



NUCLEAR SAFETY REFORM PLAN

FY2017 Q3 PROGRESS REPORT

TOKYO ELECTRIC POWER COMPANY HOLDINGS, INC.
FEBRUARY 9, 2018

TEPCO



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FOREWORD

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

On March 29, 2013, TEPCO announced its Reassessment of the Fukushima Nuclear Accident and Nuclear Safety Reform Plan to implement nuclear safety reforms. The following is a report on the progress that we have made during the third quarter of FY2017 (October~December, 2017¹).

During discussions with the Nuclear Regulation Authority held last year, TEPCO explained to the committee that, *"we solemnly swear to never allow an accident such as this to occur again and will fulfill our responsibility to make decisions about, carry out and explain efforts to help Fukushima recover, decommission the Fukushima Daiichi NPS and provide compensation,"* and that *"our efforts to improve nuclear safety will never end."* TEPCO management also directly conveyed this sentiment to the local governments and the people of Fukushima and Niigata Prefectures. Furthermore, in order to operate the company from the perspective of the local community TEPCO has announced its "Action Plan to Combat Bad Rumors".

¹ All dates hereinafter referred to 2017 unless otherwise noted.

1 PROGRESS WITH SAFETY MEASURES AT NUCLEAR POWER STATIONS

1.1 PROGRESS OF REACTOR DECOMMISSIONING

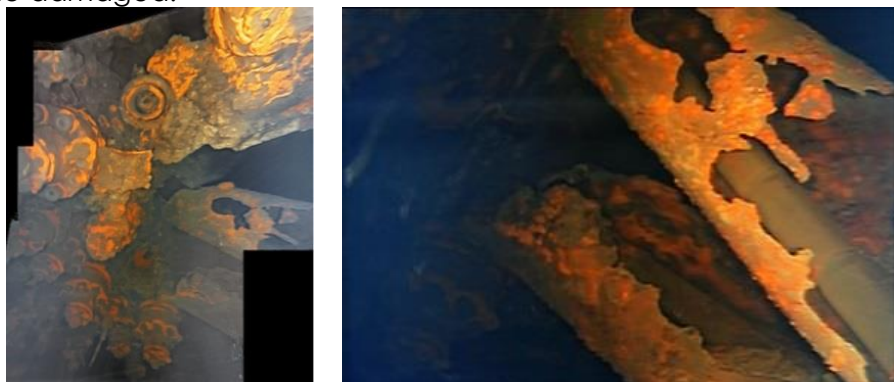
At Fukushima Daiichi, we are moving steadily and safely forward with decommissioning in accordance with the TEPCO Holdings, Inc. Mid-and-Long-Term Roadmap Towards Decommissioning of Fukushima Daiichi Nuclear Power Station Units 1 to 4 (September 26 revision).

(1) Fuel Debris Removal

In preparation for fuel debris removal we conducted investigations of the Unit 1-3 primary containment vessels utilizing robots and muons, and we were able to verify for the first time the existence of fuel debris-like substances during the investigation of Unit 3 in July. Upon analyzing the images, we were able to confirm that core structures exist inside the pedestal, and obtain information that will contribute to deciding on a fuel debris removal method. Going forward, we shall take a step-by-step approach to fuel removal that is based upon this plan for fuel debris removal. The basis of the plan will be removing the fuel in the open air and from the side, and we shall start small and gradually enlarge the scope of operations. We are currently examining methods for fuel debris removal for those units which have been prioritized for fuel debris removal.

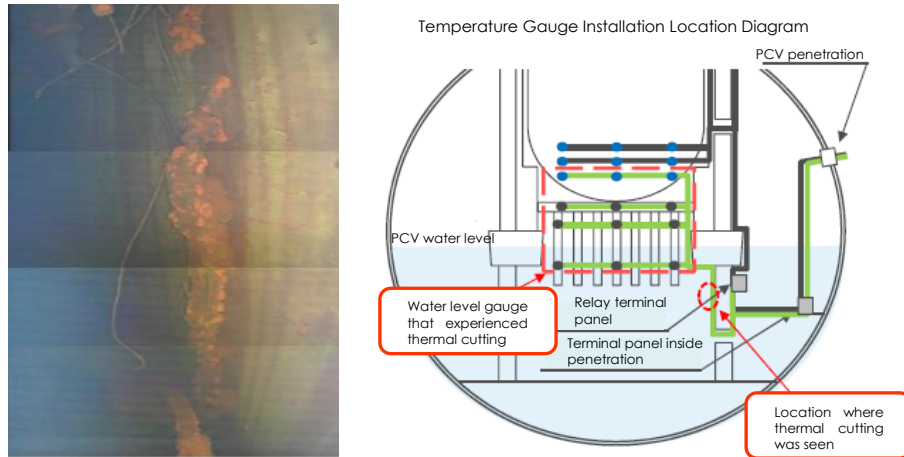
◆ Unit 3

Compared with Units 1 and 2, the level of water inside the primary containment vessel of Unit 3 is higher, so we used a submersible remotely operated vehicle (submersible ROV) to survey the inside of the pedestal (July 19~22). Inside the pedestal we found what we believe is fuel debris that has solidified after melting, as well as multiple fallen objects, such as grating, etc. and deposited material. Upon analyzing the images obtained during the investigation we were able to confirm that multiple internal structures have been damaged and that core internal structures assumed to be the control rod guide tube and control rod drive mechanism index tube have fallen inside the pedestal. Furthermore, since we observed disturbances in the surface of the water caused by dripping reactor cooling water not only in the center of the bottom of the reactor pressure vessel, but also on the periphery, we believe that the periphery of reactor pressure vessel was also damaged.



Observed core internal structures

We also observed damage to temperature gauge cables on the inside wall of the pedestal connected to temperature gauges at the bottom of the reactor pressure vessel. There are 12 temperature gauge cables inside the pedestal, and six outside the pedestal. Readings have been taken from these cables but the 12 cables inside the pedestal for which image analysis showed damage have been deemed to be "damaged" since temperature readings for the bottom of the reactor pressure vessel cannot be taken.

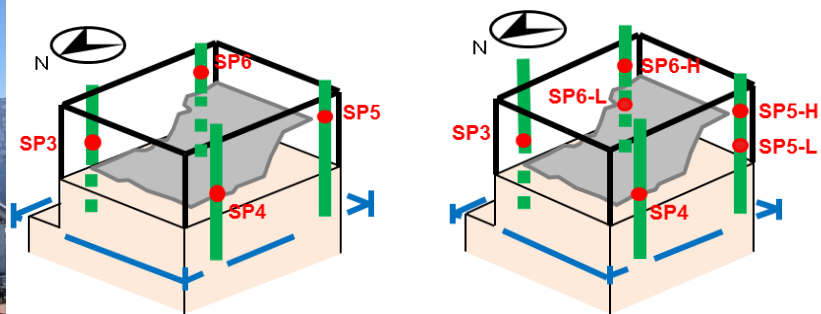


Locations of temperature gauge damage in the Unit 3 reactor pressure vessel

(2) (2) Removing fuel from spent fuel pools

◆ Unit 1

The erection of modified pillars and beams on the north side of the reactor building began on August 29 in preparation for the erection of a wind break fence (to prevent the dispersion of dust during the removal of rubble) and was completed on October 26. The direction of the wind break fence began on October 31 and was completed on December 19. Furthermore, in preparation for rubble removal, the number of continuous dust monitoring posts on the uppermost floor of the reactor building (the refueling floor) has been increased from four to six (September 21). To date, no dust monitor alarms have sounded in conjunction with work and the concentration of dust remains low. We will continue to diligently assess risks and control dust as we proceed with this task in order to prevent the dispersion of radioactive substances and ensure that safety measures are implemented as we aim to begin fuel removal in FY2023.



Unit 1 wind break fence erection (shown in red)

Changes to dust monitoring points
(Left: Prior to changes, Right: After changes)

◆ Unit 3

In preparation to remove fuel from the spent fuel pools we have moved forward with the installation and adjustment of running rails after the construction of fuel handling machine girders and a working platform, and have begun installing the domed roof. Five out of eight of the domed roof segments have been installed (November 4). Thereafter a fuel handling machine was installed on November 12 and a crane on November 20. After this was completed the sixth segment of the domed roof (domed roof segment 8) the was installed (completed on December 20). Installation is proceeding smoothly and we expect to commence to removal during FY2018.



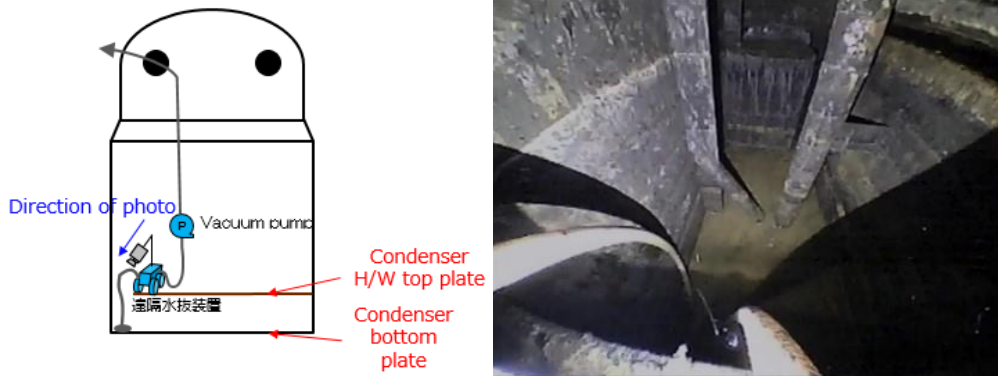
Domed roof installation (Left: Crane installation, Right: Domed roof segment installation)

(3) (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.

◆ Draining accumulated water from the Unit 2/3 condensers

Highly concentrated contaminated water has accumulated inside the Unit 1~3 condensers and the level of this water must be reduced in order to move forward with treating the accumulated water inside buildings. Water has already been drained from the Unit 1 condenser but the water inside the Unit 2 and 3 condensers had only been drained down to the top of the hot well (H/W) top plates inside the condensers. However, the structures inside the condenser were examined and water draining pumps and transfer lines were installed thereby enabling all of the water below the hot well top plate inside the condensers to be drained. Cameras were used to confirm that all of the water had been drained from Unit 2 on November 17 and from Unit 3 on December 18.



Draining accumulated water from the Unit 3 condenser

(4) Introduction of automated electric buses

At Fukushima Daiichi we are deliberating the introduction of automatic electric buses in order to help workers move about the site and use vehicles more efficiently. At current time, the buses used on site to transport workers are individually chartered by each contractor so it is expected that transportation will be used more efficiently if these automated buses are shared. Also, convenience can be improved by offering bus transportation on demand to workers working during the night and workers at facilities at which buses rarely stop. Introducing these buses will have the secondary benefits of reducing the number of vehicles on site and contributing to reducing oil leaks from vehicles, which have become quite common. In order to confirm the route that the automated electric buses take, how obstacles are detected, and how passengers are recognized, running tests were performed. Two types of automated electric buses being considered were tested and employees from TEPCO and cooperating companies took test rides on these buses on a course approximately 1.7km long at speeds between 5~20km/h. The automated electric bus to be put into service shall be selected based upon these running tests and put into operation sometime during the next fiscal year.



Automated electric bus (left: The vehicle in front) running tests

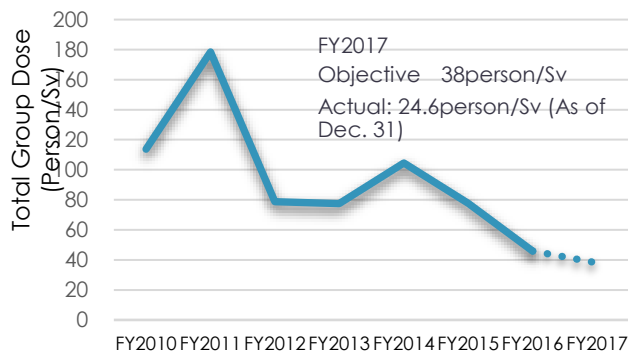
(5) Initiatives to reduce exposure doses

According to the revised Mid-and-Long-Term Roadmap, radioactive substances that pose potential risks are to be prioritized and subject to optimal countermeasures in consideration of the conditions surrounding these substances. At Fukushima Daiichi, work priorities are being set by comparing the reduction of dose risks in the environment with

worker exposure and the increase in risks associated with labor safety. And, whether or not to implement a certain task is being decided upon by estimating the potential exposure dose before the work is implemented and also assessing increases/decreases in risk.

Furthermore, in order to further reduce exposure doses, we have benchmarked with nuclear operators in the United States and introduced a remote monitoring system that enables the indirect exposure doses of workers, such as radiation control officers, to be reduced by remotely monitoring work tasks. The introduction of this remote monitoring system enabled an approximate 10% reduction in exposure when used during the internal investigation of the Unit 3 primary containment vessel. This system is currently being used as we remove the protective layer from the top of the Unit 2 reactor building roof. This system will also be proactively leveraged going forward during work inside the reactor buildings and in the vicinity where dose levels are high.

Furthermore, for use in highly radioactive areas we have tested a multicopter² (RISER: Remote Intelligent Survey Equipment for Radiation) that can take three-dimensional dose level measurements thereby contributing to the formulation of work plans that include exposure reduction measures, and helping to confirm the achievements of work tasks, such as decontamination. Tests have shown that whereas there are some limitations to the use of these drones due to the inability of the drone to ascertain its position in the absence of walls in the vicinity of the destination, practical application is possible through the implementation of countermeasures, such as flight plan creation. These drones will be effectively leveraged going forward in order to reduce exposure in high-dose areas while confirming the needs of work implementation departments.



Annual trends in total group dose



Multicopter (RISER)

(6) Results of investigating/examining unexplained issues

Through investigations and analysis to date, TEPCO has shed light on how the Fukushima Nuclear Accident unfolded and clarified many of the causes. We will continue to conduct investigations in order to further clarify the details of the mechanism by which this accident occurred in an effort to accumulate knowledge that can be leveraged during decommissioning and further improve the safety of nuclear power stations.

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

As part of this initiative we identified 52 unexamined/unexplained issues that need to be investigated and to date we have released the results of these investigations four times (December 13, 2013, August 6, 2014, May 20, 2015, December 17, 2015). Since then we have been able to obtain information closer to the scene of the accident through, for example, investigations to locate the position of fuel debris inside the reactor pressure vessels of Unit 2 and Unit 3 utilizing muons, and the Unit 1~3 primary containment vessel internal investigations. By leveraging this new information, we have been able to make better assumptions about the conditions inside the reactor pressure vessels and primary containment vessels, and made our 5th progress report on December 25.³

The 5th progress report gave summaries of the investigation results for the following six issues.

- Detailed fuel debris distribution estimate based upon field information
 - ① Fuel debris distribution estimate
- Issues that help to enable us to understand the detailed mechanisms by which the accident unfolded
 - ② Analysis of the hydrogen explosion that occurred at the Unit 1 reactor building
 - ③ Additional examination of the emergency AC power loss caused by the tsunami
 - ④ Estimates of the reactor water levels around the time that Unit 2 core damage/core melt down occurred
 - ⑤ Assessment of the percentage of Unit 3 vented gases that flowed into the Unit 4 reactor building
 - ⑥ Estimates about how the accident at Unit 1 unfolded based upon air dose rate monitoring data

Out of all 52 unexamined/unexplained issues, we have compiled investigation result reports for 36⁴ of them, and we shall continue to examine these issues and release results as suitable.

1.1.1 Subdrain⁵ Water Level Gauge Setting Errors

(1) Event Overview

At newly built subdrain pits (6 locations) around the Units 1 ~4 reactor building it was discovered that errors during the setting of water level gauges resulted in the actual water

³ http://www.tepco.co.jp/press/release/2017/1470526_8706.html

⁴ Out of the six issues discussed, two issues from prior reports were included because additional information was been provided (Issues (③, ④), therefore 18 issues remain.

