



Nuclear Safety Reform Plan

FY2017Q2 Progress Report

Tokyo Electric Power Company Holdings, Inc.

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TEPCO



Table of Contents

Foreword	2
1 Progress with Safety Measures at Nuclear Power Stations.....	3
1.1 Progress of Reactor Decommissioning	3
1.2 Progress of Safety Measures at Kashiwazaki-Kariwa	16
2 The Progress Status of Nuclear Safety Reform Plan (Management)	22
2.1 Initiatives to Enhance Governance by Nuclear leader	23
2.2 Measure 1 REFORM FROM TOP MANAGEMENT.....	30
2.3 Measure 2 ENHANCEMENT OF OVERSIGHT AND SUPPORT FOR MANAGEMENT.....	36
2.4 Measure 3 ABILITY TO PROPOSE DEFENSE IN DEPTH/CAPABILITY FOR PROPOSING DEFENSE-IN-DEPTH.....	44
2.5 Measure 4 ENHANCEMENT OF RISK COMMUNICATION ACTIVITIES.....	54
.....	55
2.6 Measure 5 ENHANCEMENT OF POWER STATION AND HEADQUARTERS EMERGENCY RESPONSE CAPABILITIES	61
2.7 Measure 6 DEVELOPMENT OF PERSONNEL FOR ENHANCING NUCLEAR SAFETY.....	66
2.8 KPI/PI Performance and Assessment.....	75
Conclusion	82

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 second quarter of

FY2017 (July~September 2017¹).

Members of our new management team exchanged opinions with the Nuclear Regulation Authority during its 22nd extraordinary session held on July 10th. At this meeting members of the committee commented that, *“we have not seen any independent decision-making or prioritization when it comes to reducing risks associated with the decommissioning of the Fukushima Daiichi NPS.”* In response to this, on August 25th we provided a written response² that addresses the seven points of discussion brought up by the Nuclear Regulation Authority and states the resolution of TEPCO’s new management team. Furthermore, at the 33rd meeting of the Nuclear Regulation Authority held on August 30th, we directly 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 will formulate and carry out a detailed action plan that fulfills these promises. In particular, TEPCO leaders will travel to the siting community and promote dialogue with local residents in order to take their concerns into consideration and engage in independent action to fulfill our responsibilities.

1 Progress with Safety Measures at Nuclear Power Stations

1.1 Progress of Reactor Decommissioning

“The Mid-and-Long-Term Roadmap towards Decommissioning of TEPCO Fukushima Daiichi Nuclear Power Station Units 1 to 4” was revised at the meeting of the Ministerial Council on Decommissioning and Contaminated Water Countermeasures held on September 26th. The following is an overview of the revisions.

¹ All dates hereinafter referred to 2017 unless otherwise noted.

² http://www.tepco.co.jp/press/news/2017/1449764_8963.html

Issue	Revision
(1) Fuel debris removal	<p>Fuel debris removal plans shall be determined upon comparing and examining multiple removal methods.</p> <ul style="list-style-type: none"> ✓ A method that entails removing the fuel in the open air from the side starting with fuel at the bottom of the containment vessel shall be the basis of the plan. ✓ Step-by-step (fuel will be removed in a step-by-step fashion starting small)
(2) Removing fuel from spent fuel pools	<p>Work shall be implemented carefully by thoroughly implementing and adding measures to ensure safety in conjunction with field conditions that come to light. The entire decommissioning process shall be optimized and the environment around the buildings improved simultaneously.</p>
(3) Contaminated water countermeasures	<p>Preventative and multilayered countermeasures, such as the operation of sub-drains, the ocean side impermeable wall, and the Ice wall, etc., shall be maintained/managed appropriately and steadily implemented. The amount of contaminated water being generated shall be reduced through the combined use of the Ice wall and sub-drains.</p>
(4) Waste countermeasures	<p>A “fundamental approach” to waste countermeasures was formulated.</p> <ul style="list-style-type: none"> ✓ Ensure safety (contain/isolate) ✓ Treatment methods shall be selected while ascertaining the characteristics of waste
(5) Communication	<p>Further enhance communication. Develop two-way communication in addition to providing information in an easy-to-understand manner.</p>

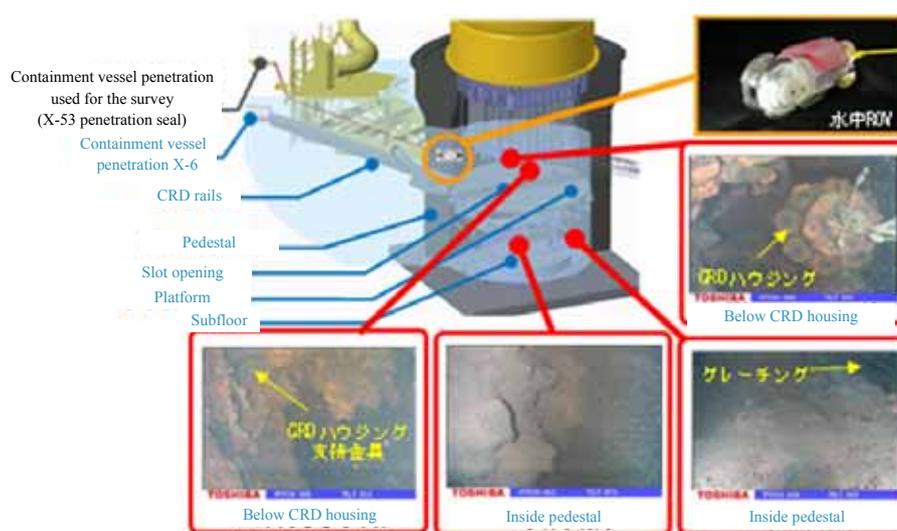
(1) Fuel debris removal

In preparation for fuel debris removal we conducted surveys of the Unit 1-3 primary containment vessels utilizing robots and muons. We were able to verify the existence of fuel debris-like substances during the survey of Unit 3 in July and obtain information that will contribute to deciding on a plan for fuel debris removal. 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.

