiple plants and deliberate ways in which information can be shared in the midst of compound events.

◆ Kashiwazaki-Kariwa; Fourth Quarter General Training: January 18, February 21, March 15

Emergency response Center (KK)

Training exercises based on basic base scenarios were conducted in order to train personnel who are not part of experienced teams, which was an issue identified after emergency response exercises conducted during the third quarter. During the training, two exercises were run consecutively in order to improve the level of experience in a short amount of time. During the first exercise trainees learned the basics by responding to a scenario of which they had been informed. During the second exercise, the ability to respond to accidents was improved by having participants respond to a different scenario which had not been disclosed. Also, joint training between Headquarters and the power station was held on March 15 in order to enhance coordination with Headquarters, which was an issue identified during emergency response exercises. By repeating training exercises consecutively, it is possible to ascertain trends in decision making mistakes by response personnel and information sharing mistakes, thereby enabling focused corrections and improving the initial response ability of personnel when faced with an accident, so we will continue in this way to cultivate experienced personnel and strengthen their skills.

◆ Headquarters; Fourth Quarter General Training: January 9, January 16, January 23, January 30, February 4, February 5, March 15

Emergency response Center (HQ)

During emergency response exercises held at Kashiwazaki-Kariwa and Fukushima Daiichi during the third quarter, all the simulated events were handled by highly experienced and knowledgeable teams. In preparation for the emergency response exercises held at Fukushima Daini on February 5, repeated training conducted jointly with the power station was implemented in order to raise the level of skill at Headquarters/power stations to the same level as that of Kashiwazaki-Kariwa and

Fukushima Daiichi. As we head into next fiscal year, we will continue to increase the number of experienced personnel to address the issue of enabling experienced initial response personnel to quickly arrive at Headquarters.

(2) Improving the in-house technological capability of power stations【Measure 6】

◆ Fukushima Daiichi

Since FY2014 Unit 5/6 operators have been trained on the use of fire trucks and power supply trucks. As of the end of March, 38 people had been trained on fire trucks thereby fulfilling our goal of 31 certified personnel (80% of field personnel (38 workers) (one person decrease over quarter three)), and 38 people had been certified on the use of power supply trucks (see the chart below for details). Acquiring skills needed to manage the operation of reactor cooling water injection equipment and contaminated water treatment equipment has been prioritized for Unit 1~4 equipment operators and water treatment equipment operators.

◆ Fukushima Daini

Training on fire engines and power supply cars commenced in FY2014. As of the end of March, 233 operators have been certified on the operation of fire engines thereby meeting our 27-operator goal (80% of the 33 operators in the field (decrease of one operator since the first quarter)), and 32 operators had been certified on the operation of power supply cars (see the chart below for details). Quarter four objectives were also achieved. Furthermore, up until now personnel have been assigned to either Units 1/2, or Units 3/4. However, since the second quarter personnel have been gathered into one team to enable anybody to work on any reactor. Giving personnel multiple skills in this way should not only improve normal duties but also the ability to respond to emergencies.

◆ Kashiwazaki-Kariwa

Fire engine and power supply car operation training commenced during FY2013. As of the end of March, 113 operators have been certified on the operation of fire engines thereby exceeding our 90-operator goal (80% of the 113 operators in the field (decrease of four operators since the third quarter)), and 102 operators had been certified on the operation of power supply cars (see the chart below for details). As of the end of March, the number of instructors in shift departments was 149 (increase of three since the third quarter). Also, a field operations competition like the one that was held first at Fukushima Daini was held for the first time this fiscal year for auxiliary operators. Operators from each unit competed in common field tasks, such as pre-startup checks after pump inspections, in order to learn points for improvement thereby maintaining/improving and standardizing field skills.

Power Station	Fire engines		Power supply trucks	
	No. of certifications (comparison with last quarter)	Fill rate	No. of certifications (comparison with last quarter)	Fill rate
1F	38 (+2)	123%	38 (+2)	123%
2F	33 (+6)	122%	32 (+2)	119%
KK	113 (+11)	126%	102 (-1)	113%

Initiatives to improve the in-house technological capability of operators (no. of certifications)

(3) Status of initiatives to improve the in-house technological capability of power stations (maintenance field)【Measure 6】

◆ Fukushima Daiichi

We are continually implementing training to develop in-house technological capability (training on the operation of power supply cars, emergency generator operation training, concrete pump truck operation training, training on the temporary laying and connecting of hoses, etc.) in order to improve the ability to respond to emergencies. During the fourth quarter training focused on using fire engines to inject seawater into reactors for which reactor coolant injection equipment was damaged by a tsunami (fire truck deployment, hose laying, etc.) thereby improving skills needed in an emergency.

During this fiscal year emphasis was put on training to respond to abnormalities with reactor coolant injection and spent fuel pools in light of the foreseen risks at the Fukushima Daiichi thereby deepening understanding of methods for deploying fire engines and laying hoses, etc. During next fiscal year we will continue to implement repeated training in an effort to maintain skill and we will aim to improve the precision of training by, for example, shortening response time and improving accuracy.

Reactor coolant injection training (Fire truck deployment)

Reactor coolant injection training (hose laying)

◆ 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). During the fourth quarter we continued to implement training during which team members are rotated in order to increase the number of personnel that can respond to an emergency by subjecting them to training with different team members. We will continue to implement training in innovative ways in order to flexibly respond to various conditions.

During this fiscal year we primarily put a focus on improving skill, such as increasing the number of certified team leaders to repeated training, and increasing the number of response personnel by rotating members into experienced teams. The content of drone operation training was also further enhanced by simulating disaster conditions thereby enabling drones

to be operated in environments that differ from normal environments (operation locations, flight routes). Next fiscal year we shall continue repetitive training and attempt to use the minimum number of people needed to respond to an accident during training (optimization).

◆ Kashiwazaki-Kariwa

In order to improve in-house technological capability and prevent severe accidents from happening, during the fourth quarter we implemented various training on, for example, the operation of bucket trucks, valve/drive mechanisms (AO copper pipe fitting), welding/cutting/grinding, scaffold assembly, and forklift operation. We will continue to implement repetitive training in order to maintain and improve in-house technological capability.

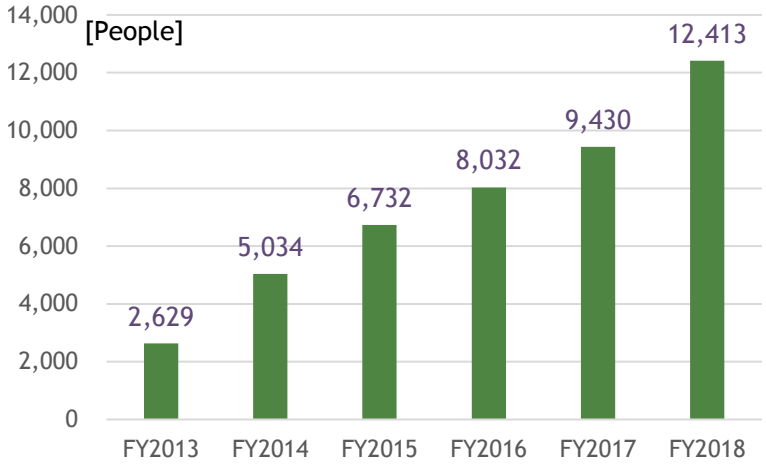
During this fiscal year we continued to implement repetitive training in accordance with plans in order to improve in-house technological capability in the field. In particular, we focused on improving skills through highly versatile training, such as the operation of mobile cranes, which are needed for loading heavy objects, the assembly and disassembly of scaffolding, which all personnel need to be familiar with regardless of whether they are engaging in emergency work or non-emergency work, and welding/cutting/grinding training, which teaches how to fabricate metal, a skill needed to repair damaged equipment. Next fiscal year we will continue to maintain skill through repetitive training and strive to expand the abilities of personnel and improve technological capability.

Bucket truck operation training

Valve/drive mechanism (AO copper pipe fitting) training

Welding/cutting/grinding (gas torch cutting)

Scaffolding assembly training



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

3.4.2 Strengthening Technological Capability (during times of non-emergency)

(1) Improving education and training programs based on SAT【Measure 6】

◆ Reconstructing education and training programs based on SAT

The Nuclear Education and 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 Meeting. These three bodies effectively put education and training programs through the PDCA cycle based upon SAT.

Tiered review committees

In the area of maintenance, more effort is being put into education and training aimed at preventing human error and equipment nonconformances. At Fukushima Daini and Kashiwazaki-Kariwa, we continue to offer human factor/human error prevention tool training and skill training on foreign material exclusion (FME) for Maintenance Division personnel that act as work foremen, and from March we will also commence slinging/torque management training. Furthermore, we conducted pilot training programs for Maintenance Curriculum Review Council members in preparation for human factors/human performance tool training to be provided in FY2019 to maintenance system personnel who supervise work at Fukushima Daiichi.

Human performance tool training (Fukushima Daiichi)
Left: Work procedure pre-check; Right: Skill practice in simulated field environment

In the area of nuclear safety, we have commenced accident response training that teaches trainees about plant behavior during a severe accident, such as reactor water levels, and containment vessel pressure and temperature, etc., and cultivates a natural ability to ascertain accident conditions and respond appropriately. During the fourth quarter, classroom training in order to deepen understanding about plant behavior and response procedures during an accident was held twice, and skill practice during which severe accident mapping code (MAAP) was used to deliberate accident responses was implemented once. Approximately 83 people including emergency response personnel from each site (planning teams), skill certification holders (nuclear safety) and other station personnel (Power Generation Division, etc.) participated. During skill practice using the analysis code (MAAP), a sensitivity assessment was conducted on the topics of core cooling and spent fuel pool cooling during an accident, and trainees learned effective responses to various plant conditions during an accident.