⁵ Wells located around the reactor buildings and turbine buildings, etc. The water level (groundwater level) in the wells is measured and compared with the level of accumulated water in the buildings. Groundwater is pumped up from the wells in order to suppress the amount of groundwater flowing into the buildings, and the water levels of wells are kept higher than the level of water in the buildings in order to prevent the accumulated water in buildings from leaking out. If there is a reversal in these water levels it is considered to be a deviation from the limiting conditions of operation stipulated in the implementation plan.

level being 690mm less than the water level gauge readings. As a result, it is possible that the level of accumulated water in the Units 1~4 reactor building was higher than the level of accumulated water in the newly built subdrain pits since the day when the first new subdrain (Subdrain No. 203) was put into operation (April 19). It has therefore been deemed that during this time there was a deviation from the limited conditions of operation (September 28).

As a result of the Great Eastern Japan Earthquake, the level of the ground at Fukushima Daiichi subsided approximately 70cm so the level at which the water level of sub-drains should be maintained was changed in FY2015 to reflect the degree of ground subsidence. However, these new levels were not reflected properly when setting the water level gauges for the six new sub-drain pits. The results of a subsequent inspection of the six new sub-drain pits conducted between May 19~21 revealed that data for sub-drain No. 203 showed a reversal with water levels in the Unit 1 waste treatment building at least eight times with a maximum reversal difference of 19mm. However, sub-drain No. 203 is approximately 80cm away from the Unit 1 waste treatment building and the water level readings from sub-drain No. 204, which is about half this distance from the building, and from sub-drains No. 8, 9, 205 and 206 were all higher than the level of water in the Unit 1 waste treatment building. Therefore, we do not believe that there were any leaks from the Unit 1 waste treatment building that were caused by the low water levels in sub-drain pit No. 203.

In response to this event, a general inspection was performed to ensure that equipment required to confirm that power station sub-drains are operating within the limited conditions of operation has been installed, and is being managed (operated/maintained) appropriately. The results of this general inspection revealed that all equipment required for monitoring has been installed and is being managed (maintained, operated) appropriately, and that no serious errors that would result in a deviation from the limited conditions of operation have been made.

(2) Identify problems and lessons learned

The cause of this event was the failure to sufficiently convey changes made to control standards related to elevation in conjunction with ground subsidence. This issue has been examined from the perspectives of safety awareness, technological capability, and the ability to promote dialogue, and the lessons learned in regards to organization operation and management have been identified along with areas for improvement.

	Problems	Lessons Learned/Areas for Improvements
Safety awareness	When it was determined that the water levels may have reversed, the event was deemed to be a deviation from the limiting conditions of operation thereby showing that the lessons from the sub-drain No. 51 event (reported in the previous progress report) have been learned from the perspective of safety awareness. Furthermore, whereas the TEPCO department in charge of setting the water level gauges did not take immediate action with the error was noticed, the event was quickly reported to the Emergency Countermeasures Office.	
Technological capability	<ul style="list-style-type: none"> Requirements concerning elevation were not noted in the specifications when new sub-drain excavation work was contracted. 	<ul style="list-style-type: none"> It was added to the manuals for sub-drain-related work that reference points, hole depth and hole height requirements be clearly noted. A checklist will be added to the related manuals to ensure that records are examined when taking elevation measurements on site.

	<ul style="list-style-type: none"> • When the TEPCO work supervision department performed a field inspection the measurement record was not examined, so the error in measurement readings was not noticed. • The changes in standards for managing elevation were not made into rules thereby resulting in the new and the old elevation standards becoming mixed together. 	<ul style="list-style-type: none"> • Power station site elevation standards shall be standardized with T.P. ⁶, which is not impacted by subsidence, and measures formulated to prevent the mistaken use of the old form of notation.
Ability to promote dialogue	<ul style="list-style-type: none"> • TEPCO and contractor personnel engaged in the work had not been informed of the changes to management standards for elevation • The data that was exchanged between the department in charge of excavation and the department in charge of setting the water level gauges was based upon the old elevation standards. 	<ul style="list-style-type: none"> • Briefings will be held to inform TEPCO and contractor personnel about this event and the standardization of reference points. • Rules will be created to require a standardized format to be used when providing and receiving data related to building water level management

1.1.2 Unit 2 containment vessel gas management equipment system B shut down and Unit 3 spent fuel pool circulated cooling equipment primary system pump B shut down

(1) Unit 2 containment vessel management equipment system B shut down

On November 20, an alarm indicating low flow levels in system B of the Unit 2 containment vessel gas management equipment sounded. When the indicator was checked flow level was 0 l/m (normally approximately: 70 l/m). At this time system A had been shut down for control panel redundancy improvements so the shift supervisor declared a deviation from the limited conditions of operation (LCO) after deeming that the Unit 2 containment vessel gas management system radiation detector was inoperable. A field inspection revealed that a tag (work tag) had been attached to the system B noble gas radiation monitor outlet valve (normally open) and that the valve was “fully closed,” so the aforementioned valve was opened. Thereafter, flow levels returned to normal levels and it was confirmed that there were no longer any abnormalities with related parameters, so the LCO deviation was lifted.

A subsequent investigation of the event revealed the following:

- When the event occurred, 33 workers engaged in system A improvements were in the midst of checking safety equipment, confirming the scope of the work area and making preparations. During interviews with the workers, no one admitted to opening the aforementioned valve or accidentally coming in contact with it, but the risk of equipment shutdown in conjunction with performing work in the vicinity was not managed sufficiently.
- The tag on the aforementioned valve indicating that it should be “fully closed” was attached during work implemented between March and June and was not removed after the work had been completed. Furthermore, even though

⁶ Average sea level of Tokyo Bay (Average sea level used as national standard for elevation)

workers noticed the tag when the field was inspected on November 19, no mention of it was made and nothing about the tag was mentioned to the shift supervisor.

- In response to the shutdown of the Unit 1~3 spent fuel pool cooling system and the shutdown of Unit 3 reactor coolant injection, which resulted from similar causes, valves are kept locked and the levers for ball valves are removed as part of recurrence prevention countermeasures, however this system was not subject to such countermeasures because it needs to fulfill system function in the event that the other system shuts down.
- From November 19 flow levels had dropped several times in conjunction with system B alarms for which the causes were unidentified, but the events resolved naturally so no questions were asked. Furthermore, even though system B was unstable, site conditions were not conveyed to all when shutting down system A.

(2) Unit 3 spent fuel pool circulated cooling equipment primary system pump B shut down 3

On November 27, the Unit 3 spent fuel pool circulated cooling system primary system pump B shut down. A field inspection revealed that the pump automatically shut down in response to a system inlet isolation valve "close" signal. A worker engaged in pipe painting work nearby accidentally came in contact with the inlet isolation valve position detection switch thereby assumedly causing the system to believe that the "inlet isolation valve had closed," and resulting in the shutdown signal being sent to the aforementioned pump. Thereafter, it was confirmed that there were no abnormalities with the inlet isolation valve or pump B that had shut down, so pump B was reactivated and spent fuel pool cooling restarted. The shutdown lasted for approximately two hours during which the temperature of the Unit 3 spent fuel pool raised by 0.1°C.

The direct cause of this event was accidental contact between a worker in the field and the inlet isolation valve position detection switch. However, even though there is a rule that states that maintenance work is not to be performed while important equipment is in operation, painting of the pipes of the spent fuel pool circulated cooling system, which is an important piece of equipment, was not considered to be "maintenance work performed while important equipment is in operation." Furthermore, as with the Unit 2 containment vessel gas management system event, the system in question was not subject to recurrence prevention measures formulated in the wake of similar events in the past, so protective measures had not been implemented for this important piece of equipment.

Since both of these events resulted from a failure to sufficiently manage risks associated with work performed in the vicinity of important safety equipment, they reveal problems with technological capability. Furthermore, the lessons learned from past events are not being put into practice to prevent similar events from happening thereby indicating problems with safety awareness and the ability to promote dialogue. Therefore, we will continue to ascertain the causes of these events and make efforts to strengthen safety awareness, technological capability, and the ability to promote dialogue in order to prevent similar events from happening again.

1.2 PROGRESS OF SAFETY MEASURES AT KASHIWAZAKI-KARIWA

(1) Progress with safety measures

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

<Progress with Safety Measure Renovations>

Safety Measures (※: Measures independently implemented by TEPCO)		Unit 6	Unit 7
Preparations for tsunami and internal inundation	Tidal wall (seawall) construction	Completed	
	Installation of tidal walls for buildings (including flood barrier panels)	No openings below 15m above sea level	
	Installation of water-tight doors in reactor building, etc.	Completed	Completed
	Installation of tidal walls at switchyards*	Completed	
	Installation of tsunami monitoring cameras	Completed	
	Improving the reliability of flooding prevention measures (interior flooding measures)	Underway	Underway
	Dyke construction	Completed	Completed
	Installation of permanent bilge pumps in rooms housing important equipment	Completed	Completed
Preparations for power loss [Augmenting power sources]	Additional deployment of air-cooled gas turbine power supply cars	Underway	Underway
	Installation of emergency high voltage distribution panels	Completed	
	Laying of permanent cables from emergency high-voltage distribution panels to reactor buildings	Completed	Completed
	Preparation of substitute DC power sources (batteries, etc.)	Underway	Completed
	Reinforcement of transmission tower foundations* and strengthening of the seismic resistance of switchyard equipment*	Completed	
Preparing for damage to the reactor core or spent fuel [Augmenting heat removal and cooling functions]	Installation of substitute submersible pumps and substitute seawater heat exchanger equipment	Completed	Completed
	Installation of high pressure substitute for water injection systems	Underway	Underway
	Building of water sources (reservoirs)	Completed	
	Enhancement of the seismic resistance of pure water tanks on the Oominato side*	Completed	
Preparing for damage to the primary	Installation of filtered venting equipment (aboveground)	Performance tests completed ⁷	Performance tests completed

⁷ Work in the vicinity is underway (at both Units 6 and 7)

Safety Measures (※: Measures independently implemented by TEPCO)		Unit 6	Unit 7
containment vessel or the reactor building [Measures to prevent damage due to excessive PCV pressure and prevent a hydrogen explosion]	Installation of filtered venting equipment (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 book filter for ventilation and air conditioning systems	Completed	Completed
Improvements to Main Control Room environments	Measures to reduce operator exposure in the event of a severe accident	Underway	
Strengthening emergency response	Construction and reinforcement of multiple access routes	Underway	
	Enhancement of communications equipment (installation of satellite phones, etc.)	Completed	
	Enhancement of environment monitoring equipment/additional deployment of monitoring cars	Completed	
	Erection of emergency materials and equipment warehouse on high ground*	Completed	
	Construction of Emergency Response Center in Unit 5	Underway	

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

◆ Strengthening emergency response

- Establishment of an Emergency Response Center in Unit 5

An Emergency Response Center is being constructed inside the Unit 5 reactor building to be used as a substitute for the existing seismic isolation building. The center includes living space for personnel in charge of responding to a severe accident that is livable (radiation shielding and air ventilation equipment⁸ added, etc.) thereby enabling required plant data to be ascertained. The center is also being additionally equipped with infrastructure such as communications equipment.



Prior to renovation (old process computer room) After renovations (Anchors being installed to erect shielding walls)

(2) Firewall penetration holes that have yet to be fireproofed at the Kashiwazaki-Kariwa Nuclear Power Station

After it was discovered in July that two penetration holes in the firewalls at Unit 2 have yet to be fireproofed, the firewalls in the reactor buildings and turbine buildings for all units were inspected for similar problems. As a result, it was discovered that 60 locations had yet to be fireproofed (November). A detailed investigation is underway. It is assumed that these locations were not fireproofed because of the lack of a rule that requires the department in charge of fireproofing the penetration holes in building walls to consult with the department that has expert knowledge about building regulations.

⁸ Air-conditioning equipment is comprised of air tanks, pipes, and valves. This equipment is used to pressurize and ventilate the Emergency Response Center in order to "prevent radioactive substances from entering the Emergency Response Center," and "provide a livable Emergency Response Center by maintaining oxygen concentrations and carbon dioxide concentrations within allowable limits."

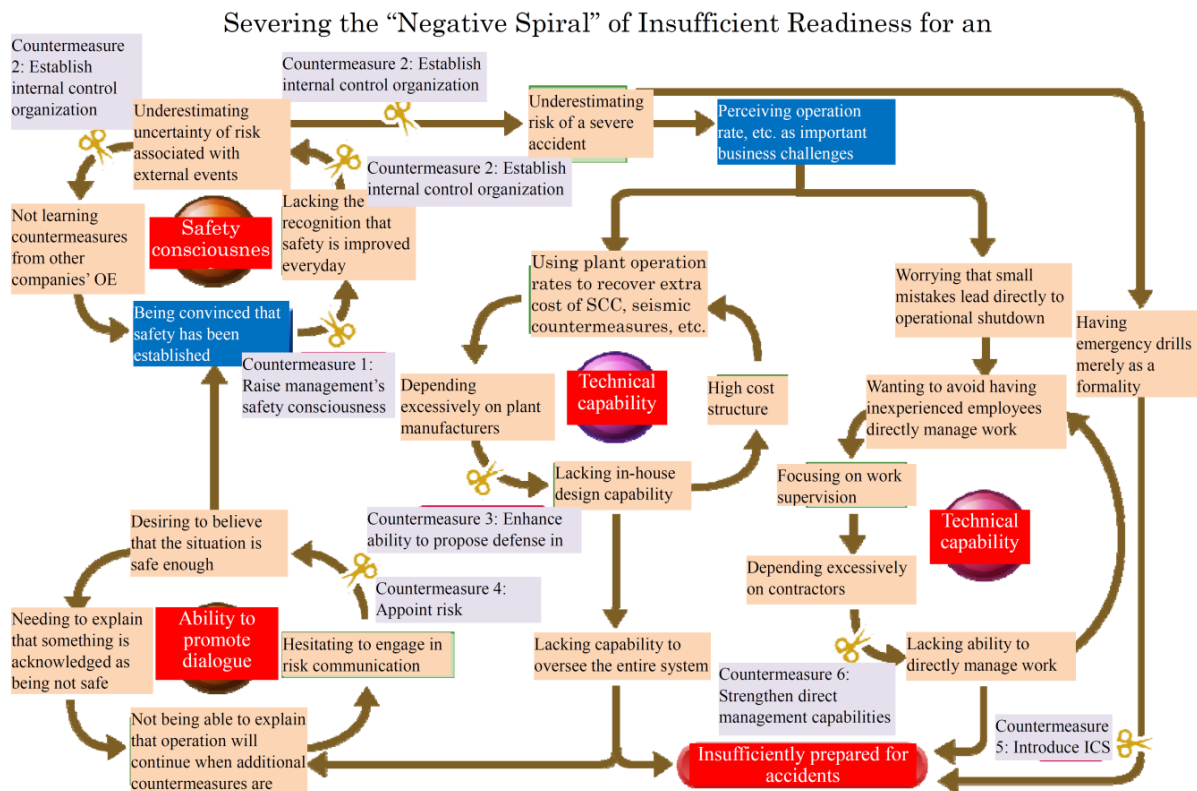


Penetration hole in a firewall that has yet to be fireproofed (Unit 2 reactor building subfloor 1)

Going forward, corrective measures shall be quickly implemented without fail for these locations that have yet to be fireproofed in accordance with recurrence prevention measures, such as enlisting the help of an expert (in-house expert) to confirm the quality of the corrective measures, as has been done since December 2015 in the wake of the cable laying problem.

2 THE PROGRESS STATUS OF THE NUCLEAR SAFETY REFORM PLAN (MANAGEMENT)

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



Since the FY2017Q1 progress report, we have formulated initiatives to tackle “enhancing governance (including developing internal communication),” which was an area that was deemed as requiring improvement as a result of the self-assessment of the Nuclear Safety Reform Plan that TEPCO conducted in FY2016. Additionally, we’ve also formulated initiatives for Measures 1~6 in the form of “stronger initiatives in light of suggestions from the Nuclear Reform Monitor Committee” and the “progress of future initiatives.”

