Nuclear Safety Reform Plan

FY2019Q2 Progress Report

Tokyo Electric Power Company Holdings, Inc.

November 12, 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 second quarter of FY2019[1](July~September, 2019).

During the second quarter, the World Association of Nuclear Operators (WANO) conducted a Corporate Peer Review (CPR) to examine and assess the performance of the entire Nuclear Power Division (with a focus on Headquarter functions) in regards to achieving nuclear safety reforms (September). During this CPR, a review team of nuclear experts with a plethora of experience around the world pointed out areas for improvement in regards to our initiatives and the current state of TEPCO's efforts to use standard management methods leveraged by the world's operators, such as the management model and self-assessments, etc., that will enable us to make further improvements. Going forward we will quickly address these areas for improvement and leverage the issues noticed by reviewers during the assessment to further promote nuclear safety.

1 All dates hereinafter refer to 2019 unless otherwise noted.

1 PROGRESS WITH SAFETY MEASURES AT NUCLEAR POWER STATIONS

1.1 PROGRESS OF 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, 2017 revision).

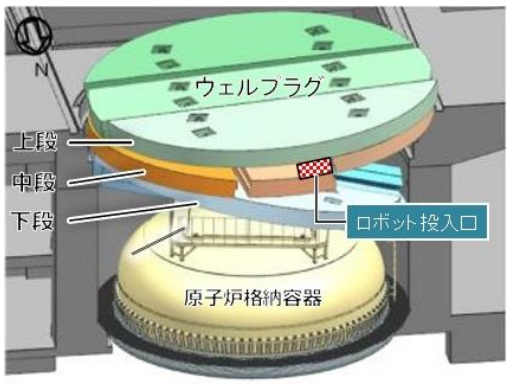
(1) Fuel Debris Removal

◆ Unit 1

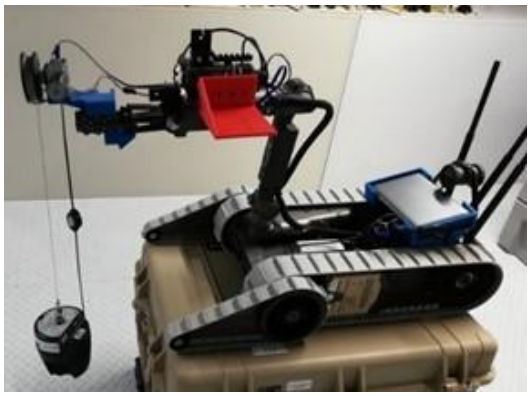
In order to secure an access route to the primary containment vessel in preparation for an internal exploration, we bored holes in the X-2 penetration, which is a door-equipped penetration used to enter and exit the primary containment vessel. During hole-boring work conducted in the first quarter, dust concentrations increased so work to collect more data on dust concentration fluctuations was conducted (July 31~August 2) in order to ascertain the impact of dust concentrations in conjunction with hole-boring work. Based on this data, we are deliberating the additional installation of dust monitors by using pipes installed near the primary containment vessel head in order to enhance monitoring of dust concentrations near the primary containment vessel and optimize drilling time as we move forward with this task. At the beginning of October, we began the additional installation of dust monitors upon performing pipe obstruction explorations, etc., as we look to recommence access route construction at the beginning of November at the earliest.

(2) Removing fuel from the spent fuel pools

◆ Unit 1



Well plug (concept drawing)



Remotely operated robot

◆ Unit 3

The Unit 3 spent fuel pool contains 514 spent fuel assemblies and 52 new fuel assemblies (total: 566 assemblies) and the removal of new fuel commenced during the first quarter. During the second quarter we reflected upon the methods and equipment used to remove

the fuel and started removing fuel for the second time on July 4. The planned removal of 21 new fuel assemblies (total: 28 assemblies) was completed on July 21. Thereafter, a regular inspection of the fuel handling machine was conducted and equipment was adjusted in preparation to recommence fuel removal. During this time problems with the tensile truss (mechanism for adjusting the position of the manipulator, which has the same motor functions as the arms and hands of a human, to remove small rubble from inside the pool) and a rotation malfunction with the mast were found. The tensile truss was adjusted and work to remove rubble from inside the spent fuel pool recommenced on September 10. The cause of the rotation malfunction of the mast, however, was found to be a nonconformity with the motor used to cause rotation, so preparations to replace the aforementioned motor are underway. As a result, fuel removal work will most likely recommence after October. We will continue to monitor dust concentrations in the surrounding environment and move forward with this task while prioritizing safety.

(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.

◆ Flow of groundwater into the site bunker building

Groundwater has continued to flow into the site bunker building since the middle of November 2018 and an investigation found on May 23 that groundwater is flowing into the building from the inner side of the floor funnel in the subfloor 1 maintenance area. In order to find out where the water is flowing from, a camera was inserted into the drain pipe and no other sources of water aside from that mentioned above were found. The flow of water was controlled by opening a hole near the funnel and inserting a temporary plug in the aforementioned location, and the hole was permanently sealed by inserting filler material on August 30. The flow of water has stopped since the hole was sealed and the amount of water flowing into the site bunker building has decreased dramatically from approximately 40m^3 per day to approximately 0.2m^3 per day. We will continue to monitor water levels.

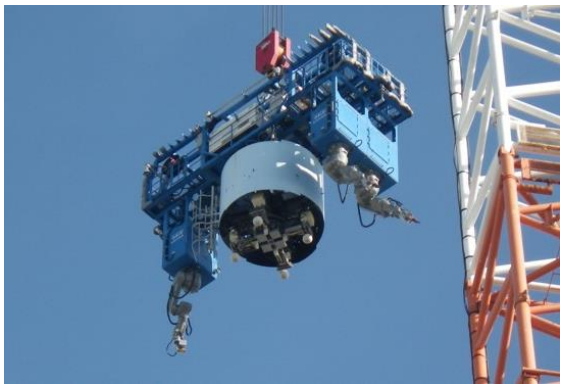

Floor funnel sealed using filler material

(4) Dismantling the Unit 1/2 exhaust stack

Damage and cracks have been found in the steel tower that supports the Unit 1/2 exhaust stack, so dismantling of the top part of the steel frame using remotely operated machinery has begun in order to ensure seismic resistance margins. In order to address the approximate 3m discrepancy between the estimated distance from the crane hook to the top of the exhaust stack and the actual distance, which was discovered during the first quarter, measures to ensure that the crane can be positioned at the correct height were implemented. These measures comprised of making road improvements that enabled us to move the crane closer to the exhaust stack and raise it higher and we confirmed that the crane hook can now be

raised to the desired height (July 18). The approximate 60m tall exhaust stack will be cut into 23 blocks and dismantled. Cutting of the top block commenced on August 7, and on September 1 the top block was removed. Thereafter, the work procedure was reflected upon and dismantling of the second block commenced on September 12 with removal of the second block completed on September 26. During this time, we experienced more problems than anticipated with communications equipment malfunctions and chip saw wear, so we reflected on the work process and made improvements to address each issue. In regards to communications equipment malfunctions, it was found that rain water had infiltrated the communications antenna attached to the end of the crane, so as a countermeasure a cover to prevent the intrusion of rain water was installed. In regards to chip saw wear, cutting procedures were revised as a countermeasure for wear, which differs from chip saw wear when used on the mockup and is occurring much quicker than anticipated. With the cooperation of ABLE Co., Ltd., a local contractor, we aim to complete dismantling by the end of the fiscal year and move forward with earthquake risk reductions while prioritizing safety.

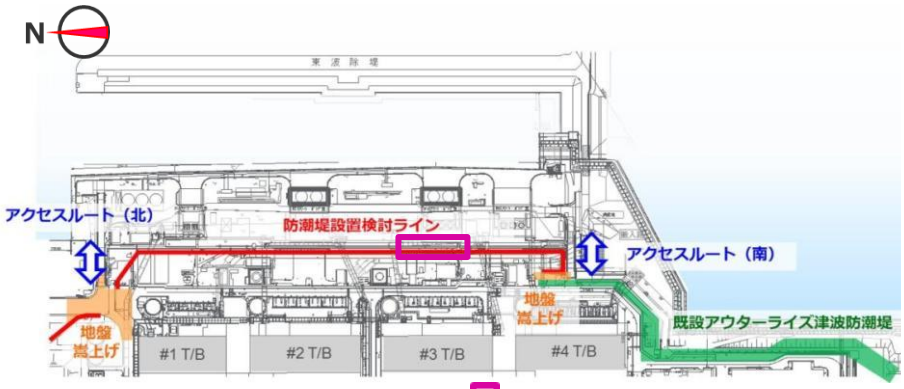
Cutting of the top block



Lowering the second block

(5) Construction of a seawall as a countermeasure for a Kuril-Kamchatka Trench tsunami

According to an announcement (December 2017) made by the government's Headquarters for Earthquake Research Promotion, long-term assessments for massive earthquakes along the Kuril-Kamchatka Trench, which lies on the Pacific Ocean side of Hokkaido, predicted that there is a 7%~40% probability that a massive earthquake with a magnitude of 8.8 or greater will occur within the next 30 years. As a voluntary safety measure, we have begun construction of a seawall to counter a potential tsunami originating from the Kuril-Kamchatka Trench, which is said to be likely to occur in the near future. This L-shaped steel reinforced concrete wall will be approximately 600m in length and will be joined to the existing outer rise tsunami wall on the south end of the site. The maximum anticipated height of this tsunami is 10.3m (average sea level of Tokyo Bay), and the height to the top of the wall from the ocean surface, which includes the L-shaped retaining wall, will be 11.0m. During the second quarter the concrete foundation was completed (September 19) and work on the first section of wall, which is approximately 80m long, began on September 23 with construction of the L-shaped retaining wall. We aim to have this seawall be completely functional by the first half of FY2020 as we look to reduce tsunami risks as quickly as possible.



Area of planned seawall construction, ; Initial construction location

L-shaped retaining wall

Constructed wall

(6) Wave meter installation location information error

Wave meters (devices for measuring the height of waves) installed at Fukushima Daiichi continued to measure tsunami waves during the great East Japan Earthquake and Tsunami that occurred on March 11, 2011 until they were damaged, and TEPCO had provided information on the installation location of these wave meters to external parties. On June 24, a review performed in response to a question from the Niigata Prefecture Technical Committee revealed that the actual installation location of wave meters was "approximately 1.3km off the coast (approximately 200m closer to shore)" and not "approximately 1.5km off the coast" as originally stated.

When TEPCO reported the tsunami analysis and assessment results to the former Nuclear and Industrial Safety Agency in July 2011, the main administrative building at Fukushima Daiichi could not be accessed so the report was created based upon positioning diagrams in the "Thermal Discharge Survey Report" (submitted to Fukushima Prefecture) that was at Headquarters. Furthermore, deliberations in the National Accident Investigation Report (July 2012) about the time when the tsunami arrived and discussions about the time when the tsunami arrived by the Niigata Prefecture Technical Committee (November 2013~) have been based on this information. The mistaken information about the installation locations of wave meters means that the time the tsunami arrived is approximately 10 seconds earlier than stated in TEPCO's "Unsolved Issue Report," but does not impact the conclusion of the aforementioned report that the "tsunami arrived at 3:36 PM." Furthermore, whereas [wave meter] installation location information was used to deliberate the time that the tsunami arrived when compiling the "National Accident Investigation Report," it does not change the conclusion in the aforementioned report that the "tsunami arrived around 3:37 PM." We

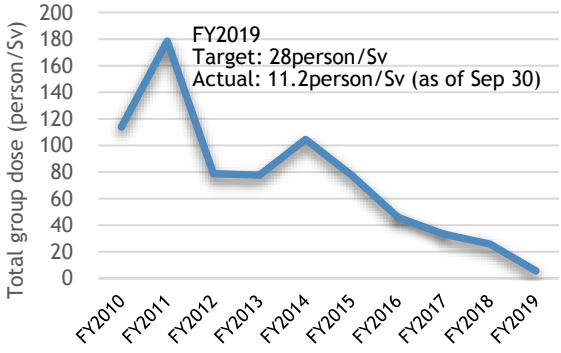
shall carefully make any corrections to documents requested by the powers that be.

Wave meter installed in 1978

Wave meter installed in 2001

(7) Initiatives Aimed at Reducing Exposure Doses

At Fukushima Daiichi, we are striving to reduce exposure doses by predicting work-related exposure doses during the planning stages and deliberating exposure reduction measures from an engineering standpoint upon assessing the increases or decreases in risk based upon the Mid-to Long-Term Roadmap. Furthermore, during the work implementation stage, the number of remote monitoring systems introduced as a management measure was increased in order to enhance our means for managing high-dose work (March 2019). During the second quarter, remote monitoring systems were used for a total of four projects, including dose surveys of the Unit 3 reactor building and the removal of rubble from the Unit 2 turbine building annex, etc., in continuation from Q1 and exposure doses were reduced to the same extent (approximately 10%) as past achievements. These systems will be proactively leveraged during future work inside the reactor building and surrounding high-dose work environments.



Trends in total group dose by year

1.2 Progress of Safety Measures at Kashiwazaki-Kariwa

(1) Progress with safety measuresy

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. 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 [Augmenting power sources]	Additional deployment of air-cooled gas turbine power supply cars	Underway	Underway
	Installation of emergency high voltage distribution panels	Completed	
	Laying of permanent cables from emergency high-voltage distribution panels to reactor buildings	Completed	Completed
	Preparation of substitute DC power sources (batteries, etc.)	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 second quarter is as follows:

◆ Unit 7 work plan permit application

The detailed designing of equipment is proceeding based upon the basic design policy of the Unit 6 and Unit 7 reactor installation modification permit. On July 5, the second amendment to the work plan permit application was submitted to the Nuclear Regulation Authority for Unit 7.

This amendment that was submitted included primarily additional attachments, such as explanations and schematics. With this amendment we have now submitted approximately 70% of the amendments that we assume will be necessary. We are currently in the process of refining the details for remaining issues, such as strength calculations and seismic-resistance calculations, and will submit them to the Nuclear Regulation Authority as soon as preparations have been completed.

We will continue to sincerely and carefully handle Nuclear Regulation Authority inspections as we strive to further improve power station safety and reliability.

◆ Addressing external hazards (tornado countermeasures)

Tornado countermeasures include measures to secure and isolate equipment and materials that may be turned into flying debris (flying debris prevention measures) and measures to address openings and vulnerabilities in structures that contain equipment that must be protected in order to prevent this equipment from being impacted if the structures were to

be damage by a tornado (protective measures).

As one of these protective measures, wire nets have been installed on the inside of the blowout panels[2] in order to prevent flying debris from entering the spent fuel pool and damaging fuel in the event that these blowout panels were to open as a result of a drop in external air pressure in conjunction with a tornado. Going forward we plan to renovate these blowout panels in order to enhance functions for re-closing them if they were to be opened in this manner.

(2) Causes and countermeasures for the notification form errors made after the earthquake that occurred off the coast of Yamagata Prefecture

An earthquake notification sent after an earthquake occurred off the coast of Yamagata Prefecture on June 18 contained errors indicating a problem with fuel pool cooling and the errors were not caught thereby indicating insufficiencies with the system for checking notification details prior to release. Therefore, the following countermeasures have been implemented.

- The format for notifications has been revised so as to prevent errors and also enable plant abnormalities to be quickly ascertained (completed during FY2019Q1).
- Number of people on a shift has been increased from 6 to 8 in order to prevent shift members from being overwhelmed (completed during FY2019Q1).
- Improving the skill of shift members/improving methods for confirming the skills of shift members.

In order to improve the skills of shift members and improve methods for confirming these skills, training on the following processes is being implemented in order to improve the comprehension and skills of shift members in regards performed tasks, such as filling out notification forms and writing emails, etc.

Process	Training content
① **Understanding the role of the night shift (completed)**	・Hold briefings to foster understanding about the requirements of notification handling (complying with safety agreements and dealing with regulatory agencies) and the role of the night shift.
② **Acquiring general skills needed to give notifications (completed)**	Enable trainees to acquire the following skills during individual training that are needed to give notifications. ・Training on filling out notification forms (earthquakes, fires) and sending faxes A training scenario is employed to let trainees actually practice filling out notification forms. The notification forms are checked for errors and to ensure that important information is being conveyed. Whether or not faxes are being sent properly is also confirmed. ・Email system (local government, in-house) usage training Whether or not sent emails correctly reflect the content of notification forms is checked. A certain amount of time is allotted for this training and trainees repeat the process until they are able to respond suitably within the allotted time.
③ **Determining promotion to**	・Team training is provided for trainees that have passed individual training and the skills of trainees for each duty assigned is assessed.

[2] Blowout panels are normally kept closed in order to maintain the negative pressure in the reactor zone of the reactor building, but in the event of a main steam pipe rupture, the blowout panels would be released to prevent an abnormal rise in pressure inside the reactor building.

	night shift (completed)	・The Site Superintendent shall give permission for night shift assignment to those that have acquired the necessary skills. ・Trainees that do not pass skill assessments shall be retested.
④	**Maintaining the skill of night shift members (ongoing)**	・ Training simulations that include sending actual notifications (via telephone/facsimile/email) are being implemented as part of night shift training. ・ Night shift members that fail to display adequate skills during training assessments shall be removed from the night shift and subjected to retraining starting with [① Understanding the role of the night shift]

The causes and countermeasures were reported to the Kashiwazaki City Mayor and Kashiwazaki City Council on August 1, and on August 14 representatives from the government of the siting community observed training to improve the skills of shift members, which has been implemented as part of improvement measures. This type of effective training for station shift members will be continued in order to make continual improvements as we maintain a strong awareness of not just conveying information, but "conveying information that is easily understood" and strive to provide the siting community, and society, with information that makes them feel safe and provides them with peace of mind.

Instruction from the Site Superintendent during notification training

Shift member skill training being observed by r epresentatives of the local government

(3) Joint firefighting training with the Kashiwazaki City Fire Department

Joint firefighting training between the Kashiwazaki City Fire Department and in-house fire brigades was held on September 20. Joint firefighting training is being held to ensure that information between the city fire department and in-house fire brigades is being shared appropriately and also to improve the skills of in-house fire brigades by conducting firefighting training at nuclear facilities in coordination with the Kashiwazaki City Fire Department. The training simulated a compound disaster in which a nuclear disaster occurred simultaneously with fires. Based on lessons learned from the past, training was also held on the filling out and sending of notification forms. At the simulated scene of the fire, training was also held on using external fire hydrants for water sources to send water from fire trucks to the fire suppression systems inside the building where the fire had broken out, and also carrying in and setting up smoke exhaust fans in anticipation of smoke-filled areas.

The Kashiwazaki City Fire Department Chief commented that, "as a result of the skill course that we gave to TEPCO in-house fire brigades in July and this joint training, the level at which the power station can fight fires has improved, so it's important to continue this type of training in the future."

We will continue to hold training in the future based on various fire scenarios and continually hold joint firefighting training with the Kashiwazaki City Fire Department in an effort to improve our fire response capabilities.

In September we also started securing both ends of straight-line splices with brackets in the 64 locations that require them as a countermeasure to the cable service tunnel fire that occurred on November 1, 2018.

Joint field command center run by the Kashiwa zaki City Fire Department and TEPCO in-house fire brigades


Coordinated use of Kashiwazaki City Fire Department ladder truck and TEPCO high-rise water truck

1.3 PROGRESS IN THE AOMORI REGION

In the Aomori region we established an Aomori Division on July 1 and exchanged opinions about the Aomori Action Plan with the Higashidori Village council and Aomori Prefecture Council on July 22 and September 10, respectively. (Refer to 2.3.1 Communication with the Siting Community (3) Activities in the Aomori region for details)

(1) Project progress in the Aomori region

On July 1 we established an Aomori Division, which has its head office at Higashidori, for the purpose of hashing out the details of the Aomori Action Plan formulated in March, thereby greatly enhancing our personnel base for projects in the Aomori region. Having an executive (managing executive officer) permanently stationed at the Aomori office and Headquarter functions on site will enable quick decision-making and action thereby propelling projects, such as Higashidori, etc., forward and enabling us to examine and implement initiatives that shall contribute to the continual development of the region.