Skill practice using MAAP (at TEPCO Systems)
Left: Event analysis by each group; Right: Presentation of analysis results by each group and discussions

◆ Team leader training

In March, soft skill training for team leaders was conducted in order to make Nuclear Power Division team leaders aware of their roles as leaders and bestow upon them a heightened sense of responsibility. The training also served to give them the soft skills necessary to identify even the smallest of problems in their departments, and exhibit the leadership and communication required to solve them. This training was held three times and a total of 87 leaders participated. This initiative will be continued in FY2019 and onward.


Team leader training (HQ)
Left: Group discussion of team leader's handling of issues; Right: Listening practice "Talking about worries in the field"

◆ New employee training

An effectiveness assessment of the training for new Nuclear Power Division employees that concluded in the third quarter is underway. During the assessment the results of tests to confirm comprehension and questionnaires were gathered, and trends analyzed. Their assessment also confirmed that trainees acquired the common knowledge and skills related to power station operation that they should have prior to being assigned to the Division, and that targets were achieved. Furthermore, both instructors and participants in shift training were given high marks, so this training will continue in FY2019. Issues that were identified as areas that require improvement, such as including more visual information in training textbooks, providing active training, such as group work and observation (training during which participants participate and experience things for themselves), and determining an appropriate time for conducting follow-ups in the event that comprehension is low, etc., shall be addressed in the new employee training plan for FY2019.

◆ Support for gaining expert knowledge

Group training and group study sessions are held prior to the senior reactor engineer exam in order to give support to those taking the exam. 63 people took the senior reactor engineer written exam in March. Furthermore, since FY2017 study sessions have been held for those looking to become certified as licensed electrical engineers and in FY2018 two people passed the category 1 licensed electrical engineer exam for the first time since the study sessions began.

(2) Establishment of a Nuclear Engineering Center【Measure 6】

By integrating the engineering functions of Headquarters and power stations to create a Nuclear Engineering Center under the direct supervision of CNO, we will be able to take responsibility for engineering work required to design and maintain plant functions thereby enabling us to make improvements. During the fourth quarter discussions about internal manual revision drafts continued and in-house procedures, such as preparations to apply for modifications to the safety regulations, etc., began in preparation for department reorganization.

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.

(3) Cultivating and certifying system engineers【Measure 6】

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.

There are currently five system engineers at Kashiwazaki-Kariwa that monitor 22 systems at both Units 6 and 7, and there have been no abnormalities with system performance. During the fourth quarter education and training continued for two system engineers assigned during the second quarter, and preparations for adding an additional system to be monitored by existing system engineers in the first quarter of FY2019, such as the creation of monitoring programs and education to give these engineers the knowledge they are required to perform monitoring, began. The number of monitoring systems shall be increased, personnel secured and training continued with the objective of having at least five system engineers for each reactor.

At Fukushima Daini there are currently two system engineers that are responsible six systems at the Fukushima Daini Units 1~4, and there have been no abnormalities with performance. During FY2018 training to increase the number of system engineers by two was completed.

(4) Enhancing configuration management【Measure 6】

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.

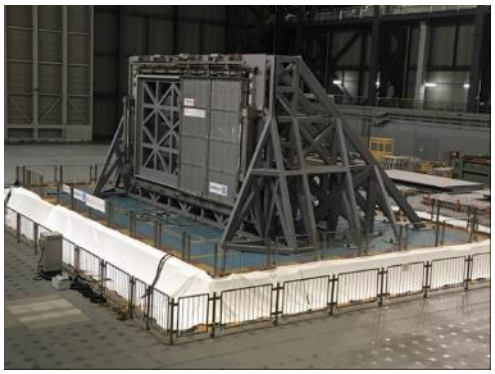
Design management documents important for constructing configuration management processes are being prepared sequentially with a focus on systems that are very important for safety and during the fourth quarter documents pertaining to main control rooms, reactor buildings, and eight systems, such as the emergency AC system, were created.

In regards to systems that support the use of configuration management processes, we conducted a task simulation that uses task manuals and the system operation procedures that have already been prepared. Going forward, we will optimize these procedures now that areas for improvement in both the task manuals and system operation procedures have been identified.

(5) Improving project management skills

We have created projects for resolving problems that exist across all departments involved in decommissioning at Fukushima Daiichi and safety measure implementation at Kashiwazaki-Kariwa, and these projects continued during the fourth quarter. During the fourth quarter, important processes, such as methods for setting objectives and risk management, etc. were selected and implemented for parties implementing projects on a trial basis while methods for dividing project responsibilities and monitoring/controlling entire projects were selected and implemented for larger projects. Furthermore, in addition to education on how to proceed with tasks that span all departments, e-learning educational materials were also created in addition to conventional classroom education in order to teach all employees about methods for project management as a means for effectively carrying out tasks. During FY2019 we aim to bestow this knowledge upon all parties through these educational endeavors.

(6) Reactor building blowout panels vibration tests



Blowout panels

At our testing facility in Kobe (E-Defense) we conducted a vibration test of the blowout panels used for the Unit 7 reactor building at Kashiwazaki-Kariwa on March 27 and 28. The seismic resistance of the closing mechanism of the blowout panels was tested to ensure that they can be opened to prevent a buildup of pressure inside the reactor building and then quickly closed again to contain radioactive substances. And, according to the new safety regulations blowout panels that have been opened as a result of a main steam pipe rupture must be able to be closed in the event that a severe accident occurs thereafter. In the case of Kashiwazaki-Kariwa Units 6 and 7, two types of closing mechanisms need to be installed, one on the side of the reactor building and one in the main steam pipe room. After the existing blowout panels have been opened, the closing mechanism is designed so that panels can be slid laterally to close the openings and attain airtightness, so improvements, such as redesigning the deadbolt used to secure the doors, etc., are being made. The unprecedented design and manufacture of blowout panels mechanisms is extremely important in the testing process, and these successful vibration tests,

which is a result of improvements to technological capability, represents the achievement of a huge milestone at the end of the fiscal year. Going forward we will continue with the design and testing of the main steam room [blowout panel] closing mechanism, and installation in the field.

4 PROGRESS STATUS ASSESSMENT

4.1 SELF-ASSESSMENT OF KEY ISSUES

The Nuclear Reform Monitoring Committee (NRMC) has requested an assessment and report on the status of improvements and on the rooting of measures implemented to address the five key issues (strengthening governance, improving human resource training, improving communication, cultivating nuclear safety culture, strengthening internal oversight functions) which were identified through the self-assessment of the progress of the Nuclear Safety Reform Plan (implemented in FY2016) and issues pointed out by the NRMC. In accordance with this request, self-assessments were implemented and the results of these self-assessments were reported along with action plans aimed at making improvements during the 15th meeting of the Nuclear Reform Monitoring Committee held on October 5, 2018.

At the 16th meeting of NRMC held on January 29, 2019, TEPCO gave a report on the current gaps that exist in regards to the Committee's expectations as part of its re-examination of the self-assessment results prior to hearing the Committee's conclusions from its review of the self-assessment. This was done because TEPCO determined that expectations were not being fulfilled in light of the series of troubles stemming from a lack of technological capability and the ability to communicate that have occurred since the self-assessment was implemented.

Nuclear Reform Monitoring Committee

NRMC presented the results of its review of the self-assessment reported on in October. The conclusion that, "progress is being made but there are still issues to address," is being taken extremely seriously by TEPCO which in turn conveyed to the NRMC that it will strive to make further improvements and report on those improvements at the next NRMC meeting.

President

Measures to address the issues pointed out and the comments made during the review by the NRMC are being incorporated into action plans aimed at making improvements, which were proposed after re-examining the results of the self-assessment.

4.1.1 Reflecting upon the Self-Assessment of Key Issues

(1) Reporting the results of re-examining the self-assessment to NRMC

◆ Re-examining how technological capability is being enhanced

Equipment and task nonconformances that stem from a lack of technological capability continue to occur. In order to improve the situation, we aim to prevent troubles before they happen by taking another look at the level of quality of current equipment and task processes, and proposing/implementing countermeasures to fill in the gaps between our current state and our ideal state.

◆ Re-examining how communication is being improved

Even though various countermeasures have been proposed and implemented in order to prevent troubles stemming from a lack of ability to promote dialogue, we have still been unable to prevent operational mistakes and insufficiencies. The root causes of the situation are a lack of professionalism and a lack of awareness about disseminating information that is easily understood. In particular, two issues are of vital importance in regards to awareness about disclosing information. Making sure the Nuclear Power Division, which is the source of information, is aware of what information needs to be disclosed. And, ensuring that corporate communications departments can convey this information quickly and in a manner that is easily understood. In order to address these issues improvement actions shall be proposed and implemented.

(2) Conclusions from the Nuclear Reform Monitoring Committee's review

Results of the Nuclear Reform Monitoring Committee's review of the self-assessment

~ Report from the Nuclear Reform Monitoring Committee to the Board of Directors of Tokyo Electric Power Company Holdings, Inc. ~

On October 5 of last year, The Nuclear Reform Monitoring Committee (hereinafter referred to as, "NRMC") received a report on the self-assessment of nuclear safety reforms (hereinafter referred to as, "self-assessment") implemented by Tokyo Electric Power Company Holdings, Inc. (hereinafter referred to as, "TEPCO HD"). The findings of a review of this self-assessment performed by the NRMC, and suggestions from the NRMC, are as follows.