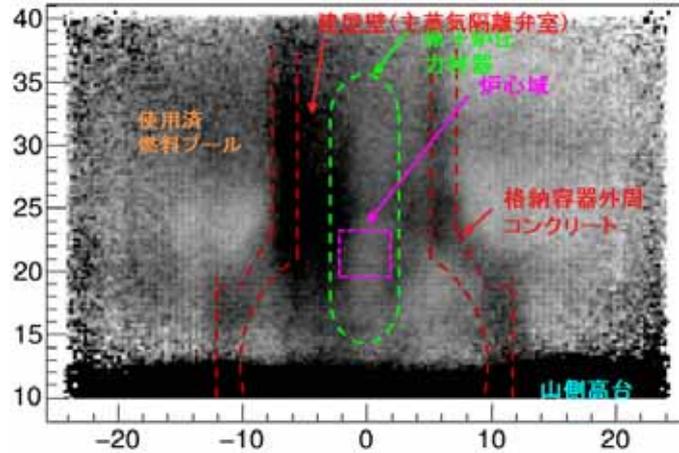
◆ Unit 3

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.



Primary containment vessel survey results

In order to ascertain the conditions of fuel debris inside the Unit 3 reactor, we measured the path of muons (elementary particles) from space traveling through the reactor from May 2nd through September 8th. The results of a qualitative assessment indicated that there is no large clump of material inside the core where the fuel originally was and that it is possible that some fuel debris is at the bottom of the reactor pressure vessel.



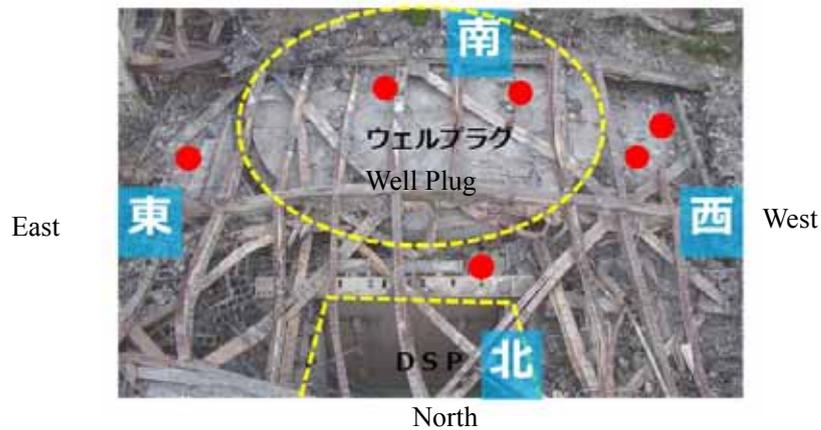
Unit 3 muon measurement results

(2) Removing fuel from spent fuel pools

◆ Unit 1

Removal of the pillars and beams of the building cover began on March 31st and was completed on May 11th. Modified pillars and beams have been placed on the north side of the reactor building (completed on August 31st) in preparation for the erection of a wind barrier to prevent the dispersion of dust during the removal of debris. From May 22nd through August 25th we implemented additional debris condition surveys using 3-D scanners and took radiation level measurements from above the well plug in preparation for proposal of a debris removal work plan. We found that the well plug is out of alignment and were able to confirm the condition of debris inside the dryer separator part (DSP). Going forward we will continue to assess and manage risks associated with work and thoroughly implement measures to ensure safety and relief, such as measures to prevent the dispersion of radioactive substances, as we aim to commence fuel removal in FY2023.

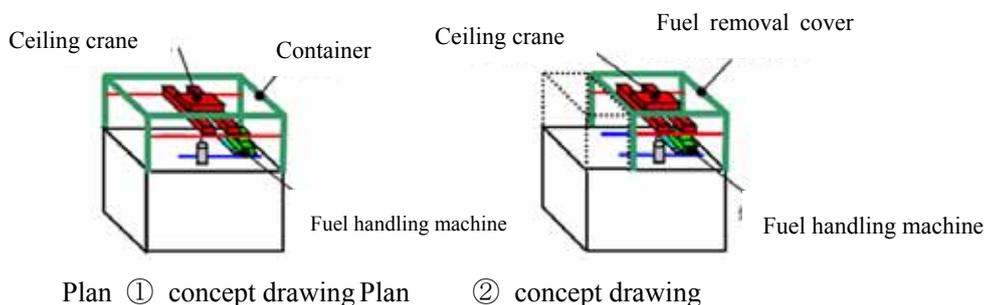
South



Survey of conditions around the Unit 1 well plug (red dot indicates position of 3D scanner)

◆ Unit 2

In preparation for the removal of fuel from the spent fuel pools we plan to open a hole in the west wall of the reactor building in order to access the refueling floor (uppermost floor of the reactor building) and have completed preparations work. In consideration of work safety, the impact on the area outside the site, and reducing risks by removing fuel as early as possible, it was deemed favorable to completely dismantle the top of the existing reactor building above the uppermost floor. We are currently examining a plan that would involve using the same containers for fuel in spent fuel and also fuel debris removal (Plan ①) and a plan that would involve using separate containers (Plan ②). Ultimately, we are aiming to commence fuel removal in FY2023 after we install a fuel handling machine upon the completion of dismantling of the top of the reactor building.