Furthermore, since August 2018 we have continued to conduct detailed geologic surveys of the Higashidori site so that we can not only conform to new regulatory requirements, but also pursue the safest plant design possible, based on the most up-to-date knowledge as we prepare to construct an advanced boiling water reactor (ABWR).

(2) Nuclear power project teams

On August 28, TEPCO signed a letter of intent with Chubu Electric, Hitachi and Toshiba for the purpose of examining the formation of a consortium related to boiling water reactor projects (hereinafter referred to as, "BWR projects") in order to construct a sustainable business management group that can safely and economically operate BWR projects into the future.

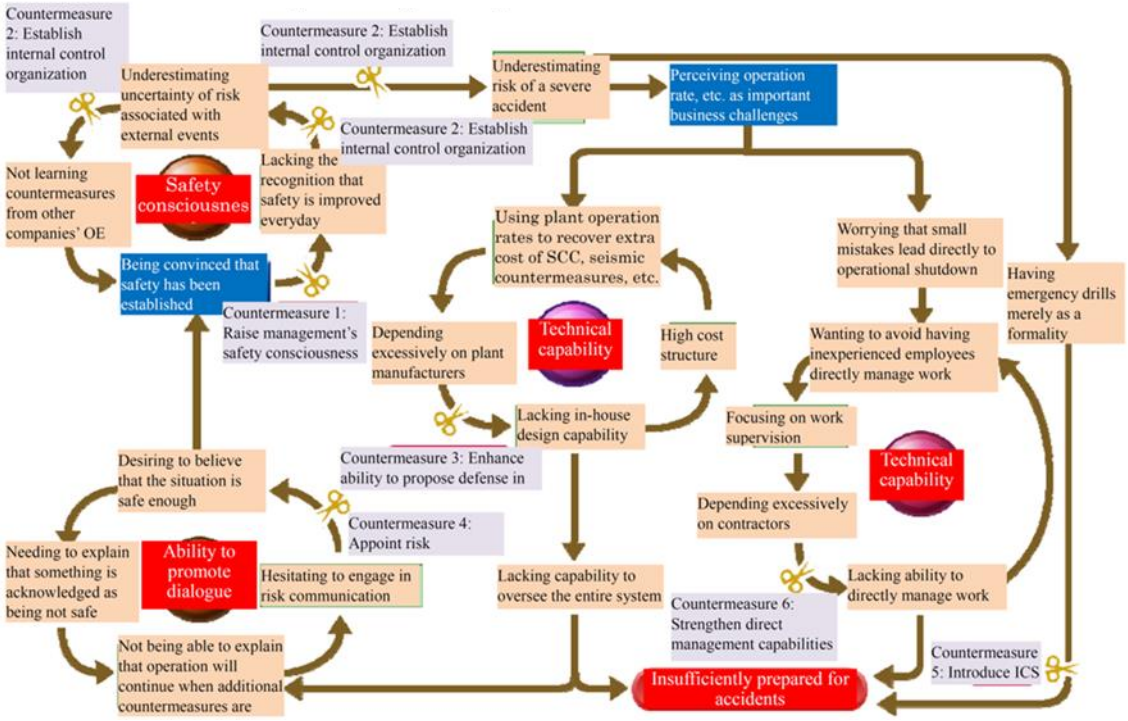
The details of this consortium will be determined based upon future detailed deliberation, but TEPCO aims to turn the Higashidori Nuclear Power Station project into a joint venture with other operators and believes that construction of this power station is a potential candidate for the framework of this consortium for which the letter of intent was executed. The details will be discussed by all parties involved going forward.

Geological survey site

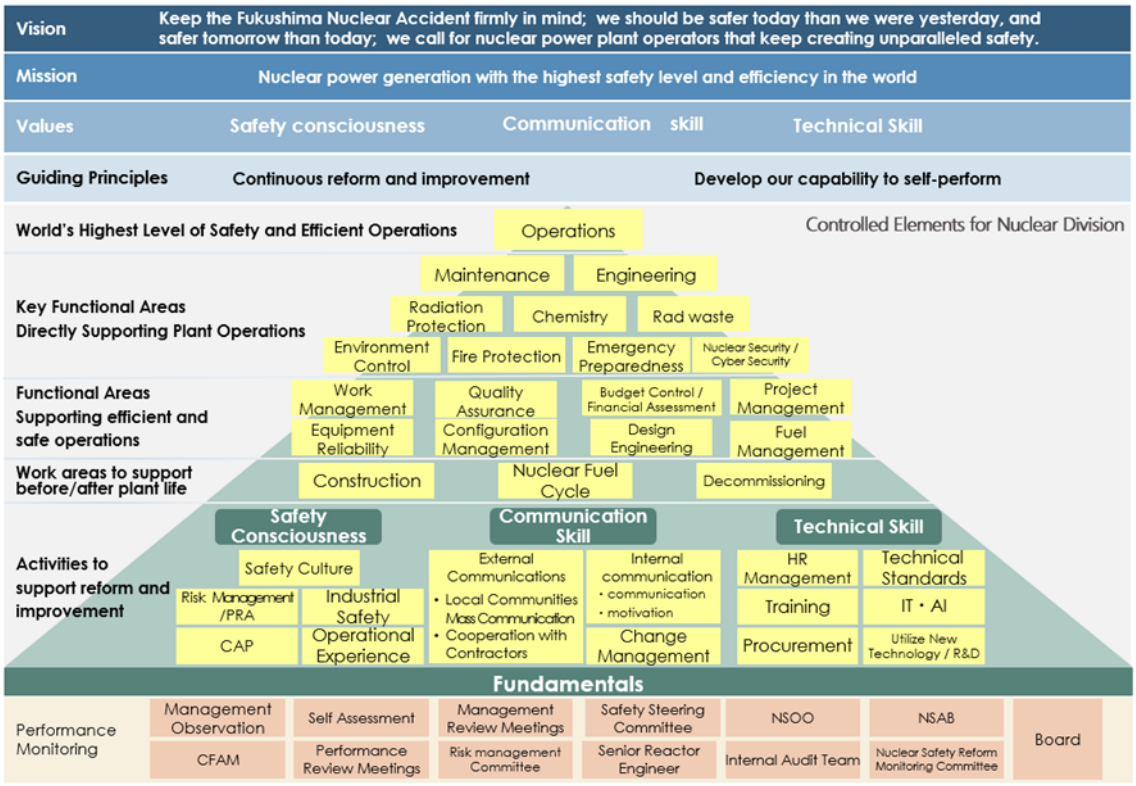
Concept of consortium

2 PROGRESS WITH 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.



2.1 Activities to Better Align the Vectors of All Divisions

2.1.1 Strengthening Governance

(1) 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 FY2019 we will continue to engage in activities that aim for excellence upon creating business plans based on the Management Model.

During the second quarter we continued to engage in activities based upon the FY2019 business plan and make CFAM/SFAM improvements, and we also began discussing the details of the FY2020 business plan.

(2) Improvement activities by CFAM/SFAM

CFAMs and SFAMs have been assigned to each area 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 Chief Nuclear Officer (CNO), and activities are being furthered while receiving advice and guidance from these parties (since April 2015).

And, work is being carried out based upon the Fundamentals that stipulate the approach to, and general principles for, engaging in daily duties. We continue to spread and develop the fundamentals throughout the company while also engaging in activities to foster

understanding of "Fundamentals for Contractors" and confirm the degree to which the Fundamentals have permeated throughout the organization through management observation. During the key self-assessment implemented in April we found that performance indicators (PI) are biased towards result indicators in many fields and identified the inability of CFAM to provide sufficient oversight as a problem. In light of this we are deliberating whether or not PIs for each area need to be revised.

A year and a half has passed since the introduction of the Management Model and even though the objective was to carry out the Safety Reform Plan we are aware that, "current CFAM activities are not completely effective," and "the objective of the Management Model and the ideal state that it aims to achieve have still not sufficiently permeated throughout personnel at Headquarters and power stations." In order to rectify this situation, we held CFAM retreats for CFAM and other related parties on July 31 and August 16. In addition to CFAM, SFAM supervisors from each power station and the Higashidori Nuclear Power Station construction Site Superintendent (who has declared to also engage in SFAM supervisor duties for the construction site) participated in the retreat and discussed the factors that are hindering CFAM activities, how to overcome these hindrances, and what is necessary to make these activities completely effective.


Discussions during the CFAM retreat

During FY2019 all departments are focusing on strengthening risk management, enabling the concept of operational focus to permeate throughout the station, improving corrective action programs (CAP), and activities aimed at reducing human errors as these areas of the Management Model are deemed necessary to achieve excellence. The status of initiatives for this quarter are as follows.

◆ Enhancing risk management

In FY2018 a systematic mechanism for managing risk was created in order to enhance risk management. During FY2019 we shall focus on providing risk management education and implement effectiveness assessments. During the second quarter we created a mechanism for ensuring the monitoring of indicators, which is the foundation for assessing the effectiveness of risk management, and continually monitored indicators, both of which are key issues that needed to be addressed. In particular, we set the number of "GII or higher nonconformities that occurred due to insufficiencies with risk management processes" as an indicator, and monitored nonconformances by continually holding risk screening meetings during which the frequency of occurrence of these nonconformances and what should be done in order to strengthen risk management were discussed. Going forward, we aim to become an organization that can systematically manages risks while maintaining a high sensitivity to risk amongst all employees through coordination with corrective action programs (CAP).

◆ Permeation of operational focus (Prioritizing the safe and stable operation of power stations)

In order to support operations, which is the most important functional area 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 area 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. In conjunction with this, Operations Division management is providing guidance and advice to operators on a daily basis that is in line with the operational focus fundamentals.

We have also started to sample indicators related to operational focus in order to accelerate the permeation of this concept by enabling a visual representation of the degree to which operational focus has permeated throughout the organization.

Additionally, by repeatedly providing education and training, observing the status of implementation, and giving feedback on weaknesses, we are systematically improving the performance of operators. For example, we are continually providing training on the use of human performance tools for workers in operations, and Operations Division management engage in management observation (MO) more than four times a month to confirm, and provide guidance on, the use of human performance tools in the course of daily duties.

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. Activities to help this concept to permeate have been incorporated into educational programs for new employees. For all other employees, in continuation from last fiscal year, power station executives and operations CFAM give briefings on operational focus and engage participants in group discussions that explain the relationship between their duties and operational focus. These activities will be continued in the third quarter and beyond in order to cultivate a sense of values according to which power station safety and safe operation are prioritized by having employees reflect upon how they engage in their daily duties while referencing the Fundamentals.

◆ Improving corrective action programs (CAP)

2.2.2 Noted in performance improvements (CAP)

◆ Activities to reduce human error

The Nuclear Power Division is engaged in efforts to minimize human error, such as by deepening understanding of human performance tools (human error prevention tools). Furthermore, in light of the fact that human errors have occurred many times at Kashiwazaki-Kariwa, during the second quarter a power station human error prevention task force led by operations CFAM was set up at Headquarters and began initiatives to analyze causes and formulate improvement measures. During the second quarter the task force proposed countermeasures for issues identified through analysis and interviews that focused on preventing safety device mistakes, for which errors occur frequently. During the third quarter actions will be taken to resolve these issues based upon the proposals.

(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. The content of this Decommissioning Strategy is being continually revised with the second revision performed in December 2018.

In order to promote and enable this strategy to permeate through the organization we have repeatedly held forums at the FDEC. In July and August, forums, which were attended by the FDEC president, were held four times (three times at Fukushima Daiichi, once at Headquarters) on topics such as reflecting upon promotion of the strategy to date and future plans. There was also a forum where only general workers were allowed to participate in at Fukushima Daiichi in order to encourage attendees to proactively speak out. In a questionnaire distributed following the forum many participants commented that they were able to hear the honest opinions of FDEC executives, they were able to directly hear the opinions of executives, and that the forum was helpful in promoting understanding of the strategy. Furthermore, during recent forums group discussions in small numbers have been held so as to hear the opinions of as many employees as possible. This has led to discussions and lively exchanges of opinions between people in different departments that have very little contact in the course of their regular duties.

In light of the policies put forth during the aforementioned forums, mini forums for smaller groups that focus on more specific topics are being continually held since the end of August at a frequency of approximately twice a month. The opinions generated through these forums and mini forums will be referenced when revising the Decommissioning Promotion Strategy at the beginning of next year, which will be the third time it has been revised. During this revision, a version of the Management Model being used in the Nuclear Power & Plant Siting Division will be created for Fukushima Daiichi and incorporated into the Decommissioning Promotion Strategy. We intend to further strengthen governance through initiatives such as these.

Forum (Fukushima Daiichi)

Group discussions during mini forums

2.1.2 Internal Communication

(1) Communication through dialogue

Meet-and-greet with the Sales Division (August 29, Headquarters main building)

In August a meet-and-greet was held between the Nuclear Power Division and the Sales Division. At the gathering, Sales Division employees talked about changes they've seen in the power retail market since the disaster, the impact that liberalization has had, and how they feel about nuclear power after which employees from the Sales Division and the Nuclear Power Division exchanged opinions. Many participants commented positively about the gathering saying such things as, "it was a good opportunity to take another look at the significance of restarting operation and the act of selling electricity," "the event was motivating," and "it was a valuable opportunity to learn how people in the Sales Division think." Interdepartmental meet-and-greets will be continued into the future.

At the FDEC, document creation and presentation training is being held for all company employees as an initiative to strengthen our ability to communicate "information that is easily understood." Participants commented that, "I'll be able to employ these skills in my own duties," and "I wish they had taught me this when I first joined the company," so this initiative will be continued as we strive to improve internal communication capability.

At Fukushima Daiichi, a sporting event for contractors was held in order to cultivate a sense of unity on site and provide an opportunity to transcend departmental and corporate boundaries and interact with each other. Participants commented that, "I feel a stronger sense of unity with the other people that work on site now that we've played sports together," so we will proactively create more of these opportunities as we develop communications activities that include contractors.

Fukushima Daiichi "conveying information that is easily understood" training

Fukushima Daiichi sports event

At Fukushima Daini, we are continually making efforts to improve internal communication, such as by setting up the "*homeru hiroba* (*compliment square*)" website on the company's intranet. In light of the announcement made on July 31 to decommission all reactors (units

1~4), the President and the CNO spoke to all station personnel about the importance of decommissioning on the next day, August 1. Following this, CNO engaged in group discussions with each department and lively exchanges of opinions ensued in regards to "how the decision to decommission [will impact] duties and the organization." Furthermore, between September 5 and September 30, the Site Superintendent and lower executives sat down with all groups to have informal discussions (a total of 45 times). Executives engaged in dialogue with all station personnel about decommissioning, symbiosis with the community, and the future outlook for Fukushima Daini, and station personnel commented that, "decommissioning is the last stage of the nuclear power business, I want to see it through to the end," and "it will help recovery in the region." We will continue to strive to improve internal communication.

At Kashiwazaki-Kariwa, we continue to publish the "Group Manager Times," which has been distributed since January of this year (2019) to shed light on the personal side of each manager and convey interesting facts about them to employees. During the second quarter Vol. 9 was published and posted on the intranet as well as on power station bulletin boards. Station personnel have commented that, "I found it a little daunting to talk to other group managers in the past, but through the Group Manager Times I learned that they have the same hobbies as I do which has made easier for me to strike up conversation with them. This in turn has enabled me to easily reach out to them about work issues as well," and "they looked familiar to me, but I was afraid to say anything in case I was mistaken. But, I learned through the Group Manager Times that we had indeed been in the same office in the past, and that made it easy for me to strike up conversation about the good old days." We will continue with activities such as these that enable better communication.

(2) Using in-house media to share information

In-house media is being used as follows to share information within TEPCO HD and between TEPCO HD, core company employees and the Nuclear Power Division.

- Company intranet videos
  - "Special Advisor Uchikawa's Guidance Session ~Let's go Fukushima Daiichi~" (July 9)
  - "Official decision to decommission TEPCO Fukushima Daini to be made by month's end ~Article Explanation~" (July 22)
  - "Special Advisor Uchikawa's Guidance Session on Procurement Purchasing vented large capacity storage batteries, etc. ~Kashiwazaki-Kariwa~" (July 23)
  - "TEPCO conveys decision to decommission Fukushima Daini TEPCO to the Prefecture ~Article explanation~" (July 25)
  - "Official decision to decommission all reactors at Fukushima Daini" (August 1)

Kashiwazaki-Kariwa on-site bulletin board

- "President Kobayakawa and GM Makino brief Fukushima Daini workers on decision to decommission Fukushima Daini" (August 2)
- "Letter of gratitude presented to Fukushima University for 'Development of Strontium quick analysis method'" (August 13)
- "200m discrepancy of off-shore wave meters at Fukushima Daiini has 'No effect' on reports" (August 21)
- "Managing Executive Officer Yamamoto's Safety Patrol ~Stay safe Kashiwazaki-Kariwa Nuclear Power Station!" (August 23)
- "Remembering 3.11 ~Mr. Yoshimura, Mr. Aoyama~" (August 28)
- "Special Advisor Uchikawa's Guidance Session on Procurement Replacing large capacity storage batteries ~Kashiwazaki-Kariwa~" (September 4)
- "7th Kaizen Grand Prix Nuclear Power Division Preliminaries ~Kashiwazaki-Kariwa chosen as representative~" (September 6)
- Evacuation assistance during a nuclear disaster Training ~Kashiwazaki-Kariwa~" (September 9)
- "Special Advisor Uchikawa's Guidance Session on Kaizen ~Kashiwazaki-Kariwa Nuclear Power Station" (September 12)

◆ TEPCO Group News Letter
- 14th Decommissioning Project Report What are Risk Communicators (RC)? (July issue)
- TEPCO NEWS FY2018 Japan Society of Civil Engineers Technical Award received for "World's largest ice wall created and used for land-side impermeable wall at the Fukushima Daiichi Nuclear Power Station" (July issue)
- Aiming for recovery in Fukushima Inviting more visitors to the Fukushima Daiichi Nuclear Power Station (July issue)
- 15th Decommissioning Project Report Remotely operated robots used to explore the inside of the Unit 1 well plug! (September issue)
- VOICE ~Listening to opinions outside the company Mr. Hitoshi Ono visits Fukushima Daiichi (September issue)
- Aiming for recovery in Fukushima Decommissioning Fukushima Daini (September issue)

◆ "Messages from Management" sent via the intranet
- "RE: Decision to decommission the Fukushima Daini Nuclear Power Station" from the President (August 1)
- "Talking about Fukushima in Europe in the blistering heat" from the Deputy Chairman (July 31)
- "All homes in the Kashiwazaki-Kariwa region being visited" from the Managing Executive Officer (September 2)

Going forward we will disseminate information that fulfills the desires of employees and leverages 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 uploaded to the company's intranet (Kashiwazaki-Kariwa)

TEPCO Group News Letter (Fukushima Daiichi)

(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. During the second quarter we continued to disseminate information while also addressing work issues brought up by readers as part of initiatives that began in FY2018.

Examples of information conveyed during the second quarter.