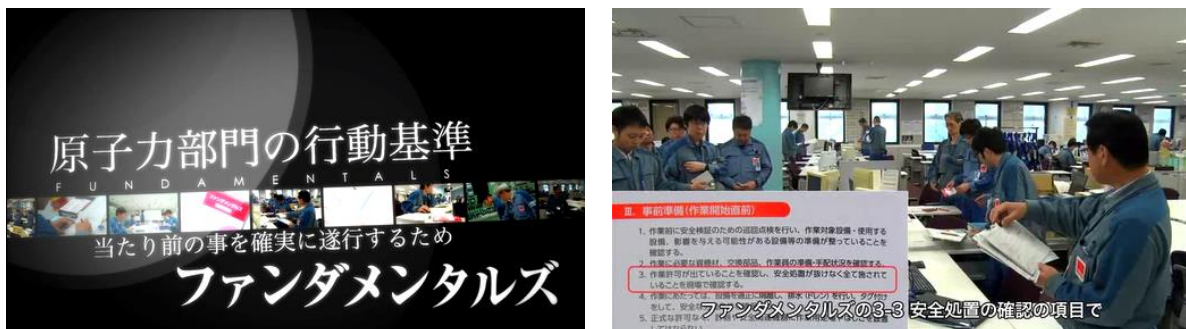
2.1 INITIATIVES TO ENHANCE GOVERNANCE BY NUCLEAR POWER LEADERS

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

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

(1) Development and permeation of the management model

A management model was created to enable all employees in the Nuclear Power & Plant Siting Division to engage in their duties with a common understanding of the objectives of the division and each other's roles (June 22, 2017). One of the compositional elements of the Management Model is "Fundamentals" which have been compiled to convey the ideal behaviors desired of each position that each individual should be aware of when engaging in their daily duties. Now that these Fundamentals have been in use for half a year a questionnaire was distributed in order to analyze in detail to what extent they have permeated through the organization (October). The response rate to the questionnaire was over 90%, and more than 80% of responses were positive in regards to the degree to which the fundamentals are understood, utilized, and needed. This shows that efforts to help the fundamentals permeate throughout the organization, such as the distribution of fundamentals pamphlets and briefings, have been successful to a certain extent.



"Utilizing Fundamentals" shown on in-house TV system

In order to further enable the fundamentals to permeate and take root, the degree to which the fundamentals have permeated through each organization and department has been shown and nuclear power leaders have conveyed enhancement strategies to the leaders of each department. Furthermore, meetings in the operations and maintenance departments at Kashiwazaki-Kariwa are broadcast on the company's internal television network to provide an example of how the Fundamentals are to be leveraged. During the fourth quarter, another questionnaire will be distributed in order to assess the achievements of these measures.

Initiatives to help the management model and fundamentals permeate and take root are being implemented in accordance with the change management guide. This guide will be revised during the fourth quarter since areas for further improvement, such as handling “partial duplication of requirements mentioned in other manuals,” and “clarifying change management process application flow and forms,” were identified after the guide was revised on June 30.

(2) Improvement activities by CFAM⁹/SFAM¹⁰

Since April 2015, CFAMs and SFAMs have been ascertaining excellence achieved in other countries, identifying key issues to be resolved, and formulating and implementing improvements for each field of expertise. Furthermore, management model project members and CFAM have been working together in those fields focused on by the management model to move forward with improvements.

During the third quarter efforts were made to enable the concept of “Operational Focus,” which has greatly contributed to performance improvements at power stations in the United States, to permeate through the organization and take root. An organization with “Operational Focus” is an operations-led organization refers to an organization in which the operations department and operators take the lead in setting high standards in order to achieve the world's highest levels of safety, and lead by example will the other departments follow suit. The following are some examples of actions taken by an operations-led organization.

- Operators are proactively involved in maintenance department work planning and offer opinions on process adequacy and risks.
- When operators authorize a job, they ask Maintenance Department work supervisors about the worst possible circumstances that could arise from the work in question.
- Operations Department personnel do not just leave work up to maintenance but rather proactively discuss issues with workers in the field if anything is noticed during patrols.
- If an operator notices a piece of malfunctioning equipment, s/he shall examine/assess the risks and formulate countermeasures while also quickly requesting repair.
- Operators should hold themselves and other operators to high performance standards.

From October 13th, organization and operation methods shall be revised in order to accelerate these improvements. In particular the following shall be implemented.

- Dedicated CFAMs shall be assigned to core specialty fields, such as operations, maintenance, and radiological protection.
- CFAM supervisors (Headquarters) and SFAM supervisors (power stations) shall be assigned to supervise, monitor, and support all activities.

⁹ Corporate Functional Area Manager : Leader at the Head Office that aims to achieve the world's highest level of excellence for each aspect of power station operation

¹⁰ Site Functional Area Manager : CFAM counterpart at power stations

- Letters of appointment shall be given to CFAM/SFAM by the Nuclear Power & Plant Siting Division General Manager in order to clarify responsibilities.

Furthermore, all appointed CFAM and SFAM were subjected to education and training with the cooperation of overseas experts necessary for them to become leaders in each specialty field. (October~November).



Presentation of the letters of assignment



CFAM education and training

CFAM/SFAM are instrumental in formulating “objectives to be achieved” and “important factors for success” for the next fiscal year and three years from now in each field based upon the management model. These objectives to be achieved and important factors for success are reflected in midterm plans and work plans for the coming fiscal year as CFAM/SFAM promote activities in each area of the Nuclear Power Division in order to achieve the world’s highest levels of safety.

2.1.2 2.1.2 Initiatives Aimed at Developing Internal Communication

(1) (1) Initiatives for promoting internal communication

On October 13th, CFAMs/SFAMs for internal communication were assigned. Going forward, communications-related departments in the company shall coordinate in effort to accelerate activities to invigorate internal communication under the supervision of the CFAMs/SFAMs.

In November, internal communication CFAMs/SFAMs analyzed the gap between where we are and where we want to be with the cooperation of overseas consultants. Results showed that, “messages from nuclear power leaders are not being conveyed to all employees,” and that “each and every employee does not have a good grasp of the responsibilities of, and problems facing, other departments.” Measures are being formulated in order to eliminate these “gaps.”

In regards to conveying the messages of nuclear power leaders to all employees, the decision has been made to formulate and implement communication strategies for nuclear power leaders to enable consistent messages from nuclear power leaders to be conveyed at appropriate times.

In order to make it easier to understand the responsibilities of, and problems facing, other departments, the Headquarters Communications Team is in the process of creating a database for employees in the Nuclear Power & Plant Siting Division that are stationed at

Headquarters that will contain a picture of each employee and an introduction about their work history and current position. As of the end of December, approximately 70% of employees were recorded in this database, and all employees should be included by the end of January.

Furthermore, a “marshmallow challenge” event was held at Headquarters to allow people to get to know each other and the work they are involved in. 47 employees in a range of positions, from nuclear power leaders to new young hires, participated. Participants commented that, “team discussion led to ideas that could not have come from one person which enabled us to do great things” and requests were made pertaining to future events. Going forward we will continue to periodically hold these types of events that will help to build a climate of cooperation by enabling employees to get to know each other and the jobs that they do.



Marshmallow Challenge (Headquarters)

At Fukushima Daini, the opinion was voiced during discussions between internal communications teams and young worker job satisfaction WG members that, “there is little contact with departments with which there is no direct relationship.” Therefore, in order to provide opportunities to come in contact with people other than those with whom they are directly working, efforts are underway to form group activities, such as group discussions and group cleaning efforts. Furthermore, since November efforts have been underway to redesign intranet screens to make it easier to access information by categories and enable personnel to obtain the information they require effectively and quickly. In conjunction with these efforts, a “Fukushima Daini Site Personnel Introduction Database” that links an employee’s picture with their responsibilities, career history, and current position is being created.

At Kashiwazaki-Kariwa, every month we gather opinions from opinion makers in the community, facility tour participants and community residents, and convey them to all site personnel in the hopes that sharing information about issues of great concern to the regional community will enable personnel to engage in their duties from the perspective of the local community and society. Furthermore, in order to cultivate a sense of unity amongst site personnel we have held a tug-of-war competition as well as a relay race in cooperation with contractors.



Tug-of-war competition and relay race (Kashiwazaki-Kariwa)

At Fukushima Daiichi, we are implementing a program to improve communication. On November 8th, a lecture was held on successful circulation models, on November 15th, a lecture and dialogue were held on solving problems in the workplace, and a dialogue session with other companies was held on November 20th. Retrospection will be conducted in January. Participants commented that the activity was meaningful and that they intend to recommend it to other colleagues, so these activities will be continued going forward.



Communication improvement program (Fukushima Daiichi)

During the third quarter, the “*tsunagu sairo no kai*,” an independent initiative to promote coordination between managers (for managers/shift supervisors), met twice.

And, the Electrical/Communications Infrastructure Department Electrical Equipment Maintenance Group has established a “Electricity Consultation Desk” to answer any questions employees may have about electricity and also provide support for construction work, such as by explaining appropriate methods for laying cables and introducing workers to the power distribution equipment at Fukushima Daiichi to which construction equipment can be connected, in order to improve communication.



Electricity Consultation Desk sign (Fukushima Daiichi)

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

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

- Company intranet videos
 - Emergency Response Training (conducted on October 4, video uploaded on October 20)
 - 14th Nuclear Reform Monitoring Committee Meeting (held on November 20, video uploaded on November 28)
 - Explanation of TEPCO-related news coverage (One story explained during the third quarter)
- TEPCO Group Report
 - Article on Fukushima Daiichi Unit 3 spent fuel pool removal method and schedule (Printed on November 29)

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

Since July 2016, each site superintendent and Headquarter general managers have been sending e-mails to all members of the Nuclear Power Division about important work issues in order to share information on these matters. Results from electronic questionnaires designed to gather opinions about the messages that were conveyed and also confirm the level of understanding¹¹ of these messages and whether or not they were received, show that during the third quarter response rate was 51.6% (objective: over 70%), and the level of understanding was 2.4 points (objective: more than 2.5 points). Response rate increased by +7.5 points and continues to increase from the first quarter. The level of understanding increased by +0.1 points but an analysis of the details revealed little change.

It is assumed that improvement to response rate during the third quarter is the result of improvements made to the questionnaire system, and voluntary efforts to respond by departments that have shown poor response rates in the past. The results of the questionnaire and opinions about messages will continue to be provided as feedback to

¹¹ Measured on a four-step scale with 1 being "well understood" and 4 being "not very well understood"

the sender, and also Headquarters and power stations, in order to improve subsequent messages.

2.2 MEASURES 1 REFORM FROM TOP MANAGEMENT

2.2.1 Initiatives Related to Suggestions from the Nuclear Reform Monitoring Committee

(1) Activities to develop communication and understanding amongst contractors

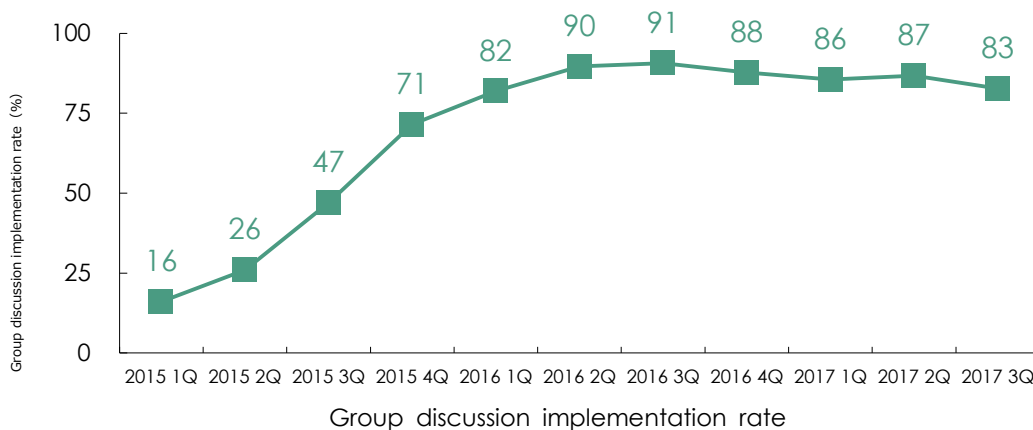
In order to improve nuclear safety at TEPCO's nuclear power stations, contractors must have an understanding of nuclear safety reforms and cultivate nuclear safety culture. During the third quarter we continued to engage in dialogue with contractors (October, 20, November 2, 9, 21, December 19, 21).

During the dialogues it was conveyed to contractors that their efforts to provide work of high quality leads to nuclear safety. The results of a questionnaire about dialogue activities distributed to companies visited during the first half revealed that 92% of companies felt that these dialogue sessions were "helpful," or "fairly helpful." We will continue to engage in dialogue with contractors in order to deepen mutual understanding about nuclear safety.

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

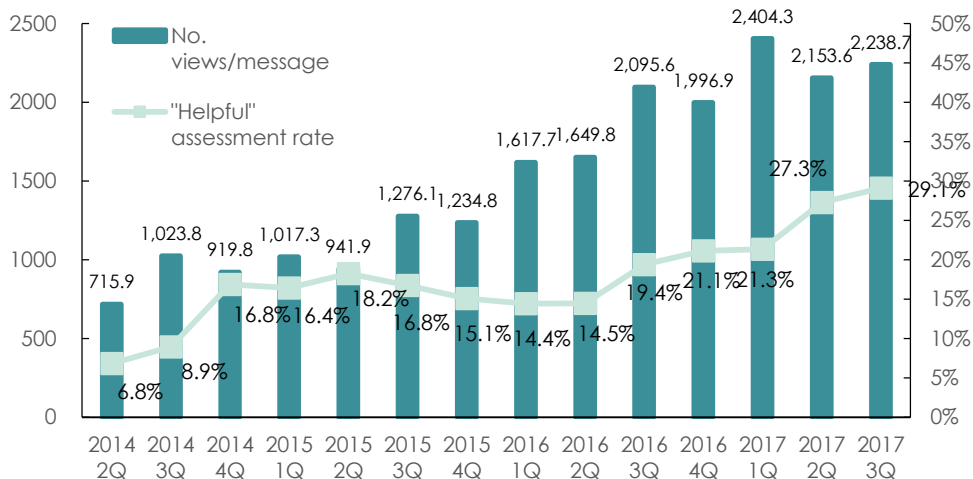
In the Nuclear Power Division, we have stipulated the, "individual, leader and organizational traits needed to embody robust nuclear safety culture (10 traits and 40 behaviors for robust nuclear safety culture)." By using these traits to reflect on and compare one's own actions with ideal behavior on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

The rate of self-retrospection during the third quarter was approximately 94% (+1 point compared with FY2017Q2) and efforts will continue to ensure that this activity is engaged in. The implementation rate of group discussions, which are used to share the results of individual self-retrospection, learn from each other, and take notice of new issues, was 83% (-4 points compared to FY2017Q2). It is believed that the large-scale reorganizations that took place during November at the FDEC were the cause of the temporary suspension of group discussions, but these activities will be watched closely going forward. From the middle of the second quarter the perspectives of daily retrospection were clarified by presenting multiple-choice answers and also giving detailed examples of behavior. Since 57% of participants replied that group discussions using the results of retrospection "clarified detailed actions to be taken in order to embody the traits," it is believed that this activity has helped promote serious retrospection to a certain extent. On the other hand, since some responded that the switch to a multiple-choice format "made daily retrospection more difficult," during the fourth quarter we will examine making revisions to the method by which retrospection is conducted during the next fiscal year.