Plan ① concept drawing Plan ② concept drawing

◆ 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 work platform, and

have begun installing the domed roof. Running rails were loaded into the first of eight sections of the domed roof (domed roof section 1) on August 2nd and the section was slid into the designated position for the fuel handling machine girders. The section was then secured and exterior materials attached on the east side. Installation was completed on August 29th. The second section (domed roof section 2) was lifted into place in a similar fashion on September 4th and installation was completed on September 15th. Installation is proceeding smoothly and we plan to commence fuel removal around the middle of FY2018.

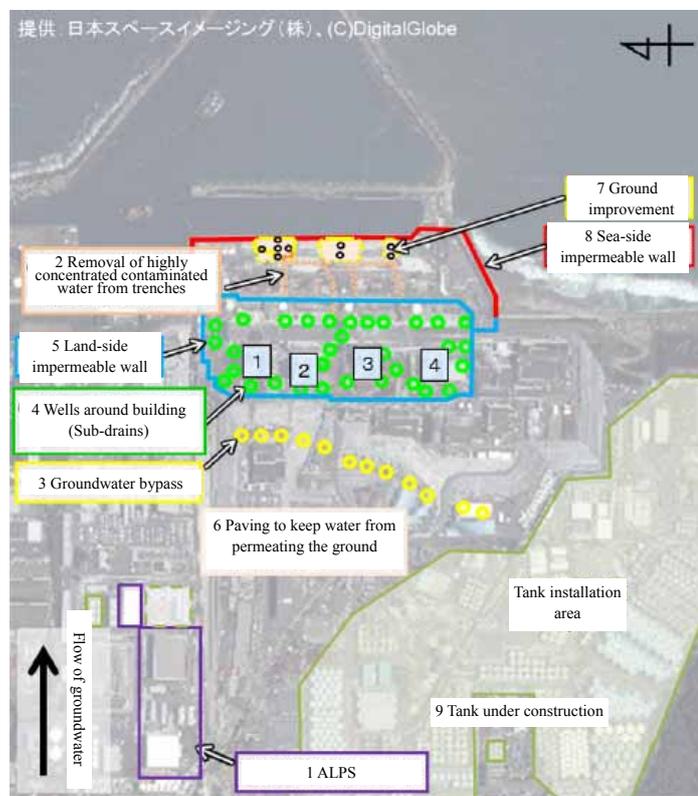


Dome roof installation (Left: September 6, Right: September 26)

(3) Contaminated water countermeasures

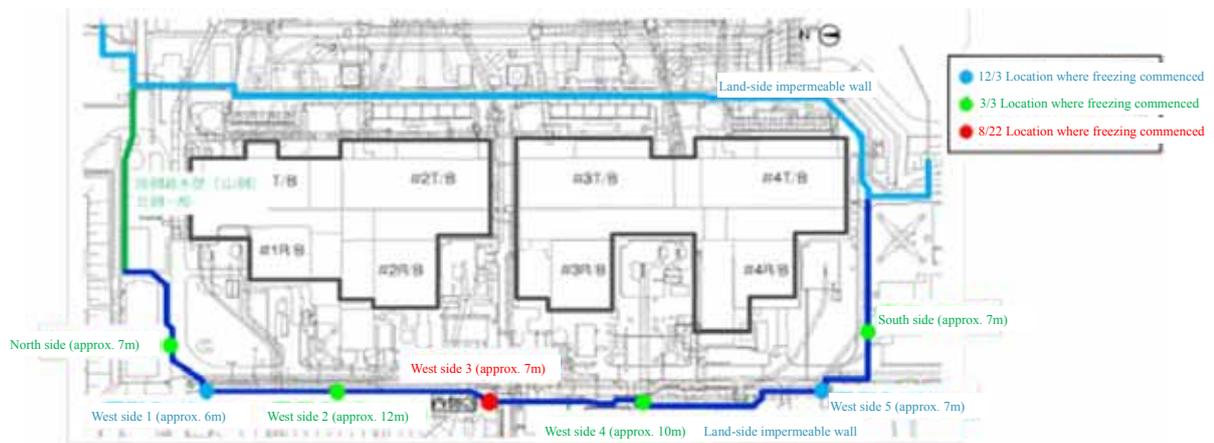
Based on the three basic policies of “removing contamination sources,” “isolating water from contamination sources,” and “preventing the leakage of contaminated water,” TEPCO is continuing to implement measures to prevent the outflow of contaminated water into the power station port, and counter the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

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



Primary contaminated water countermeasures

- ◆ Status of formation of the frozen-soil impermeable wall on the land-side
Freezing of location ③ on the west side, which was the only portion of the land-side impermeable wall (mountain side) that had not been closed, began on August 22nd. The temperature of part of this section has already fallen below 0°C and we have confirmed that the difference in water levels inside and outside the land-side impermeable wall around location ③ on the west side is increasing. We will continue to monitor the effect of the land-side impermeable wall by looking at conditions, such as the level of groundwater and the temperature of the ground.



Overview of the frozen sections of the impermeable wall

(4) Waste countermeasures

We are moving forward with waste countermeasures after formulating a storage and management plan for solid waste generated in conjunction with decommissioning that consists of appropriately storing the waste after reducing its volume based upon forecasts for the amount of waste that shall be generated over the next approximate 10 years. In addition to constructing storage facilities we have commenced operation of miscellaneous solid waste incineration facilities in order to reduce the volume of used protective clothing that is being temporarily stored on-site through incineration. In consideration of the progress of decommissioning and based upon the basic approach to waste countermeasures put forth in the revised Mid-and-Long-Term Roadmap, we shall revise the estimates for the amount of waste to be generated on an annual basis and update the storage and management plan as suitable in an effort to

store and manage the waste generated in conjunction with decommissioning in a safe and logical manner.