- We commend TEPCO HD for creating the systems and departments required to implement reforms through the nuclear reform initiatives that have been underway for over six years.
- The fact that TEPCO HD implemented a self-assessment is a step in the right direction. However, in light of the rash of incidents that have occurred we cannot help but question to what degree of severity TEPCO HD is looking at its own actions. When conducting self-assessments, we want each department to be strict in its assessment and identify weaknesses, in particular.
- Management must not forget that nuclear safety is the first priority and it must continue to convey this stance both within and outside the company.

- What human resources are needed and how employees are to be trained needs to be clarified.
- In regards to communication, you need to transition from "conveying information" to "providing information that is easily understood," and not forget that reflecting upon the Fukushima Nuclear Accident, having a level of competency suitable of a nuclear operator, and switching your focus from internal communication to external communication are the basis for regaining trust."
- In order to succeed with reforms, internal oversight functions must be improved and oversight continued.
- There is no end to nuclear safety initiatives. In order to move forward with and root nuclear reforms, we would like you to proceed while being flexible, thinking about priorities, and finding innovative ways to be more efficient.

This report contains various recommendations to help TEPCO HD make further improvements. The NRMC hopes that TEPCO HD will continue to make unending improvements by continually implementing self-assessments, and regain the trust of stakeholders through effective and transparent communication.

Nuclear Reform Monitoring Committee
Dr. Dale Klein, Chairman
Lady Barbara Judge CBE, Deputy Chairman
Mr. Masafumi Sakurai, Committee Member
Mr. Takashi Kawamura, Committee Member

4.1.2 Improvement Initiatives Based upon Self-Assessment Retrospection

(1) Improving human resource training (technological capability)

◆ Developing safety/quality improvement Kaizen activities

The Kaizen that TEPCO is currently engaged in consists of creating safety and quality processes in order to achieve improvements in both safety/quality and productivity. Based on this objective TEPCO is moving forward with Kaizen activities while receiving guidance and instruction from external consultants more than ever before.

During the fourth quarter we began an initiative that tackles equipment nonconformances whereby employees disassemble equipment in pursuit of the true cause of the nonconformance. The objective of this initiative is to enable employees to continually use equipment by repairing it rather than just replacing parts, as has been done to date.

For example, at Fukushima Daini, a nonconformance occurred with the operation switch on the radioactive waste treatment equipment operation panel. Employees disassembled the switch, identified the part that was the cause of the nonconformance and reported that information to an external consultant who in turn gave guidance on how to make further improvements.


Identifying switch noncofor-mances through disassembly (Fukushima Daini)

Furthermore, since March 2019 we have been engaging in Kaizen activities that look into using IT to assist with tasks upon identifying task processes that were done manually since human error and task completion delays may result in legal infractions and a further burden on society. During the first quarter of FY2019 we shall identify such task processes and deliberate countermeasures.

◆ Constructing education/training programs

In order to improve the technological capability of engineers, we are in the course of redesigning our education curriculum for each type of engineer, such as design engineers and system engineers. Our engineer training to date has focused on on-the-job training (OJT), but now we have created classroom training and e-learning materials in order to provide trainees with the knowledge they lack thereby resulting in a more balanced curriculum. Furthermore, we are also moving forward with putting together a clear picture of performance requirements and the knowledge that each type of engineer should have upon completing this education.

We plan to put this newly created curriculum into effect use during the first half of FY2019 and start skill confirmation tests during the second half.

◆ Procurement improvement benchmarking

One of the root causes of the Fukushima Daiichi Unit 3 fuel handling machine nonconformances that occurred last year is a lack of skill when it comes to TEPCO's procurement activities. We are therefore currently taking two approaches to bestow

employees with the technical skills needed to appropriately procure materials/equipment. The first is to benchmark with other companies that procure materials/equipment in a similar way as the FDEC. In order to ensure that the procured materials of are the highest quality, we are engaging in benchmarking that will enable us to create detailed specifications, such as equipment specifications, testing/inspection specifications and requirements for vendors when managing primary suppliers and so forth. In particular, we aim not to just copy processes and mechanisms, but benchmark systems and technical prowess needed to actually use the aforementioned processes and mechanisms (the actual details of the benchmarking are being discussed with the client with the aim of benchmarking in April). We will incorporate the results of this benchmarking into manuals, etc. in the form of precautions and know-how related to procurement activities.

The second approach focuses on leveraging external mentors. We shall assign external mentors to project managers that manage procurement projects, and also project management offices that support these project managers in an effort to directly provide advice and instruction that will improve their skill in the same way that a home tutor would. We will also assign external mentors to personnel that negotiate procurement contracts in order to improve their ability to select vendors and analyze costs in order to diversify procurement sources and ascertain cost structures, etc.

◆ Check for gaps in equipment/task quality

Equipment and task quality improvements, which were started in response to the Fukushima Daiichi Unit 3 fuel handling machine nonconformances that were found last year, are being accelerated.

In regards to task quality improvements, as a result of discussions that included executives about gaps between current and ideal levels of quality it was found that amongst all task processes, the process of technical deliberation (design deliberation) is especially weak. So, it was decided that every process weakness should be meticulously identified.

In the course of identifying these weaknesses, basic tasks for suitably managing design based upon manuals were compiled. Then, documents that were subject to technical deliberation and issues addressed during design review meetings were examined to check whether or not these basic tasks are being carried out without fail.

As a result several issues were identified as problems, such as the facts that the results of deliberation on what issues need to be addressed were not noted in the documents, and that decisions regarding deficiency or excess could not be made because issues to be subjected to design management, and the issue identification process, were also not noted. In order to rectify these issues, task processes were revised, such as requiring that design-related issues that need to be addressed be written on the design management sheet, etc., and these revised processes are currently being employed.

A working group to handle equipment quality improvements was also created in the wake of the Fukushima Daiichi Unit 3 fuel handling machine nonconformances, and these improvement initiatives are being accelerated based upon improvements made to the technical deliberation process.

We are currently identifying equipment that may be vulnerable from a design standpoint by looking at equipment that meets any of the following criteria.

- Equipment for which it has been deemed that redundant systems are necessary based upon past nonconformances and operating experience.
- Equipment that has been designed/installed not by a diverse group of people, but a single department.
- Equipment for which the department in charge of management has changed as a result of department reorganization or changes made to the division of responsibilities.

Equipment that is identified as being vulnerable shall be subjected to design/technical deliberation once again based upon the improved technical deliberation process and measures implemented to improve the reliability of such equipment, if necessary.

(2) Communication improvements

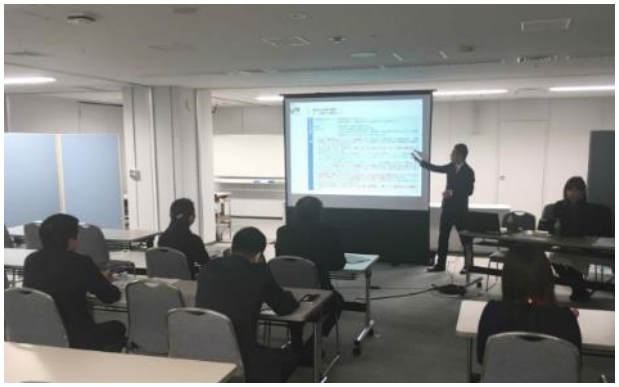
◆ Improving awareness at the source of information (Nuclear Power Division)

In order for TEPCO to convey information to society that is accurate and easy-to-understand, it is imperative that the Nuclear Power Division, which is the source of this information, quickly and accurately provides information of great concern to society to related departments (management, corporate communications departments, communication departments, etc.). Therefore, from FY2019 we will be using the results of in-house questionnaires on information disclosure awareness, and cases where information was not disseminated very skillfully in the past when holding group discussions in the Nuclear Power Division on conveying information. Additionally, case studies of incidents that have occurred in the past during activities to root safety culture (10 Traits, newly arrived OE information) will be used to encourage employees to notice things on a daily basis.

Furthermore, in order to get personnel in the field to think on their own and engage in Kaizen, discussions based on two topics (sharing information between the Nuclear Power Division and related in-house departments, and disseminating information in consideration of stakeholders) have started at Fukushima Daiichi, Fukushima Daini, and Kashiwazaki-Kariwa. Going forward, each site shall share information on these topics while engaging in improvements that are based upon nonconformance cause analysis.

◆ Improving the awareness of corporate communications departments

It is also necessary that corporate communications departments convey the information received from the Nuclear Power Division in a manner that is easily understood. Therefore, during FY2018 a training program was started for new members of the HD Corporate Communications Department. Training taught by external instructors and training on ascertaining situations are implemented in a planned manner to provide trainees with the knowledge and skills needed when actually conveying information that is easily understood.



Training for corporate communications departments by external instructors

◆ Using case studies for information disclosure training

The Nuclear Power Division and corporate communications have come together as one to periodically hold information disclosure training that leverages case studies to ensure that information flows freely even in the event of an unpredicted situation. Initial response procedures that focus on speaking out and notifying the authorities have been created, interdepartmental coordination enhanced, and training implemented using blind scenarios, or without any notice at all, in an effort to strengthen the ability to respond to various situations. These initiatives have been underway at Fukushima Daiichi since March 2019, at Fukushima Daini since April 2017, and at Kashiwazaki-Kariwa and Headquarters since February 2019.