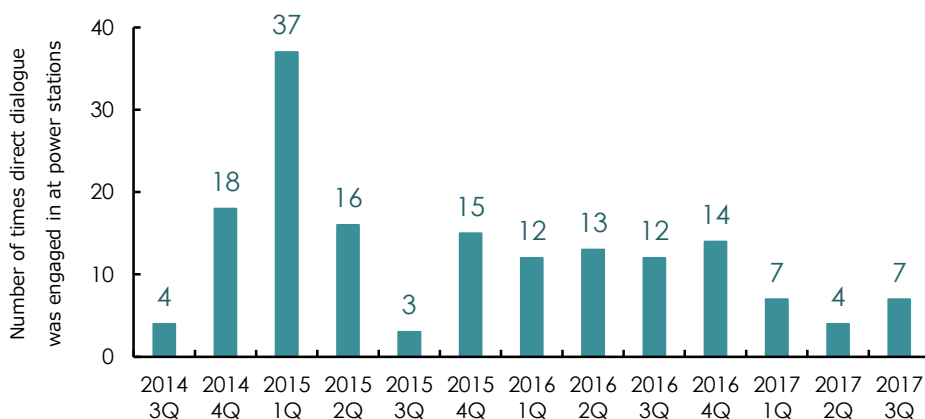
2.2.2 Other initiatives

- (1) (1) Increase Safety awareness throughout the Entire Organization and Management
 - ◆ Direct dialogue between nuclear power leaders
 - Since the fourth quarter of FY2015, nuclear power leaders at headquarters (General Manager of the Nuclear Power & Plant Siting Division and other Head Office General Managers) have been visiting power stations to engage in direct dialogue with power station executives (site superintendent, unit superintendents, Nuclear Safety Center director, power station general managers) in order to improve the safety awareness of the entire organization. During the third quarter, discussions were held about creating mechanisms that can prevent serious accidents and improving the satisfaction of important human resources (Kashiwazaki-Kariwa: October 25, Fukushima Daini: November 16).
 - ◆ Messages from nuclear power leaders
 - In order to promote nuclear safety reforms, nuclear power leaders must accurately convey their expectations, and the reasons for those expectations, so that they permeate throughout the entire organization. In order to do this, nuclear power leaders are leveraging video messages, intranet messages, email, meetings and morning briefings as opportunities to convey their expectations.
 - The following graph shows the number of times that messages by nuclear power leaders have been read by employees via the intranet. During the third quarter, the number of employees that read each message was approximately 2,240, and the percentage of these people that felt that the messages were "helpful" rose to 29.1%.



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

- In order to convey "thoughts" that cannot be completely conveyed through written messages over the intranet, the General Manager of the Nuclear Power & Plant Siting Division has been engaging in direct dialogue with power station personnel and Headquarter employees since February 2014 and this initiative is being continued by the new Nuclear Power & Plant Siting Division General Manager who was appointed in June last year.



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

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

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

Period	Headquarters	F1	F2	KK
FY2015	24(2)	47	19	24
FY2016	25(1)	19	14	25
FY2017				
Q1	4(1)	2	4	10
Q2 ¹²	4	0	4	4
Q3	6	1	3	2

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

- ◆ Gathering information on notifications that were given and information that was disclosed during the accident (core meltdown issue countermeasures)
 - Many facts about the accident have been revealed by the government's Investigation and Verification Committee. However, in order to improve nuclear safety going forward and contribute to improving how events are reported and disclosed to the public, employees are being encouraged to proactively report anything that they find to be missing from these investigation reports via an intranet site that has been set up for that purpose (June 21, 2016). No information or opinions were provided through the site during the third quarter.

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

- ◆ Safety Steering Council¹³
 - At the 10th Safety Steering Council meeting a discussion was held on "Assessing and analyzing/examining nuclear safety KPI" (October 23). Emergency response training-related issues that have been pointed out during both internal and third-party reviews have also been seen in nuclear safety KPIs. So, it was confirmed during the meeting that leadership needs to be displayed in order to accelerate improvements. Furthermore, the president commented that, "It's important to ascertain the causes of each and every trouble and formulate recurrence prevention measures, however is it not also necessary to get a bird's eye view of all of these troubles and identify (learn from experience) the concepts and common underlying causes?" So, how to handle this issue shall be deliberated going forward.
- ◆ Assessing the status of nuclear safety culture
 - During FY2017, we have been assessing the state of safety culture at the Fukushima Daiichi NPS in cooperation with the field diagnostic initiatives conducted by the Japan Nuclear Safety Institute.
 - During the third quarter the Japan Nuclear Safety Institute reported the results of this diagnosis to the president (December 7). Currently, Headquarters is working together with power stations to leverage the interview results from the Japan Nuclear Safety Institute in its status assessment of power stations. Based

¹² In the Q2 report it was reported that three commendations had been given (FDEC: Headquarters: 2, Fukushima Daiichi: 1), but the awarding of these commendations was actually pushed back to Q3, so the Q2 report has been corrected.

¹³ The Council is comprised of the President, Nuclear Power & Plant Siting Division General Manager, FDEC President, and the Head of the Nuclear Safety Oversight Office

on the results of this assessment action plans to cultivate nuclear safety culture shall be deliberated and proposed, and ultimately incorporated into next fiscal year's action plan.



Report by the Japan Nuclear Safety Institute



Power station status assessment

2.3 MEASURE 2 ENHANCEMENT OF OVERSIGHT AND SUPPORT FOR MANAGEMENT

2.3.1 Initiatives Related to Suggestions from the Nuclear Reform Monitoring Committee

(1) Nuclear Safety Advisory Board (NSAB¹⁴) Actions

The Nuclear Safety Advisory Board commenced review activities this fiscal year. During its first review conducted between August 21st through the 25th, the following suggestions were made to Nuclear Power & Plant Siting Division General Manager Makino and an improvement plan compiled. This improvement plan was presented to the Nuclear Safety Advisory Board and the Nuclear Reform Monitoring Committee (November 20) and is currently being implemented.

¹⁴ Nuclear Safety Advisory Board : Established to enable parties with experience as general managers and site superintendents at overseas nuclear operators to provide advice and guidance to the Nuclear Power & Plant Siting Division General Manager and nuclear power leaders.

	Suggestions from the NSAB	Improvement Plan
Kashiwazaki-Kariwa	<ul style="list-style-type: none"> • Training and certification for emergency response personnel, including leaders, has not been completed. • Effective evacuation training that includes contractors has not been planned. 	<ul style="list-style-type: none"> • A certification system has been put in place for emergency countermeasures Headquarter personnel. • Plans are in place to provide preparedness training to all personnel by the end of March 2018 with priority given to those people who have never participated in training. • Large-scale evacuation training for site personnel and contractors has been implemented (November 22)
	<ul style="list-style-type: none"> • Schedules that play important roles in regards to safely and steadily renovating Unit 6/7 facilities have not been made "visible." • Related parties do not understand the work and schedules required to make this schedule a reality. 	<ul style="list-style-type: none"> • The progress across the board of all safety measures, including Unit 6/7 facility renovations, will be managed. • The status of achievement of objectives in consideration of the deadlines shall be made visible and a manager (unit superintendent, department general manager, GM) shall be assigned in accordance with importance to regularly check progress. • Progress is now being checked at meetings attended by the Nuclear Power & Plant Siting Division General Manager and site superintendents (from the end of October).
Fukushima Daini	<ul style="list-style-type: none"> • The concept of "Operational Focus" is not fully understood. • There is also a lack of understanding in regards to the necessity for cross-departmental/cross-power station initiatives in order to put this concept into practice. 	<ul style="list-style-type: none"> • A document defining "Operational Focus" will be written and distributed to the Operations Department and personnel on site. • The degree to which the concept has taken root shall be confirmed through internal communication. • The concept of "Operation Focus" shall be embodied by important councils such as the shift supervisor's council and the performance improvement council • Items to assess "Operational Focus" shall be added to performance evaluations.
	<ul style="list-style-type: none"> • Risks are not being continuously identified and measures to mitigate risk until permanent measures can be put in place are not being fully implemented. 	<ul style="list-style-type: none"> • Measures for labeling and identifying safety equipment with functional requirements and for protecting such equipment shall be deliberated, plans formulated, and permanent countermeasures implemented quickly. • A self-assessment and countermeasures shall be implemented based upon SOER15-2 "Risk Management Challenge."

During the second review implemented from December 4th through the 8th, the progress status of the improvement plan presented during the last meeting was checked, and instructions were given to “not just identify issues pertaining to the recommencement of operation, but also issues that need to be addressed to improve nuclear safety in order to achieve world excellence after the recommencement of operation.” Furthermore, the field observation and interviews were conducted in regards to operations, maintenance, human resource cultivation, radiological protection, project management, and performance improvements, which the Nuclear Safety Advisory Board has identified as areas that require special attention. The results of the second review shall be received during the fourth quarter.



Interviews by the NSAB (Kashiwazaki-Kariwa)



Review result briefing (Headquarters)

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

The following are the opinions of the Nuclear Safety Oversight Office (NSOO) about observations made during several months with a focus on mainly on the third quarter that were reported to the executive officer committee on January 23rd and the Board of Directors on January 30th.

Nuclear Safety Oversight Office (NSOO) Quarterly Report

2017 Quarter 3 Report

Foreword

This report summarises the Nuclear Safety Oversight Office (NSOO) assessment results for 2017, Quarter 3 (October through December). Recommendations, advice and observations have been discussed with the relevant management as they arose and have already been accepted and acted on (or actions are planned). They are not repeated in this summary.

1. Safety Performance

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

The following summarizes the advice given for future challenges and observations made.

1.1 Fukushima Daiichi

The evaluation team has the following results in the observation under themes of operational management and emergency exercise/trainings.

- The shift crews operating decommissioning-related facilities need to acquire skills and knowledge different from those required for operating reactors. The site is developing an educational program for crewmembers by utilizing training materials developed for Maintenance Department, but in order to strengthen manipulation and monitoring for the operation, it is important to provide trainings to deepen the understanding of facilities and risks unique to the Fukushima-Daiichi NPS. It is necessary to clarify requirements expected for the crews involved in the decommissioning work and provide more effective education based on them.
- FDEC's headquarter function of operational management is such weak to support the site as not providing information of Corporate Functional Area Managers' (CFAMs') activities advanced by the Nuclear Division. The headquarter and the site should boost their collaboration.
- In the run-up to the emergency exercise, the site were undertaking various initiatives with enthusiasm several times in order to enhance organizational competence of the emergency structure. As a result, its capability to respond to emergencies have significantly improved. We expect the site to aim for further improvement as there is still room for improvement in comparison with excellence.

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

- Disaster training

Certain results have been reaped through trainings focusing on improvement of competence in speech and information sharing at the Technical Support Center. However, standard strategies over various events anticipated at the site are on the course of development. Going forward, the site should further advance development of the strategies by reflecting a large number of technical considerations made through past trainings,

- Limiting conditions for operation (LCO) deviation events

In the 3rd quarter, 2 events of the LCO deviation occurred (an over-scale occurred in the water gauge of the sub-drain No. 19 on Oct 23th; a monitor for PCV gas control equipment was disabled at Unit 2 on Nov 19th.) These events were attributed to the fact that the site finds difficulty in managing facilities coexisting in proximity under different conditions like construction, operation or dismantling. Therefore, facility responsible organizations should ensure risk management on the relevant works and shift managers should implement their facility management in more rigorous manner based on work permits more stringent.

1.2 Fukushima Daini

The evaluation team observed the status of penetration of improvement actions on the field work and activities of TEPCO's self-performing maintenance team

- As an improvement measure, the Guide to Protect Safety Significant Equipment was developed April 2016. Although measures based on the Guide has been implemented, the effects on the field have not reached to a sufficient level. It is important for the site to review objectives/ purpose of the measures and evaluate the effectiveness to ensure protecting safety important equipment.

- TEPCO personnel's direct maintenance has been fully launched from last July. It is desired from now on to collect and sort out their learnings on the field and establish an educational program (specifying requirements of accreditation, education items and instruction methods) so that the employees can raise their competence to a higher level.

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

- Leadership

Under the leadership of the Site Superintendent, activities to reform and improve operations and mindsets have been advancing. Deputy Site Superintendent and General Managers are also driving to enhance abilities to manage risks on a daily basis and to respond to emergencies.

- Performance Improvement

Minor human errors continue to occur. Although Shift Managers are now more engaged to respond to respective nonconformance, the cause is not deeply analyzed to prevent recurrences of similar events. In light of the plan to put emphasis on reports of minor events in the Corrective Action Program, it is important for the site to clearly define the purpose and goals of the program and to conduct an effectiveness review.

- Fire Protection

The site is engaged in actions for improvement based on the survey conducted on combustible management and status of temporary storage of goods. However, the speed of correction is slow and not thorough. The site needs to spell out an ideal status of the field and plan for corrective action.

1.3 Kashiwazaki Kariwa

The KK Evaluation team observed progress control of safety enhancement for Units 6-7, emergency preparedness and enhancement of engineering capabilities in a mid to long term. The oversight evaluation can be summarized as follows.

- Engineering is now advancing basic design and detail design of Units 6-7 safety enhancement work. In order for respective project to ensure satisfaction of safety requirements, it is important to establish a support system consisting of safety design experts so that contents of design change, if any, are always guaranteed to be in conformity with safety requirements.
- The site performed the first large-scale evacuation exercise with contractors and attained a large number of findings. Based on the insight obtained from the exercise, going forward, the site must solve problems identified during the exercise and verify the contents in detail through conducting trainings in stages so that the procedures will be refined to be more effective.
- As a measure to strengthen the mid-to-long term engineering capability, improvement activities on a series of process (configuration management) have been continued. It aims to achieve coherent maintenance and control of (1) design requirement of facilities, (2) status of equipment on the field and (3) design basis documents. We once confirmed weak coordination between HQ and sites, but the situation is addressed with a specific action. Now the HQ and sites are set to jointly introduce a trial-run of the process, and we will confirm the effectiveness from a viewpoint of sustainable safety design requirements.

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

- Management and Governance

The challenge has been how to develop safety culture so that the site can voluntarily “find solution and act for improvement on its own.” In light of this, long-standing issues are recently addressed as follows. The important enabler would be the fact that the site referred to best practices of overseas nuclear operators and “established them in the site with a deep understanding of the benefits”

- Receiving good evaluations from World Association of Nuclear Operators (WANO) and International Atomic Energy Agency (IAEA)'s follow-ups

- Utilizing management observations on the field and human performance tools by operators

- The site understood that the event of insufficient penetration survey relating to the Shika NPS case was attributed to “silos in organizations” and accordingly, a guideline was developed and implemented for cross-functional operation. From now on, site personnel needs to put the guide into practice and experience cross-functional operations more, while constantly receiving instruction from supervisors.

- Human Resource Development
Partly due to the fact that HR Development Center was established away at 2F, KK is struggling to activate education/training and build a smooth communication path with line organizations. It is necessary for the HR Center to figure out methods to share information and others to strengthen coordination with KK. From this December, the Unit Superintendent has been assigned another post in the HR Development Center, which is expected to stimulate sharing the needs with the Center.

- Operational Focus
As General Managers and over are almost aligned to permeate “operations-led organization,” which is a common attribute of good stations in the world, the current challenge is how to cascade it down to the level of field operators. It is important to indicate specific examples of behaviors demonstrated by an organization so that site operators can deeply understand the principles.

- Relation with Contractors
Site executives seem to apprehend that TEPCO bears the ultimate responsibility for safety of the nuclear stations, including that derived from contractors' work. The challenge for KK is how to ensure safety enhancement measures to be implemented down to the level of front line workers. In specific, there should be a counter-part initiative where Group Managers are appointed to each contractor to provide coaching and guidance for safety enhancement or instructions of TEPCO managers (management observation) to workers on the field.

1.4 Corporate

The evaluation team observed status of the Corporate's actions to permeate change management.

- Aiming to reinforce activities to permeate change management, Change Management CFAM (Corporate Functional Area Manager) /SFAMs (Site Functional Area Manager) have been appointed in the Nuclear Siting Division last October. The FDEC for their part is also engaged in strengthening the operation of change management; NSOO expects the improvement activities to be aligned with those of the Nuclear Siting Division.

Footnote to Section 1

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

2. CNSO Insights from Assessments

2.1 Emergency Preparedness

Significant efforts were made in this quarter to improve emergency preparedness at all sites and at Tokyo HQ. The focus has been on improving procedures and on enhanced exercises and training.

There are still improvements to be made as identified not only by NSOO but by the self assessment techniques now built into the training. CNSO encourages sites and HQ to continue these improvements.

CNSO observes that the exercises tend to be focused mainly on the TSC with only limited field or off-site involvement. CNSO recommends that the exercises should be more integrated so as to more fully and realistically test and practise our emergency response capabilities.