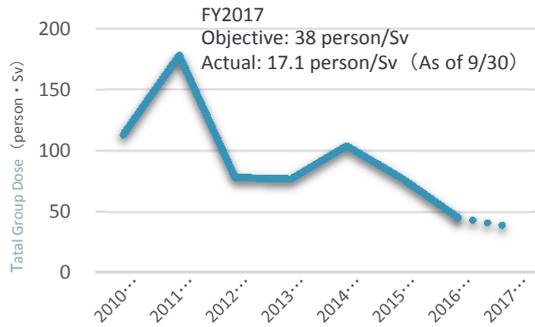
(5) Communication

The decommissioning of the Fukushima Daiichi is an unprecedented task and we believe that answering the questions and alleviating the concerns of the siting community, and society as a whole, and gaining their understanding, are of the utmost importance. We shall further enhance two-way communication by not only proactively disseminating information but also through participating in the meetings of various bodies. Furthermore, we also hope to give tours to approximately 20,000 people by FY 2020 (FY2016 results: approximately 10,000 people) because we believe that getting people to see the decommissioning site with their own eyes is an effective form of communication.

(6) Initiatives to lower 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 radiation 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 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 survey of the Unit 3 primary containment vessel. Going forward we will proactively leverage this system during work inside reactor buildings and in surrounding high radiation environment.



Annual trends in total group dose



Remote monitoring system

(7) Deviation from the limiting conditions for operation (LCO) of sub-drains³

◆ Overview of the drop in water level of sub-drain No. 51

- On August 2nd at around 6:31 PM, an alarm sounded indicating that the water level of sub-drain pit No. 51 located on the southwest side of the Unit 4 reactor building had dropped. The indicator of the water gauge for the aforementioned sub-drain pit was immediately checked and it was found that the water level had suddenly decreased and was below the levels of accumulated water in the Unit 4 reactor building and the waste treatment building. However, since there were no significant changes in the readings of water level gauges for a accumulated water in the buildings or the water level gauges of surrounding sub-drain pits, and it is unlikely that only the water level of sub-drain pit No. 51 would decrease, it was determined that the water level gauge of the aforementioned sub-drain was broken (**Problem A**). Furthermore, the water level of the aforementioned sub-drain recovered to the level it was prior to the event approximately 90 minutes later.
- When the water level gauge of the aforementioned sub-drain was inspected the next day, August 3rd, it was found that the indicator of the

³ Wells located around the reactor buildings and turbine buildings, etc. The water level (groundwater level) 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.

water level gauge was correctly reflecting the level of water in the pit, which was measured using an inspection ruler. This meant that it was unlikely that the water level gauge was broken and that it was highly possible that the water level of the aforementioned sub-drain had indeed decreased. Therefore, it was determined that there had been a deviation from the limiting conditions of operation stipulated in the implementation plan during the time period that the water level of the aforementioned sub-drain fell below the level of accumulated water in the buildings. However, as of August 3rd when it had been determined that there had been a deviation from the limiting conditions of operation, the water level of the aforementioned sub-drain had already recovered and there was no deviation from the limiting conditions of operation, therefore the ex post facto declaration of a deviation from the limiting conditions of operation was not immediately issued (**Problem B**) and there was a delay in notifying the government and the public (**Problem C**).

- Furthermore, in order to determine whether or not there had been a leak of accumulated water from the buildings, the time that it would take for such water to seep out had to be considered. However, since there was no significant rise in the concentration of radioactive substances in samples taken from water from the aforementioned sub-drain and also surrounding sub-drains on August 3rd, it was conveyed to the public that there had been no leak of accumulated water (**Problem D**).
- Results of an investigation performed thereafter revealed that the direct cause of the decrease in water level was new excavation work for sub-drain pit No. 215 that was being conducted approximately 6m to the south of sub-drain pit No. 51. It is assumed that there had been a temporary and localized flow of water from sub-drain pit No. 51 into No. 215 (**Problem E**). Sub-drain water is being continually sampled and there have been no significant increases in the concentration of radioactive substances so it was determined that there had been no impact from this event on the outside environment.
- ◆ Summary of the problems that occurred during the sub-drain No. 51 water level decrease event and lessons learned
 - The aforementioned problems were examined from the perspectives of

safety consciousness, technological capability, and the ability to promote dialogue. And, the lessons learned and improvements to be made from an organizational management and operation perspective were identified as follows.

	Problems	Lessons learned/improvements
Safety consciousness	<ul style="list-style-type: none"> Workers were convinced that there could not be a temporary and localized decrease in groundwater levels and therefore assumed that the cause was a malfunction with the water level gauge indicator so the event was not considered to be a deviation from limiting conditions of operation. (Problem A) Cases from other companies and related documents were interpreted fortuitously and it was decided not to issue an ex post facto declaration of a deviation from the limiting conditions of operation (Problem B). 	<ul style="list-style-type: none"> Don't assume simple instrument malfunction, gather data to back up your hypothesis. Create documents that clarify the conditions for determining a deviation from the limiting conditions of operation and train personnel on this process so as to prevent deviations from the limiting conditions of operations from being overlooked as a result of assuming malfunction with instrumentation. Clarify the positioning of safety regulation-related documents that were unfortunately used as the basis for making a determination in this instance and improve methods for teaching personnel about events that have happened at other companies.
Technological capability	<ul style="list-style-type: none"> It was not determined that the government had to be notified about this event because information on what alarms should be shared amongst personnel in the Emergency Response Center was not clear. (Problem C) The risks associated with excavating new sub-drains had not been sufficiently identified and the fact that this work was being done had not been shared with managing departments (Problem E) 	<ul style="list-style-type: none"> Procedures that clarify which events should be shared amongst personnel in the Emergency Response Center will be created and training implemented based on these procedures. During the planning stages of sub-drain-related work, groundwork departments will be included when determining the suitability of such projects, and during the work implementation stage information will be shared with facility management departments in order to enhance monitoring.
Ability to promote dialogue	<ul style="list-style-type: none"> Too much time was taken to discuss whether or not the event should be deemed as a deviation from the limiting conditions of operation thereby causing delays with notifying the government and safety officers. (Problem C) The public was told that there was no impact on the external environment even though there is insufficient awareness about the behavior of accumulated water when leaking outside of building. (Problem C) 	<ul style="list-style-type: none"> Procedures will be created that stipulate that in the event of nonconformances or signs of abnormalities with equipment, the Emergency Response Center is to be notified foremost and initial response procedures implemented. Procedures that stipulate that the details of information to be disclosed to the public shall be examined by corporate communications departments prior to release shall be created, and all station personnel shall be subjected to training in order to improve the ability to disseminate information.