- Communication kaizen~ If something bothers you, tell your supervisor (Nuclear Safety Management Department General Manager)
- RE: Progress of decommissioning at Fukushima Daiichi (Fukushima Daiichi Site Superintendent)
- RE: Activities by the Nuclear Power Division related to repairs in the wake of Typhoon #15

2.2 SAFETY AWARENESS IMPROVEMENTS

2.2.1 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. During the second quarter discussions were held about preventing the recurrence of legal infractions and better use of the Management Model by the organization. (Kashiwazaki-Kariwa: July 24, Fukushima Daini: August 29)

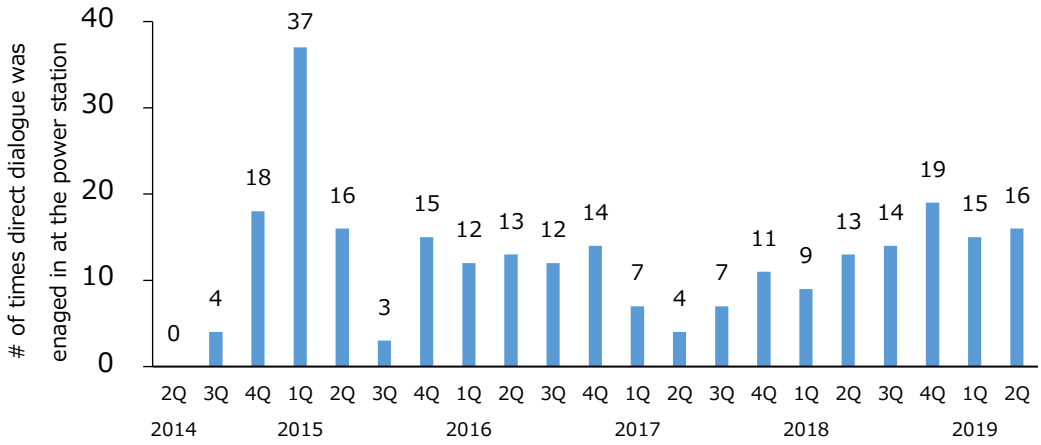
In regards to legal infractions and recurrence prevention, executives used case examples from each department to discuss realistic and effective measures for promoting use of the "Duty and Law Relationship Chart ("12 laws and regulations")," which is an auxiliary work tool created after reflecting upon past legal infractions as well as methods for further strengthening adherence to laws other than the "12 laws and regulations" that apply to

work being done in each group. An issue that was brought up is the creation of a database for saving knowledge, such as the experience of veterans, etc., in each department.


Dialogue with CNO (Fukushima Daiichi)

In regards to engineering functions at Headquarters and power stations, it was discussed how to make design engineering, plant engineering, nuclear safety engineering, fuel management engineering, and procurement engineering as defined in the Management Model a reality. In regards to large-scale equipment infrastructure, while some expressed the idea to concentrate engineering functions at Headquarters to comprehensively manage these functions, others said that engineering function deeply related to equipment operation should be located at power stations. The opinion was also expressed in regards to the location of engineering functions that this matter also impacts the training of human resources that can handle various issues at the power station.

These opinions will be further analyzed and discussions will continue in regards to how to make these engineering functions a reality. Furthermore, CNO engaged in direct dialogue with the Fukushima Daiichi team leaders and members in order to foster a common awareness about the use of human error prevention tools, the roles of individuals and departments, and the significance of risk management (Fukushima Daiichi: June 27).



Number of times CNO engaged in direct dialogue with each department

◆ 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.

t

September 6　Here's your "Risuku no kusuri" (*Risk medicine*) information. (Nuclear Safety Management Department General Manager)

Hello everyone in the Nuclear Power Division! This is your first installment of "Risuku no kusuri"! It's a palindrome! I'd like those people who didn't notice that to pay particular attention to this message and increase their sensitivity to risk.

Risuku no kusuri is a tool to improve your sensitivity to risk that is mentioned in "Integrated Risk Management*," which is a key action item for the Nuclear Power & Plant Siting Division for FY2018.

In order for "Integrated Risk Management" to be effective, it is of vital importance that everyone notices risks. Please take this risk medicine so that you can create opportunities to discuss risks on a daily basis and improve your sensitivity to risks. Just remember, this risk medicine is not a silver bullet and it's extremely important that you keep taking it. I know that continuing to take medicine is difficult, but please take an adequate dose before you engage in your work.

<Risk medicine attributes (the difference between OE and JIT information)>

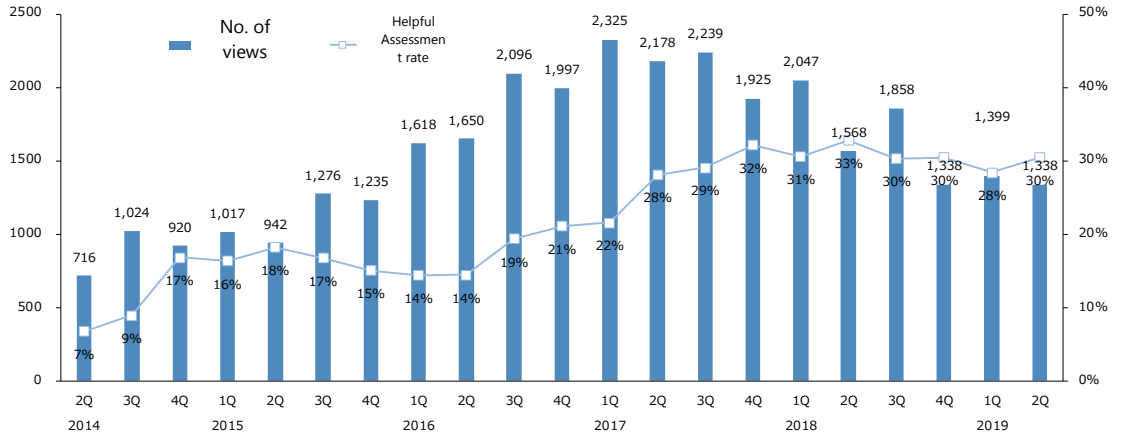
- Incidents are organized according to the type of risk that should be considered through Integrated Risk Management
- The approach to safety design is conveyed in conjunction with specific details
- Examples of successes, such as near misses and good catches, etc., are also conveyed
- The system enables searches by work type (disassembly, isolation, electrical equipment inspections, etc.)

<Examples of taking risk medicine>

Please discuss risks using risk medicine related to each step of the pre-implementation process, namely, schedule adjustment, pre-work review meetings, and TBM-KY.　(*omitted*)

*Integrated Risk Management

The objective of integrated risk management is to have everyone involved in plant operation identify risks that may occur in the course of plant operation, assess these risks, and formulate countermeasures to serious risks thereby keeping risks at a minimum and shifting from trouble resolution to trouble prevention.　(*omitted*)



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

◆ Commendations given by CNO and CDO

Since FY2015, the CNO and the President of the Fukushima Daiichi Decontamination & Decommissioning Engineering Company (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
Numbers in ( ) indicate the number for Higashidori from the total

Period	HQ	1F	2F	KK
FY2015	24(2)	47	19	24
FY2016	25(1)	19	14	25
FY2017	21(2)	5	15	22
FY2018	16(2)	13	16	15
FY2019				
Q1	7	8*	3	5
Q2	1	12	3	4

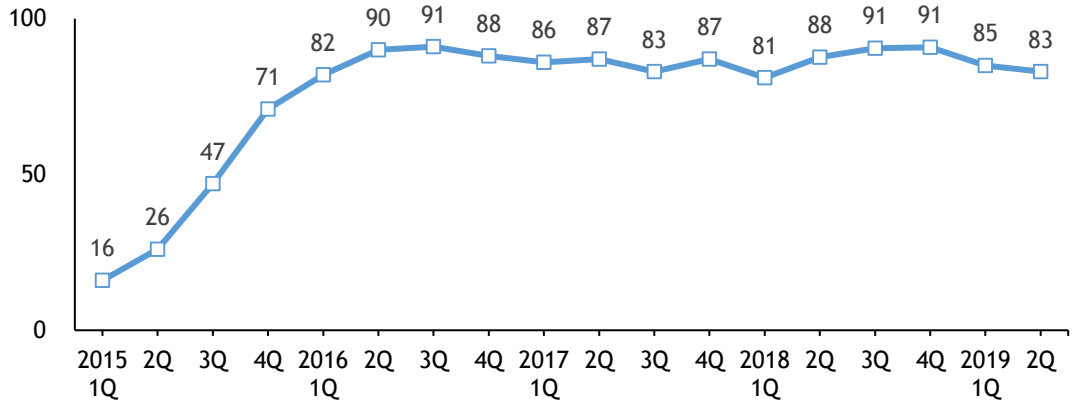
Note: Q1 performance for Fukushima Daiichi was corrected

(2) Reflecting on the Traits【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.

During the second quarter, although few, the response, "I behaved in a regrettable matter," to the question in intranet retrospection about, "were you able to act while being aware of your behavior to abide by laws and regulations?" was received so we will look into exactly

what type of behavior is being referred to and will deliberate adding this type of behavior to the "issues to be reflected on."



Group discussion implementation rate

(3) Enabling the permeation of nuclear safety culture【Measure 1】

◆ Common basic education for safety culture

The Focused Self-Assessment of safety culture implemented in FY2018 found that although various initiatives related to safety culture are being implemented, the basic approach and interpretation of safety culture is left up to the individual, so we are developing a common, basic and practical education program. During the second quarter, this common, basic and practical education program was put into trial use at Headquarters. This education program will be expanded to include all divisions based on the results of trial use.

(4) 8.29 Rehabilitation Day initiatives

On August 29 of every year we engage in "8.29 Rehabilitation Day" activities during which we look back upon the scandal of 2002. This year marks the 17th year since recurrence prevention measures began and the number of employees that were not at the company at the time of the scandal has increased. In order to reaffirm awareness about never letting such a scandal happen again, messages from nuclear leaders were posted on the intranet, moral discourse by directors and executives was used to directly engage employees, and group discussions to promote understanding through opinion exchange were used at Headquarters and the sites as part of consistent efforts.

As part of 8.29 Rehabilitation Day activities, CNO and CDO sent out joint messages that convey their feelings and expectations, and executives were dispatched to Fukushima Daini, Kashiwazaki-Kariwa, Higashidori/Aomori Office, and Fukushima Daiichi to gather employees and engage in moral discourse. Furthermore, group managers led group discussions with group members in order to increase the level of knowledge about the scandal. At this time, members who were not at the company at the time of the scandal were given careful explanations of what happened in order to promote understanding. General managers observed group discussions and offered advice to group managers as needed.

This type of scandal is inherently dangerous because it can occur as a result of changes in the attitudes of individuals, so we're using lessons learned from the past as educational materials to reaffirm awareness about never letting scandals happen again and improving safety awareness.

Kashiwazaki-Kariwa (Moral discourse by Site Superintendent)


Fukushima Daiichi (Lecture by executives)

(5) Training for all employees to convey the facts and lessons learned from the Fukushima Nuclear Accident

In order to ensure that future generations understand the importance of fulfilling our responsibilities to Fukushima, we have been holding "training to convey to all employees the facts and lessons learned from the Fukushima Nuclear Accident" since July 2018. During this training the circumstances surrounding, and the causes and lessons learned from the Fukushima Nuclear Accident, as well as the impact that the accident had on society and Fukushima, and the damage it caused, is explained. Participants sit in circles to engage in dialogue under the supervision of instructors about the things they noticed and lessons learned in order to provide new knowledge and drive home the lessons learned.

As of the end of the second quarter, 16,210 employees (53% of all employees) have participated in this training and we aim have all employees complete this training by July 2020. Employees that have undergone this training have commented positively saying such things as, "I want to put the things I noticed into action as soon as tomorrow," and "the training is very useful and should be held regularly." Nuclear Reform Monitoring Committee member Mr. Sakurai also observed training and commented that, "it's important that each and every employee think for themselves and have the desire to speak from the heart, and it's important that workplace supervisors support this attitude." Furthermore, in light of requests to participate in this training again, we have revised the training system and the details of this training for people participating in it for the second time in order to further root the lessons that we have learned in organization and the daily duties of employees.


Explanations by instructors


Circle discussions

2.2.2 Performance Improvements (CAP)

(1) Promoting improvement through CAP【Measure 3】

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 nuclear safety performance (such as management observation (MO) results, benchmarking results, third-party assessment results, near-miss information, etc.), and formulate even more fundamental countermeasures.

During the second quarter, weaknesses were identified and corrective action was continuously implemented in the form of quarterly performance assessments by analyzing and assessing information inputted into CAP for the major fields at Kashiwazaki-Kariwa and Fukushima Daini. Furthermore, when assigning importance levels to nonconformance information, in addition to managing nonconformances as they have been, an attempt was made at Kashiwazaki-Kariwa to categorize information while focusing on nuclear safety. (To be put into full-scale operation next fiscal year)

(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 second quarter are as follows:

	1F	2F	KK
# of times implemented	978	726	1,076
# of times per month per manager	3.4times/month/person	4.1 times/month/person	3.3 times/month/person
Good MO rate＊	–	71%	63%

＊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.

Furthermore, newly appointed group managers in TEPCO's maintenance division at Fukushima Daini and Kashiwazaki-Kariwa are continually being given guidance on MO by overseas experts, and this guidance is also being provided to some contracting company managers.

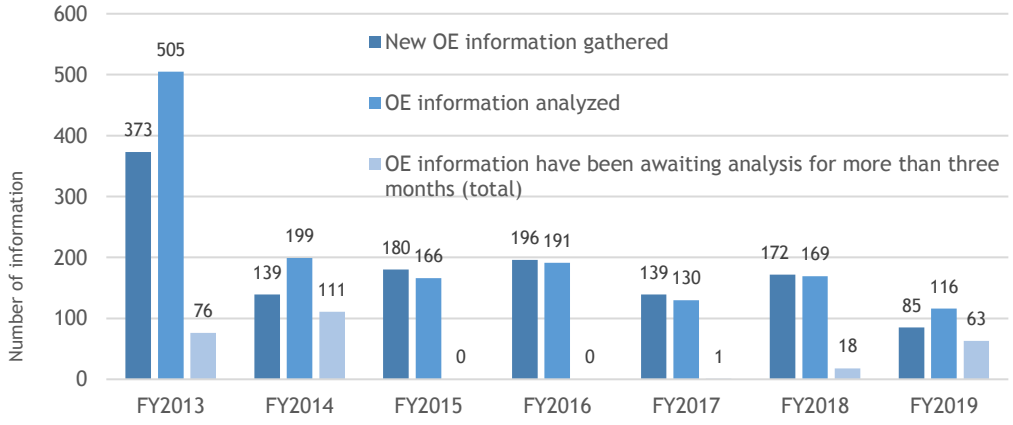
2.2.3 Leveraging Operating Experience【Measure 3】

In regards to leveraging operating experience, at its meeting held on April 3, the Nuclear Regulation Authority 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. Further cause analysis of these infractions is underway and countermeasures, such as leveraging IT tools for monitoring, etc., are being proposed and implemented.

(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 second quarter of 56 pieces of the new OE information was gathered thereby increasing the total number for this fiscal year from 29 in the first quarter to 85. Furthermore, analysis of 57 pieces of OE information has been completed thereby raising the total number of cases that have been analyzed for the fiscal year from 59 in the first quarter to 116. We will continue to strive to quickly gather and analyze OE information so that it can be utilized.



OE data gathering and analysis performance trends

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

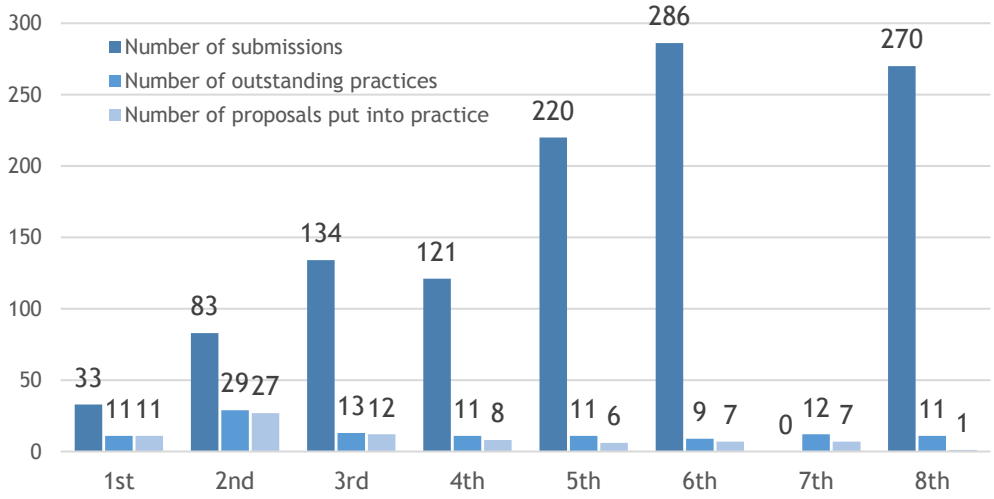
2.2.4 Improving the Ability to Propose Defense-in-Depth Measures (Risk Management)

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

◆ The status of competition initiatives

TEPCO has been holding Safety Improvement Proposal Competitions so that personnel may, in addition to conducting multi-faceted reviews from the perspective of defense-in-depth, acquire the technical ability to propose cost-effective safety measures and have these proposals put promptly into practice. During the second quarter we continued to deliberate improvements to the methods for implementing these safety improvement measure proposal competitions based upon the results of questionnaires distributed to Nuclear Power Division employees and the results of past safety improvement measure competition proposals. In the third quarter we plan to begin accepting proposal submissions for the 9th safety improvement measure competition.

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: After a detailed examination of "Ascertaining field status by creating three representation s from videos taken by drones, "which was an outstanding proposal from the 8th safety im provement measure competition, it was found that existing imagery from drones can be su fficiently leveraged to ascertain site conditions after a natural disaster without creating 3-D representations, so the proposal was withdrawn.

◆ Outstanding proposals that have been put into practice

During the second quarter one outstanding proposal from both the 8th competition was put into practice as noted below.

- Constructing new substitute cooling water injection methods for spent fuel pools (Fukushima Daini)

In the event that cooling water needed to be injected into the spent fuel pools during an emergency, plant cooling water injection equipment and fire extinguishing systems would be used, and fire trucks have been put on site as a substitute means for injecting cooling water. This proposal aims to construct a further means for injecting cooling water using the fire extinguishing system by preparing procedures for rerouting water used for cleaning insulators and general preparedness through the fire extinguishing system if the fire trucks could not be used due to site access road damage.

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

We have created approaches to, and mechanisms for, accidents and hazards that have the potential to create a calamitous situation resulting from a simultaneous and wide-scale loss of function caused by common factors, and we are engaged in proposing and implementing countermeasures under the assumption that these accidents will occur.

During the second quarter we examined how to resolve the issue of a lack of equipment that was identified during training on responding to a high-altitude nuclear explosion (HEMP)

that was implemented at Kashiwazaki-Kariwa in September (scenario conditions included having many pieces of electronic and communications equipment rendered inoperable).

(3) Risk Informed Decision Making (RIDM)

It is important to identify plant vulnerabilities using risk information, such as knowledge obtained through probabilistic risk assessments (PRA) and maintain/improve plant safety by implementing security measures to make up for these vulnerabilities.
The Risk Informed Decision-Making (RIDM) process is extremely effective for managing plant risk and entails making decisions related to plant renovations and operation based on knowledge from conventional deterministic evaluation mixed with the knowledge obtained from probabilistic risk assessments.

During the first quarter an action plan (state we aim to achieve by leveraging risk information) was formulated in order to leverage risk information. During the second quarter a basic plan for employing RIDM that explains how to use the RIDM process and how it will contribute to maintaining and improving the safety of the plant operation was compiled in preparation for the in-house implementation of activities to bring the aforementioned action plan to fruition.

Furthermore, we are examining the following detailed actions that will be taken as a result of utilizing risk information.

- Using the results of probabilistic risk assessments (PRA) to identify equipment and operations that are important for nuclear safety, and informing the Operations and Maintenance Divisions of this, will aid in improving technological capability.
- Improving the reliability of operations by reflecting important operational information in plant operating procedures.
- Leverage the latest risk information during equipment maintenance in order to focus maintenance on important pieces of equipment.