◆ Strengthening monitoring by risk communicators

Risk communicators (RC), who serve as liaisons between the Nuclear Power Division and corporate communications, shall be further trained in order to monitor each department with a heightened awareness of society's concerns. With this objective in mind training on strengthening monitoring function was held on February 15, February 25, and March 15. During this training, group discussions were held using not only past incidents that have occurred in the Nuclear Power Division, such as the failure to completely explain the nature of water treated with ALPS, but incidents that have occurred throughout the TEPCO Group, such as the smart meter fire that occurred at TEPCO Power Grid, Inc.

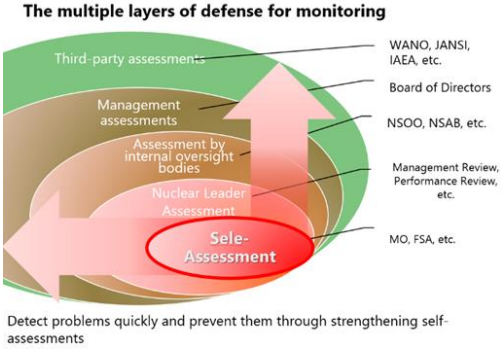
Training for RC

We are also revising management methods in order to strengthen monitoring function, such as sharing things noticed by RC in each department and continually following up with important issues.

4.2 ASSESSMENT BY THE NUCLEAR POWER DIVISION

(1) Key self-assessments【Measure 2】

As part of defence-in-depth for assessments, each CFAM/SFAM in the Management Model create biannual key self-assessment plans for each business area and perform self-assessments based upon the policy of performing self-assessments that take a critical look at one's own actions.



Defence-in-depth for assessments and self-assessments

◆ Cultivating safety culture

At Kashiwazaki-Kariwa, in continuation from December another key self-assessment (January 22-23) was implemented in order to cultivate safety culture. While referencing the ideal state of nuclear safety culture put forth in the "10 Traits and 40 Behaviors for Robust Nuclear Safety Culture" and assessment methods stipulated in assessment guides from the United States (NEI09-07), an assessment of the state of safety culture at power stations was implemented with the addition of interviews with TEPCO employees that work in clerical divisions, which was not able to be done in December. Five weaknesses and eight strengths were identified and an analysis of underlying factors indicate that next fiscal year we need to develop a common foundation for educational programs on safety culture, find innovative ways that make it easier to point out things that are noticed, and develop methods for obtaining non-technical skill, including coaching. Going forward, the results of this assessment will be used to improve safety culture cultivation activities next fiscal year.

Group discussions

◆ Equipment reliability

At Kashiwazaki-Kariwa, a self-assessment of the sampling and processing of as-found data (data that indicates the condition of equipment prior to inspections) was implemented by passing out questionnaires and conducting interviews with employees and contractors. As-found data is necessary for properly assessing equipment inspection cycles, etc. and is vital

input for continuing and improving maintenance. The results of this assessment identified strengths, such as continual efforts to remain fully aware of the importance of sampling, and the creation of a handbook for effectively taking data samples. On the other hand, weaknesses were found in the form of discrepancies in the understanding/knowledge of the parties involved in regards to the significance and importance of sampling. One of the causes of this weakness is a failure to implement systematic training, so along with planning new comprehension and awareness activities, we have begun deliberating the construction of a systematic education program. Furthermore, we have started deliberating methods for streamlining tasks and confirmed with all parties that they will continually strive to make improvements going forward.

Interviews

Deliberation of assessment/countermeasures

◆ Education and training

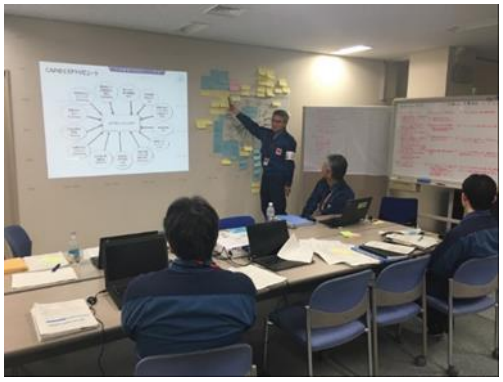
In the area of education and training, a self-assessment of the effectiveness of improvement measures made in response to external comments about education and training programs received in the past was implemented at Kashiwazaki-Kariwa (February 12~February 15). The assessment consisted of three parts: ① a detailed examination of the improvement measures that have been made in response to external comments, ② post-countermeasure observation of classroom study and simulator training, and ③ interviews with trainees, instructors, and line department managers. The assessment was conducted by human resource training departments and operations division leaders with support from experts from the United States.

The facts that various tools and processes introduced to heighten the effectiveness of simulator training are having an impact, and that shift supervisors are giving high-quality feedback after training were identified as strengths during the self-assessment. Meanwhile, amidst the countermeasures implemented in response to external comments, which was the focus of the self-assessment, there were issues that were identified as requiring additional countermeasures for further monitoring to see if the countermeasures under way will indeed have an impact. Further improvement measures have been formulated by checking the implementation status of education programs and countermeasures that have already been deemed completed, and by performing a critical assessment of one's own performance from the perspective of excellence. Action plans for these improvement measures have been newly created and we will move steadily forward with improvements within the allotted timeframe

as we aim to provide education and training that is on par with the world's highest levels of excellence.

◆ Performance improvements

In the area of performance improvements, a key self-assessment of CAP was implemented at Fukushima Daini (February 6~8). With the assistance of experts from the United States, documents were reviewed, interviews conducted, and meetings observed for each of the 13 attributes of CAP excellence, and an assessment of the collected information was conducted. While the assessment showed strengths in the form of quick creation of nonconformance reports, there were also weaknesses that were identified, such as the facts that manager monitoring is not being effectively implemented and that the habit of employing lower thresholds for reporting has not sufficiently permeated throughout the organization, etc., so countermeasures will be proposed and improvements made.



Discussion of assessment results

Reporting of assessment results

4.3 OPINIONS OF THE PEOPLE

(1) Results of questionnaire on the nuclear power-related communication activities

We periodically distribute questionnaires to the people to whom information is conveyed (residents of Fukushima, Niigata, Aomori, the Tokyo Metropolitan area, overseas parties <foreign embassies in Japan>) in order to receive an objective assessment from society in regards to TEPCO's nuclear power-related communication activities.

◆ Questionnaire overview

Questionnaire method: Written response on paper questionnaire (anonymous)
Assessment issues: The quality/quantity of disseminated information and approach to corporate communications and awareness of public opinion
Response Period: November~December 2018
Total number of responses: 187 (response rate: 70%)

◆ Questionnaire-based assessment results overview

Respondents rated "to what degree of improvement has there been compared to the situation one year ago" on a seven-step scale from -3 to +3 (no change being 0). A positive

rating was received once again this fiscal year for both of the quality and quantity of disseminated information and the approach to corporate communication and awareness of public opinion (+0.9), however the degree of improvement for both was low at only 0.1 points year-on-year (+1.0→+0.9).

Total assessment points	Fukushima	Niigata	Aomori	Tokyo	Overseas	All areas
◆ Quality/quantity of disseminated information	+0.7	+1.1	+2.1	+0.8	+0.2	+0.9
◆ Approach to corporate communications and awareness of public opinion	+0.9	+1.1	+2.2	+0.6	+0.4	+0.9
Number of respondents	78	46	5	54	4	187

◆ Quality/quantity of disseminated information

We have been highly commended for our attitude when giving explanations during visits to residents and the frequency at which information is disseminated through periodic info releases and home visits. On the other hand, although videos, illustrations and manga have been leveraged to make information easier to understand, some have said that the content is still a little too technical and difficult to comprehend.

Comments from the community (excerpt)

（A ○ indicates a positive comment while a ▲ indicates areas for improvement）

○ Home visits are frequent and the TEPCO representatives are enthusiastic.

○ The use of videos, illustrations, photographs and manga have made the information on safety measures easier to understand.

▲ The frequency at which information is being provided can be commended, but is very technical and difficult for the layman to understand.

▲ A lot of abbreviations and technical terms are used. It would be nice if you could simplify the important parts.

◆ Approach to corporate communication and awareness of public opinion

The assessment of our approach to corporate communication and awareness of public opinion continues from last fiscal year to be positive (+0.9). In regards to conveying information face-to-face, such as through regular home visitations, respondents said that the visitors from TEPCO are explaining things in an easy-to-understand manner. However, others commented that there has been a decrease in consciousness of the fact that TEPCO is responsible for the accident and a decrease in safety awareness, that they would like to see information disseminated in an easy-to-understand manner since one mistake or problem can lead to a bad reputation.

Comments from the community (excerpt)

（A ○ indicates a positive comment while a ▲ indicates areas for improvement）

○ We commend your efforts to explain things in an easy-to-understand manner.

○ We can see that each employee is trying to engage with residents.

▲ The "factory love" Instagram incident indicates a decrease in consciousness that TEPCO is responsible for the accident.