- ◆ A setting error in newly installed sub-drain water level gauges
 - On September 28th, it was discovered that there had been an error when setting new water level gauges for newly excavated sub-drain pits (six

locations) located around the Unit 1~4 buildings and that the actual water level was 690mm lower than the indicators on the water level gauges.

- Therefore, it was deemed that there might have been a reversal of the water levels of the six newly excavated sub-drain pits and the level of accumulated water in buildings since the day when the first new sub-drain No. 203 was put into operation (April 19), so a deviation from the limiting conditions of operation was declared (September 28).
- As a result of the Great Eastern Japan Earthquake, the level of the ground at Fukushima Daiichi subsided approximately 70cm so 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 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.
- During this event, a deviation from the limiting conditions of operation was immediately declared when it was determined that there might have been a reversal of water levels thereby showing that the lessons from the decrease in the water level of sub-drain No. 51 have been learned. On the other hand, the fact that the new levels at which sub-drain pit water is to be managed were not correctly reflected when setting newly installed sub-drain pit water level gauges is a huge problem from the perspective of technological capability.
- Root cause analysis is currently being performed and all of the problems surrounding this event, and the lessons learned from it, shall be compiled in the third quarter progress report.

◆ Current initiatives

There were no leaks of accumulated water from inside buildings into groundwater during the August 2nd or the September 28th events, however delays with determining whether or not an event should be notified/disclosed were seen and information about changes made to water level gauge settings were not thoroughly conveyed. Therefore, the following initiatives are underway in regards to important measurements (measurements related to limiting conditions of operation) that are being

monitored/managed at the power station:

- Clarify the objectives of monitoring and also the basis for determining abnormalities to eliminate gray areas when it comes to decision-making.
- Train on mechanisms for quickly and accurately conveying information in preparation for abnormal measurements

1.2 Progress of Safety Measures at Kashiwazaki-Kariwa

(1) Progress with safety measures

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

<Progress with Safety Measure Renovations>

Safety Measures (※ Measures independently implemented by TEPCO)		Unit 6	Unit 7
Preparations for tsunami and internal inundation	Tidal wall (sea wall) construction	Completed	
	Installation of tidal walls for buildings (including flood barrier panels)	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
Preparations for power loss [Augmenting power sources]	Installation of permanent bilge pumps in rooms housing important equipment	Completed	Completed
	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
Preparing for damage to the reactor core or spent fuel [Augmenting heat removal and cooling functions]	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	
	Installation of substitute submersible pumps and substitute seawater heat exchanger equipment	Completed	Completed
	Installation of high pressure substitute for water injection systems	Underway	Underway
Preparing for damage to the primary containment vessel	Building of water sources (reservoirs)	Completed	
	Enhancement of the seismic resistance of pure water tanks on the Oominato side [※]	Completed	
	Installation of filtered venting equipment (aboveground)	Performance tests completed ⁴	Performance tests completed
	Installation of filtered venting equipment (below ground)	Underway	Underway
	Installation of substitute circulation cooling system	Underway	Underway

⁴ Work in the vicinity is ongoing (at both Units 6 and 7)

Safety Measures (※ Measures independently implemented by TEPCO)		Unit 6	Unit 7
or the reactor building [Measures to prevent damage due to excessive PCV pressure and prevent a hydrogen explosion]	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 and Emergency Response Center environments	Measures to reduce operator exposure in the event of a severe accident	Underway	
Strengthening emergency response	Construction and reinforcement of multiple access routes	Underway	
	Enhancement of communications equipment (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	

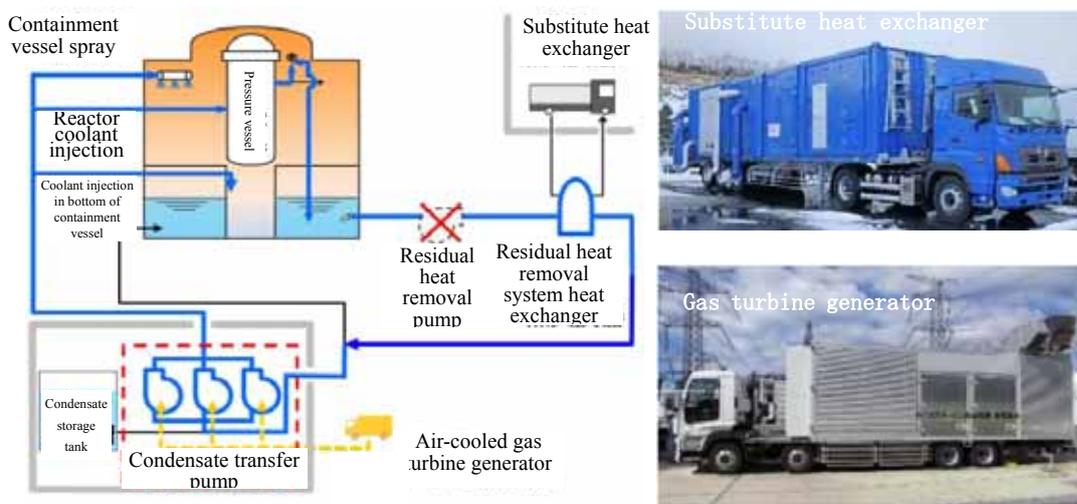
※Countermeasures implemented as part of voluntary initiatives on behalf of TEPCO