2.3 IMPROVING THE ABILITY TO PROMOTE DIALOGUE

2.3.1 Communication with the Siting Community【Measure 4】

(1) Activities in the Fukushima region

◆ Providing information that is easily understood

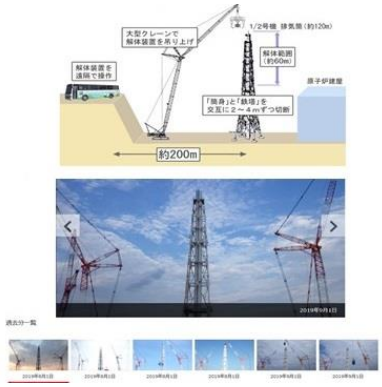
- Creating a dedicated website page to the dismantling of the Unit 1/2 exhaust stack

In conjunction with the commencement of the dismantling of the Unit 1/2 exhaust stack, a dedicated page entitled "Dismantling of the Unit 1/2 Exhaust Stack" was created on the company's website for conveying information on the status of decommissioning (August 1). The page gives an overview of the project and also has fixed point photographs of the exhaust stack taken at regular intervals that convey the progress that is being made. In order to enable as many people as possible to view the site, the webpage was introduced via Facebook in conjunction with its release. We will continue to develop content on this webpage in order to convey information on the progress of decommissioning in an easy-to-understand manner.

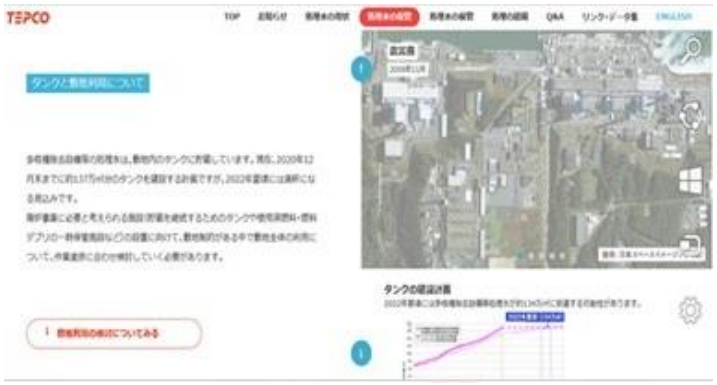
- Developing content on the treated water portal site

The treated water portal site provides information on how treated water is being handled

in addition to data on “treated water” generated by removing the radioactive substances contained in contaminated water thereby reducing risk. The content on this portal site was further developed and used by TEPCO representatives as an aid when giving explanations to the government’s Subcommittee on the Handling of Alps-Treated Water when it met on August 9 in order to convey information in an easy-to-understand manner (September 27). In particular, a new category entitled “Treated Water Storage” was added to give information on the number of new tanks that have been constructed over time, predictions for when the tanks will be full (around the summer of 2022), and our deliberations on future site utilization. Furthermore, a link to an English version of the treated water portal site has also been added due to particular interest in this matter by people overseas. People from outside of the company have commented that, “there is a lot of detailed information on the portal site.” We will continue to further develop the content of the treated water portal site in accordance with the circumstances.



Unit 1/2 exhaust stack dismantling page

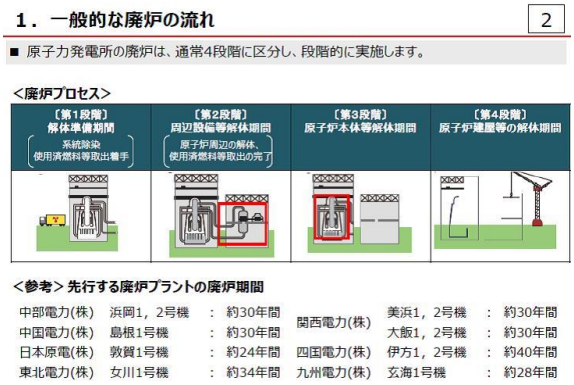


Treated water portal site

- Conveying information on the decommissioning of Fukushima Daini

Since the decision to decommission Fukushima Daini was announced on July 31 we have received many inquiries from the siting community and visitors to the power station about the decommissioning process and the handling of spent fuel. Therefore, in order to give an overview of the decommissioning process in an easy-to-understand manner, we have posted explanatory materials that uses illustrations to give an overview of the process on the Fukushima Daini website (September 9). This content gives an overview of the General decommissioning process, uses concept of diagrams to illustrate the decommissioning schedule for Fukushima Daini, and also talks about the safety of dry casks that will be used on site. This content is also being used when giving explanations to the regional communities about the decommissioning of Fukushima Daini. Members from the siting community have commented that, “We’ve gained a good understanding about the entire decommissioning process and the safety and use of dry casks.”

We will continue to use our regularly published information magazines to convey information in an easy-to-understand manner to the siting community and each and every member of the cities, towns, and villages surrounding the power station. And, the opinions and requests received from community members will be adequately reflected in various public relations activities.



General flow of decommissioning

Dry cask safety explanation

◆ Communication with stakeholders

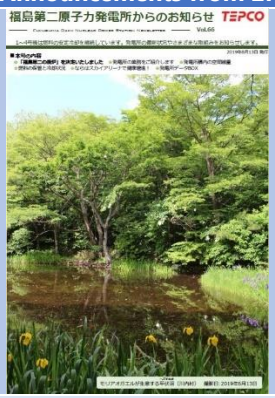
- Fukushima Daiichi tours

At Fukushima Daiichi many visitors from the siting community, educational institutions and overseas have been able to deepen their understanding of the decommissioning process, fuel debris, and the work environment through tours of the site. On August 26, disaster response robot expert, Professor Keiji Nagatani, from the Department of Precision Engineering at Tokyo University visited the Decommissioning Archives and was given a tour of Fukushima Daiichi along with professors Marco Hutter and Roland Stieger from ETH Zurich, who were visiting Japan for an international conference. The professors were greatly interested in the types of technology that will be required going forward and how we can foster more technical cooperation with the rest of the world, and opinions were exchanged on various subjects after the tour. We will continue to work together with the Decommissioning Archives to convey the facts about the Fukushima Daiichi accident and the progress of decommissioning in an easy-to-understand manner while also enabling many people to visit the site.

Decommissioning Archives

Unit 1 reactor building

◆ Published Info Magazines

	Hairomichi	Monthly 1F	Announcements from 2F
			
Date of issue	August 10	July 30	August 13
Circulation	Approx. 35,000 copies	Approximately 500 copies	Approx. 14,000 copies
Overview	・Disaster preparedness measures ・Introduction of new employees ・Making decommissioning-related analysis work more efficient	・1F today ・Dedication to safety ・The people who protect 1F ・Fukushima Quiz	・Fukushima Daini will be decommissioned ・Fuel storage and cooling update

(2) Activities in the Niigata area

◆ Providing information that is easily understood

- Posting virtual reality (VR) videos on our website

The Niigata Headquarters is using various forms of media for public relations to inform as many people as possible about TEPCO's efforts. As part of these efforts, we have created virtual-reality content that introduces the safety measures being implemented at Kashiwazaki-Kariwa and are using that content at Kashiwazaki-Kariwa Service Hall and communication booths in various locations. Since many people that have seen the content have commented that, "learning about the safety measures at the power station through a virtual reality video that makes it feel like I'm there enabled me to better understand the measures," and "it's important to get more people to see this," we have set up a special page on our website entitled "KKVR Visit the Kashiwazaki-Kariwa Nuclear Power Station in a virtual reality!" (September 2). We will continue to strive to convey information in an easy-to-understand manner while listening to the opinions of the community residents in order to transition from "conveying information" to "conveying

Virtual reality (VR) content

information that is easily understood."

◆ Communication with stakeholders

- Visits to all households

Between August 28 and November 20, we visited all the approximate 41,000 households (including households that are also family stores) in Kashiwazaki City and Kariwa Village for the fifth year in a row. The objective of these visits is to hear the honest opinions, such as opinions and concerns concerning the power station, from as many residents as possible.

During these visits, "visit results," which were requested by residents the year before, were conveyed and information on the safety measure renovations was included in distributed materials in order to reduce concerns about the accident that were brought up by many people. Community residents commented that, "we want to keep moving forward for the community," and "we'd like you to disclose information without hiding anything."

Furthermore, as a countermeasure for the errors on the earthquake notification sent after an earthquake occurred off the coast of Yamagata Prefecture, all station employees at Kashiwazaki-Kariwa participated in home visits. In addition to the approximate 300 representatives that visited homes last year, approximately 900 more employees took part this year for a total of approximately 1,200 employees. Employees responded positively to the experience saying, "it was a good opportunity to directly hear the opinions of community residents." We will remain aware of how the community residents are involved with what we do and leverage that awareness as we engage in business.

Household visit by the Site Superintendent

Household visit by new employee

- Furthering understanding amongst the general public through events

A summer event was held from August 10th through the 14th at Service Hall, Kashiwazaki-Kariwa's public relations facility. This event is held every year and this year saw 3,544 visitors over the five days (500 more visitors than last year) thereby indicating its popularity. The main theme of this year's event was "dinosaurs," which are popular amongst children as well as adults. In addition to actual size models of dinosaurs and a fossil display, we also created a craft-making corner for children in an effort to tailor the event to the hobbies and interests of our visitors and create an opportunity to explain power station issues to as many people as possible. Tours of the power station were also given during the event and this year approximately 740 people participated in these tours over the five days, which is approximately 200 people more than last year. According to the results of a questionnaire distributed after the tours, an average of 87% of tour participants were able to better understand safety measures, understood the necessity for nuclear power, and felt a better

connection with TEPCO. According to a questionnaire about the entire event, 89% of visitors were "satisfied," and the percentage of visitors that had a good impression of TEPCO before and after the event increased from 77% to 93%, respectively. In light of these results we feel that events are extremely effective for promoting understanding amongst a large group of people and we intend to continue them into the future.

In conjunction with Kariwa Village Hometown Festival (August 15), a summer event held in Kariwa Village, TEPCO set up communication booths (number of visitors: approximately 370). This year, virtual-reality was used to explain the safety measure renovations as part of a tie-up event with the Kariwa Village Energy and Science Festival. Since the event was held during the Obon season/summer vacation, we are able to explain TEPCO initiatives to people of all generations. In a questionnaire, visitors commented that, "I learned that Japan is poor in natural resources," and "I was able to understand the initiatives underway by taking a tour of the power station."

- Engaging students and the next generation through regional events

In Kashiwazaki City, TEPCO participated for the first time in the "Job Fair for Kids" held on August 18 and cooperation between the worlds of industry, government, and academia in order to pique the interest of children, who hold our future, in various occupations. During the event, more than 40 companies in the city from various industries set up booths and approximately 700 elementary school-aged children (third-graders~sixth-graders) participated. At the TEPCO booth, approximately 100 children experienced what it's like to take radiation measurements by using Geiger counters to measure various samples. Information was also given to the many local junior high, high school, and college students that worked as volunteers for the event as well as the parents and guardians of participating children. We will continue to approach the next generation in this manner because we feel that activities to promote understanding amongst the next generation are extremely effective at promoting understanding of nuclear power and improving the recognition of TEPCO.

Summer event at Service Hall

Job Fair for Kids

◆ Report on the "Basic Approach to the Recommencement of Operation and Decommissioning [of Kashiwazaki-Kariwa]"

In June 2017, TEPCO received a request from Kashiwazaki City Mayor Sakurai to present a plan for the decommissioning of Kashiwazaki-Kariwa Units 1~5 within two years. On August 26, TEPCO provided a response to the Mayor's request in the form of report that compiles our basic approach to the recommencement of operation and decommissioning of Kashiwazaki-Kariwa. Our basic stance is that if we are able to secure a sufficient amount of

power from non-fossil fuel sources, we are prepared to take steps towards the decommissioning of one or more of reactor Units 1~5 within five years after the recommencement of operation of Units 6 and 7, which would be done with the understanding of the local community.

Overview of the "Basic Approach to the Recommencement of Operation and Decommissioning [of Kashiwazaki-Kariwa]"

- We believe that the Kashiwazaki-Kariwa nuclear power station is necessary to provide a stable source of affordable electricity that generates little CO2 emissions.
- If we are able to secure a sufficient amount of power from non-fossil fuel sources, we are prepared to take steps towards the decommissioning of one or more of reactor units 1~5 within five years after the recommencement of operation of Units 6 and 7, which would be done with the understanding of the local community.
- We understand the community's concerns and fears about having so many nuclear reactors in one location and we shall address these concerns in a sincere manner.
- As an electric operator we shall look beyond nuclear power and leverage the vast knowledge we have acquired to help the city achieve its "Kashiwazaki City Regional Energy Vision" as we work together to create a "prosperous and sustainable city."

The mayor has commented that, "We have received the best response that TEPCO can give at current time. I will consult with the people and convey the results of our assessment of TEPCO's answer." Through continued dialogue with the local government and residents of the community, we shall remain aware of the relationship between our business and the community while leveraging their opinions in our future business operations.

◆ Info Magazine Stats

News Atom		
Date of Issue	July 7, August 4, September 1	
Circulation	Approx. 32,000 copies	
Overview	This month's power station news Info on visits to community households Articles on station employees	

(3) Activities in the Aomori region

◆ Providing information that is easily understood

- Creation of Aomori Division website

In conjunction with the establishment of the Aomori Division we have added a page to the TEPCO website for the office (July 1). In addition to the details of the Aomori Action Plan, we have also posted information on our participation in local events on the website and will strive to further develop content and convey information in an easy-to-understand manner while listening to the opinions of community residents.

Splash page

Local initiatives

◆ Communication with stakeholders

- Dialogue with the community

At the Aomori Division, the first thing that we did after opening the office on July 1 was to strengthen our information dissemination and dialogue activities. During regular visits to the homes of opinion leaders in the community, which we have been doing for some time, we are making efforts to convey information about topics that residents want to hear and learn about before they ask. During opinion exchanges with regional organizations, we have been commended for our efforts to strengthen our communications functions through the establishment of an Aomori Division, however we have been asked to offer our outlook on project progress and the recommencement of construction. Therefore, we have tried to deepen understanding by giving explanations of our initiatives to accelerate progress based on the Aomori Action Plan as well as how we are engaging in business from the perspective of the local community.

- Opinion exchanges with the Higashidori Village Council and Aomori Prefecture Council

At the general assembly of the Higashidori Village Council we gave an explanation of the current and future state of the Higashidori Nuclear Power Station Unit 1 project along with an explanation of the details of the Aomori Action Plan and our reasons behind the establishment of an Aomori Office (July 22). Village Mayor Yasuo Echizen commented in regards to the fact that there has been no progress with TEPCO's nuclear power project even though [the village has made changes] to live in symbiosis with the nuclear power station that, "this is an extremely important issue that dictates the life or death of the village, and these alarming circumstances could destroy the relationship of trust that we have built and turn the villagers against nuclear power," and indicated that the local government will continue with its efforts to enable the quick recommencement of construction.

We also exchange opinions about "the significance of establishing an Aomori Office and the status of initiatives aimed at constructing a nuclear power station with superior safety attributes" with the Aomori Prefecture Council's General Administrative Planning and Crisis Management Committee (September 10). Committee Chairman Yoetsu Echizen requested that TEPCO make efforts to recommence construction and fulfill the desires of the community because the regional economy is impoverished and suffering. At the end of his comment he also offered words of encouragement saying, "nuclear power has no future if safety is not prioritized," thereby creating a valuable opportunity for us to reaffirm the feelings of society in regards to nuclear power.

Going forward we will utilize various opportunities to engage in communication with

stakeholders and community residents, further disseminate information and engage in deeper dialogue in order to "proactively disseminate information and engage in dialogue, and strengthen company-led [communication] initiatives" as put forth in the Aomori Action Plan.

Higashidori Village General Assembly

Opinion exchange with prefectural council

(4) Communication activities by management

The CNO give a lecture on the current state of decommissioning and contaminated water countermeasures at Fukushima Daiichi to seniors at Tokyo University as part of FY2019 special lectures on electrical systems (July 16). Many of the students voiced their opinions during the lecture, which was focused on the removal of fuel from the spent fuel pool and the removal of fuel debris. Some of the comments made by the audience included, "I haven't heard a lot of about Fukushima Daiichi Nuclear Power Station recently, and I learned that the accident is still being handled and steady progress is being made, "and "I didn't know that even today there are several thousand people working at the Fukushima Daiichi Nuclear Power Station," thereby indicating that many students became newly aware of the current state of the decommissioning of Fukushima Daiichi. Going forward we shall not only disseminate information on new technologies, such as remotely operated technologies (robots, etc.) and decommissioning technology used in high-dose environments, etc., but also strive to convey information that will allow younger generations to correctly understand the situation at hand.

On July 5, CDO visited Fukushima University to talk to new students about the future of recovery in Fukushima. During the lecture the president talked about what happened during the accident that occurred in conjunction with the Great East Japan Earthquake and Tsunami, radiation levels in Fukushima Prefecture, evacuation zones and trends in the number of evacuees, and also decommissioning initiatives.

At Fukushima University, this is a required course lecture designed to teach about humans and industry, humans and the environment, and the environment and industry from the perspective of "symbiotic sciences." Approximately 200 students and graduate students attended the lecture. Many questions were asked during the lecture and a lively exchange of opinions ensued. Participants commented that, "I've always been interested in robots, and now that I've heard that remote-controlled robots are being used at the decommissioning site I feel more familiar with decommissioning," "I have a clearer understanding of future recovery in Fukushima now that I understand the decommissioning process," and "I'd like to make an effort to visit the site." We will continue to convey information on the current conditions at Fukushima Daiichi while considering the interests and concerns of the people in the audience.

Lecture at Fukushima University

2.3.2 Communicating with overseas partners【Measure 4】

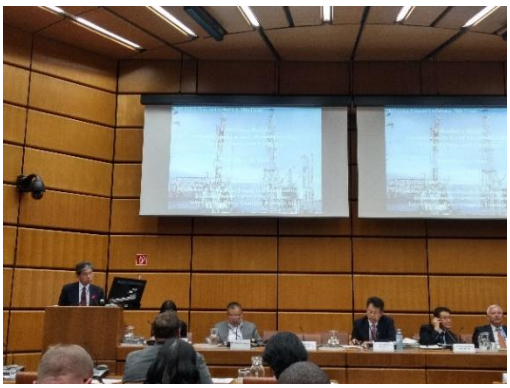
(1) Communication activities by management

The Deputy Chairman gives lectures about the current conditions in Fukushima and the lessons learned from the nuclear accident. During the second quarter a total of more than 350 people from various layers of society, such as those working in the nuclear power industry, regulatory agency officials, government officials, professors, and students, including high school students, attended lectures that were given in Switzerland (World Nuclear University, summer seminar, July 25), the United Kingdom (at a luncheon hosted by the Embassy of Japan in the UK, London University, July 26), and the United States (Purdue University, Chicago University, September 4 and 5). Many questions were asked after the lecture and a lively exchange of opinions ensued. Participants commented that, "I learned that the decommissioning of Fukushima Daiichi is progressing." We will continue to give lectures overseas in order to convey the current conditions at Fukushima Daiichi while tailoring these lectures to the interests and concerns of the people in the countries and regions in which they are given.

Lecture at World Nuclear University, Switzerland

Lecture at London University in the UK

The CDO participated as a panelist in a side event held during the 63rd annual International Atomic Energy Association (IAEA) convention held in Vienna (September 16), and gave a presentation on the status of decommissioning of Fukushima Daiichi. After the panel discussion, a question and answer session was held with attendees during which questions were raised about the handling of ALPS-treated water and the radiation levels of marine products from Fukushima. It was conveyed to the attendees that, "we're placing emphasis on providing information that is 'easily understood.' And to this end TEPCO has created an English version of its website in order to convey information that is 'easily understood' and provide information on matters of concern to you."



Presentation on decommissioning efforts

Side event during the annual IAEA conference

(2) Disseminating information overseas

◆ Conveying information that is easily-understood

- In an effort to proactively disseminate information we continue to convey information through English press releases, social media platforms, such as Facebook and Twitter, etc., and email magazines are being sent to overseas media outlets and intellectuals. During the second quarter, 29 press releases and four email magazines were issued, seven posts were made to Facebook, and 167 tweets were made on Twitter. We will continue to disseminate information at appropriate times while paying attention to the concerns of overseas media outlets and trends in the overseas media coverage of TEPCO.