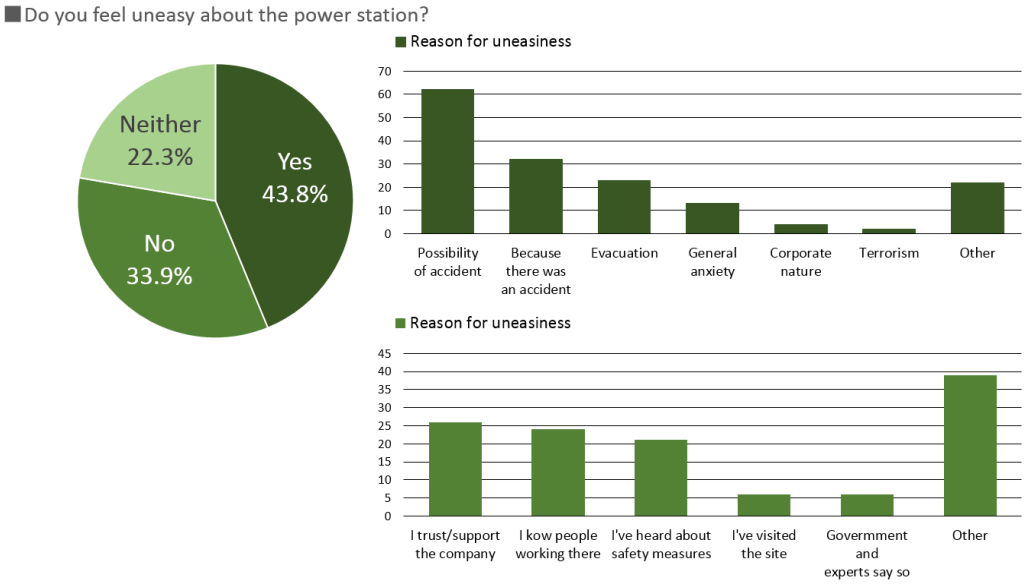
▲ When it comes to insufficient explanations about treated water, etc., we want to be given an explanation that is easily understood, and not just told "you know what I mean, right?"

In light of these comments we will strive to convey information that is easily understood from the standpoint of the person receiving information, and aim to transition from "conveying" information to providing information that is "easily understood."

(2) Visits to all homes in Kashiwazaki City and Kariwa Village

Between August and December 2018 residents in Kashiwazaki City and Kariwa Village were visited and various opinions gathered, however there are those that asked whether or not we were going to release the results of these visits. To date, all the homes in these areas have been visited a total of four times, but for the first time we compiled the opinions gathered during these visits and printed them in the February issue of News Atom, the power station newsletter. Some of the information printed in the newsletter included the percentage of residents who were home at the time of the visit (dialogue), whether or not residents felt uneasy about the power station, and the recognition of/percentage of people who were aware of the safety measures being implemented at Kashiwazaki-Kariwa. In regards to uneasiness about the power station, more than 40% of residents said that they were worried that the same thing that occurred at Fukushima Daiichi might happen. In light of this we realized that we have not been proactive enough in our explanation of the conditions at Fukushima. So, during TEPCO events held for the community at Energy Hall and Comfy (TEPCO PR facilities) we are explaining how we are preparing for a potential accident and what countermeasures are being put in place at Kashiwazaki-Kariwa based upon the lessons learned from the Fukushima Daiichi accident. We are also using videos, etc. to explain the current conditions at Fukushima Daiichi. Furthermore, in the March issue of News Atom, we provided information on the progress of decommissioning work at Fukushima Daiichi and included an interview with a unit superintendent at Kashiwazaki-Kariwa who was at Fukushima Daiichi on the day of the accident. In the interview the superintendent conveyed his strong determination to enhance safety measures at Kashiwazaki-Kariwa because of what

he experienced at the time of the accident. We will continue initiatives to appropriately disseminate information based on the opinions received from the local community.



Stats for visits to all homes in Kashiwazaki City and Kariwa village
(Printed in February issue of News Atoms issued on Feb. 11 2019)

4.4 Monitoring Results from Internal Oversight Departments (Nuclear Safety Oversight Office) 【Measure 2】

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 and the Board of Directors.

4.5 Comments, Guidance and Assessment by Nuclear Power-Related Agencies

(1) Headquarters: Insufficient preventative measures at Headquarters

During the third safety inspection of FY2018 at Fukushima Daini conducted on November 27, 2018, it was pointed out that preventative measures for four nonconformances, which were deemed to require preventative measures, had not been deliberated at Headquarters. An investigation into the past three years uncovered that a total of 33 nonconformances that required preventative measures had been overlooked at Headquarters.

An additional investigation that looked further into the past found that in addition to these 33 nonconformances, there were three more that had not been deliberated. Furthermore, in addition to TEPCO nonconformances an investigation into preventative measure deliberation based upon accident and malfunction information from overseas and within Japan (other

electric companies, other industries) found that the aforementioned deliberations had not been carried out for one domestic incident and 41 overseas incidents.

The reasons for this are a failure to engage in effective monitoring and the fact that the gathering and managing of required information was left at the discretion of the managing officer. As a recurrence prevention measure, we have introduced a mechanism for checking the information that is periodically logged into the system by the administrator in order to strengthen oversight.

Furthermore, at the April 3 meeting of NRA, the results of the fourth safety inspection were given and it was reported that the NRA had deemed the insufficiencies at Headquarters with preventative measures at the Fukushima Daini Nuclear Power Station, which were discovered during the third safety inspection of FY2018 implemented by NRA, to be a safety regulation infraction. This infraction was labeled "Infraction 3." [5] Appropriately implementing preventative measures is of extreme importance for maintaining and improving nuclear safety. As such, we have taken this infraction very seriously and are steadily implementing recurrence prevention measures while also further improving task quality in an effort to ensure the safety of our nuclear power stations.

＜Company Nonconformance Investigation Results＞

	Additional investigation ※Includes initial investigations	**【Reference】Initial investigation**
Period covered by Investigation	April 2010 through end of January 2019	October 2015 through end of November 2018
No. of issues overlooked (no. of issues investigated)	36 (508)	33 (182)

＜Investigation into preventative measure deliberation based upon accident and malfunction information from overseas and within Japan (other utilities/other industries)＞

	Period covered by investigation: February 2007 through end of January 2019		
	① Overlooked issues	② Deliberation status unknown※	③ Deliberations required (①+②)
Domestic info (Other utilities/other industries)	1	0	1/1,216 investigated
Overseas info	16	25	41/1,545 investigated
Total	17	25	42/2,761 investigated

※ Some of the original documents could not be examined due to document format changes made in-house, so it could not be determined whether or not these issues had been deliberated.

5 Refer to the following for details on Infraction 3 and NRA's judgement:
http://www.nsr.go.jp/data/000266400.pdf

(2) Fukushima Daini: Failure to give an overview of the discussions by the Safety and Health Committee

During an in-house audit conducted at Fukushima Daini it was pointed out that an overview of the discussions during meetings of the Safety and Health Committee, which are held in compliance with labor safety and health regulations, had not been conveyed to station personnel. This was reported to the Tomioka Labor Standards Office on February 26.

According to labor safety and health regulation 23, the Safety and Health Committee is to meet at least once a month and an overview of the discussions held at that meeting are to be conveyed to laborers without delay when the meetings are held. However, at Fukushima Daini the summaries of the minutes from the Safety and Health Committee meetings held from September through December 2018, which had been created, were not given to station personnel (March 15 press release).

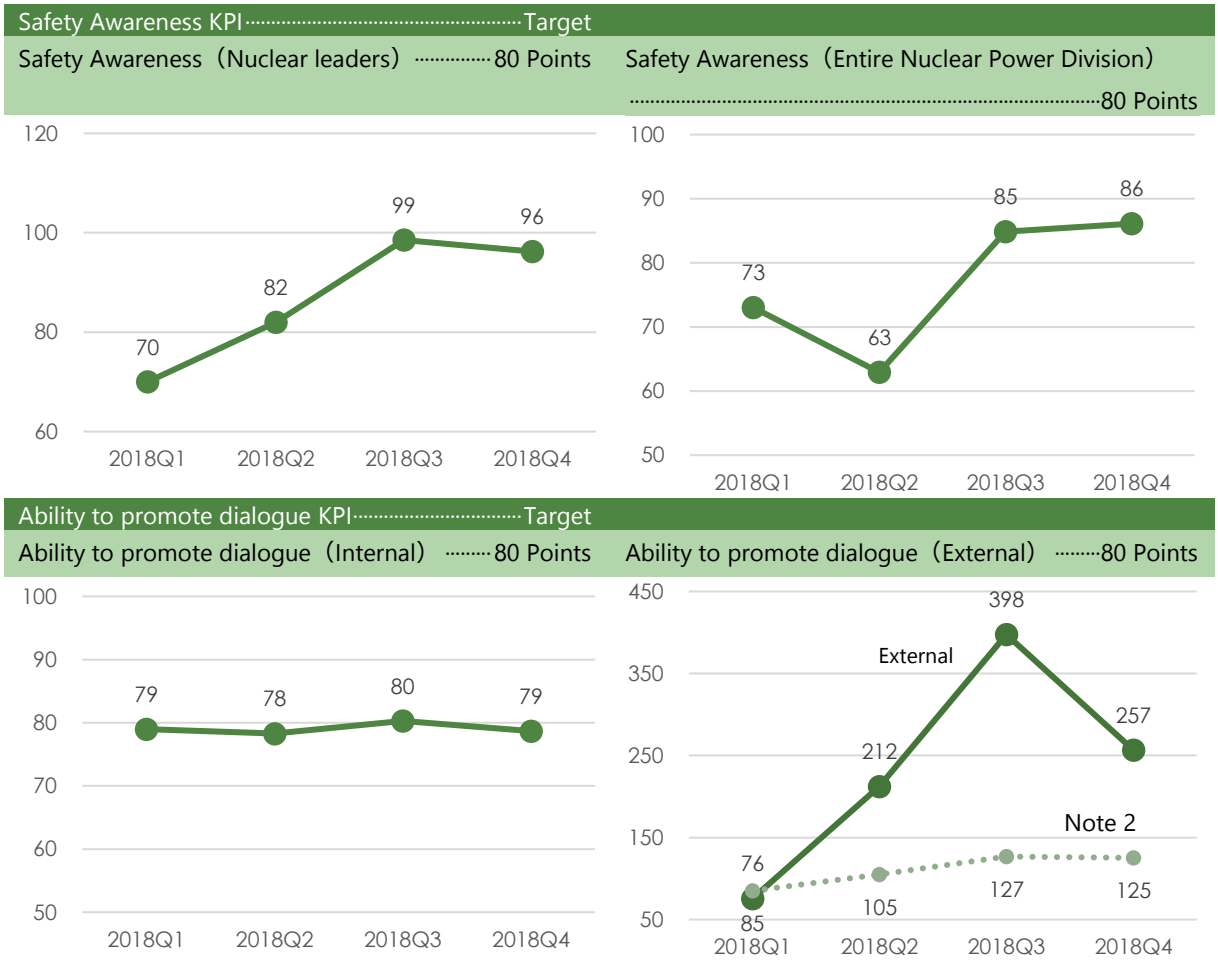
During the course of examining the causes of this incident and deliberating countermeasures an investigation was conducted to see if similar incidents had occurred over the past three years. This investigation revealed that summaries of the minutes for the meetings held in February, April, and July 2018 had not been distributed to station personnel. This was in turn reported to the Tomioka Labor Standards Office and TEPCO received an additional correction recommendation concerning Safety and Health Law infractions (announced in March 22 press release). Causes and countermeasures were reported to the Tomioka Labor Standards Office on March 25 (announced in March 25 press release).