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

◆ Preparing for primary containment vessel damage/reactor building damage

- Installation of substitute circulated cooling systems

We are moving forward with the development and installation of a system that cools the primary containment vessel by circulating water from the suppression pool (substitute circulated cooling system) as a substitute for the existing system for residual heat removal. Since the system can prevent increases in pressure by cooling the containment vessel it does not require that radioactive substances be intentionally discharged and will therefore be used before filtered venting equipment in the event of a severe accident during which the core is damaged and the safety function of emergency core cooling equipment, etc., is lost. Furthermore, during compliance inspections it was found that this system, which was conceived by TEPCO, is more effective than filtered venting equipment, so this new technical knowledge obtained during the course of new regulatory requirement compliance inspections will be leveraged during future compliance inspections for other BWRs.



New cooling system for the primary containment vessel (substitute circulated cooling system)

◆ Enhancing emergency response measures

- Construction and reinforcement of multiple access routes

In order to make access routes redundant and in consideration of potential liquefaction of the ground under the seawall on the Arahama side, a new access route (1.9km in length) for traveling from the main building to the Unit 5 Emergency Response Center is being built on

ground that is higher than design standard tsunami height (more than 12m above sea level). As an independent measure, a paved road 3m wide was built so that vehicles can travel on this route. A fire belt more than 20m in width will also be created in order to protect this new access route from forest fires. Mortar will be used to create the fire belt in order to make it resistant to fires and the area will be paved to prevent vegetation from growing. Construction of the access route and the fire belt began in April and work to fell trees has been completed. Slope formation, mortar laying and asphalt paving is underway.



Prior to asphalt paving



After asphalt paving



Prior to fire belt creation



After fire belt creation (finished section)



(2) Status of New Regulatory Requirement compliance inspections

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

In light of our failure to give an accurate explanation of the validity of seismic resistance analyses performed in the past for the Main Seismic Isolation Building, TEPCO (the first utility to undergo these inspections) re-examined the points of discussion in regards to the inspections being performed, revised the application to modify its reactor installation permit to reflect the comprehensive review of all inspection documents from all departments, and submitted the results of initiatives implemented to improve the reliability of inspection documents to the Nuclear Regulation Authority on June 16th. Revisions were also submitted on August 15th and September 1st as part of our continual effort to make the details of these documents as accurate as possible.

On July 27th and 28th the Nuclear Regulation Authority conducted a safety awareness survey at Kashiwazaki-Kariwa during which contractors and station personnel, including the Site Superintendent, were interviewed.

Chairman Tanaka (former) commented that, “Workers in the field are optimistically engaging in their duties with pride and spirit. The Site Superintendent needs to show strong leadership.”

In regards to the application to modify the reactor installation permit for Kashiwazaki-Kariwa Units 6/7, the inspection record that shows that the new regulatory requirements have been complied with was approved at the 41st meeting of the Nuclear Regulation Authority on October 4th and a call for scientific and technical opinions was made. We will continue to improve safety by taking independent action that goes above and beyond the regulatory requirements.