Example of Facebook posts

Twitter tweet example
(video content showing the progress of decommissioning)

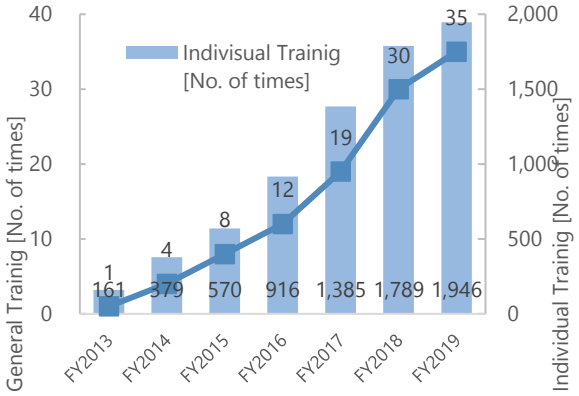
2.4 IMPROVING TECHNOLOGICAL CAPABILITY

In light of our inability to examine current equipment and work processes and make improvements on our own even though initiatives to improve technological capability have been underway, we have commenced initiatives such as various training programs and kaizen activities.

2.4.1 Strengthening Technological Capability (during times of emergency)

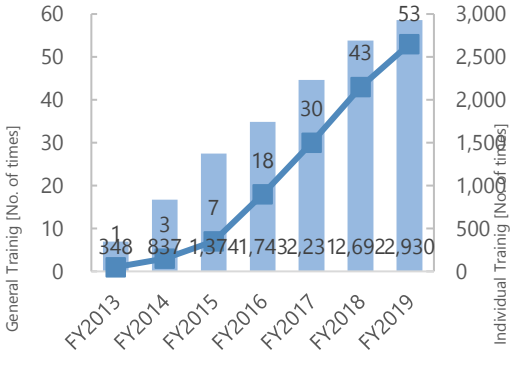
(1) Enhancement of Power Station and Headquarter Emergency Response (Organizational) Capabilities【Measure 5】

The Nuclear Regulation Authority's preparedness training assessment results (announced on June 28) gave all "A"-ratings (10 categories) to Kashiwazaki-Kariwa, which started implementing the aforementioned improvements quickly and had previously received C's during its FY2017 assessment. And, Fukushima Daini and Fukushima Daiichi received A's in nine and eight categories, respectively, thereby showing great improvement over FY2017. We shall not let ourselves be content with this assessment, but rather implement further improvements as we pursue excellence.

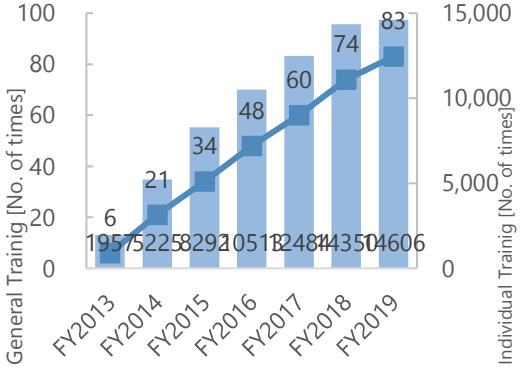


<Fukushima Daiichi>

Training was performed at each power station as follows:



<Fukushima Daini>



<Kashiwazaki-Kariwa>

◆ Fukushima Daiichi; Second Quarter General Training: July 29, August 26, September 30

On July 29 and August 26 training was conducted in order to master tasks that must be performed in the field following a tsunami, which are part of training on "handling emergencies stemming from a tsunami caused by an earthquake originating in the Kuril-

Kamchatka Trench," which was implemented during the fourth quarter of FY2018. This training enabled the deliberation of strategies and tactics based upon field conditions following a tsunami in accordance with tsunami accident management manuals. Furthermore, in light of the discovery of contaminated water leaks, instructions were given to perform an impact assessment on the ocean thereby showing that such emergencies can be handled while prioritizing safety. On the other hand, during training on mobilizing power supply trucks in the field, issues were seen with methods for communicating between the Emergency Response Center and field units, so improvements will be made so that multiple means of communication are available to respond to varying field conditions.

On September 30 training was conducted based upon a scenario where equipment had been damaged in conjunction with a tornado. In addition to gaining experience with responding to an emergency amidst circumstances where it is not possible to assemble in the seismic isolation building, field mobilization training was also conducted in order to strengthen coordination between the Emergency Response Center and field units. As a result, strategies and tactics for handling the simulated equipment damage were able to be deliberated at the emergency response command center established within the Emergency Response Center in the main administrative building using information obtained by the centralized monitoring center in the seismic isolation building amidst conditions where only limited field inspections could be conducted due to a passing tornado. However, improvements will be made to enable a more effective emergency response since issues were seen with the sharing of information between the emergency response command center and each functional team.

- Fukushima Daini; Second Quarter General Training: July 10, July 30, August 28, September 25

On September 25 training was held to respond to a high-altitude electromagnetic pulse (HEMP). As with last year, the lights in the Emergency Response Center were turned off to make the conditions dark. Also, in order to make the situation even harsher, the use of LED lights was forbidden. Since LED lights could not be used, flashlights using incandescent light-bulbs gathered from different locations in the power station and chemical light sticks were used in the command center to provide light. When handling emergencies in the field, HEMP equipment/materials were deployed, small cooling water injection pump startup was confirmed, training on reporting information using satellite phones, and brest transmitters were set up to secure a means of communication in accordance with the flexible response guide. During this training areas for improvement were seen with dose management (the number of glass badges on hand for use) and the environment inside the command center (air-conditioning/lighting), so changes will be made in preparation for the next HEMP training session.

- Kashiwazaki-Kariwa; Second Quarter General Training: July 19, August 9, August 23, September 5, September 12, September 20

Initiatives to repair for FY2019 emergency response exercises were commenced on August 23. One of these initiatives entails implementing intensive training designed to improve the skill of members were not on veteran teams, which was an issue pointed out during FY2018 emergency response exercises. Efforts are being made to improve skills by increasing the frequency of training, and implement training in accordance with various severe accident

scenarios such as the training to strengthen initial response held on August 23 (cooling water/power source tactic deliberation), the training to ascertain core damage on September 12, and the training to respond to a decrease in spent fuel pool water level on September 20.

Furthermore, since July, field mobilization training has been incorporated into general preparedness training and training to improve coordination between the Emergency Response Center and field units has begun. On September 5, training on providing emergency power to M/C using power supply trucks conducted through live exercises in the field was observed and evaluated by the Nuclear Regulatory Agency and other companies. Information was accurately conveyed between the command center and field units thereby enabling strategy changes made at the command center in accordance with changing event circumstances to be carried out surely and steadily in the field, but even more areas for improvement were discovered so continual improvements made. On September 20, communication methods for providing information to external parties were examined amidst a harsh scenario where fires occurred simultaneously with a nuclear disaster. As a result, in addition to notifying the authorities of the fires in accordance with the Act on Special Measures Concerning Nuclear Emergency Preparedness, information on the fires was also suitably provided thereby showing that the lessons learned from the cable service tunnel fire are being leveraged. Furthermore, the aforementioned training was participated in jointly by the Kashiwazaki City Fire Department and TEPCO in-house fire brigades, who coordinated to engage in training on fighting fires and rescues. This training will be continued into the future in order to strengthen coordination.

- Training on providing support to resident evacuations; July 10, July 11, September 4, September 5

According to the "Approach to Developing Nuclear Disaster Countermeasures (March 11, 2016)" adopted by the cabinet meeting on nuclear power-related issues, nuclear operators must "respond in good faith to resident evacuations" during a nuclear disaster, and therefore must construct detailed mechanisms for assisting local governments with resident evacuations during a nuclear disaster, and implement training on such mechanisms. During the second quarter, and evacuation assistance team was created and team personnel underwent assistance activity training at the Kashiwazaki City Industry and Culture Center in order to ensure that assistance provided in conjunction with resident evacuation would go smoothly. During assistance activity training, in addition to training on putting on protective clothing, which dispatched personnel would need to wear, training on the use of radiation measurement equipment and simple decontamination methods, which would be necessary for screening and inspecting vehicles, and training on the use of information devices and smartphone applications, which would be necessary when assisting with resident evacuations, was implemented. This kind of training will be regularly implemented in the future as we strive to educate and [enhance the skills] of personnel.

Training on wearing protective clothing

Training on the use of radiation measuring equipment

◆ Addressing the damage caused by Typhoon #15

In light of the prolonged power outages in Chiba Prefecture caused by Typhoon #15, from September 10 through the 29, a total of six high-voltage power supply trucks and two tanker trucks from Fukushima Daiichi, Fukushima Daini and Kashiwazaki-Kariwa were dispatched along with approximately 676 workers needed to operate these vehicles in order to quickly respond and provide assistance with power supply work upon ensuring that each power station still had enough power supply trucks and tanker trucks required for safety.

Supplying power using power supply trucks from Kashiwazaki-Kariwa

Filling a power supply truck with gasoline using a tanker truck from Fukushima Daini

(2) Improving the in-house technological capability of power stations (operations) 【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 September, 36 people had been trained on fire trucks thereby fulfilling our goal of 33 certified personnel (80% of field personnel (41 workers) (two person increase over quarter one)), and 35 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 September, 24 operators have been certified on the operation of fire engines thereby

meeting our 29-operator goal (80% of the 32 operators in the field (decrease of four operators over quarter one)), and 30 operators had been certified on the operation of power supply cars (see the chart below for details).

◆ Kashiwazaki-Kariwa

Fire engine and power supply car operation training commenced during FY2013. As of the end of September, 96 operators have been certified on the operation of fire engines thereby exceeding our 88-operator goal (80% of the 111 operators in the field (decrease of twelve uoperators since the first quarter)), and 90 operators had been certified on the operation of power supply cars (see the chart below for details). As of the end of September, the number of instructors in shift departments was 136 (decrease of seven since the first quarter) thereby achieving second quarter goals.

Also, during the second quarter a field operations competition was held for the third time at Kashiwazaki-Kariwa (August 28~29). During the field operations competition, six young operators who are serving as auxiliary operators competed to see who could most accurately take electric equipment insulation measurements in the field. These competitions will continue on a regular basis as we strive to overcome technical issues facing operators (ensuring that they can correctly use procedures and human error prevention tools during fieldwork, and determine whether equipment is performing well or poorly), and increase professionalism while maintaining and improving the motivation and skills of workers by commending individuals that demonstrate outstanding performance.

Field operations competition (Kashiwazaki -Kariwa)

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	36 (-3)	109%	35 (-3)	106%
2F	24 (-5)	82%	30 (±0)	103%
KK	96 (-12)	97%	90 (-10)	92%

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)【Measure 6】

◆ Fukushima Daiichi

We are continually implementing training on responding to a loss of on-site power (cooling water injection equipment operation training, such as training on the operation of power supply cars, emergency generator operation training, and concrete pump truck operation training) in order to improve the ability to respond to emergencies. During the second quarter a focus was put on emergency generator operation training in order to be able to secure

power for instruments in the main control room in the event of a loss of external power. Training on responding to abnormalities with the spent fuel pool cooling systems was also implemented as part of field mobilization training designed to enhance coordination between the Emergency Response Center and field units. During field mobilization training, truck-based pumps were used to inject cooling water into the spent fuel pools in accordance with instructions from the Emergency Response Center, and training on quickly reporting on the status of field activities to the Emergency Response Center was implemented in an effort to maintain the skills needed to respond to an emergency.


Spent fuel pool cooling water injection training (left; truck-based pump operation, right; sending cooling water)

◆ 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). In light of the broadening gap both within teams and between teams caused by the insertion of new employees and transferred employees, teams with poor skills were subjected to basic training, and the teams with better skills were subjected to training designed to reduce response time and respond to emergencies with as few people as possible. Furthermore, in light of the overall decrease in the number of personnel, training on enabling a flexible response by having veterans from each team participate in the training of other teams is being planned and implemented. In the generator replacement team, focus was put on hoisting work, which is the riskiest operation during this process, and new personnel were given briefings on points of caution using field training equipment. Furthermore, training is being implemented while re-examining the division of responsibilities and examining how issues can be responded to with a fewer number of personnel. We will continue to be innovative in our approach to training to enable a flexible response amidst various conditions.

Instructions on hoisting work

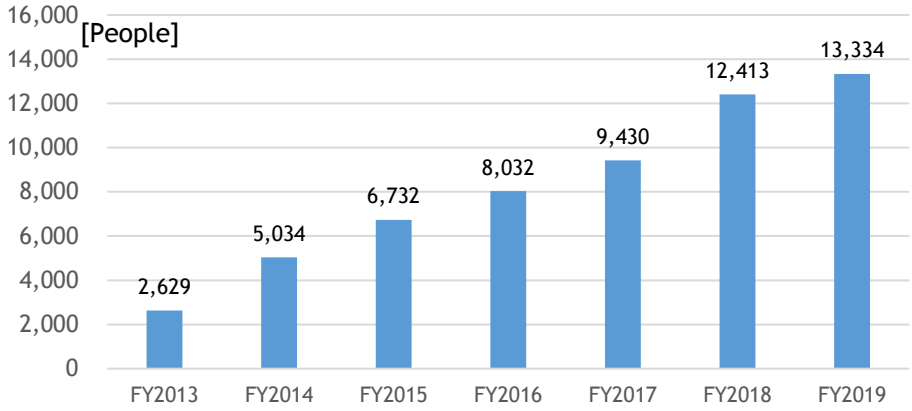
Generator replacement training

◆ Kashiwazaki-Kariwa

In order to improve in-house technological capability and prevent severe accidents, various training is being implemented, such as training on responding to gas turbine generator malfunctions, training on cable terminal splicing and connection, and training on the operation of mobile cranes, forklifts, and bucket trucks. During the second quarter, training on engine (gas turbine and auxiliary equipment and instruments) replacement was newly incorporated into training on responding to gas turbine generator malfunctions. The objective of this training is to shorten the time needed to repair gas turbine generator malfunctions by replacing the generator engine with a spare engine, which is quicker than repairing malfunctioning parts, thereby enabling quicker recovery. We will continue to implement repetitive training in order to maintain and improve in-house technological capability.

Engine replacement training

Sampling data prior to trial operation of replaced generator



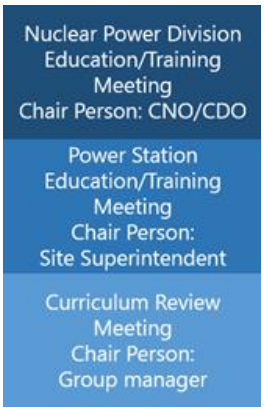
Trends in the number of maintenance personnel that have undergone in-house training (Total for 1F, 2F and KK)

2.4.2 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

At the curriculum review meetings for each area, such as operations and maintenance, etc., key issues related to education training that need to be solved in order to improve power station performance during FY2019 were identified during the first quarter and currently the departments overseeing these issues at power stations are coordinating with the Nuclear Education and Training Center to improve performance in each field. Progress is reported to and assessed by the Power Station Education and Training Committee thereby directly involving power station executives in the progress management process. For example, in order to address the problem that "the permeation of SAT processes throughout layers of management is insufficient" SAT overview training has been incorporated into management training in order to promote the permeation, and meeting documents and procedures for running meetings have been changed and revised in order to increase awareness of SAT processes during the Curriculum Review Committee and Power Station Education and Training Committee meetings for each field.

In the maintenance and security/chemistry divisions, focus is being put on education and

training to prevent human errors and equipment nonconformances. In the maintenance division, training for work supervisors on human error prevention tools commenced at Fukushima Daiichi during the second quarter there by following the lead of Fukushima Daini and Kashiwazaki-Kariwa. When providing training to maintenance personnel, management, such as general managers and group managers, undergo the training first and then provide the training to members thereby enabling power station management to convey their expectations to members and promoting learning by the entire organization. Similarly, in the security/chemistry division, training for work supervisors has commenced at Fukushima Daini and Kashiwazaki-Kariwa, and this training will be continually implemented going forward.


Training on human error prevention tools for maintenance division personnel (Fukushima Daiichi)

In the nuclear safety field, training on procedures for mitigating radioactive substance discharges and ascertaining the behavior of radioactive substances in the event of a severe accident is being implemented in order to strengthen our ability to respond to accidents. At Kashiwazaki-Kariwa, approximately 146 workers including all members of the emergency response planning team and certified skill holders (nuclear safety) participated in this training in July. During the second half of FY2019, skill training using MAAP, a containment vessel behavior analysis code, will be continually implemented in order to further deepen the understanding of severe accidents.


Training to strengthen the ability to respond to accidents (Kashiwazaki-Kariwa)

◆ Training for nuclear leaders and middle management

Since FY2015 middle management training has been implemented in order to ensure that managers are sufficiently aware of their personal responsibility to nuclear safety and provide them with the awareness and ability to thoroughly fulfill their responsibilities along with nuclear leaders.

Power station general manager training has been provided for middle managers in order to accelerate nuclear safety reforms and reconstruct the roles and mission of general managers in charge of departments with as many as 250 people. During general manager training held in the second quarter, efforts were made to improve the leadership skills of 10 new general managers. During the third quarter training will be provided to 18 second-year general managers.


General manager training

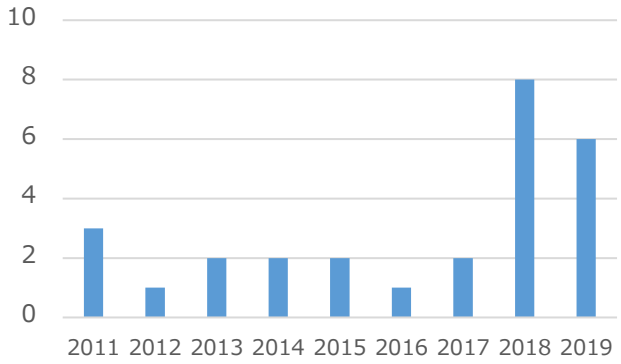
◆ New employee training

During the second quarter, employees that joined the company in FY2019 continued their classroom study at the Nuclear Human Resource Training Center to acquire basic knowledge and knowledge about plant facilities, and were subjected to shift training from August until the end of September. During shift training, trainees were able to experience actual operator tasks, such as performing field patrols and implementing work safety measures, etc., thereby allowing them to practically apply the facility and task knowledge they had acquired in the classroom in an effort to improve the technological capability of each individual. Trainees also gave presentations on different topics in order to confirm the effectiveness of training. During these presentations, group discussions were held on OE information, problems and issues were identified, and new employees had the chance to give presentations to power station executives on the actions they feel should be taken going forward there by nurturing their ability to solve problems and communicate.


Topic presentations (left; Fukushima Daiichi, right; Fukushima Daini)

◆ Initiatives aimed at acquiring advanced expert knowledge

In order to support those preparing for the oral portion of the senior reactor engineer exam (secondary exam), booklets of past test problems have been distributed and opportunities are being provided to engage in mock oral exams in-house. Thanks in part to this assistance the number of people that have passed the exam over recent years has increased with six more people passing this fiscal year. Assistance for the written portion of the exam (to be given next in March 2020) is currently being provided in the form of reactor theory study groups and group study sessions.



Trends in the number of people that have passed the oral portion of the senior reactor engineer exam

(2) Training on an actual reactor at a pressurized water reactor (PWR) plant

In the Operations Division, operators are sent to domestic pressurized water reactor (PWR) plants in operation during "real reactor training" so that they can directly experience and cultivate a sense of what it feels like to work at a plant in operation as part of efforts to improve the technological capability of operators. During the second quarter five operators from Kashiwazaki-Kariwa's Operations Division were sent to KEPCO's Takahama Nuclear Power Station (August), which follows visits to Kyushu Electric's Genkai Nuclear Power Station (February), and Shikoku Electric's Ikata Nuclear Power Station (June) made by ten other operators (five to each plant). During this training, operators can experience with their five senses the heat, sound, vibrations, and smells, etc. given off by equipment and systems, something that is not possible at a plant in long-term shutdown. These operators learn about how to conduct patrol inspections by participating in patrols with the operators from other companies, as well as about how to implement various regular inspections. They can also learn through experience about the differences in procedures, etc., and about best practices. In particular, for younger employees that have little experience working at a plant in operation, this is a valuable opportunity to learn through experience about what it's like to work at a plant in operation. Furthermore, opportunities to discuss the differences noticed in how things are done and approaches to different matters with operators from other companies enable parties on both sides to learn about know-how related to operations in general. Real reactor training will be continually implemented into the future and the useful information and know-how obtained this training shall be shared internally, reflected in operational duties, and leveraged to make improvements.