We will strive to convey and thoroughly implement recurrence prevention measures in light of the content of this correction recommendation.

5 KPI/PI RESULTS

KPI have been set so that the progress with safety reforms are reflected based upon "average achievement level of related PI targets" and the FY2018 targets were increased 10 points above FY2017. Safety awareness KPI targets (80 points) have been reached. In regards to ability to promote dialogue KPI, targets for the ability to promote dialogue (external) (80 points) when including reference values calculated from results that exclude the number of opinions gathered during visits to all households, were reached, but the target for the ability to promote dialogue (internal) (80 points) was just missed. In regards to technological capability KPI, the target (110 points) for technological capability (times of non-emergency) was reached, however the target (110 points) for technological capability (times of emergency) was not reached due to the low achievement rate for the rate of A assessments for preparedness training by the Nuclear Regulatory Agency <Technological-4>.

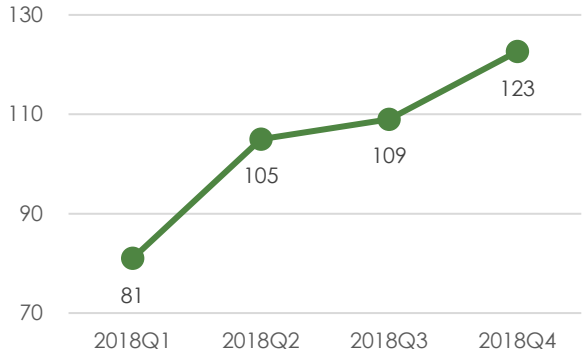
5.1 KPI RESULTS



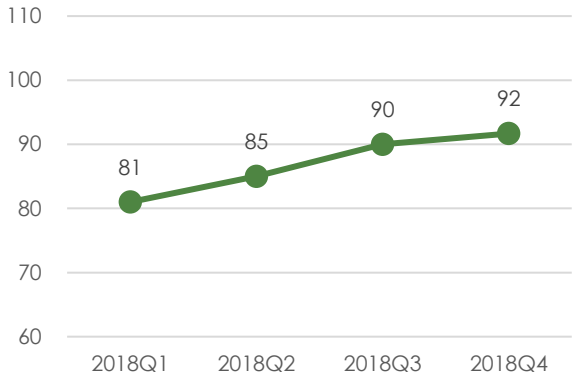
Note 1: Ability to promote dialogue KPI (external) for Q3 increased dramatically due to over 50,000 opinions received during home visits in the Kashiwazaki-Kariwa region.
Note 2: The dotted line indicates reference values for the ability to promote dialogue (external) excluding the opinions gathered during home visits.

Technological Capability KPI·····Target

Technological Capability（Times of non-emergency）·····110 Points



Technological Capability（Times of emergency）··110 Points

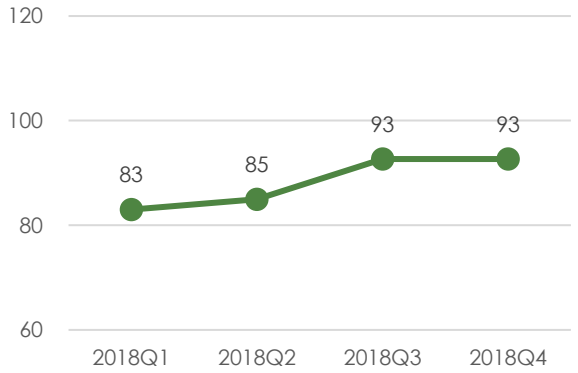


5.2 PI RESULTS

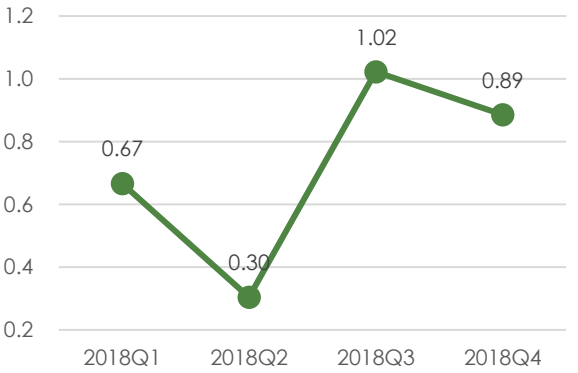
Safety Awareness PI·····Target

Nuclear leaders

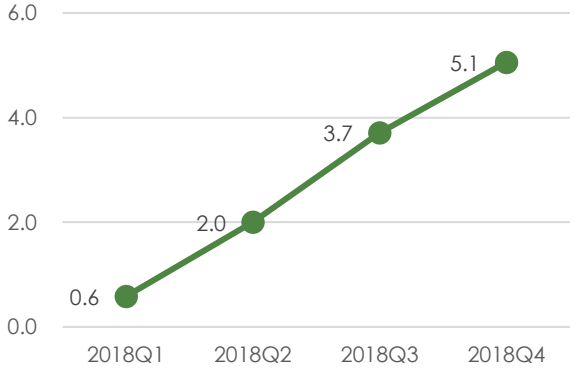
<Safety-1> Rate of implementation of retrospection leveraging the traits by Nuclear leaders ·····100%



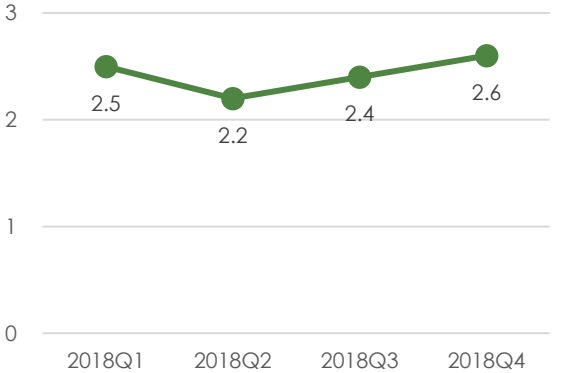
<Safety-2> Number of times emails have been sent by nuclear leaders in order to share information ····Once a week/person



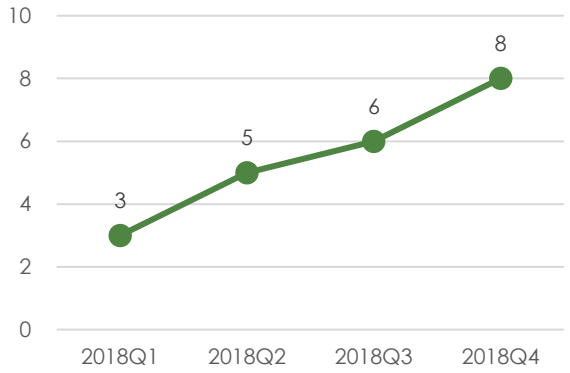
<Safety-3> ·····Number of times nuclear leaders participated in training according to plan Twice/year/person



<Safety-4> ····· Number of times nuclear leaders went into the field ·····Twice a month

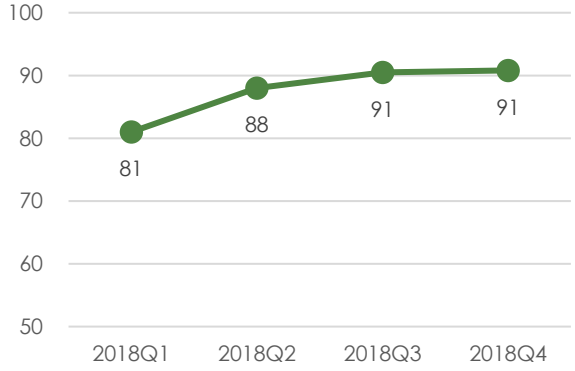


<Safety-5> ····· Number of benchmarked issues for which nuclear leaders are responsible for were put into practice ····· 4 times/year