3. NSOO Performance – Closure of NSOO Recommendations

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

- Of the 146 recommendations raised prior to this quarter, 117 are closed. 14 actions closed this quarter.
- In this quarter 3 new recommendations were raised.

4. Benchmarking and Training

NSOO took part in the Independent Nuclear Safety Oversight (INSO) workshop hosted by World Association of Nuclear Operators (WANO) in France this November. The participants discussed on a final draft of the INSO Guideline that is jointly formulated by WANO and IAEA. We would like to utilize the Guideline for our oversight activities once it is finalized.

We also invited a former inspector of the UK regulatory authority as our mentor. He joined our observations over emergency exercise at 1F and 2F and provided us with informative advices on perspectives of oversight.

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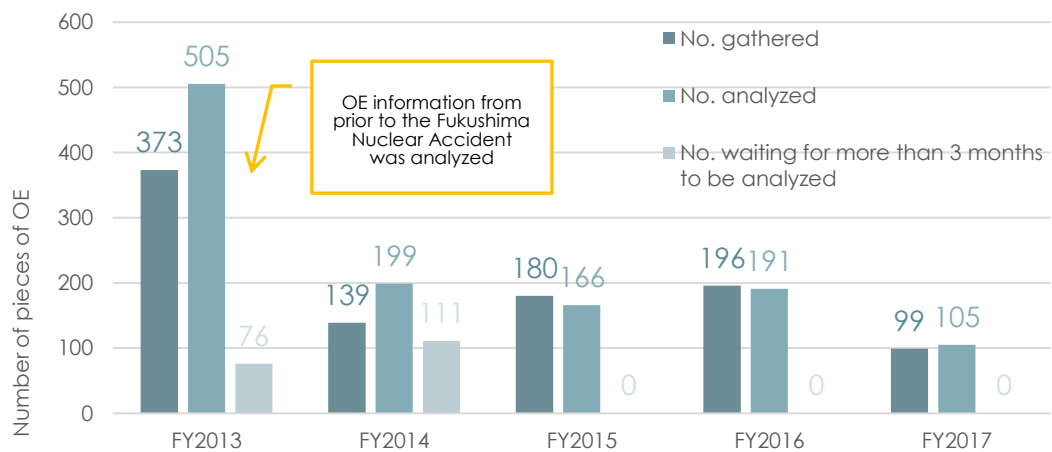
2.4 MEASURE 3 ABILITY TO PROPOSE DEFENCE IN DEPTH MEASURES

2.4.1 Initiatives Related to Nuclear Reform Monitoring Committee Proposals

(1) leveraging Operational Experience (OE¹⁵) from within and outside of Japan

◆ Gathering and sharing OE information

- One of the lessons learned from the Fukushima Nuclear Accident is that we must “learn from the failures of others.” Lessons to be learned are being identified and countermeasures deliberated/implemented under the premise that something that has occurred somewhere else in the world can also occur at TEPCO power stations.
- Prior to the Fukushima Nuclear Accident, the gathering of Operational 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 third quarter, 30 pieces of the new OE information were gathered and 18 pieces of OE information, that include information gathered in the past, were analyzed. We will continue to analyze this information in a planned manner to ensure that no information waits to be analyzed for more than three months.



Trends in OE information gathering and analysis

- Recent OE information is posted on the company's intranet thereby providing an environment in which all Nuclear Power Division personnel can easily access OE information and the viewing rate of new OE information during the third quarter for the entire Nuclear Power Division was 68%. Since viewing rate seems to remain at around 70% it is assumed that a peak has been reached, so initiatives are underway to improve the screen layout in order to encourage viewing and get upper managers to encourage viewing.

¹⁵ Operational Experience

- ◆ SOER¹⁶ and severe accident information study sessions
 - Focused study sessions on OE information of particular significance¹⁷ (severe accidents from both within and outside of Japan and SOER) are being held to provide an overview of these accidents and troubles, and understand the lessons learned from them.
 - Significant OE study sessions to date have focused on getting primarily managers to look deeply at the causes of the event and identify lessons to learn.
 - During the third quarter, overview study sessions using the current SOER were commenced for all employees in the Nuclear Power Division, including general workers, in order to promote understanding of significant OE information over a wider cross-section of personnel. These study sessions are currently being held at Headquarters, Kashiwazaki-Kariwa and Higashidori.



SOER overview study session for clerical staff (Kashiwazaki-Kariwa)

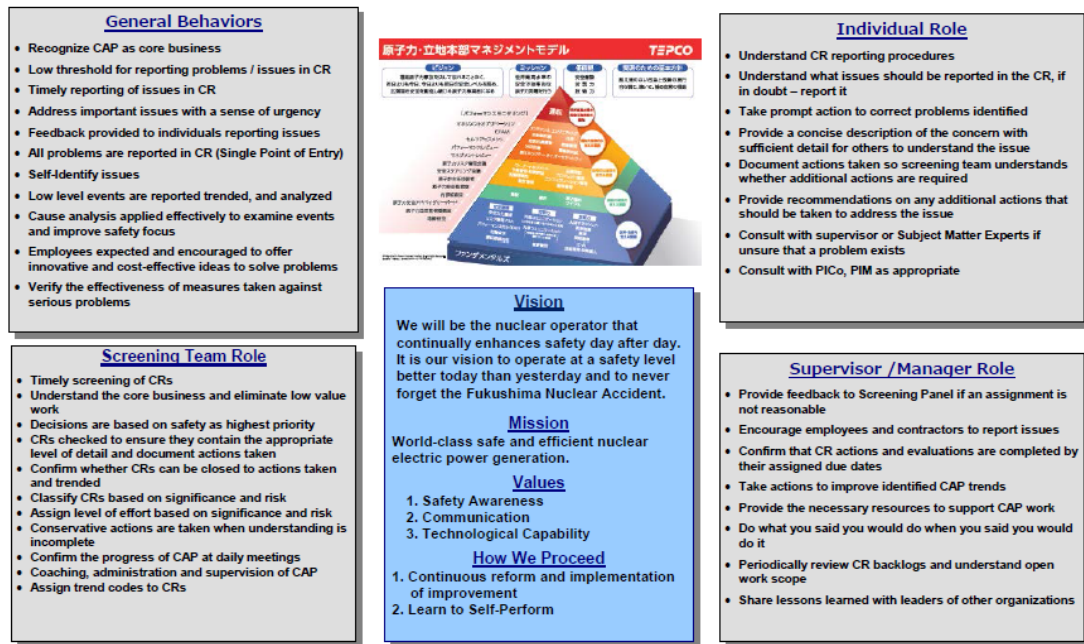
(2) Promoting improvements through CAP¹⁸

- ◆ Enhancing CAP processes
 - We aim to make efficient and effective improvements by using CAP to manage not only nonconformance and OE information, but also information useful for improving performance that can contribute to nuclear safety (management observation results, benchmarking results, third-party review results, near-miss information, etc.), in a unified manner.
 - Intensive CAP study sessions were held at Headquarters for CFAM/SFAM in performance improvement fields (October 27). During the study sessions, participants learned about the history and objectives of CAP and created a “CAP Vision” (world’s highest standards concept) with which site personnel can learn about the importance of CAP.

¹⁶ Significant Operational Experience Report by WANO

¹⁷ 22 accidents and troubles including the cable fire at the Browns Ferry Nuclear Power Plant

¹⁸ Corrective Action Program (performance improvement program)



CAP-related world's highest standard concept

- In the third quarter, performance improvement coordinators (hereinafter referred to as, "PICO¹⁹") in each department began examining MO results and the progress of issues pointed out by third-party reviews. In conjunction with this we began using CAP to manage responses to MO results, and issues pointed out by internal and third-party reviews in a unified manner as we enhance the way that indication level information is leveraged in order to prevent incidents from occurring. At Kashiwazaki-Kariwa, in addition to nonconformance information gathered to date, PICOs compiled information for making these improvements into condition reports (CR) and are currently engaged in initiatives to make effective and efficient improvements by incorporating this information into CAP. The same initiatives shall begin during the fourth quarter at Fukushima Daini.
- ◆ Activities for improving nuclear safety (inputted into CAP)
 - Management observation (MO)
 - In order to promote nuclear safety reforms and improve nuclear safety, TEPCO engages in management observation (MO), which is proactively employed by the best nuclear operators overseas. Through MO, managers can observe actual conditions in the field and accurately identify problems.
 - During the second quarter, PICOs began selecting good things observed during MO as "Good MO." During the third quarter, in addition to these efforts we will also made the percentage of effective observation more visible.
 - An MO database system was developed in order to efficiently gather and analyze the results of management observation at each power station and put into use on April 1. During the third quarter an improved version

¹⁹ Performance Improvement COordinator

of the database was put into use to make it easier to input information about the fundamentals for all fields.

- Management observation implemented during the third quarter is as follows

	Headquarters	F1	F2	KK
No. of times implemented	20	247	850	1,815
No. of times per person/month	0.16times/month/person	0.57times/month/person	4.17times/month/person	5.99times/month/person
Good MO rate	–	–	38%	35%

2.4.2 Other Initiatives

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

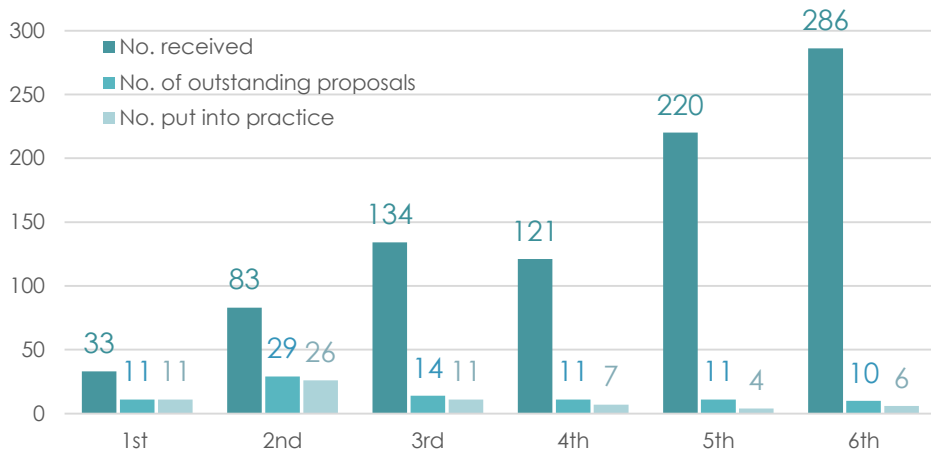
TEPCO has been holding Safety Improvement Proposal Competitions so that personnel may, in addition to conducting multi-faceted reviews from the perspective of defence in depth, acquire the technical ability to propose cost-effective safety measures and have these proposals put promptly into practice.

- During past competitions (3rd competition and after) outstanding proposals were selected by vote and also by a panel of judges, and the number of outstanding proposals selected was set at a maximum of approximately three for each power station because the focus was put on putting these proposals into practice. However, as a result of this, it is possible that there may be outstanding proposals that could contribute to improving nuclear safety lying in wait in the approximate 900 proposals that were not selected in the past. Therefore, during the 7th competition held in the third quarter we conducted a repechage for unselected proposals that were deemed as effective countermeasures during past competitions.
- 20 excellent proposal candidates were selected after votes were cast by Nuclear Power Division personnel in October and November, and recommendations were made by the secretariat.
- Outstanding proposals were selected at Fukushima Daiichi and Fukushima Daini in December by a panel of judges at each power station. (Fukushima Daiichi: Outstanding proposals: 7 (December 18), Fukushima Daini: Outstanding proposals: 2 (December 7)). A panel of judges will convene at Kashiwazaki-Kariwa in February.

<Main Outstanding Proposals>

- Fukushima Daiichi: Reducing human errors by utilizing wearable cameras
- Fukushima Daini: Power source equipment flooding countermeasures (watertight door installation)
- Fukushima Daini: Deliberating methods for transferring water from the Kido River intake equipment backup deep well pump

- The following chart shows the number of outstanding proposals as of the 6th competition that were put into practice



Percentage of proposals not employed increases because of the three-proposal limit for each power station

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

- The outstanding proposals to date that were put into practice during the third quarter are as follows:
 - 6th competition: Out of the 10 outstanding proposals submitted, one was put into practice since the last report. (Cumulative total: Six proposals)

<6th Competition>

- Up until now it was impossible to directly monitor spent fuel pool water temperature data from the Emergency Response Center in the main seismic isolation building, but with the installation of a system that uses a video camera to read spent fuel pool water temperature data from the gauges in the main control room and send it to (share it with) the Emergency Response Center, this data can now be checked in real time. (Fukushima Daini).



Displaying fuel pool water temperature data in the Emergency Response Center (Left: Checking data in the main seismic isolation building Emergency Response Center, right: Location of spent fuel pool water temperature gauge display in the main control room)

- During the third quarter “increases in the number of proposals and increases in the number of outstanding proposals put into practice” was set as a performance indicator. This performance indicator will be applied to the 8th competition for which new proposals are being invited.
- We will continue to monitor the process by which outstanding proposals are put into practice and follow-up in instances where proposals are not put into practice smoothly.

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

In order to proactively and continually improve nuclear safety, TEPCO is not only engaging in improvements to respond to nonconformances and issues pointed out during safety inspections and third-party reviews, but also implementing safety reviews that examine underlying contributors. At each power station, the method for conducting a review that focuses on the selected topic is examined in detail so that the review can be conducted in a logical manner in accordance with the actual conditions at the power station. Plans and manuals are then written after which the review is implemented.

- Fukushima Daiichi: “Risk Management Process Effectiveness Assessment”
Progress was made with formulating a detailed method for assessing the effectiveness of risk management processes. While referring to good practices both within and outside of Japan the decision was made to review issues relating primarily to nuclear safety.
- Fukushima Daini: “Reliability of Pool Cooling Equipment”
The decision was made to implement a review of the following two issues.
 - a. Guides on physical protection and fire protection for important equipment used for spent fuel pool cooling shall be reviewed based upon excellence from overseas to confirm that measures required for avoiding latent risks are included.
 - b. A field walk-down of important equipment for spent fuel pool cooling shall be implemented to confirm that physical protection and fire protection measures have been implemented according to the guides.
- Kashiwazaki-Kariwa: “The Impact of Fieldwork on Plant Safety Design”
At current time, the *Guide for Assessing the Impact on Plant Safety Design* is being used, however through the use of this guide it has been discovered that there are problems with improving the skills of people that use this guide and also preparing tools for referring to it. Therefore, a review plan and review manual have been written while focusing on the question, “are activities to improve the skill of the people that are engaged in this initiative effective?” A review of guide study sessions found that study sessions that required the participants to think and participate are more effective than lecture-style study sessions, so the content of study sessions will be improved.

(3) Using hazard analysis to construct improvement processes

We are creating approaches to, and mechanisms for, accidents and hazards that have high “cliff-edge potential²⁰” and for which there is great uncertainty in regards to the

²⁰ Potential for a calamitous situation resulting from a simultaneous and wide-scale loss of function caused by common factors.

frequency of occurrence, and efforts are being made to propose and implement countermeasures under the assumption that these accidents will happen.

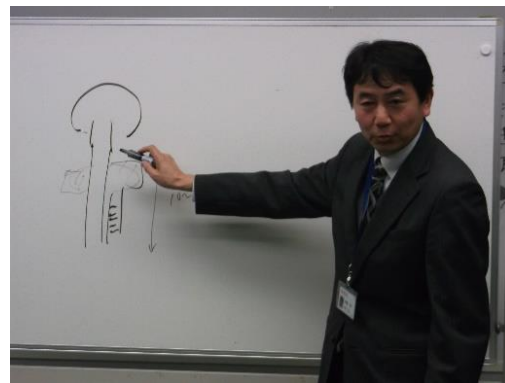
- At Kashiwazaki-Kariwa the analysis of approximately 30 identified hazards was completed in FY2014 and countermeasures are being deliberated in accordance with the created plan.
- During the third quarter we examined handling the impact of an electromagnetic pulse created by a high-altitude nuclear explosion. It was decided that further countermeasures to improve reliability should be identified through field surveys, and initial response training for operators that simulates the impact of an electromagnetic pulse during operation was implemented.