Instructions being given in the field during real reactor training (KEPCO Takahama Nuclear Power Station)

(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 four 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 second quarter four more engineers were newly certified. During the third quarter three more additional systems will be added to those being monitored. We will continue to increase the number of systems to be monitored and the train personnel with the objective of having five system engineers for each operational plant.

Currently at Fukushima Daini four system engineers continuously monitor six systems at each of reactor units 1~4 and there have been no abnormalities with performance.

(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. During the second quarter documents pertaining to design requirements and the basis for these requirements were created for nine systems (systems required to maintain plant shutdown, such as the residual heat removal system, spent fuel pool, fuel pool cooling and cleaning system and emergency AC power source systems).

In regards to systems that support the use of configuration management processes, detailed system designs were created for the improvements identified during the task simulation we conducted last fiscal year. Development and amounting will take place during the third quarter based on detailed design results as we create an environment that enables suitable task management and execution.

In regards to human resource training (education), we are moving forward with the creation of educational materials to enable each individual to understand the role that they play in achieving configuration management.

(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 are striving to resolve trans-departmental issues. During the second quarter, common e-learning educational materials for the Nuclear Power & Plant Siting Division and the FDEC were created in addition to conventional classroom education in order to apply this knowledge to actual projects and educate all parties about project management methods as we aim for a "consistent approach to nuclear power." Starting in the third quarter we shall cultivate "experienced project managers" by providing basic education and practical education to all employees through e-learning, and increase the amount of human resources that can use the methods they have learned to think in a project-oriented manner.

(6) Improving nuclear safety and productivity through Toyota-type kaizen

◆ Nuclear Power & Plant Siting Division: Kaizen Grand Prix for all companies

A Kaizen Grand Prix for all companies is being held as part of Toyota-type kaizen activities intended to balance nuclear safety with productivity improvements. In the Nuclear Power Division, preliminaries are held at Kashiwazaki-Kariwa and Fukushima Daini, as well as in the Nuclear Power Division, and selected examples are announced at the Kaizen Grand Prix for all offices. Most recently, ② below from Kashiwazaki-cardio was selected from the following eight examples and announced to all offices.

Office	Kaizen example
KK	① Reception/registering kaizen during site admittance registration, etc.
	★②Reducing additional costs and reflecting foreign material exclusion measures in specifications in a more efficient manner【Tenfold increase in productivity】
	② Making the calibration of radiation safety instruments more efficient
2F	③ Water quality analysis and radiation measurement kaizen
	④ Making the inspections of instrument control equipment more efficient (simple recorder inspections)
	⑤ Making fire prevention damper inspections more efficient
HQ departments	⑥ Residence expense calculation kaizen for employees sent overseas (Nuclear Safety Management Department)
	⑦ Procurement kaizen initiatives ~switching from post-process to pre-process~ (Nuclear Material Procurement Center)

Preliminary (Kashiwazaki-Kariwa)

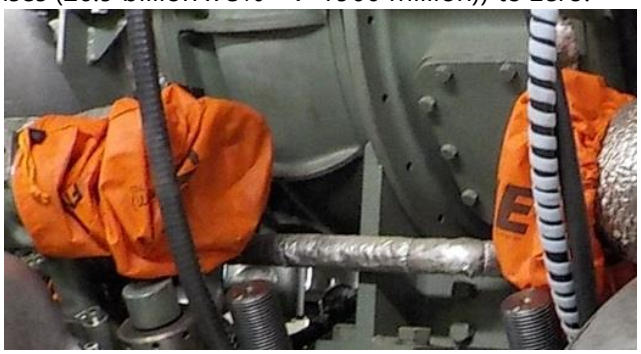
Preliminary (Fukushima Daini)

Special Advisor Uchikawa, who is providing guidance on Toyota-type kaizen, said in regards to recent initiatives that, "I heard that changes are happening at Kashiwazaki-Kariwa, and having visited the site I feel this to be true," and "I feel like the attitude at Fukushima Daini is changing. People in the field are implementing kaizen in-house through trial and error."

- (Kashiwazaki-Kariwa) ② Reducing additional costs and reflecting foreign material exclusion measures in specifications in a more efficient manner【Tenfold increase in productivity】

In order to achieve the world's highest levels of foreign material exclusion measures during the inspection and maintenance of approximately 50,000 pieces of equipment at each plant, we have increased our level of management by having the Fuel Group take the lead in benchmarking with overseas operators and creating guidelines. However, in conjunction with this, work specification creation work has increased 10%, so we implemented kaizen to reduce additional costs and make "additional specification creation work" more efficient. For the inspection and maintenance of instrument control equipment (576 devices) specification creation time (time needed to reflect foreign material exclusion measures) increased 35 hours, but we examined innovative methods for preventing additional burden on the company (streamlining check sheets, covering openings with customized covers, streamlining area demarcation, etc.), and carefully gave explanations to contractors about how to implement these measures and the need for them. As a result, we reduced the additional 35 hours to 0. Furthermore, in conjunction with this we reduced the increase in costs invoiced by contractors (approximately 3% of direct work expenses (26.9 billion x 3% ≒ ¥900 million)) to zero.

Prior to kaizen: Covered with fire-proof sheet



After kaizen: Custom covers

◆ Fukushima Daiichi: Kaizen for work to remake the megafloat into a harbor yard


Dose measurement device kaizen

Kaizen are also being implemented at Fukushima Daiichi in order to improve nuclear safety and work quality. During this term we deliberated the dismantling of the megafloat that was used to store accumulated water from the Unit 5 and 6 turbine buildings after the accident whereas it could impact current facilities if it were to be washed inland by an outer rise tsunami[3]. As a result of this deliberation, we implemented kaizen to remake the megafloat into landfill in front of the Unit 1~4 open culvert in order to create workspace on the ocean side where there is currently little space due to decommissioning work. In accordance with this kaizen, incinerator ash will be procured from the Hirono Thermal Power Plant, which is having difficulty finding ways to dispose of the incinerator ash, to be used to build a grounding mound and also to create filler material for the inside of the megafloat. This filler material will be manufactured and supplied at the Fukushima Daiichi site. Furthermore, when decontaminating the inside of the megafloat, water jets were employed to make the work more efficient, and kaizen to enable efficient post-decontamination surface dose rate measurements by building a jig (see photo) that lines up surfaced dose rate measurement instruments next to each other were implemented thereby improving work quality.

[3]Tsunami caused by a *rise* in the ocean side tectonic plate on the *outer* side of an ocean trench when the ocean side tectonic plate subducts under the land side tectonic plate.

3 PROGRESS ASSESSMENT

3.1 SELF-ASSESSMENT OF KEY ISSUES

A self-assessment of the five key issues (strengthening governance, improving human resource training, improving communication, cultivating nuclear safety culture, strengthening internal oversight functions) that were identified through the self-assessment of the progress of the Nuclear Safety Reform Plan (implemented in FY2016) and issues pointed out by the Nuclear Reform Monitoring Committee (NRMC) was implemented and the results were reported along with action plans aimed at improvements at the 15th meeting of the NRMC on October 5, 2018. Additionally, at the 16th meeting of the Nuclear Reform Monitoring Committee held on January 29, 2019, TEPCO gave a report on the action plan intended to fill in the current gaps that exist between reality and the expectations that the NRMC has for "technological capability" and "communication," which was created based on the results of the self-assessment.

The Nuclear Reform Monitoring Committee reached the conclusion that, "progress is being made but there are still issues to address." TEPCO has taken this conclusion to heart and is working further develop the action plan

In regards to technological capability, we are aiming to prevent troubles before they happen by proposing and implementing countermeasures that fill the gap between the current level of quality of equipment and work processes and what it should be ideally in order to make improvements to our current situation where facility and work nonconformances that stem from a lack of technological capability continue to occur.

In regards to communication, a lack of professional awareness and awareness about information that is easily understood have been deemed the reasons why we have not been able to eradicate errors and half measures even though we have proposed and implemented individual countermeasures that make up for a lack of our ability to engage in dialogue, so we have created, and are implementing, an action plan.

3.1.1 Improvement Initiatives based upon Self-Assessments

(1) Improving human resource training (technological capability)

◆ Developing safety/quality improvement kaizen activities

2.4.2 (6) Noted in "Improving nuclear safety and productivity through Toyota-type kaizen"

◆ Constructing education/training programs

We are continuing to develop engineer education curriculum that covers seven areas (design, systems, equipment/programs, equipping diagnostics, procurement, safety, and fuel) and have begun using those curriculums for which preparations have been completed. As a further initiative, during the second quarter we commenced "equipment reliability basics," which is basic training related to equipment reliability processes that enable sustainable improvements of equipment reliability, safety, and performance, for all Nuclear Power Division personnel.

◆ Design/procurement improvement initiatives

The FDEC is striving to improve design/procurement in light of the nonconformities with the Unit 3 fuel handling machine. As part of these initiatives we engaged in procurement-related benchmarking with other industries (May, September). Knowledge that should be incorporated as we move forward with the decommissioning of Fukushima Daiichi, such as "overseas products and general industrial product quality management," and "comprehensive required specifications that clearly state usage concepts and define the mission," was obtained. In light of the knowledge that was obtained, we created proposals for improving design and procurement processes. Furthermore, we have put improvement proposals for newly procured overseas products into trial use and are examining [effectiveness].

◆ Initiatives to strengthen quality management

At the FDEC, we are comparing current work processes to those prior to the accident in order to strengthen quality management and also analyzing import nonconformances related to quality, and examining measures to shore up identified weaknesses. In particular, we have completed the task of identifying equipment for which it is feared that design weaknesses exist, and going forward we shall perform new design/technical evaluations as we strive to improve equipment reliability. Furthermore, in addition to analyzing common factors related to nonconformances and implementing countermeasures, we also continue to examine the effectiveness of these countermeasures.

(2) Communication improvements

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

Since August we have been holding group discussions in all departments in the Nuclear Power Division using "the results of questionnaires regarding information disclosure awareness" and "past cases of incompetency regarding the dissemination of information" in order to cultivate awareness about information disclosure in the course of one's daily duties.

Furthermore, as an initiative to promote those in the field to think for themselves and implement kaizen, each power station is examining kaizen measures based upon the cause analysis of nonconformances related to internal/external communication, and is gradually implementing these measures.

At Kashiwazaki-Kariwa, we continue to have all station personnel participate in visits to all households in Kashiwazaki City and Kariwa Village to provide an opportunity for them to cultivate awareness about disseminating information from the perspective of community residents.

◆ Improving the awareness of corporate communications departments

In order to provide new public relations officers with the knowledge and skills necessary to "disseminate information that is easily understood" during the second quarter we held an orientation, a tours of Kashiwazaki-Kariwa and Fukushima Daiichi and a traing camp learning the basics of corporate communications.

◆ Using case studies for information disclosure training

At Fukushima Daiichi information disclosure training conducted jointly by the Nuclear

Power Division and the Corporate Communications Division is being held monthly to ensure that information flows smoothly in the event of unforeseen circumstances. At Kashiwazaki-Kariwa and Fukushima Daini, notification training is being continually held for night shift members in order to improve the response of the night shift. During the second quarter, training was held a total of 92 times at Kashiwazaki-Kariwa (implemented every day in principle), and a total of 29 times at Fukushima Daini (implemented on weekends and holidays in principle).

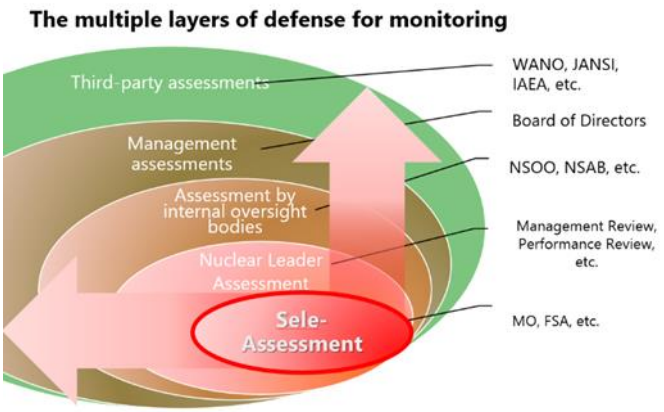
◆ Strengthening monitoring by risk communicators

In order to enhance the monitoring of each department from the perspective of society, training on "Strengthening Monitoring" shall be held in October 2019 for risk communicators (RC), who serve as liaisons between the Nuclear Power Division and corporate communications.

3.2 ASSESSMENT BY THE NUCLEAR POWER DIVISION

(1) Focused Self-Assessment (FSA)【Measure 2】

In the pursuit of excellence and to make improvements that enable assessors to identify for themselves those issues that should be improved, a Focused Self-Assessment Implementation Guide that compiles standard self-assessment methods used by the world's finest operators, such as including external parties and representatives of other sites as assessors, etc., has been created and put into use. During this fiscal year, a self-assessment of the suitability of Headquarter functions was implemented based on the Focused Self-Assessment Implementation Guide and areas for improvement, such as "strengthening function for Headquarters to check power station status," were identified. In addition, advice from overseas experts, such as the Nuclear Safety Advisory Board (NSAB) was gathered and reflected in action plans for improvement that are now being executed. Going forward we shall strive to strengthen self-assessments in order to further root the behavior of learning and making improvements on one's own.



Defense-in-depth for assessments and self-assessments

Focused Self-Assessment implemented during the second quarter[4] are as follows.

◆ Equipment reliability (critical focus) (Kashiwazaki-Kariwa)

In the field of equipment reliability, a FSA of "critical focus" was implemented at Kashiwazaki-Kariwa as it had been at Fukushima Daini during the first quarter. As shutdown is even further prolonged, plant conditions continue to differ from those of a plant in normal

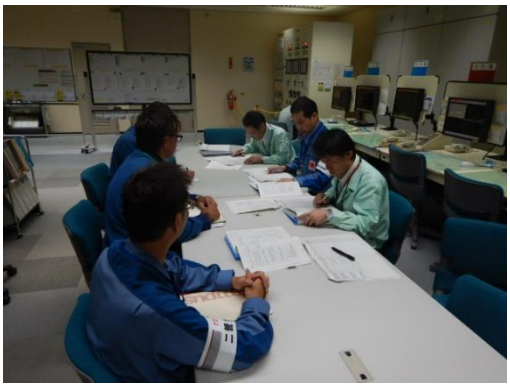
[4] Self-assessments performed in accordance with the Focused Self-Assessment Implementation Guide

operation, so the self-assessment reflected upon whether or not we are able to identify important equipment in accordance with a consistent understanding and effectively maintained reliability of equipment.

Assessment results revealed a “strength” in “being able to avoid function loss by having shift personnel engage in patrols and detect symptoms of function loss in important functions before these functions are lost.” On the other hand, the results revealed a “weakness” in “not being able to sufficiently compile function maintenance requirements and importance levels for a plant in long-term shutdown.” The cause of this has been deemed to be an insufficient understanding of degradation mechanisms and how to assess the impact of plant shutdown. We have reaffirmed the necessity to once again classify and organize what pieces of equipment and functions in systems are necessary/important, are making preparations for education on degradation mechanisms and have started to reorganize function maintenance criteria for plants in shutdown.

◆ Chemistry (liquid waste discharge management) (Kashiwazaki-Kariwa)

In the chemistry field a Focused Self-Assessment of liquid waste discharge management was conducted at Kashiwazaki-Kariwa (September 25~26). The World Association of Nuclear Operators Performance Objectives and Criteria (WANO PO&C) and Japan Nuclear Safety Institute Guidelines, etc. are being used to assess the performance of power station liquid waste discharge management by performing interviews of TEPCO employees and contract workers, engaging in field observation, and performing process reviews. The assessment has identified “strength; blind tests and classroom tests are being implemented in order to improve technical skill and knowledge related to sample analysis, and efforts to prevent human error are being made by making sure to use human error prevention tools, such as place keeping, etc., during specimen sampling and analysis, etc., and samples are being analyzed accurately” and “area for improvement; specimens are being sampled and analyzed accurately, however information on specimen sampling and analysis in the procedures is insufficient in some places,” so countermeasures are being drafted with the aim of making improvements during FY2019.



Interviews

Field observation (liquid specimen sampling)

3.3 OPINIONS OF THE PEOPLE (ASSESSMENT BY THE LOCAL COMMUNITIES)

(1) Notification form errors after the earthquake off the coast of Yamagata Prefecture

Details on recurrence prevention measures are discussed in 1.2 Progress of Safety Measures at Kashiwazaki-Kariwa.

3.4 MONITORING RESULTS FROM THE NUCLEAR SAFETY OVERSIGHT OFFICE 【MEASURE 2】

In the pursuit of excellence, the Nuclear Safety Oversight Office (NSOO), which is an independent internal oversight department, has made the following recommendations based on observations it has made over several months with a focus on mainly the second quarter that were reported to the executive officer committee and the Board of Directors.

NSOO-19-013
October 28, 2019

Nuclear Safety Oversight Office - Quarterly Monitoring Evaluation Report
Second Quarterly of FY2019

Introduction

This report summarizes the evaluation results of the second quarter of FY2019 (July to September) of the Nuclear Safety Monitoring Office (hereafter "NSOO"). The NSOO has discussed the recommendations, advices, observations described in this report with competent departments when they noticed each case, the proposals made by the NSOO have been accepted by the Managers of the Line Department, and countermeasures have been taken (or under consideration).

1. Top three recommendations in response to which improvement should be made from a perspective of nuclear safety

The reports of the NSOO Teams and the Senior Reactor Engineer of Site (hereafter "Senior Reactor Engineer") are showing that safety level is improving step by step in many areas.

This chapter presents some particularly important recommendations that were made through observations in this period.

1.1 Clarification of temporally stored combustible control process and inadequate confirmation of effectiveness
(Kashiwazaki Kariwa)

[Issues confirmed]

It is a good point that Kashiwazaki Kariwa introduced a quantitative control method of temporally stored combustibles based on fire load evaluation and has been working to stabilize the operation by familiarizing contractors with our rules, etc.

On the other hand, in the quantitative fire load evaluation of temporally stored combustibles, the strict observance of the fire load limit was not confirmed.

If this situation is continued, the fire spread prevention functions within the plant expected at a designing stage will not be strictly ensured, which may hinder the accomplishment of our intended purpose "mitigation of fire effects."

[Considerations and possible causes]

(Case)

- In the quantitative fire load evaluation of temporally stored combustibles, areas exceeding the limit were found.
- The Maintenance Management Group of the Maintenance Department (Unit No. 1 - 4) that implements the above evaluation at the time of application for temporary storage only pays attention to the confirmation whether the control reference value (70% of the limit) is exceeded or not and to the control based on the compensation measures when the control reference value is exceeded. However, confirmation whether the limit is exceeded or not and the control has not been strictly implemented.

The attributable cause is as follows:

- The Maintenance Management Group of the Maintenance Department (Unit No. 1 - 4) has not shared the purpose of the control process of the fire load limit of temporally stored combustibles and the specific implementation method with all members who implement the operation in a clearly defined manner such as in writing.
- The Maintenance Management Group of the Maintenance Department (Unit No. 1 - 4) has not strictly confirmed that the implementation results of the work conform to the purpose.

[Recommendations]

The NSOO recommends Maintenance Management Group Manager of the Maintenance Department (Unit No. 1 - 4) to do the following:

- The purpose of the fire load control of temporally stored combustibles and the specific implementation method shall be made clear in writing to give all members who implement the operation a better understanding.
- The appropriateness of implementation results of the work shall be continuously ensured to maintain strict control.

1.2 Development of emergency response plans (Fukushima Daiichi)

[Issues confirmed]

Some critical facilities in hard-to-access places have implemented corrective maintenance and monitoring as a maintenance system. For these facilities, it was

confirmed that emergency response plans are not sufficiently developed, although abnormality detection by monitoring and the subsequent response are presupposed.