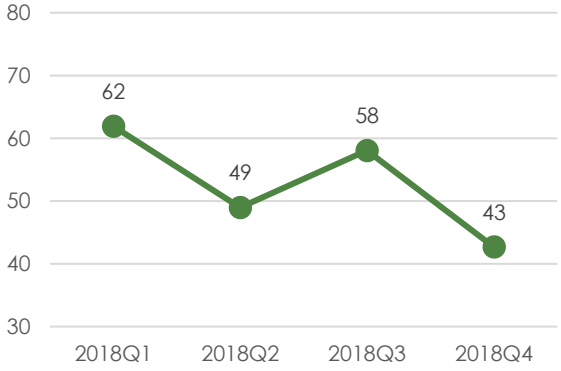


Entire Nuclear Power Division

<Safety-6> Implementation rate of group discussion about Traits ····· 100%

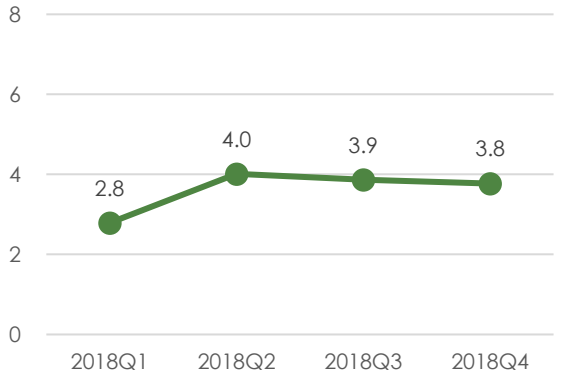


<Safety-7> ·····Percentage of intranet messages from nuclear leaders that have been read ····· 80%



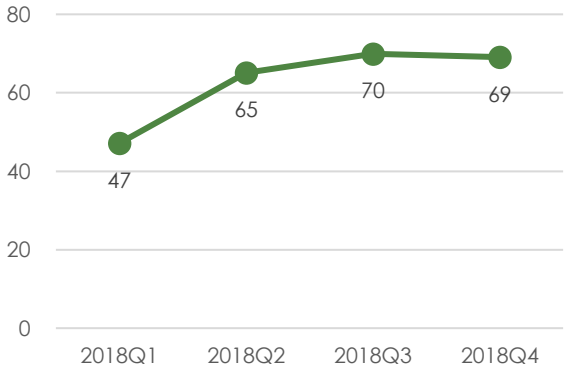
Note: Values for Q4 are the most recent but do not include the last month which is not a full month since the message was sent. Q3 values are fixed and include the last month.

<Safety-8> ···Number of times managers engaged in management observation at power stations ····· ····· times/month/person（Determined by each dept.）



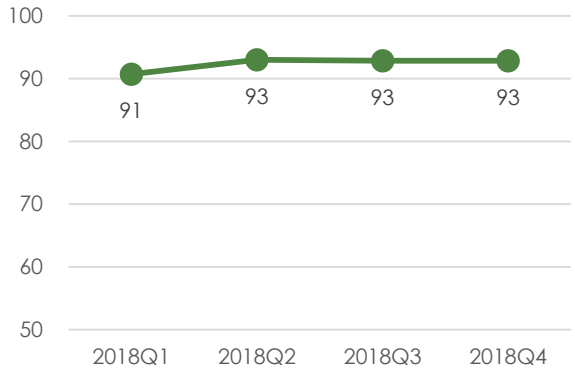
Reference: Weighted average for Fukushima Daiichi, Fukushima Daini and Kashiwazaki-Kariwa

<Safety-9> ·····Good MO reporting rate ····· 50%



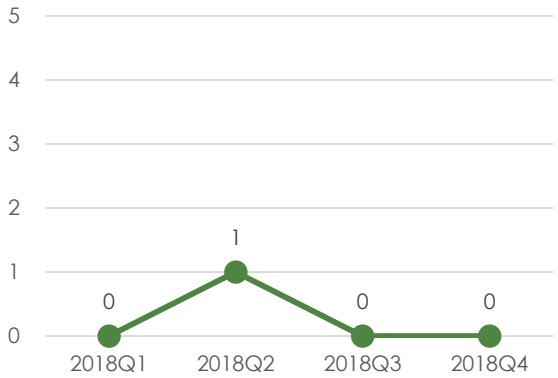
Reference: Weighted average for Fukushima Daini and Kashiwazaki-Kariwa

<Safety-10> Completion rate of GII or higher corrective measures within the deadline ····· 100%



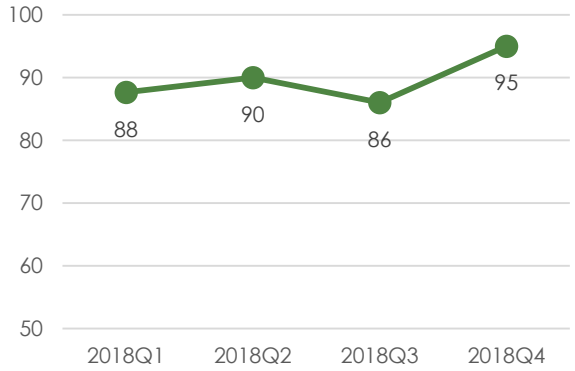
Note: Weighted average for HQ, 2F and KK

<Safety-11> No. of nonconformance recurrences (GII or higher) ····· 0/month



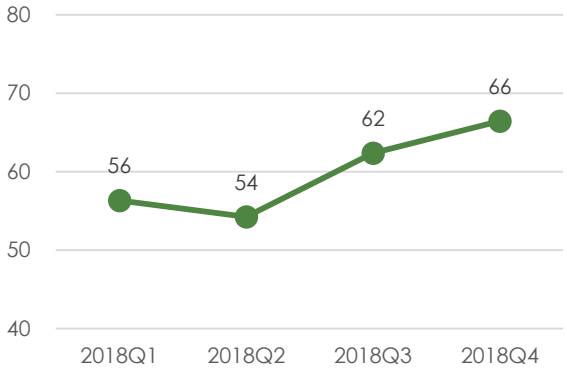
Note: Total for HQ, 2F and KK

<Safety-12> Nonconformance voucher period achievement rate ····· 80%



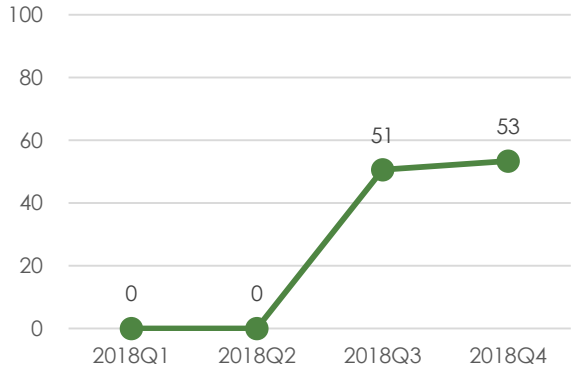
Note: Weighted average for HQ, 2F and KK

<Safety-13> New OE information viewing rate····· 75%



Note: Q3 numbers corrected due to tabulation mistake in December

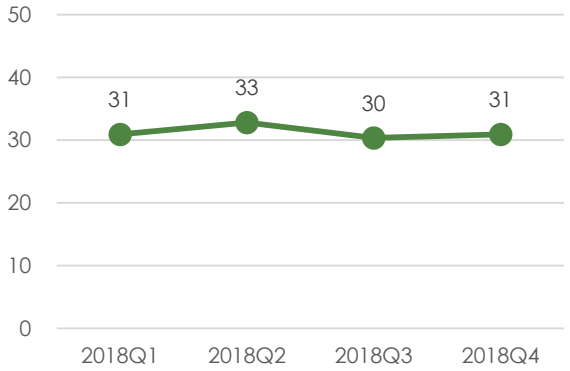
<Safety-14> Significant OE training participation rate ····· 60%



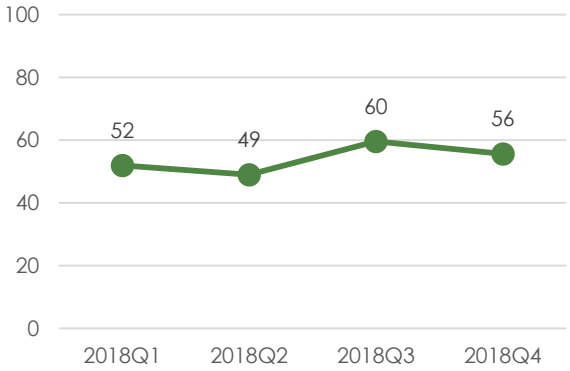
Ability to promote dialogue PI ····· Target

Internal

＜Dialogue-1＞ Percentage of employees that feel that intranet messages from nuclear leaders are "helpful" ····· 50%

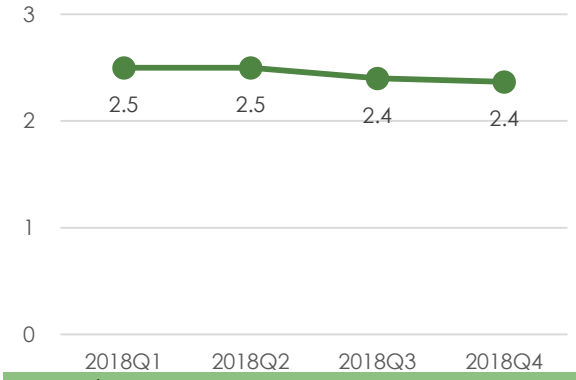


＜Dialogue-2＞ Response rate to e-mail questionnaire on the information conveyed by nuclear leaders ····· 70%



Note: Values for Q4 are the most recent but do not include the last month which is not a full month since the message was sent. Q3 values are fixed and include the last month.