2.5 MEASURE 4 ENHANCEMENT OF RISK COMMUNICATION ACTIVITIES

2.5.1 Initiatives Related to Suggestions from the Nuclear Reform Monitoring Committee

(1) Initiatives to improve risk communication skill

- ◆ Training to maintain and improve the skill of risk communicators
 - Newly appointed risk communicators were subjected to simulated press conference training (October, November: Four participants in total). External instructors gave lectures and exchanged opinions with participants thereby enabling each individual to become aware of their strengths and weaknesses which has resulted in improved risk communication.
 - Risk communicators participated in presentation training given by a TEPCO Energy Partner CS Promotion Office instructor to help further improve their ability to give presentations (December: 14 participants). The simulated presentations were videotaped and feedback about the good aspects and aspects that require improvement, were given. This enabled trainees to be aware of what they need to improve thereby bettering their skills.



Risk communicator presentation training (simulated presentation)

- ◆ Improving the risk communication ability of employees
 - As part of "Niigata Prefecture Report Improvement Measures to prevent Insufficient Handling of Kashiwazaki-Kariwa New Regulatory Requirement Compliance Inspections," examples of problems that TEPCO has faced in the

past with information disclosure and communication were compiled and are used during awareness reform training, such as group discussions, etc., that began in September. Approximately 110 people from Headquarters, 75 people from the Niigata Headquarters and 1,000 people from Kashiwazaki-Kariwa have participated.

- During this training, such issues as the “problems concerning the seismic resistance of the main seismic isolation building,” “disclosure of information concerning the Fukushima Daiichi drainage channels,” and, “giving notification of/reporting core meltdowns during the Fukushima Nuclear Accident” were examined. Participants commented that, “it made me remember just how important it is to approach things from the perspective of society and share information with other internal departments.”



Awareness reform training using examples of problems related to information disclosure and communication (Headquarters)

2.5.2 Other Initiatives

(1) Engaging in risk communication

◆ Communicating with the siting community

- Activities in the Fukushima area
 - The fourth installment of *Hairomichi*, which provides information to the residents of the local community on the decommissioning of Fukushima Daiichi, was issued on October 10, and the fifth installment was issued on December 10 (10,000 copies each). We also continue to update information on the 1 FOR ALL JAPAN website for the families and workers at Fukushima Daiichi, as well as print the Monthly 1F newsletter which was distributed in October, November and December (2,000 copies each).
 - At the meeting of the Fukushima Council on Decommissioning and Decontamination Measures, an explanation was given of measures to reduce exposure doses during the construction of the Unit 3 fuel removal cover in consideration of the great concern that the residents of Fukushima have about exposure doses (November 14).
 - We attended the International Forum on Decommissioning Follow-Up Mini Workshop held in Fukushima City by the Nuclear Damage Compensation and Decommissioning Facilitation Corporation (NDF) and discussed plans for the next International Forum on Decommissioning with residents of the local community (November 24).
 - Since August 1st, equipment and instrument malfunctions found during normal inspections at Fukushima Daiichi have once again been posted

- on the website and during the third quarter 77 troubles/malfunctions were disclosed (total for FY2017: 123).
- Fukushima Prefecture Governor Uchibori visited the site and was given a briefing on the status of construction of the Unit 3 fuel removal cover and work environment improvements that have been made in conjunction with the progress of dose level reduction measures (November 15). Governor Uchibori commended us for the progress that has been made with decommissioning/contaminated water countermeasures.
 - During the third quarter, 3,347 people were given tours of the Fukushima Daiichi nuclear power station (cumulative total for FY2017: 8,896)
 - Activities in the Niigata area
 - At the meeting of the “Community Council on Ensuring Transparency at the Kashiwazaki-Kariwa Nuclear Power Station” (held on the first Wednesday of each month), reports were given on the progress of safety measures and communication activities at Kashiwazaki-Kariwa, and opinions were heard (October 4, November 1, December 6). Reports will continue to be given and efforts made to make improvements based upon elicited opinions.
 - Since July 21st, awareness reform efforts have been conducted for the purpose of directly feeling the uneasiness that the local residents harbor towards nuclear power and TEPCO (Headquarter Nuclear Power Division managers have been participating in the following activities). During the third quarter everyone engaged in this initiative (Headquarters: 42 people, Kashiwazaki-Kariwa: 138 people) participated in the following activities:
 - Visits to households in Kashiwazaki City and Kariwa Village.
 - Explanations given to visitors to communication booths at various locations within the prefecture
 - Participants have commented that they, “reaffirmed the importance of listening to people’s opinions, creating documents and giving explanations from the viewpoint of the local residents, and also coordination between in-house engineering departments and corporate communications departments.” Going forward the following activities shall be participated in:
 - Visiting opinion leaders in Niigata Prefecture
 - Attending meetings of the “Community Council on Ensuring Transparency at the Kashiwazaki-Kariwa Nuclear Power Station”
 - How to convey information in a timely and easy-to-understand manner on issues of great social concern is being deliberated. The following actions were taken during the third quarter:
 - In response to requests to hear more about the current state of radioactive waste disposal, a panel display was erected at communication booths to explain how highly radioactive waste is disposed of.
 - In order to create an opportunity for TEPCO to explain the status of New Regulatory Requirement compliance inspections for Units 6/7 to the community residents, a display panel was newly erected at communications booths and the issue was covered in the *News Atom* newsletter.
 - Virtual reality (VR) goggles are being used at communication booths in Niigata Prefecture to enable visitors to see with their own eyes the safety

measures that have been introduced at Kashiwazaki-Kariwa, such as shore bank protection. Visitors that have tried the VR goggles have said that, "it's like actually being at the power station," "it made it easier to understand what safety measures have been put in place," and "it made me want to go and visit Kashiwazaki-Kariwa."



Visitors using VR goggles at the Tsubame City/Minami-Uonuma City communication booth

- The third quarter saw 3,364 visitors to the Kashiwazaki-Kariwa NPS (cumulative total for FY 2017: 10,266 visitors).
- The Niigata Headquarters, which is responsible for giving explanations to the local government, and Kashiwazaki-Kariwa hold weekly information sharing meetings to identify important issues and discuss the information to be explained to the local government. How to keep explanations given to all parties consistent and make them easy-to-understand was discussed. During the third quarter an overview of the corrections to the Kashiwazaki-Kariwa Units 6/7 reactor installation permit application was explained.
- "Fureai Talk Salons" have been opened at the Kashiwazaki Shimin Plaza and TEPCO PR facilities to engage primarily women in the siting community and hear their opinions (held a total of three times during the third quarter; 42 participants). At these salons, explanations are given of the safety measures being implemented at the Kashiwazaki-Kariwa NPS based upon the lessons learned from the Fukushima Nuclear Accident, opinions are exchanged, and cultural seminars given.
- In order to get the local companies to feel more of a connection with Kashiwazaki-Kariwa events were held at TEPCO PR facilities. Examples of some of these events are as follows.
 - Movie Night (restarted after a six-year hiatus)
 - Christmas events and concerts
 - Harvest Festival held in coordination with local produce retailers
- Those people that read the *I have a question about the nuclear power station* pamphlet that uses manga to explain the safety measures at Kashiwazaki-Kariwa said that it was, "easy-to-understand." However, there are not a lot of people who are aware of this publication, so the free paper racks at large commercial facilities are being utilized to distribute the pamphlet. And, the number of places where they can be obtained is being gradually increased.



Distribution of *I have a question about the nuclear power station* pamphlet

- Communication initiatives on behalf of management
 - President Kobayakawa and other members of management visited the local governments of the siting communities in order to explain TEPCO's responsibility and dedication to decommissioning the Fukushima Daiichi NPS, as was conveyed in the response to the Nuclear Regulation Authority on August 25 of this year. (Niigata region: August 26~27, Fukushima region, November 14~15, November 22, November 24, November 27).
 - In the Fukushima area, Fukushima Recovery Headquarters President Okura and FDEC President Masuda continue to hold regular press conferences at the end of each month in order to give updates on the activities of the Fukushima Recovery Headquarters and progress with Fukushima Daiichi decommissioning and contaminated water countermeasures.

- ◆ Communicating with overseas parties
 - Special Advisor to the Fukushima Revitalization Headquarters Ishizaki participated in the winter conference of the American Nuclear Society (October 30 through November 2, Washington DC) as both a lecturer and a panelist. At the conference he spoke of the importance of conveying to the world the information and lessons learned from the nuclear accident.
 - The Special Advisor Ishizaki and Head of Social Communication Office Enomoto participated in and shared opinions with the attendees of the stakeholder's meeting held in, and sponsored by, West Cumbria in the UK (WCSSG). The stakeholder's meeting is attended by the UK Nuclear Decommissioning Agency and Sellafield, and offers an opportunity to exchange opinions with members of the local fishing industry. Along with reaffirming the importance of regular exchanges of opinions between the parties responsible for an accident and the stakeholders, we also became

aware of the necessity to enhance and maintain our mechanism for regularly exchanging opinions with the parties concerned.



WCSSG annual meeting

- We are proactively inviting foreign journalists to see the progress of decommissioning and the conditions here in Japan so that they will have a correct understanding of the situation. During the third quarter the following stories were written and published:
 - Joint coverage by European and Asian media (October 12, November 20,)
 - Coverage of Kashiwazaki-Kariwa by *The Guardian* (UK) from the perspective of how the lessons learned from the Fukushima Nuclear Accident are being leveraged (October 31). This coverage resulted in an article dated December 28th in response to permission to modify the installation reactor permits for KK Units 6/7.
 - Coverage of Fukushima Daini by Argentina media (November 10).
 - Coverage by NHK World for program showing what Japan has learned from the Fukushima Daiichi accident and how it is dealing with the aftermath (November 28).
 - Coverage of the current state of decommissioning and future predictions by the French TV production company, CAPA TV (November 28).
 - Coverage of mainly the primary containment vessel internal investigations by the US scientific journal *Wired* (December 4).
 - We have also been covered by the Associated Press and the Xinhua News Agency
- Information continues to be disseminated by overseas news agencies as well as through e-mail magazines, and Facebook/twitter accounts held by experts (third quarter results: e-mail magazine: three articles, Facebook posts: 45 posts, Twitter accounts: 54 tweets).
- ◆ Leveraging social network services and disseminating information in an easy-to-understand manner
 - We continue to create and post videos that explain nuclear power-related technology and initiatives in an effort to deepen understanding.
 - TEPCO HEADLINE ~ Completion of the Installation of Unit 3 Fuel Removal Equipment (December 1)

- "The Fukushima Daiichi Nuclear Power Station Today ~From that day into tomorrow~" (ver.2017.12) (December 28)
- Dose data for the power station site and the surrounding area is continuously posted on the TEPCO website in both Japanese and English.
- Information continues to be disseminated using the TEPCO Facebook page.
 - Fukushima Daiichi decommissioning progress and work environment improvements (Third-quarter: 5 posts)
 - Introduction of the safety measures at Kashiwazaki-Kariwa (Third-quarter: 1 post)
- In order to examine what improvements have been made in regards to our communication about TEPCO businesses and Fukushima recovery efforts/Fukushima Daiichi decommissioning, TEPCO has expanded the breadth of the anonymous questionnaire sent to stakeholders with whom it is in direct contact compared to last fiscal year (November 1 through December 4). The results shall be announced during the fourth quarter.

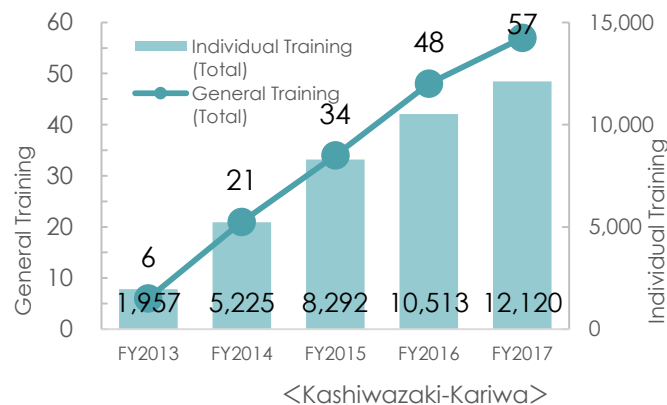
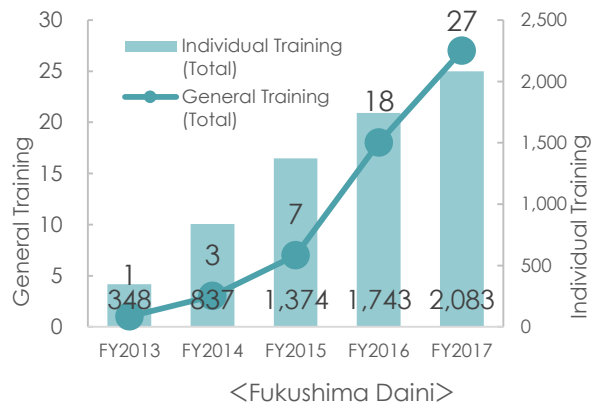
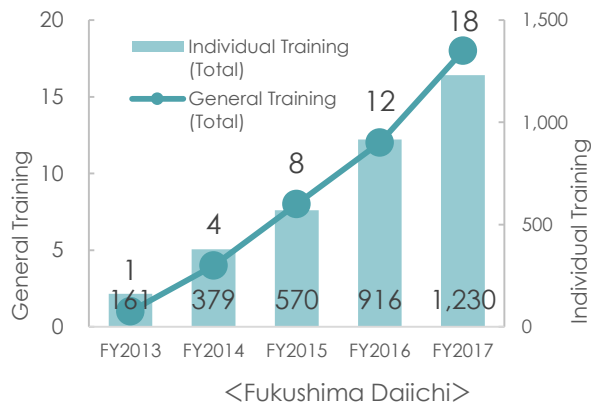
2.6 MEASURE 5 ENHANCEMENT OF POWER STATION AND HEADQUARTER EMERGENCY RESPONSE CAPABILITIES

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

Training is being implemented in a planned manner in consideration of the assessment of last fiscal years' training programs and basic plan, and based on the Mid- to Long-Term Plan that was revised in April. Since it was deemed that Fukushima Daiichi, Kashiwazaki-Kariwa and Headquarters have almost achieved the emergency response capability goals of the basic plan (STEP-1: establish the ability required to sufficiently handle a nuclear accident), the decision was made to move to STEP-2 (achieve the world's best levels of emergency response). As we move toward STEP-2 we will enhance our emergency response capabilities by implementing training in a planned manner under conditions that should be anticipated during training and in consideration of risks related to nuclear disasters.

At the Fukushima Daiichi NPS we have been unable to implement training in a planned manner as a result of prioritizing [decommissioning] work and it has been deemed that the objectives of the basic plan concerning the ability of the plant to respond to emergencies (STEP-1) has not been achieved. Therefore, we will continue to implement training on events that have a large social impact with the intention of achieving STEP-1 during this fiscal year.

Training results for each power station are as follows:



◆ Fukushima Daiichi

- Joint general training was held with Headquarters on November 29.
- During this training a scenario that simulates an earthquake was employed to determine if the Emergency Response Center can give instructions and share information appropriately, and to see if nuclear preparedness departments can make decisions on repair plans and priorities.
- Improvements were made to how instructions and commands are given, and how information is shared, by revamping preparedness department structures, making a more detailed common status diagram, and using an important information bulletin board, as was suggested after the last general training session.
- However, problems were identified with relaying information to personnel as they relocated from the new administration building to the Emergency Response Center (ERC) in the main seismic isolation building. In particular, the operations team leader, who is stationed in the Emergency Response Center, had to use a mobile phone to relay information to the field countermeasure supervisor who was in transit while also simultaneously providing information required to determine EAL to the ERC Director, which was quite a burden. Furthermore, since this information was only conveyed to the field countermeasure supervisor and personnel around him, improvements must be made to the methods by which information is shared while personnel relocates to the Emergency Response Center.
- Repair plans and priorities were determined by the power station objectives setting council, and during this training session a quiet conference room was used by the objectives setting council to share information on decisions made by the objectives setting council with the help of the common status

diagram. Being able to visualize important decisions enable a smooth emergency response.