If this situation is continued, it is concerned that the expansion of abnormality due to leakage, etc. may not be prevented or restoration using alternate facilities cannot be promptly implemented when an abnormality occurs.

[Considerations and possible causes]

(Case)

- For the spent fuel pool circulation cooling system for which inspection and servicing standards and technical review documents are relatively well prepared, specific monitoring parameters and criteria for determining abnormalities have not been clarified.
- Details of emergency responses have not been also clarified.

The attributable cause is that emergency response is basically dependent on personnel's flexibility and that a policy of developing critical facilities' abnormality detection and response procedure is not clearly established.

[Recommendations]

The NSOO recommends Plant Manager (Decommissioning System Administrative Supervisor) for the following:

- A policy of developing emergency response plans when critical facilities in hard-to-access places are detected to have functional deterioration shall be clarified.
- The direction shall be provided to the sections responsible for facility maintenance to develop emergency response plans.

1.3 Improvement of work management at the facility level (Kashiwazaki Kariwa)

[Issues confirmed]

The power station has been working proactively to control significant risks, for example, to evaluate the effects of the working process (system non-standby, etc.) on the safety at the plant level at the plenary process meeting, etc.

On the other hand, a case that there is room for improvement in planned preparation due to nonconformities such as ground fault and water leakage mainly caused by inadequate handover due to inadequate competence, etc. for the work management at the individual facility level was confirmed.

If such a situation is continued, although individual nonconformity measures have been accumulated, there remain concerns that similar nonconformities may occur when the plant state and project details change.

[Considerations and possible causes]

(Case)

- During an inspection of Kashiwazaki Kariwa Unit 2 emergency diesel generators,

unintended electrification was generated due to the conflicting electrical separation request in 2 different projects. The case that the separation could not be considered with a time allowance because the process was decided immediately before the work caused by the delayed signing of the contract, from a perspective of work management.

- During an inspection of the residual heat removal system in Kashiwazaki Kariwa Unit 7, water leakage occurred from the unrestored mounting piping flange of a safety relief valve during water-filling of the system. The case that information on the restoration schedule of the flanges (pressure parts) affected by the delay in the delivery of components could not be shared among the related parties, from a perspective of work management, although it was mainly caused by inadequate handover due to inadequate competence.
- Similar nonconformities (e.g., leakage during the flushing operation of generator sealing oil system, etc.) occurred in the past.

The attributable cause is that there is room for improvement in the summary and utilization of the points that the related parties (project supervisor, inspector, etc.) should confirm* in order to ensure work planning, process creation, work preparation, and work implementation.

*Example of the points

- Understanding/control, etc. of effects on the working process caused by delayed signing and modification of the contract
- Understanding/control, etc. of effects on the working process by the delay in the delivery of and the addition of components
- Clarification of the working process with risks of pressure part and electric facility effects, etc.

In addition, in the cases in the U.S., the points to ensure work planning, process creation, work preparation, and work implementation are clearly specified. The measures of the power station for the case described above are not systematic, however, contain many of these points.

[Recommendations]

The NSOO recommends the following so as to thoroughly prevent similar nonconformities.

- The Maintenance CFAM (Corporate Functional Area Manager) and the Work Management CFAM shall cooperate to summarize the points to ensure work planning, process creation, work preparation, and work implementation for the individual safety-significant facilitiy by reference to the cases in the U.S.
- Maintenance Department General Manager in Kashiwazaki Kariwa shall allow the related parties (project supervisor, inspector, etc.) to utilize the points summarized for the maintenance operation to verify the effectiveness so as to thoroughly prepare at each stage from work planning to work implementation.

2. Other recommendations during this quarter

Among the observations made by the NSOO Teams and the Senior Reactor Engineer

of Site in this period, noteworthy recommendations except for those described in Chapter 1 are as follows:

2.1 Fukushima Daiichi

Recommendations for Fukushima Daiichi are as follows:

[1] Strengthening of Radiation Protection Department's leadership skills for radiation safety and commitment to sites

(HQ Team)

[2] Strengthening of appropriate behaviors of supervisors and operators (HQ Team)

2.2 Fukushima Daini

Recommendations for Fukushima Daini are as follows:

[1] Further improvement of persons in charges' competence for (application ability) information sharing with offsite organizations

(Senior Reactor Engineer)

[2] Establishment of an operational procedure for the miscellaneous solid incineration system with consideration for environment and safety (Senior Reactor Engineer)

2.3 Kashiwazaki Kariwa

Recommendations for Kashiwazaki Kariwa are as follows:

[1] Strengthening of a systematic approach related to human performance of operators (HQ Team)

[2] Enhanced monitoring for the control of temporally stored combustibles (HQ Team)

[3] Horizontal development of competence required for each position established in the Maintenance Department (Senior Reactor Engineer)

[4] Strengthening of information acquisition required for embodying operation lead (Senior Reactor Engineer)

3. Views of Nuclear Safety Oversight Office General Manager based on evaluations

3.1 Tendency for similar event occurrence that can be found from the items pointed out in the past

The occurrence statuses of similar events in the whole Nuclear Department have been analyzed for the internal and external items pointed out including the NSOO's recommendations (286 cases for the past about 6 years). As a result of classification under

the WANO-PO&C provisions, similar events have occurred in specific areas. Among those with many cases, considerations for "emergency response" and "fire protection" are described below:

[Emergency response]

Many items regarding inadequate documentation and updating of the guide, response procedure, etc. were pointed out. It is believed that similar events continue to occur because the development range of the measures has not been widely specified although individual items have been improved. It is a good point that the number of items pointed out is decreasing. Managers (each Functional Team Leader) need to continuously provide directions and conduct monitoring in order not to lower the priority of documentation of organizational knowledge on an emergency response that is a work under abnormal conditions.

- Many items regarding inadequate verification of organizational response capability and inadequate training and qualification for response personnel were pointed out respectively. After the critical assessments from the nuclear regulatory agency in FY2017, a sign of improvement over the prior year is seen. It is important that the managers lead on their own to enhance the capabilities in addition to a response to regulations.

[Fire protection]

- Many items regarding the control of combustibles were pointed out. Problems were detected also in the NSOO monitoring in this period. The control rules have been established, however not been thoroughly practiced. It is believed that the causes that front-line workers' appropriate behaviors could not be strengthened are inadequate education of workers by the sections responsible for supervision, low expertise of fire protection of the sections responsible for supervision, and weak cross-organizational cooperation system.

The knowledge above is effective from a perspective of prioritization of improvement by the Line Department and priority monitoring items by the NSOO. Nuclear Safety Oversight Office General Manager will provide analytical information to the CFAM to promote the utilization and will develop the monitoring activity to prevent a recurrence of troubles with a clear perspective based on this knowledge also as an activity of the NSOO itself.

3.2 "Prompt error prevention" and "protection control"

There is a way of thinking that combines "prompt error prevention (Re)" and "protection control (Md)" in order to prevent significant events in which human errors serve as the starting point. Re will reduce the "frequency" of event occurrence, and Md will minimize the "severity" of events.

Re + Md -> Zero significant event

Examples of Re: Human performance tool such as 3-way communication

Examples of Md: Management measures such as standard process and education program, engineering measures such as interlock, measures to enhance the security culture, and daily monitoring measures

There is room for improvement in "protection control (Md)" measures although many "prompt error prevention (Re)" measures were taken when the operators' human performance, work management, and control activity of combustibles monitored in this period were overviewed. If this situation is continued, "prompt error prevention (Re)" requests are accumulated on the front line at sites, which results in increased risks of the inability of workers to respond, As a result, the frequency of event occurrence cannot be sufficiently reduced. In addition, there remain concerns that the severity of events cannot be lowered if "protection control (Md)" cannot be promoted.

For example, because cases of operational object errors occurred when the operators' human performance in Kashiwazaki Kariwa was improved, it is a good point that thorough "peer check" (2 operators simultaneously confirm an operational procedure) constituting Re was instructed. On the other hand, the implementation status of actual peer check constituting Md is has been confirmed by an individual person in a higher rank, however, the results have not been organizationally shared and evaluated.

The attributable cause is that because the creation of a system and strengthening of a work process that contributes to Md impose labor and time, they were not always regarded as a higher priority as measures although the Line Department expects the immediate results of Re and work proactively.

Nuclear Safety Oversight Office General Manager will use a point whether a systematic structure that combines Re and Md is established as a future perspective when monitoring each work category and link to effective recommendations.

4. Status of completion of recommendations presented by the NSOO

The Line Department is generally performing well on a continuous basis towards the completion of the NSOO's recommendations.

- Of the 178 recommendations presented so far, 157 recommendations have been completed. In this quarter, 6 recommendations were completed.
- In this period, 8 recommendations were presented.

In addition, recommendations which progress is not satisfactory even after passing 6 months or those that are not completed even after passing 1 year without justifiable reasons are as follows:

[1] Emergency training - competence accreditation including crisis management (No. 4-46 HQ/decommissioned nuclear reactor: Recommend in April 2017)

[2] Management of organizational change of the Water Treatment Department (No. 1-71 1F: Recommend in April 2018)

[3] Ensuring personal safety and goal setting in fire protection

(No.1-79 1F: Recommend in April 2019)

5. Benchmarking and training

The NSOO will benchmark the status of efforts for "radiation control activity in high radiation and highly contaminated environment" of Japan Nuclear Fuel Ltd. (JNFL) and "human performance improvement activity," "fire protection activity", etc. in the U.S. in the monitoring and evaluation activity in this period, and will link to effective recommendations by reference to good practices.

End of the document

3.5 SUPPORT FROM THE NUCLEAR SAFETY ADVISORY BOARD【MEASURE 2】

Since 2017, TEPCO Nuclear Power Division leaders have received advice and guidance from the Nuclear Safety Advisory Board (NASB), which is comprised of people with experience as general managers or site superintendents at overseas nuclear power companies with outstanding reputations who have been invited to participate in the NSAB. During the second quarter, [Nuclear Power Division leaders] were given a lecture by NSAB members entitled "How to fulfill the responsibilities bestowed upon leaders." In conjunction with this, advice was given in regards to countermeasures to make up for the weaknesses in each leaders' department identified through the self-assessments, and direct one-on-one coaching with Headquarters and power station managers. Furthermore, in order to align the vectors of the entire Nuclear Power Division opinions were exchanged between the heads of the Nuclear Power & Plant Siting Division and top management from the FDEC. TEPCO will leverage the advice and issues pointed out by the NSAB as we strive to improve nuclear safety.

Photos from lecture

3.6 COMMENTS, GUIDANCE AND ASSESSMENT BY NUCLEAR POWER-RELATED AGENCIES

(1) WANO review of Headquarter functions

During the third corporate peer review (CPR) by the World Association of Nuclear Operators (WANO) conducted in September, the review team reviewed and assessed the

performance of the Nuclear Power Division (with a focus on Headquarters) in regards to carrying out nuclear safety reforms. CPRs are conducted once every six years for nuclear operators all over the world that are members of WANO, and the members are required to undergo follow-up reviews of progress after the CPR. The previous CPR was conducted in 2013, and a follow-up review was conducted in 2015.

During the CPR, the reviewers, who have a plethora of experience throughout the world, examined whether or not Headquarters is providing adequate governance, whether or not conditions in departments are being examined and corrections made, whether or not power stations are being accurately supported, and whether or not Headquarters is taking the initiative to engage in actions and produce results. TEPCO gave an explanation of how we are using standard management methods employed by the world's finest operators, such as the Management Model and self-assessments, etc., and gave a status update on our improvement efforts, and the review team pointed out areas for improvement through which we can make further improvements.

Going forward, we shall quickly address the areas for improvement and leverage the issues pointed out through assessments as we continue to as we move towards world excellence.

4 KPI/PI RESULTS

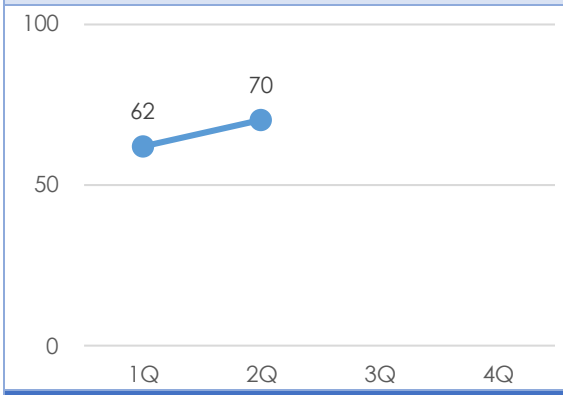
4.1 FY2019 KPI/PI

FY2018 KPI targets for safety awareness (nuclear leaders/entire Nuclear Power Division), ability to promote dialogue (external), and technological capability (during times of non-emergency) have been reached, but targets for ability to promote dialogue (internal), and technological capability (during times of emergency) were not reached. In light of FY2018 results, four new related PI have been added and will be monitored so that FY2019 KPI targets can be achieved by the end of FY2019.

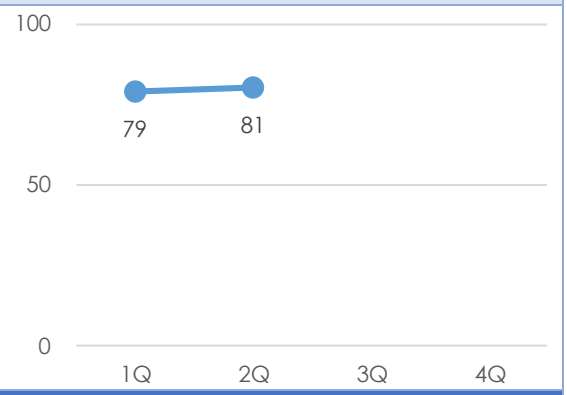
4.2 KPI RESULTS

Safety Awareness KPI ····· Target

Safety Awareness（Nuclear leaders）·····90 Points

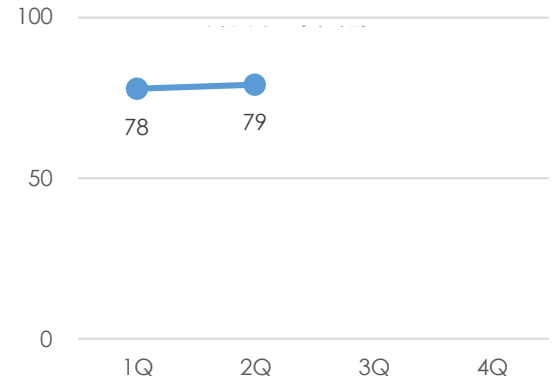


Safety Awareness（Entire Nuclear Power Division）····· 80 Points



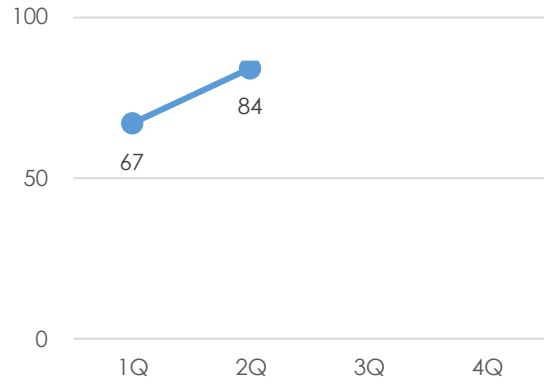
Ability to promote dialogue KPI ····· Target

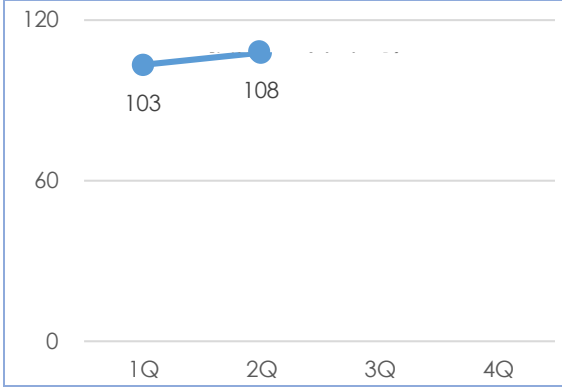
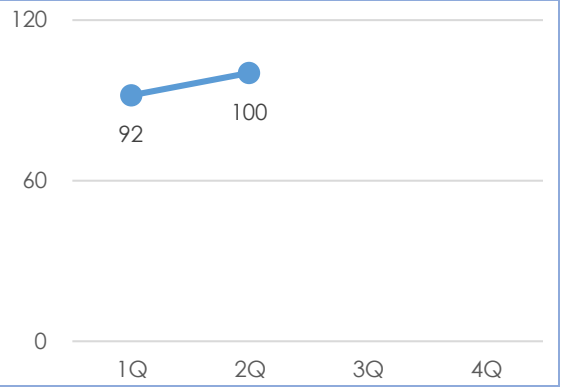
Ability to promote dialogue（Internal）··80 Points



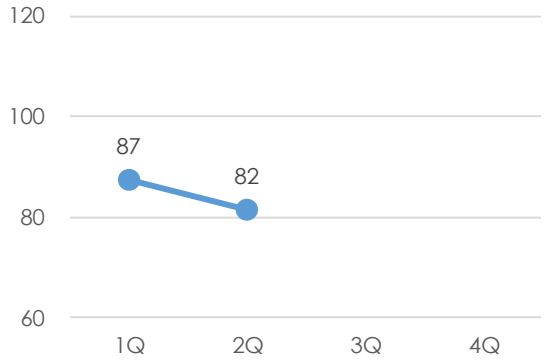
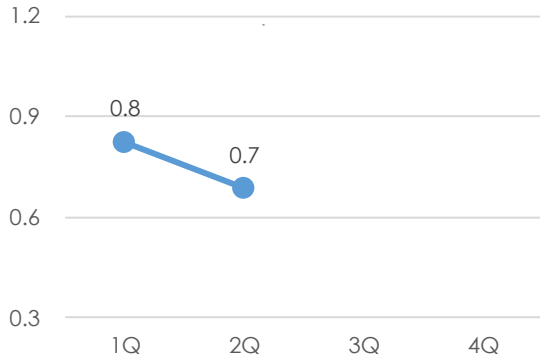
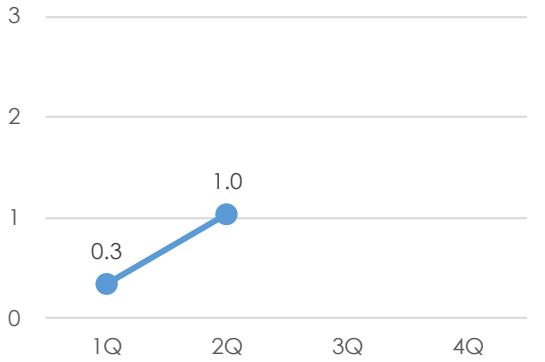
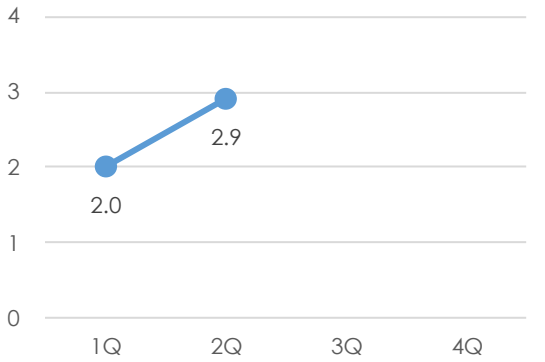
Note: KPI for 1Q has been changed to 78 from 80, which was the most up-to-date figure at the time. The reason why unfixed figures are used for the last quarter's KPI values is because PI for leader messages does not include data for the last incomplete month since the messages were sent.