＜Dialogue-3＞ Degree of understanding of information conveyed by nuclear leaders ····· 2.5 Points



External

＜Dialogue-4＞ Questionnaire results on the quality/quantity of disseminated information ····· Positive increase over last fiscal year

＋0.9

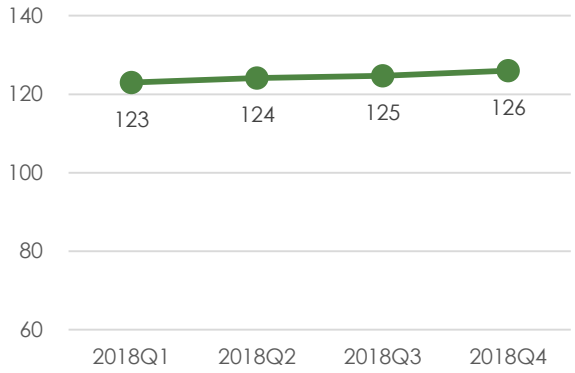
Reference: Assessed once a year

＜Dialogue-5＞ Questionnaire results on the approach to and awareness of, public relations and public opinion gathering ····· Positive increase over last fiscal year

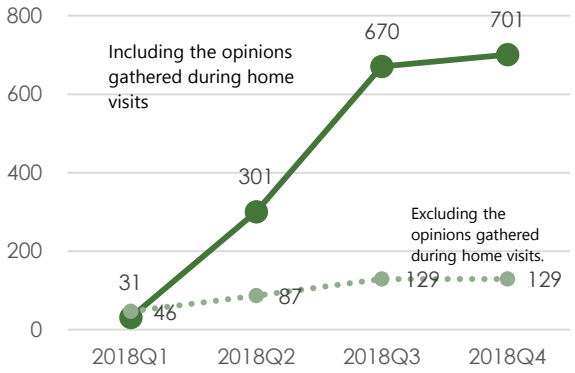
＋0.9

Reference: Assessed once a year

＜Dialogue-6＞ Dialogue activity questionnaire assessment ····100 Points



＜Dialogue-7＞ No. of opinions from community members ····Positive increase over last fiscal year

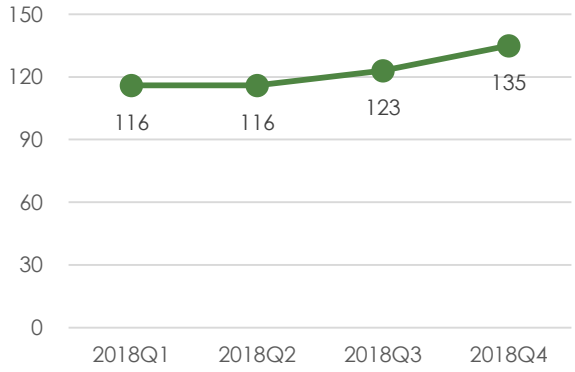


Note: The dotted line indicates reference values for the ability to promote dialogue (external) excluding the opinions gathered during home visits.

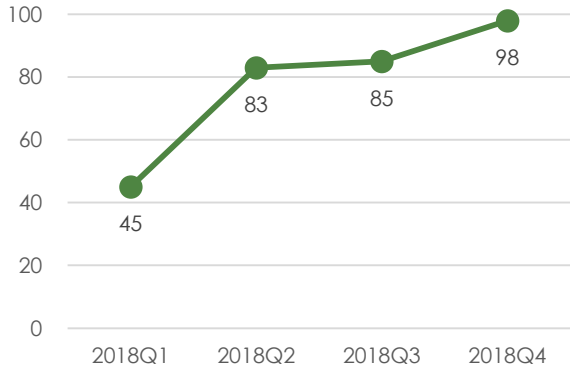
Technological Capability PI ····Target

Times of non-emergency

＜Technological-1＞ No. of workers certified in operations/maintenance/engineering/radiation and chemistry/fuel/safety, no. of external certification holders ····110 Points

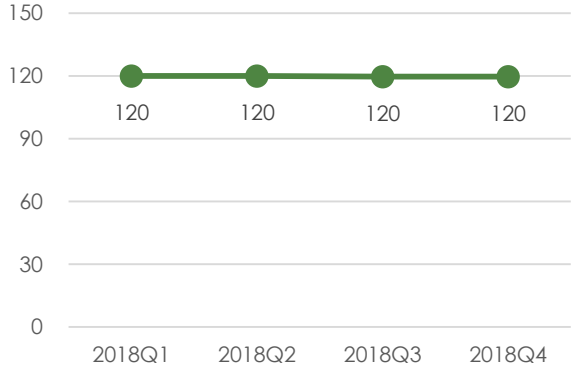


＜Technological-2＞ Rate of reflection of education/training program improvements requested by line departments····80%



Times of emergency

＜Technological-3＞ No. of in-house certified emergency personnel (fire trucks, power supply trucks, cable splicing, radiation surveys, wheel loaders, Unic trucks, etc.)····120%

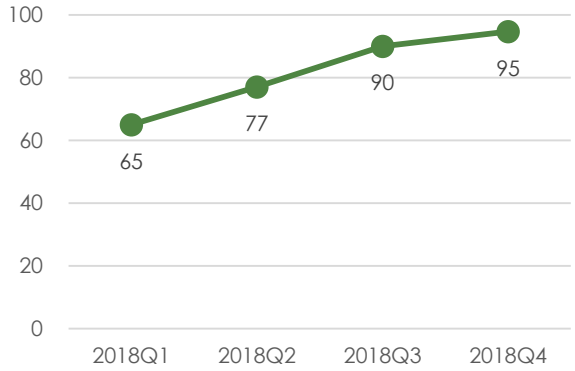


＜Technological-4＞ Percentage of "A" assessments given by the Nuclear Regulatory Agency for emergency response training categories ····80%

56%

Note: Assessment is conducted annually. Assessment results are for training from the previous fiscal year

<Technological-5> Training participation rate…90%



5.3 KPI/PI Revisions

Based upon FY2018 performance we are deliberating revisions to the nuclear reform KPI for FY2019. The primary changes are as follows.

KPI	Revisions
Safety Awareness (Nuclear Leaders)	Target revised because the 80-point target was achieved.
Safety Awareness (Nuclear Power Division)	The target (80-points) was achieved, but a safety awareness-related nonconformance (insufficiencies with headquarter preventative measures) was deemed as a safety regulation infraction. It is therefore hard to say that the level of safety awareness as indicated by the KPI has been achieved so related PI will be revised.
Ability to promote dialogue (internal)	Continual monitoring
Ability to promote dialogue (external)	The target (80-points) was achieved, but the Nuclear Reform Monitoring Committee has asked that improvements be made to turn "conveyed information" into "easily understood information." It is therefore hard to say that the high level of ability to promote dialogue as indicated by the KPI has been achieved, so related PI will be revised.
Technological Capability (times of non-emergency)	The target (110-points) has been achieved, but the Nuclear Reform Monitoring Committee has asked for stricter assessments by departments of human resource training. It is therefore hard to say that the level of technological capability during times of non-emergency has reached the levels indicated by KPI, so related PI will be revised.
Technological Capability (times of emergency)	Continual monitoring

CONCLUSION

On this past March 11, the eighth anniversary of the accident, all companies once again gave a moment of silence at the time that the earthquake occurred. We decided that this fiscal year's motto should be, "pursuing evolution based upon regrets and lessons learned," and as such we took a look back on what has been done at Fukushima Daiichi, which was ground zero for the Fukushima Nuclear Accident. And, all departments have written action declarations. The Nuclear Power Division once again addressed three questions. How did we let the accident happen? What did we learn? And, what have we sworn?

At the January 29 meeting of the Nuclear Reform Monitoring Committee, the Committee stated that, "*when conducting self-assessments, we want each department to be strict in its assessment and identify weaknesses, in particular. You need to clarify what human resources are needed and how employees are to be trained. In regards to communication, you need to transition from 'conveying information' to 'providing information that is easily understood,' and not forget that reflecting upon the Fukushima Nuclear Accident is the basis for regaining trust*." In accordance with the action plan aimed at making improvements, we are moving forward with initiatives that will leverage IT for office tasks and make it more difficult for human error to occur. We shall also periodically implement information disclosure training with the cooperation of the Nuclear Power Division and the Corporate Communications Department.

With firm 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 continue to promote nuclear safety reforms while subjecting ourselves to objective assessments by the Nuclear Reform Monitoring Committee. We are more than happy to hear any comments or opinions you may have about these reforms. Please visit our website[6] for more information.

6 https://www4.tepco.co.jp/ep/support/voice/form.html

ABBREVIATIONS

CFAM:	(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
CR:	Condition report. Used to enter things noticed and nonconformance information in a database in order to share it.
TEPCO HD:	Tokyo Electric Power Company Holdings, Inc.
IAEA:	International Atomic Energy Agency
KPI:	Key Performance Indicator
MAAP:	Modular Accident Analysis Program
MO:	Management Observations
NSOO:	Nuclear Safety Oversight Office
OE Information:	Operating Experience Information. Information on troubles at other power stations and in other industries is shared in order to learn lessons from it.
PCV:	Primary Containment Vessel
PI:	Performance Indicators
PICO:	Performance Improvement Coordinator
RC:	Risk Communicator
ROP:	Reactor Oversight Process (in the United States)
SAT:	Systematic Approach to Training (proposed by the IAEA)
SFAM:	(Site Functional Area Manager) CFAM counterpart at power stations
SOER:	Significant Operating Experience Report stipulated by WANO (World Association of Nuclear Operators)
TBM-KY:	Tool Box Meeting-*Kiken-Yochi (predicting danger)*. Prior to engaging in work, small groups gathered to predict orc dangers and decide on methods to complete the task safely
Traits:	10 Traits and 40 behaviors indicative of robust nuclear safety culture
WANO:	World Association of Nuclear Operators