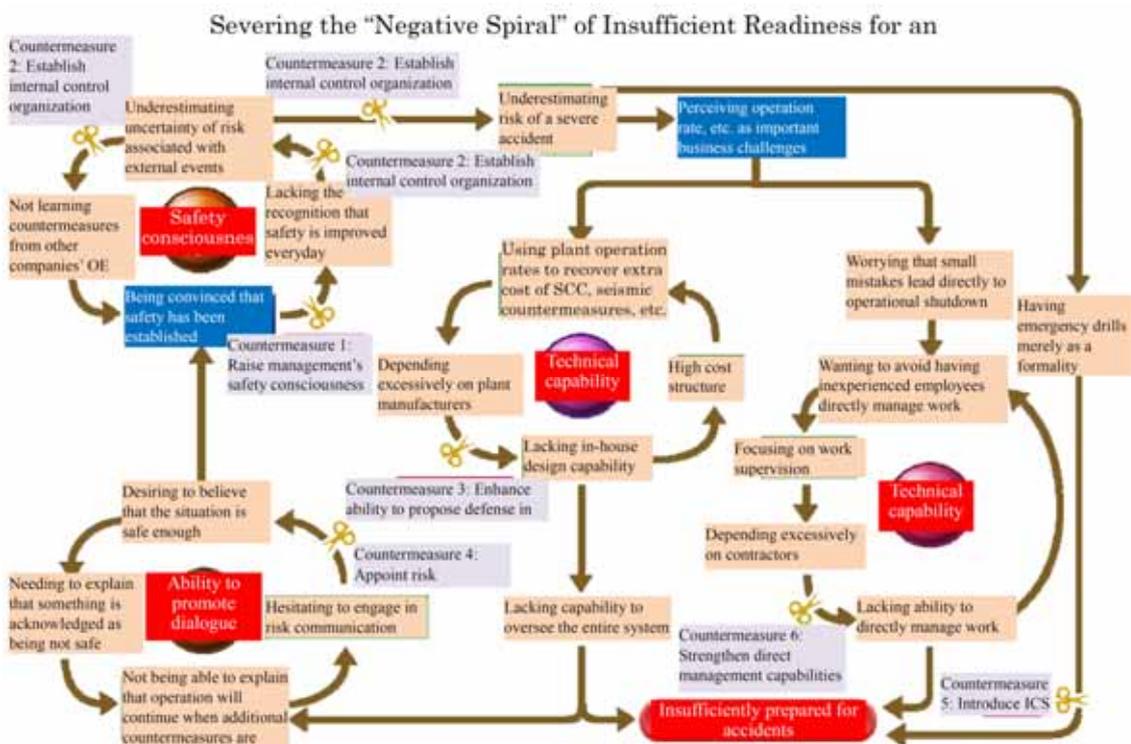


Safety awareness survey conducted by the Nuclear Regulation Authority (left: interview with the Site Superintendent, right: field inspection)

We will continue to strive to further ensure safety based on the lessons learned from the Fukushima Nuclear Accident.

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

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



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 leader

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 in permeation of the management model

A management model was created to enable all employees to engage in their duties with a common understanding of the objectives of the division and each other's roles (June 22). The management model stipulates the “goals,” “important factors for success,” “achievement level indicators,” and “responsibility” for each field of expertise in anticipation of achieving the world's highest levels of safety. In addition to briefings on the Management Model given by the General Manager of the Nuclear Power & Plant Siting Division and study sessions for personnel, during the second quarter further efforts were made to enable the management model to take root by hanging posters and placing three-dimensional models of the management model on desks in conference rooms.



Management model posters and three-dimensional models

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. A questionnaire was distributed in order to analyze in detail to what extent these fundamentals have permeated through the organization. The data will be analyzed during the third quarter and improvements will start to help the fundamentals permeate through those departments and positions where they had yet to take root. These efforts coincide with the activities commenced in July to help the fundamentals permeate through contractor organizations as well.

Work processes are also being gradually revised in accordance with the management model. Our performance review meetings are one example of these revisions. At these meetings discussion is focused on improvement measures for going beyond fiscal year objectives and achieving the ideal state put forth in the management model. And, we are making efforts to improve the documents used at these meetings and of the quality of the meetings themselves by creating an environment in which all participants, regardless of field of expertise, can speak out without reservation and frankly state their opinion to even parties in higher positions. Work plans have also been revised to include measurement indicators that match the management model.



Performance review meeting at the Fukushima Daini NPS

These initiatives are being implemented based on the change management guide. The June 30th revision of the aforementioned guide enlarges the scope of change management and also clarifies who is responsible for change management and related processes. These improvement activities, which are confirmed on a monthly basis by Headquarters General Managers who are in charge of them, are also subject to change management.

(2) Improvement activities by CFAM⁵/SFAM⁶

⁵ Corporate Functional Area Manager: Leader at the Head Office that aims to achieve

Since April 2015, CFAMs and SFAMs have been ascertaining excellence achieved in other countries, identifying key issues to be resolved, and formulating and implementing improvements for each field of expertise. Furthermore, management model project members and CFAM have been working together in those fields focused on by the management model thereby resulting in such achievements as the introduction of work management processes, enhancement of management observation (MO) skill, and the creation of education and training programs for each field of expertise such as radiological protection and engineering.

In August, revisions of organizational structure and management commenced in order to accelerate these improvement activities. In particular, dedicated CFAMs were assigned to specialty fields that make up the core of planned operations, such as operations, maintenance, and radiological protection, and CFAM managers that oversee, monitor, and support the whole of these activities were newly assigned. During the third quarter, the help of overseas experts is being enlisted to provide that education and training to CFAM and CFAM managers that is required of leaders in each field of expertise in an effort to enhance the ability to promote improvement activities as a whole, including those activities in other fields of expertise.

2.1.2 Initiatives Aimed at Developing Internal Communication

(1) Initiatives for promoting internal communication

As part of the activities of internal communication teams established during the first quarter, a video of Nuclear Power & Plant Siting Division General Manager Makino discussing his expectations for communication and the reasons for creating these teams was broadcast on the company's internal television network.

the world's highest level of excellence for each aspect of power station operation

⁶ Site Functional Area Manager: CFAM counterpart at power stations



Nuclear Power & Plant Siting Division General Manager Makino's expectations for internal communication (company television)

Premium Fridays in August were leveraged at the Headquarters to hold dialogue sessions that were participated in by a wide variety of employees from nuclear leader to new hires. Participants in the dialogue sessions broke into small groups to discuss their experiences during the Fukushima Nuclear Accident, what they're doing in their current positions and also their thoughts on communication thereby sharing experience, knowledge and awareness. Participants commented that the dialogue session was "useful" and that they would "like to continue them in the future," and also made suggestions for improving future sessions. Opportunities to interact like these will be periodically created in the future in order to spur the creation of a climate in which everyone knows and helps each other.



Dialogue session at the Headquarters

Furthermore, in order to further vitalize future activities, members of internal communication teams exchanged opinions about vitalizing communication with representatives from companies of approximately the same scale as TEPCO

(September 27). We have started examining joint initiatives with other departments in TEPCO Holdings, Inc. based upon the knowledge gained from this opportunity, such as examples of initiatives at other companies that were learned about.

At Kashiwazaki-Kariwa, Nuclear Power & Plant Siting Division General Manager Makino engaged in informal discussions with small groups of Group Managers. This was an opportunity for Nuclear Power & Plant Siting Division General Manager Makino to not only hear requests and opinions from power station representatives about solving and improving problems by concerning coordination between the Headquarters and power stations and the flow of information, but also convey his feelings as the General Manager of the Nuclear Power & Plant Siting Division. The informal discussions like these will continually be held.