Ability to promote dialogue（External）100 Points

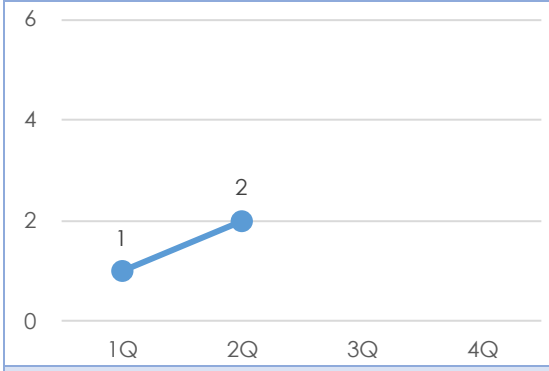


Technological Capability KPI ····· Target	
Technological Capability (Times of non-emergency) ····· 110 points	Technological Capability (Times of emergency) 110 points
	

4.3 PI RESULTS

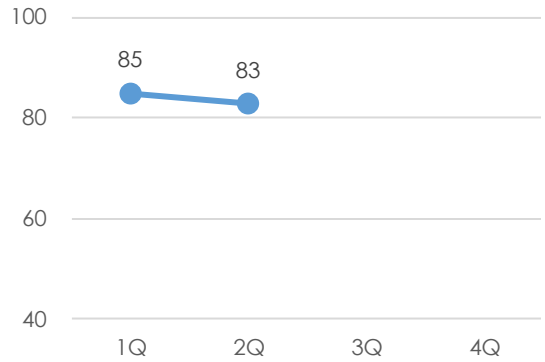
Safety Awareness PI ····· Target	
Nuclear Leaders	
Rate of implementation of retrospection leveraging the traits by Nuclear leaders ····· 100%	Number of times emails have been sent by nuclear leaders in order to share information ····· Once a week/person
	
Number of times nuclear leaders participated in training according to plan Twice/year/person	Number of times nuclear leaders went into the field ····· Twice a month
	

Number of benchmarked issues for which nuclear leaders are responsible that were put into practice ·····4/year

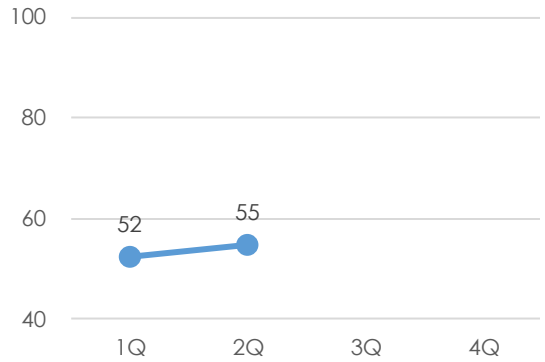


Entire Nuclear Power Division

Implementation rate of group discussion about Traits ····· 100%

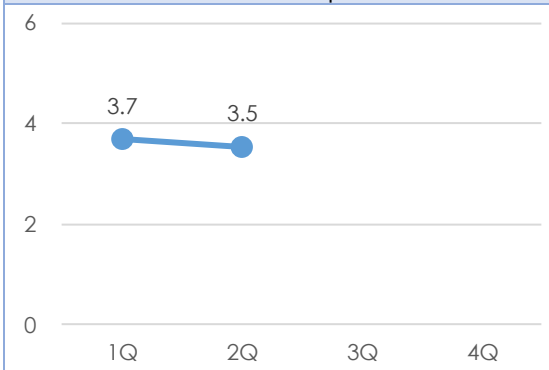


Percentage of intranet messages from nuclear leaders that have been read ·····80%



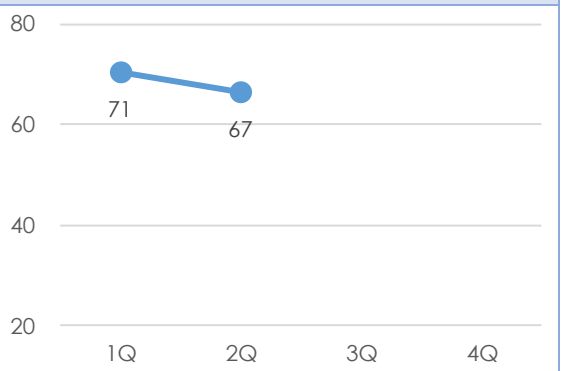
Note: Values are the most recent but do not include the last month which is not a full month since the message was sent.

Number of times managers engaged in management observation at power stations ····· ·····Fukushima Daiichi/Fukushima Daini 4.0 times, Kashiwazaki-Kariwa 3.1times/person



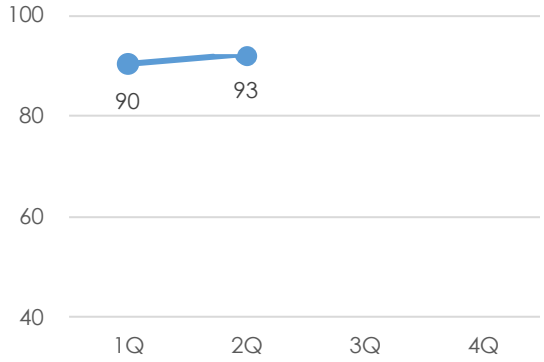
Note: Weighted average for Fukushima Daiichi, Fukushima Daini and Kashiwazaki-Kariwa

Good MO reporting rate ·····50%



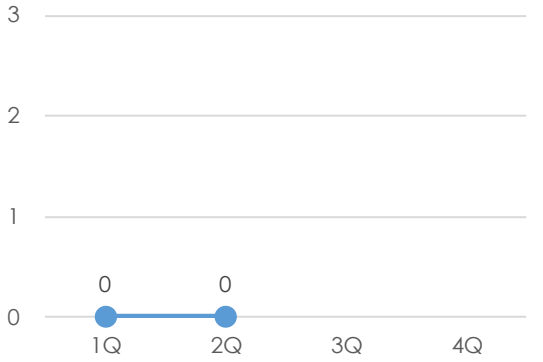
Note: Weighted average for Fukushima Daini and Kashiwazaki-Kariwa

Completion rate of GII or higher corrective measures within the deadline ····· 100%



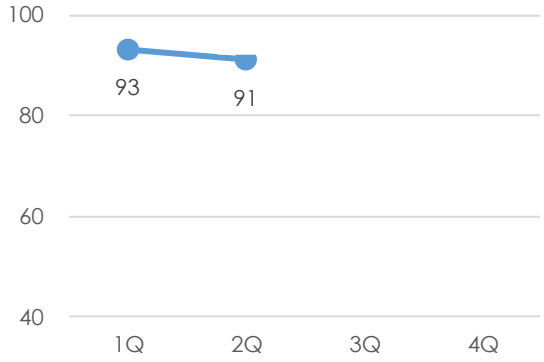
Note: Weighted average for HQ, 2F and KK

No. of nonconformance recurrences (GII or higher) ····· 0/month



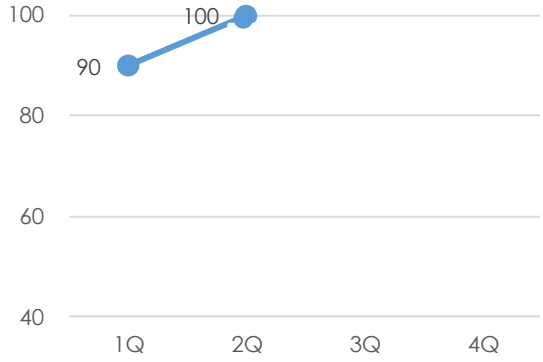
Note: Total for HQ, 2F and KK

Nonconformance voucher period achievement rate ····· 80%

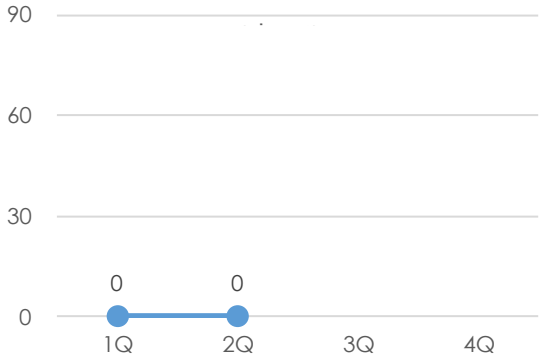


Note: Weighted average for HQ, 2F and KK

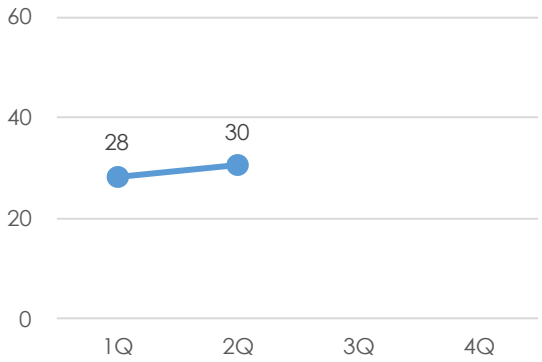
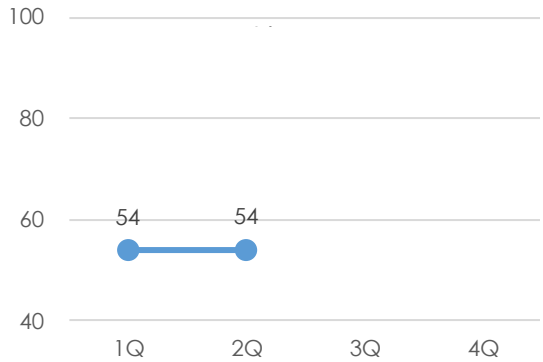
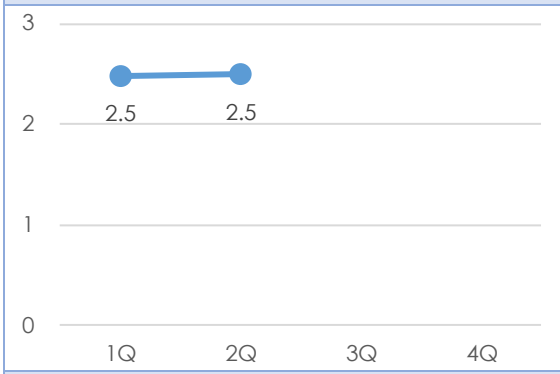
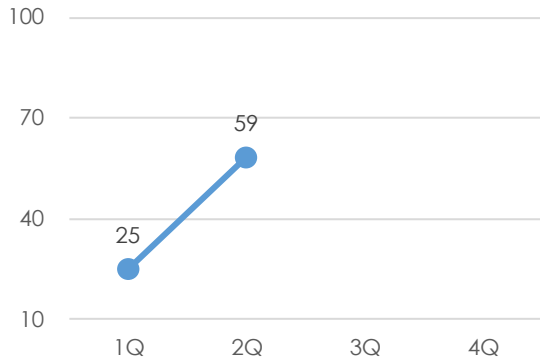
Preventative measures completion rate (within deadline) ····· 90%

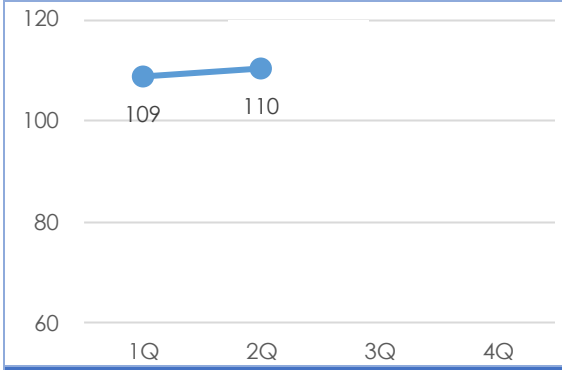
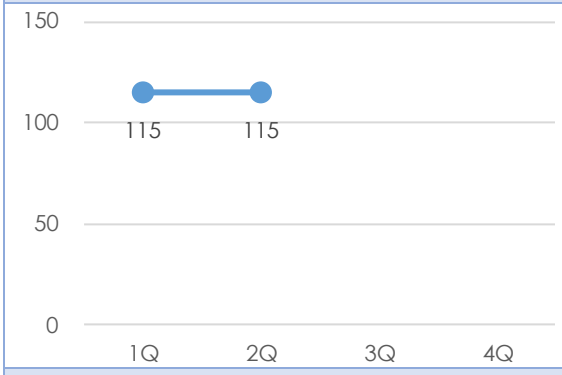
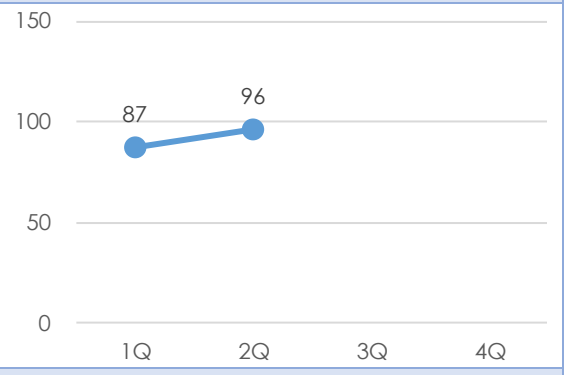
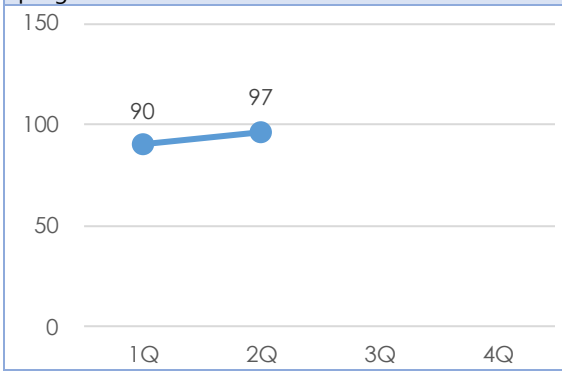
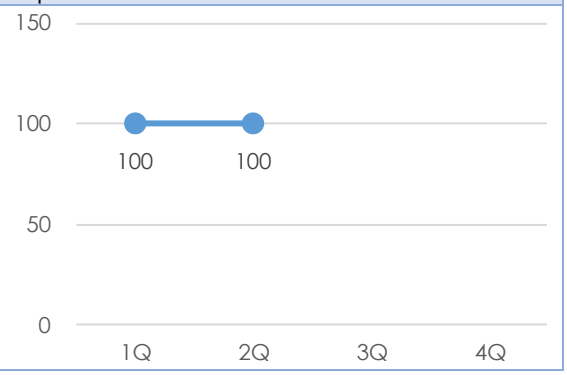


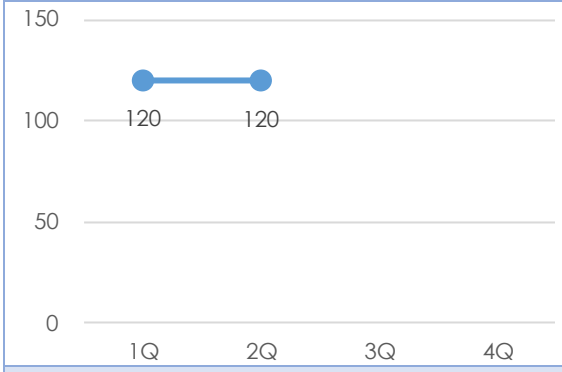
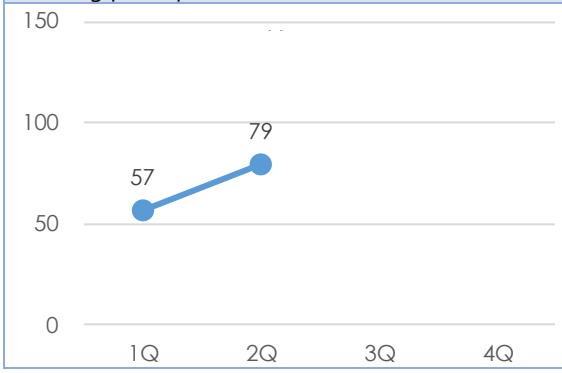
Significant OE training participation rate ····· 60%



Note: To be implemented in Q3

Ability to promote dialogue PI……Target	
Internal	
Percentage of employees that feel that intranet messages from nuclear leaders are “helpful”…50%	Response rate to e-mail questionnaire on the information conveyed by nuclear leaders……70%
 Note: Values are the most recent but do not include the last month which is not a full month since the message was sent.	
Degree of understanding of information conveyed by nuclear leaders……2.5 Points	
	
External	
Ability to promote dialogue assessment questionnaire results ……Positive increase over last fiscal year	Progress rate of dialogue activities aimed at furthering relationships……100%
<対-4> — Note: Assessment is conducted annually (to be reported on in Q3)	

Dialogue activity questionnaire assessment····· 100 points	
	
Technological Capability PI·····Target	
Times of non-emergency	
No. of workers certified in operations/maintenance/engineering/radiation and chemistry/fuel/safety, no. of external certification holders ····· 110 Points	Education/training issue resolution rate·····80%
	
Rate of participation in design-related educational programs ····· 90%	Safety/quality improvement kaizen implementation rate·····90%
	

Times of emergency	
No. of in-house certified emergency personnel (fire trucks, power supply trucks, cable splicing, radiation surveys, wheel loaders, Unic trucks, etc.) 120%	Percentage of "A" assessments given by the Nuclear Regulatory Agency for emergency response training categories 80%
	90% Note: Assessment is conducted annually. Assessment results are for training from the previous fiscal year
Training participation rate.....90%	
	

CONCLUSION

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, and become an operator that continues to create unparalleled levels of safety**," we continue to promote nuclear safety reforms while subjecting ourselves to objective assessments by the Nuclear Reform Monitoring Committee[5].

Since the decision to decommission Fukushima Daini was announced on July 31 we have received many inquiries from the siting community and visitors to the power station about the decommissioning process and the handling of spent fuel. Therefore, in order to give an overview of the decommissioning process in an easy-to-understand manner, we have posted explanatory materials that use illustrations to give an overview of the process on the Fukushima Daini website and are giving explanations to the regional communities. We will continue to use our regularly published information magazines to convey information in an easy-to-understand manner to the siting community and each and every member of the cities, towns, and villages surrounding the power station. And, the opinions and requests received from community members will be adequately reflected in various public relations activities.

Please visit our website[6] if you have any opinions and comments about nuclear safety reforms.

[5] http://www.nrmc.jp/en/index.html

[6] https://www7.tepco.co.jp/contact/index-e.html

ABBREVIATIONS

ABWR： Advanced Boiling Water Reactor

BWR： Boiling Water Reactor

CFAM： Leader at the Head Office that aims to achieve the world's highest level of excellence for each aspect of power station operation (Corporate Functional Area Manager)

CAP： Corrective Action Program

CPR： Review of the suitability of Headquarter functions（Corporate Peer Review）

CR： Condition report. Used to enter things noticed and nonconformance information in a database in order to share it.
G II or higher nonconformities: Grade II or higher nonconformities（Grade II）

HEMP： High altitude Electro Magnetic Pulse

IAEA： International Atomic Energy Agency

JANSI： Japan Nuclear Safety Institute

JIT info: ("Just in Time info") Operation experience information that contains lessons to be learned that are pertinent to work being performed that day. An overview of accident troubles and the lessons learned are compiled briefly on one piece of paper.

KPI： Key Performance Indicator

MAAP： Containment vessel behavior analysis code（Modular Accident Analysis Program）

M/C： Metal-Clad Switch Gear

MO： Management Observations

NSAB： Nuclear Safety Advisory Board

NSOO： Nuclear Safety Oversight Office

OE information： Operating Experience

PDCA： Plan-Do-Check-Act cycle

PI： Performance Indicators

PICO： Performance Improvement Coordinator

PRA： Probabilistic Risk Assessment

PWR Plant: Pressurized Water Reactor plant

RC： Risk Communicator

RIDM： Risk Informed Decision Making

SAT： Standard education and training method proposed by the International Atomic Energy Association (IAEA)（Systematic Approach to Training）

SFAM： CFAM counterpart at power stations（Site Functional Area Manager）

SNS： Social Networking Service

TBM-KY：("Tool Box Meeting") Meetings by small groups of workers held prior to engaging in a task in order to predict danger and decide on safe work methods.

Traits： 10 Traits and 40 behaviors indicative of robust nuclear safety culture

VR： Virtual Reality

WANO： World Association of Nuclear Operators

WANO PO&C：Performance Objectives and Criteria stipulated by the World Association of Nuclear Operators (WANO)