Evacuation from the new administration building



Objectives setting council

◆ Fukushima Daini

- Joint general training was held with Headquarters on October 4.
- During this training a scenario simulating a drop in spent fuel pool water levels was used to determine if information could be shared in a smooth manner with Headquarters.
- Information was shared between the power stations and Headquarters with relative ease however preparatory steps taken to combat potential risks were insufficient. And, during the objectives setting meeting the deliberation of repair strategies was put off. It was decided that during future training sessions repair strategies for potential risks at the power station shall be prepared in advance rather than just deliberating the repair strategies during the training session.
- On December 20th, general training was conducted using a scenario in which multiple plants were damaged by an earthquake.
- External evaluators were invited to observe training in order to assess effectiveness from the perspective of a third-party. Evaluators commented that there needs to be a way to visualize resources, such as personnel and operable equipment, in order to strategically respond to an accident.



Objective setting meeting

◆ Kashiwazaki-Kariwa

- On November 22nd, large-scale evacuation training for not only power station personnel, but everyone who works at the power station (approximately 4500

people) was conducted. The degree of congestion during evacuation and the effectiveness of evacuation announcements were examined.

- Temporary congestion was seen along the route from the corporate center to the main roads on-site because all of the contractors evacuated at once, however workers evacuating on foot, and procedures that restricted access to the site will prioritizing evacuation off-site prevented any substantial congestion.
- In regards to the effectiveness of evacuation announcements, it was found that in some locations the announcements were difficult to hear because of the low volume. Therefore, we shall implement a field survey and deliberate measures such as the installation of outdoor speakers.



Evacuating on foot (training)



Guiding evacuees off-site

◆ Headquarters

- On November 29th, joint general training was held with Fukushima Daiichi.
- In response to problems with communicating with the Nuclear Regulation Authority that were identified at Headquarters during the joint general training held with Fukushima Daini on October 4th, the personnel assignments of the government agency liaison team, which directly deals with government agencies, were revamped. As a result, answers to questions from the Nuclear Regulation Authority were provided much quicker.
- Furthermore, since repair strategies to combat potential risks at the power station had been deliberated in advance, communication with the Nuclear Regulation Authority went relatively smoothly, however not all risks had been prepared for so it was decided that repair strategies shall be deliberated in advance after prioritizing equipment of great importance.



Right: Emergency Response Center Director (President Kobayakawa)
Left: Emergency Response Center Assistant Director (FDEC President Masuda)



Government Agency Liaison Team

2.7 MEASURE 6 CULTIVATION OF PERSONNEL FOR ENHANCING NUCLEAR SAFETY

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

(1) Initiatives to improve individual technological capability

- ◆ Reconstructing education and training programs based on SAT²¹
 - 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 Board. These three bodies effectively put education and training programs through the PDCA cycle based upon SAT. During the third quarter, common maintenance training, such as training on work specifications, work supervision, and hazardous material management, which were newly added to skill certification training this fiscal year as a result of discussions by the Maintenance Curriculum Review Board, was commenced. The Nuclear Education and Training Center will continue to provide education and training that meets the request of power stations through these three tiers of review bodies.
 - Simulator training was provided in December at Kashiwazaki-Kariwa to a wide variety of engineering personnel in addition to operators to enable them to experience what it's like to engage in duties in the MCR and to see how the plant behaves during a reactor scram. Trainees learned the technical reasons for each task and gained a better understanding of plant behavior from the perspective of emergency response personnel (number of trainees: 5). This training will be continually offered in the future.
 - Human factor and human performance tool training²² began in July for members of the maintenance department at Fukushima Daini that are responsible for field work supervision, and training for Group Managers concluded in December. Similar training for maintenance department General Managers and Group Managers at Kashiwazaki-Kariwa also concluded in December and training for maintenance department members

Nuclear Power Division Education and Training Committee
<small>Chief Examiners: Nuclear Power & Plant Siting Division GM, FDEC President</small>
Power Station Education and Training Committee
<small>Chief Examiner: Site Superintendent</small>
Curriculum Review Board
<small>Chief Examiner: Managing Dept. GM</small>

Tiered review bodies

²¹ Systematic Approach to Training : Standard education training method advocated by the IAEA

²² Human factor training teaches that human errors will occur (humans make mistakes), and human performance tool training teaches about effective tools for preventing human error, such as 3-Way communication and the phonetic alphabet.

responsible for field work supervision shall commence during the fourth quarter.

- ◆ As a new initiative for this fiscal year, work supervisor training was held for new employees assigned to the maintenance departments at Fukushima Daiichi and Fukushima Daini to give them an overview of the duties of work supervisors, instill upon them the correct mental attitude and provide them with communication skills (October 2~6). Similar training will be conducted at Kashiwazaki-Kariwa during the fourth quarter.



Work supervisor training for new employees in the maintenance department (Fukushima Daiichi/Fukushima Daini)

◆ Middle management training

- Since FY2015, TEPCO has been providing training for middle managers from the standpoint that middle-managers need to be aware of, and have the ability to, thoroughly fulfill their responsibilities jointly with nuclear power leaders while remaining sufficiently aware of their own responsibilities to nuclear safety.
- Group Manager training

Training was provided for a total of 63 new Group Managers and shift supervisors in September and October in conjunction with periodic department transfers that occurred over the summer (September: 31 participants, October: 32 participants). Through lectures and discussion trainees gained a better understanding of the expectations of TEPCO leadership and management. The same training will be held again next fiscal year and into the future.



Group Manager training

(Left: FDEC President Masuda and Nuclear Power & Plant Siting Division General Manager Makino, Right: Head of the NSOO, John Crofts)

- Power station General Manager training

Power station General Manager training is conducted to enable General Managers of departments that have a maximum of approximately 250 personnel to reaffirm their roles and mission in an effort to accelerate nuclear safety reforms. During this fiscal year, training was held in October and December for 13 new department general managers and 20 department general managers that have been in their positions for two or more years in an effort to promote leadership.

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

- Maintenance personnel initiatives

- Fukushima Daiichi

We are continually implementing training to develop in-house technical ability (training on the operation of power supply cars, temporary laying and connecting of hoses, and training on the use of heavy equipment, etc.) in order to improve the ability to respond to emergencies. In conjunction with the department reorganization that occurred in November, training plans shall be revised and implemented to enable new department members to master their duties. Furthermore, we shall focus on the basics to provide training that ensures that operations are carried out purposefully and precisely.

- 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). Furthermore, in conjunction with the introduction of new training, such as drone training, etc., from October the members shall be rotated and training implemented for the newly formed teams in order to provide new skills to new people. These initiatives were observed by members of the Fukushima Council on Decommissioning Safety Monitoring (October 17) and by members of the Naraha Town Administrative Ward Mayor's Council (November 17). Observing members of these bodies acquired a better understanding of these initiatives by observing training on using drones to ascertain conditions in the event of a large tsunami, using every machinery to remove rubble, and restoring power using power supply trucks. We will continue training to develop creativity and innovation so as to be able to flexibly deal with a variety of circumstances.



Field inspection by the Fukushima Council on Decommissioning Safety Monitoring Administrative Ward Mayor's Council



Observation by the Naraha Town

- Kashiwazaki-Kariwa

In order to improve in-house technological capability and thereby prevent severe accidents from occurring, we are conducting various types of training such as on assembling and disassembling scaffolding, power truck operation, high voltage cable preparation and splicing, pipe duct repair training and forklift operation training. Furthermore, in an effort to improve safety awareness by enabling workers to experience danger under controlled conditions we are implementing training that involves assembling and disassembling scaffolding that uses wedged nodes (Alba System Scaffolding), and allowing workers to feel what it's like to fall wearing a safety belt and to fall from ladders that have not been secured. Training also allows workers to experience the dangers associated with attaching safety ropes to objects next to you instead of above you, as well as the correct way to use safety blocks and the dangers associated with dropping them, all in an effort to improve the ability to respond to emergencies. We will continually implement repetitive training in order to maintain and improve technological capability.



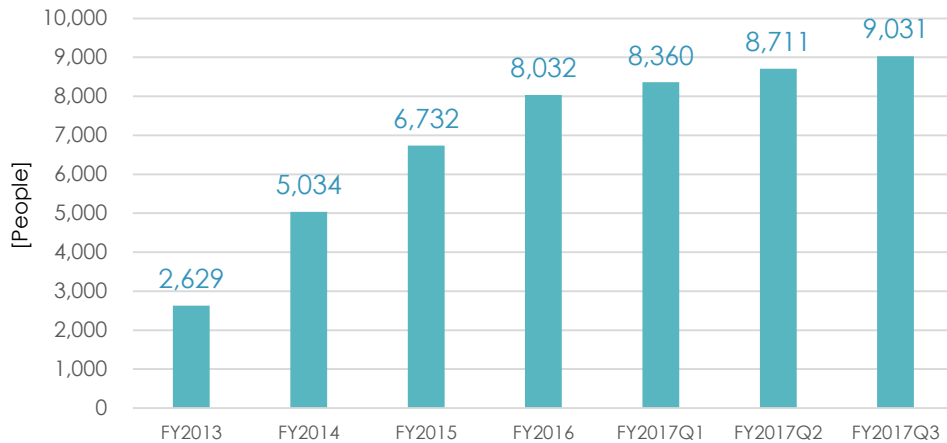
Training on assembling and disassembling scaffolding to experience the dangers associated with such tasks



Pipe duct repair training



Forklift operation training



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

- Operator Initiatives

- Fukushima Daiichi

Unit 5 and 6 operators have engaged in fire engine and power supply truck training since FY2014. As of the end of December, 40 operators had been certified on the operation of fire engines thereby exceeding our 32-operator goal (80% of the 40 operators in the field) (fill-rate: 125%, no change over Q2), and 40 operators had been certified on the operation of power supply cars (fill-rate: 125%, no change over Q2). The priority for Unit 1~4 operators is to acquire skill in operation management, such as the use of reactor coolant injection equipment and contaminated water treatment equipment, etc.

- Fukushima Daini

Training on fire engines and power supply cars commenced in FY2014. As of the end of December, 27 operators have been certified on the operation of fire engines thereby meeting our 24-operator goal (80% of the 29 operators in the field) (Fill-rate: 113%, increase of one operator from Q2), and 25 operators had been certified on the operation of power supply cars (fill-rate: 104%, increase of one operator over Q2).

- Kashiwazaki-Kariwa

Fire engine and power supply car operation training commenced during FY2013. As of the end of December, 120 operators have been certified on the operation of fire engines thereby exceeding our 96-operator goal (80% of the 120 operators in the field (no change over Q2)) (Fill-rate: 125%, increase of 21 operators from Q2), and 111 operators had been certified on the operation of power supply cars (fill-rate: 116%, increase of 5 operators over Q2). During power supply car training, in addition to the normal start-up of power supply cars, training was also implemented on manual switching in the event of an intake exhaust damper malfunction. Efforts have also been made to cultivate certified instructors within operator training teams and as of the end of December, 154 instructors (increase of two operators from Q2) had been trained. Efforts are also being made to improve the ability of not only maintenance personnel but also operators to diagnose equipment troubles in conjunction with the increase in the number of operators that has occurred in order to handle

emergencies. These operators have obtained internal certification on equipment diagnostics and are now continually sampling data for approximately 140 pieces of rotating equipment at Unit 7. This has led to an improvement in the abilities of field workers, such as the acquisition of a wide variety of knowledge related to equipment and also an increased interest in equipment status.

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

Power Station	Fire Engine		Power Supply Trucks	
	Number of skill certifications (compared with the last quarter)	Fill rate	Number of skill certifications (compared with the last quarter)	Fill rate
1F	40 (±0)	125%	40 (±0)	125%
2F	27 (+1)	113%	25 (+1)	104%
KK	120 (+21)	125%	111 (+5)	116%

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

- ◆ Deliberation of the Establishment of a Nuclear Engineering Center
 - By integrating the engineering functions of Headquarters and power stations to create a Nuclear Engineering Center under the direct supervision of the General Manager of the Nuclear Power & Plant Siting Division, we will be able to take responsibility for engineering work required to design and maintain plant functions thereby enabling us to make improvements.
 - During the third quarter we formulated a personnel assignment plan for each group that comprises the Nuclear Engineering Center after deciding during the second quarter how the groups were to share duties. We also continue to revise related internal manuals and have formulated revision proposals for basic manuals.
 - We continue to diligently make the required preparations, such as revising manuals, etc., since the timing for opening of the Nuclear Engineering Center will be decided based upon our applications to modify safety regulations.

The Main Roles of the Nuclear Engineering Center

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

◆ Cultivating System Engineers

- In order to promptly and safely stabilize a reactor when there is an emergency, personnel need to quickly ascertain the circumstances of the accident and make accurate decisions. Therefore, engineers are being trained to be proficient in design, laws and regulations, standards, operation, maintenance and other areas pertaining to facilities important for safety.
- System Engineers formulate system monitoring programs, which stipulate monitoring targets and standards for monitoring system performance degradation, in order to monitor whether or not primary plant systems are fulfilling design requirements. These monitoring activities also serve to identify areas in which reliability can be improved, which leads to overall improvements.
- Currently 22 systems at Kashiwazaki-Kariwa Units 6 and 7 subject to monitoring are being continually monitored and it has been confirmed that there are no performance abnormalities. We will continue to develop our system monitoring initiatives and make improvements.
- We currently have five System Engineers (Kashiwazaki-Kariwa) and are working toward our goal of assigning five System Engineers to each reactor. During the third quarter plant simulators were used for training on checking plant behavior during a severe accident and ascertaining conditions in accordance with System Engineering education/training programs. During this training session, participants from both operations and safety departments deepened their understanding of plant behavior and response during an accident through discussions. In addition, education and training for new members is being implemented as planned. Since System Engineers serve as the core personnel responsible for plant management we will expand the scope of personnel training at the Nuclear Engineering Center.



System Engineer education/training using plant simulators

◆ Enhancing configuration management

- Configuration management is a process for maintaining the safety of the plant and ensuring that power station equipment has been manufactured, installed, and is being operated as designed. Deliberations continue on constructing a systematic process for maintaining and managing a state in which design requirements, actual equipment, and equipment schematics all match.
- In regards to design basis documents, during the second quarter the Design Basis Document Creation and Management Guide was formulated and systems, structures and common design issues that should be prioritized when writing design basis documents were selected. During the third quarter we continued to write documents for the residual heat removal system, which has been labeled as a priority.

- Now that we have completed drafts of both the basic manual, which stipulates the configuration management process plan, and the work manual, which stipulates the actual configuration management procedures, we shall move forward with a detailed review of the contents and begin writing the various guides that must conform to these manuals.
- In regards to the development of a system for supporting configuration management processes, in addition to continuing with the transfer of equipment schematics data and system operation training, which began during the second quarter, we have also started performing system tests and reviews. We are gradually removing the bugs found in the system during these tests and plan to put the system into trial operation during the fourth quarter. During trial operation we shall examine how the system operates and make improvements in preparation for hard launch.
- Since configuration management will be the core process for design work at the Nuclear Engineering Center we will move forward with the cultivation of engineers that can handle this task appropriately.

2.8 KPI/PI PERFORMANCE AND SELF-ASSESSMENT PLANS

2.8.1 KPI/PI Performance

(1) KPI Performance (FY2017Q3)

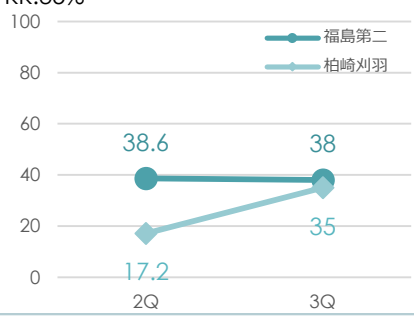
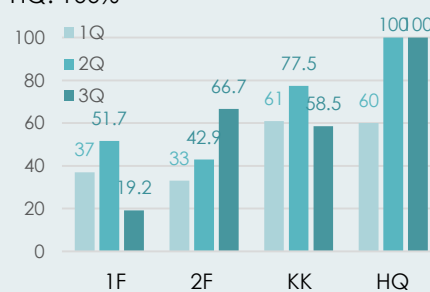
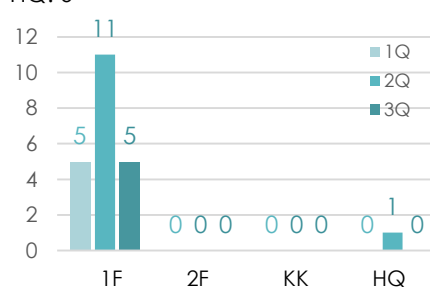
KPI	Target	Performance	Notes								
Safety awareness											
Safety awareness KPI (nuclear power leaders)	70 points	<table border="1"> <caption>Safety awareness KPI (nuclear power leaders) Performance</caption> <thead> <tr> <th>Quarter</th> <th>Performance (points)</th> </tr> </thead> <tbody> <tr> <td>1Q</td> <td>62.1</td> </tr> <tr> <td>2Q</td> <td>64</td> </tr> <tr> <td>3Q</td> <td>73.3</td> </tr> </tbody> </table>	Quarter	Performance (points)	1Q	62.1	2Q	64	3Q	73.3	
Quarter	Performance (points)										
1Q	62.1										
2Q	64										
3Q	73.3										
Safety awareness KPI (entire Nuclear Power Division)	70 points	<table border="1"> <caption>Safety awareness KPI (entire Nuclear Power Division) Performance</caption> <thead> <tr> <th>Quarter</th> <th>Performance (points)</th> </tr> </thead> <tbody> <tr> <td>1Q</td> <td>60.7</td> </tr> <tr> <td>2Q</td> <td>54.7</td> </tr> <tr> <td>3Q</td> <td>73.2</td> </tr> </tbody> </table>	Quarter	Performance (points)	1Q	60.7	2Q	54.7	3Q	73.2	
Quarter	Performance (points)										
1Q	60.7										
2Q	54.7										
3Q	73.2										
Technological capability											
Technological capability (in times of normalcy)	100 points	To be assessed at the end of the fiscal year									
Technological capability (in times of emergency)	100 points	<table border="1"> <caption>Technological capability (in times of emergency) Performance</caption> <thead> <tr> <th>Quarter</th> <th>Performance (points)</th> </tr> </thead> <tbody> <tr> <td>1Q</td> <td>97</td> </tr> <tr> <td>2Q</td> <td>97</td> </tr> <tr> <td>3Q</td> <td>97</td> </tr> </tbody> </table>	Quarter	Performance (points)	1Q	97	2Q	97	3Q	97	
Quarter	Performance (points)										
1Q	97										
2Q	97										
3Q	97										
Ability to promote dialogue											
Ability to promote dialogue (internal)	70 points	76 points									

Ability to promote dialogue (external)	Increase over last fiscal year	To be assessed at the end of the fiscal year	

(2) PI Performance (FY2017Q3)

PI	Target	Performance	Notes
Safety awareness			
Nuclear power leaders			
< Safety-1 > Rate of implementation of retrospection leveraging the traits	100%		
< Safety-2 > Number of times emails have been sent by nuclear power leaders in order to share information	More than once a week		
< Safety-3 > Number of times nuclear power leaders participated in preparedness training	More than twice a year		
< Safety-4 > Number of times nuclear power leaders went into the field (to engage in MO or exchange opinions with workers)	More than twice a year	1.8 times/month	

PI	Target	Performance	Notes																				
		<table border="1"> <tr><th>Quarter</th><th>Performance</th></tr> <tr><td>1Q</td><td>1.8</td></tr> <tr><td>2Q</td><td>1.3</td></tr> <tr><td>3Q</td><td>1.8</td></tr> </table>	Quarter	Performance	1Q	1.8	2Q	1.3	3Q	1.8													
Quarter	Performance																						
1Q	1.8																						
2Q	1.3																						
3Q	1.8																						
< Safety-5 > Number of benchmarked issues for which nuclear power leaders are responsible for putting into practice that have been put into practice	More than four a year	– To be measured from Q4	CAP system is prioritized for use for MO and third-party reviews																				
Entire Nuclear Power Division																							
< Safety-6 > Percentage of groups that discuss the results of trait retrospection	100%	<table border="1"> <tr><th>Quarter</th><th>Performance</th></tr> <tr><td>1Q</td><td>85.5</td></tr> <tr><td>2Q</td><td>86.8</td></tr> <tr><td>3Q</td><td>82.8</td></tr> </table>	Quarter	Performance	1Q	85.5	2Q	86.8	3Q	82.8													
Quarter	Performance																						
1Q	85.5																						
2Q	86.8																						
3Q	82.8																						
< Safety-7 > Percentage of messages from nuclear power leaders that have been read	More than 80%	<table border="1"> <tr><th>Quarter</th><th>Performance</th></tr> <tr><td>1Q</td><td>75.1</td></tr> <tr><td>2Q</td><td>67.3</td></tr> <tr><td>3Q</td><td>70</td></tr> </table>	Quarter	Performance	1Q	75.1	2Q	67.3	3Q	70													
Quarter	Performance																						
1Q	75.1																						
2Q	67.3																						
3Q	70																						
< Safety-8 > Number of times managers engaged in management observation	Target values to be set by each organization	<p>1F : 0.57 times 2F : 4.17 times KK : 5.99 times HQ : 0.16 times</p> <table border="1"> <tr><th>Category</th><th>1Q</th><th>2Q</th><th>3Q</th></tr> <tr><td>1F</td><td>0.84</td><td>0.63</td><td>0.57</td></tr> <tr><td>2F</td><td>4.03</td><td>4.56</td><td>4.17</td></tr> <tr><td>KK</td><td>3.96</td><td>5.51</td><td>5.99</td></tr> <tr><td>HQ</td><td>0.21</td><td>0.2</td><td>0.16</td></tr> </table>	Category	1Q	2Q	3Q	1F	0.84	0.63	0.57	2F	4.03	4.56	4.17	KK	3.96	5.51	5.99	HQ	0.21	0.2	0.16	No. of times per person per month
Category	1Q	2Q	3Q																				
1F	0.84	0.63	0.57																				
2F	4.03	4.56	4.17																				
KK	3.96	5.51	5.99																				
HQ	0.21	0.2	0.16																				

PI	Target	Performance	Notes
< Safety-9 > Good MO rate (Percentage of reports that include things that PICO has pointed out as being good MO from MO results)	More than 50%	2F: 38% KK: 35% 	
< Safety-10 > Percentage of corrective measures completed before deadline	100%	1F: 19.2% 2F: 66.7% KK: 58.5% HQ: 100% 	At Fukushima Daiichi human error-related nonconformances were measured
< Safety-11 > Number of recurring GII or higher nonconformances	0	1F: 5 2F: 0 KK: 0 HQ: 0 	
Technological capability			
During times of normalcy			
< Engineering-1 > Number of skilled workers trained in the Operations Department	More than 100% of the number required	To be assessed at the end of the fiscal year	
< Engineering-2 > Number of skilled workers trained in the Maintenance Department	More than 100% of the number required	To be assessed at the end of the fiscal year	
< Engineering-3 > Number of skilled workers trained in the Engineering Department	More than 100% of the number required	To be assessed at the end of the fiscal year	

PI	Target	Performance	Notes															
< Engineering-4 > Number of skilled workers trained in the Radiation and Chemistry Department	More than 100% of the number required	To be assessed at the end of the fiscal year																
< Engineering-5 > Number of skilled workers trained in the Fuel Department	More than 100% of the number required	To be assessed at the end of the fiscal year																
< Engineering-6 > Number of skilled workers trained in the Safety Department	More than 100% of the number required	To be assessed at the end of the fiscal year																
< Engineering-7 > Number of personnel that have external certifications such as Licensed Reactor Engineer (LRE), Class 1 Chief Radiation Handler, Engineer (Nuclear and Radiation Dept.), etc.	More than 100% of the number required	To be assessed at the end of the fiscal year																
< Engineering-8 > Participation rate in significant OE training	More than 60% of managers	<table border="1"> <caption>Participation rate in significant OE training</caption> <thead> <tr> <th>Department</th> <th>1Q</th> <th>2Q</th> </tr> </thead> <tbody> <tr> <td>1F</td> <td>29</td> <td>52</td> </tr> <tr> <td>2F</td> <td>46</td> <td>85</td> </tr> <tr> <td>KK</td> <td>63</td> <td>61</td> </tr> <tr> <td>HQ</td> <td>22</td> <td>25</td> </tr> </tbody> </table>	Department	1Q	2Q	1F	29	52	2F	46	85	KK	63	61	HQ	22	25	No training performance results for Q3
Department	1Q	2Q																
1F	29	52																
2F	46	85																
KK	63	61																
HQ	22	25																
< Engineering-9 > View rate of newly arrived OE information	More than 75%	<table border="1"> <caption>View rate of newly arrived OE information</caption> <thead> <tr> <th>Quarter</th> <th>View Rate (%)</th> </tr> </thead> <tbody> <tr> <td>1Q</td> <td>73</td> </tr> <tr> <td>2Q</td> <td>78</td> </tr> <tr> <td>3Q</td> <td>68</td> </tr> </tbody> </table>	Quarter	View Rate (%)	1Q	73	2Q	78	3Q	68								
Quarter	View Rate (%)																	
1Q	73																	
2Q	78																	
3Q	68																	
During times of emergency																		
< Engineering-10 > Number of emergency response personnel certified in-house on the operation of fire engines, power supply cars, cable connections, radiation surveys, wheel loaders, and unic trucks	More than 120% of the necessary number at each power station	<table border="1"> <caption>Number of emergency response personnel certified in-house</caption> <thead> <tr> <th>Quarter</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>1Q</td> <td>120</td> </tr> <tr> <td>2Q</td> <td>120</td> </tr> <tr> <td>3Q</td> <td>120</td> </tr> </tbody> </table>	Quarter	Number	1Q	120	2Q	120	3Q	120								
Quarter	Number																	
1Q	120																	
2Q	120																	
3Q	120																	

PI	Target	Performance	Notes								
<Engineering-11> Percentage of "A" assessments given during emergency response training	More than 80%	75.5% 【Breakdown】 1F: 72.7% (8/11 categories) 2F: 76.9% (10/13 categories) KK: 76.9% (10/13 categories)	FY2016 assessment								
Ability to promote dialogue											
Internal Communication											
<Dialogue-1> Percentage of employees that feel that messages from nuclear power leaders are "helpful"	More than 50%	<table border="1"> <tr><th>Quarter</th><th>Percentage</th></tr> <tr><td>1Q</td><td>21.6</td></tr> <tr><td>2Q</td><td>27.3</td></tr> <tr><td>3Q</td><td>29.1</td></tr> </table>	Quarter	Percentage	1Q	21.6	2Q	27.3	3Q	29.1	
Quarter	Percentage										
1Q	21.6										
2Q	27.3										
3Q	29.1										
<Dialogue-2> Response rate to questionnaire on the information conveyed by nuclear power leaders	More than 70%	<table border="1"> <tr><th>Quarter</th><th>Response Rate</th></tr> <tr><td>1Q</td><td>39.7</td></tr> <tr><td>2Q</td><td>44.1</td></tr> <tr><td>3Q</td><td>51.6</td></tr> </table>	Quarter	Response Rate	1Q	39.7	2Q	44.1	3Q	51.6	
Quarter	Response Rate										
1Q	39.7										
2Q	44.1										
3Q	51.6										
< Dialogue-3 > Degree of understanding of information conveyed by nuclear power leaders	More than 2.5 points	<table border="1"> <tr><th>Quarter</th><th>Points</th></tr> <tr><td>1Q</td><td>2.4</td></tr> <tr><td>2Q</td><td>2.3</td></tr> <tr><td>3Q</td><td>2.4</td></tr> </table>	Quarter	Points	1Q	2.4	2Q	2.3	3Q	2.4	
Quarter	Points										
1Q	2.4										
2Q	2.3										
3Q	2.4										
External Communication											
< Dialogue-4 > Questionnaire results on the quality/quantity of disseminated information	Increase over last fiscal year	To be assessed by the end of the fiscal year									
< Dialogue-5 > Questionnaire results on the approach to and awareness of, public relations and public opinion gathering	Increase over last fiscal year	To be assessed by the end of the fiscal year									

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

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

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

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

2.8.2 Self-Assessment Plan

During FY2016 we implemented a self-assessment of our progress with the Nuclear Safety Reform Plan that was subsequently reviewed by the Nuclear Reform Monitoring Committee²³. One of the expectations expressed by the committee is that TEPCO, *"continues to perform self-assessments that will yield significant input for nuclear safety reforms as part of its initiatives to achieve the world's highest levels of nuclear safety."* Now fully aware of the importance of self-assessments, TEPCO has decided to perform a self-assessment every three years in addition to its quarterly progress reports (next self-assessment planned for FY2019).

Meanwhile, at the 14th Nuclear Reform Monitoring Committee meeting held on November 20th the committee commented that, *"forming the habit of performing self-assessments is extremely important to enable a culture of self-improvement and learning to permeate throughout the entire organization."* In this regard, the committee requested that an assessment and report be compiled on the status of improvements made to date concerning the five issues that TEPCO has deemed vital, which include "strengthening governance" and "improving communication." We will begin the self-assessment of these vital issues during the fourth quarter and report the results to the Nuclear Reform Monitoring Committee during FY2018.

²³ http://www.nrnc.jp/report/_icsFiles/afieldfile/2017/07/31/01_4J.pdf

http://www.nrnc.jp/report/_icsFiles/afieldfile/2017/07/31/01_5J.pdf

CONCLUSION

During FY2017Q3, we continued to safely move steadily forward with the decommissioning of Fukushima Daiichi in accordance with the Mid-and-Long-Term Roadmap Towards Decommissioning of TEPCO Fukushima Daiichi Nuclear Power Station Units 1 to 4. However, we also saw a rash of troubles and accidents related to instruments and equipment vital for safety, such as errors with the setting of water level meters in sub-drains, the shutdown of the Unit 2 containment vessel gas control system, and the shutdown of the Unit 3 spent fuel pool cooling system, for which we are ascertaining the causes and thoroughly implementing recurrence prevention measures.

In regards to Kashiwazaki-Kariwa, inspection documents related to our application to modify the reactor installation permits for Units 6 and 7 in order to comply with the New Regulatory Requirements were examined during the 57th meeting of the Nuclear Regulation Authority on December 27th and our application was subsequently approved. Going forward TEPCO shall continue to prioritize safety while meticulously handling the inspections conducted in conjunction with its applications to receive approval of work plans and to modify safety regulations. At the same time, we shall not merely comply with regulatory requirements, but also improve safety through the implementation of voluntary measures.

In regards to the Nuclear Safety Reform Plan (Management), we are focusing our efforts this fiscal year on strengthening the governance of the entire organization and human resource cultivation, which are two issues that the company has deemed to be of vital importance. During the fourth quarter we shall perform self-assessments of the following vital issues based on the Nuclear Reform Monitoring Committee's comment that, *"forming the habit of performing self-assessments is extremely important to enable a culture of self-improvement and learning to permeate throughout the entire organization."*

- Strengthening the Organization and Governance
- Strengthening Human Resource Cultivation
- Improving Communication
- Cultivating Nuclear Safety Culture
- Improving Internal Monitoring Functions

With the resolution to, ***"keep the Fukushima Nuclear Accident firmly in mind; we should be safer today than we were yesterday, and safer tomorrow than today; we call for nuclear power plant operations that keep creating unparalleled safety"*** we will continue to advance nuclear safety reforms while receiving objective assessments from the Nuclear Reform Monitoring Committee. We are more than happy to hear any comments or opinions you may have about these reforms. Please visit our website²⁴ for more information.

End of Document

²⁴ <https://www4.tepco.co.jp/ep/support/voice/form.html>