At the Fukushima Daini NPS, discussions on improving the ability to communicate were held in small groups comprised of members that normally do not interact (August 29). The following comments from these discussions, which were identified as important elements for improving communication, will be leveraged during activities in the future.

- Managers and Supervisors should lead the way to create a work environment in which is easy to speak out
- More importance should be placed on opportunities to directly engage with people instead of e-mail
- More attention should be paid to the feelings of the person to which information is being conveyed and the way that information is conveyed



Group discussions on improving the ability to communicate (Fukushima Daini NPS)

At the Fukushima Daiichi NPS, efforts are being made to vitalize communication and monitor the status of communication improvements by making changes to the company's intranet interface in order to promote information sharing, implementing communication improvement programs to help other departments and other

companies notice issues by exchanging opinions, and distributing questionnaires in order to examine how information is being conveyed throughout the organization. Also, as we continue to develop internal communication and cultivate human resources, the knowledge and lessons learned through projects and construction completed to date is being compiled into Fukushima Operating Experience Reports (FOER) based upon interviews with employees about their experience as well as created documents. These reports are used during forums in order to ① Share the information, ② Question the work currently underway and ③ Pass down knowledge to future generations.



FOER forum (on incinerators)

Furthermore, we continue to strengthen coordination within the company both laterally and horizontally, and engage in initiatives to improve the understanding and implementation of corporate policies through such initiatives as the “*tsunagu sairo no kai*,” an independent initiative to promote coordination between managers (for managers/shift supervisors), and the Decommissioning Promotion Forum during which Fukushima Daiichi Decontamination & Decommissioning Engineering Company executives talk in their own words about the current state of affairs and future plans.



Tsunagu sairo no kai at Fukushima Daiichi

(2) Using social media to share information on nuclear power

When Nuclear Power & Plant Siting Division General Manager Makino took office, he posted a message on the company's intranet about his conviction to continue reforms to improve safety consciousness, technological capability, and the ability to promote dialogue based upon reflection on the Fukushima Nuclear Accident (July 3).

Furthermore, in order to share information with the employees of companies engaged in core businesses, videos that explain media coverage of TEPCO and the status of decommissioning have been posted (number of second-quarter posts: 9) along with articles in the TEPCO Group Newsletter on the progress of installation of the covered dome at Fukushima Daiichi Unit 3, the current conditions at Kashiwazaki-Kariwa and the main anti-earthquake problem (July 27 and September 28 issues).

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

Since July 2016, each Site Superintendent and Headquarters 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 understanding⁷ of these messages and whether or not they were received show that during the second quarter response rate

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

was 44.1% (objective: over 70%), and the level of understanding was 2.3 points (objective: more than 2.5 points). While response rate increased by 4.4 points and continues to increase from the first quarter, the level of understanding dropped by 0.1 points showing little change.

The results of the questionnaire and opinions about messages are being provided as feedback to the sender and also the Headquarters and power stations in order to improve subsequent messages.

2.2 Measure 1 REFORM FROM TOP MANAGEMENT

2.2.1 Initiatives Related to Suggestions from the Nuclear Reform Monitoring Committee

(1) Activities to develop communication and understanding amongst contractors

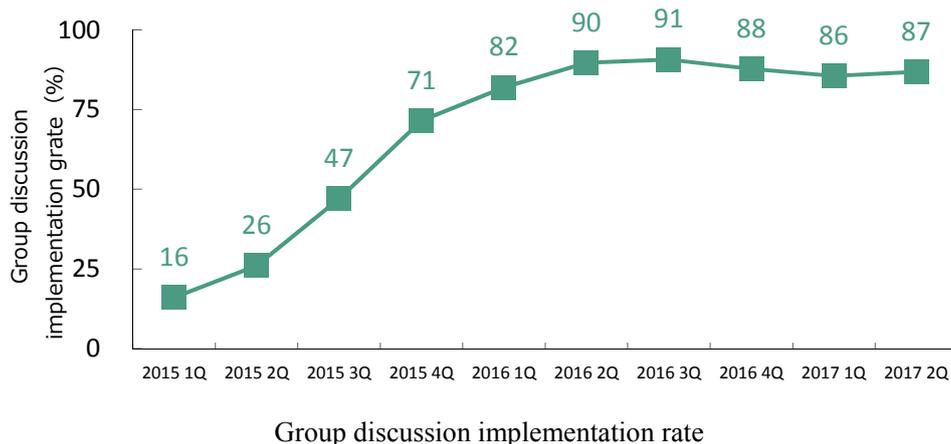
In order to improve nuclear safety at TEPCO's nuclear power stations, contractors must have an understanding of nuclear safety reforms and cultivate nuclear safety culture. During the second quarter we continue to engage in dialogue with contractors (July 13, 14, 19, August 8, 23, September 14, 15, 19, 28). In particular, materials that explain the relationship between products from different companies and nuclear safety were used when engaging in dialogue with contractors that deliver products used for safety measures at the Kashiwazaki-Kariwa NPS. Contractors commented that, "it reminded us that the products we provide are being used to support nuclear safety which will help to keep us sharp." We will continue to engage in dialogue with contractors in order to deepen our mutual understanding of nuclear safety.

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

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

The rate of self-retrospection during the second quarter was approximately 93% (+0% compared with FY2017Q1) 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 almost unchanged at 87% (+1% compared to FY2017Q1). From the middle of the second quarter efforts have been made to vitalize group discussions by clarifying the perspectives from which to engage in retrospection, such as giving choices of answers and providing examples of actions.



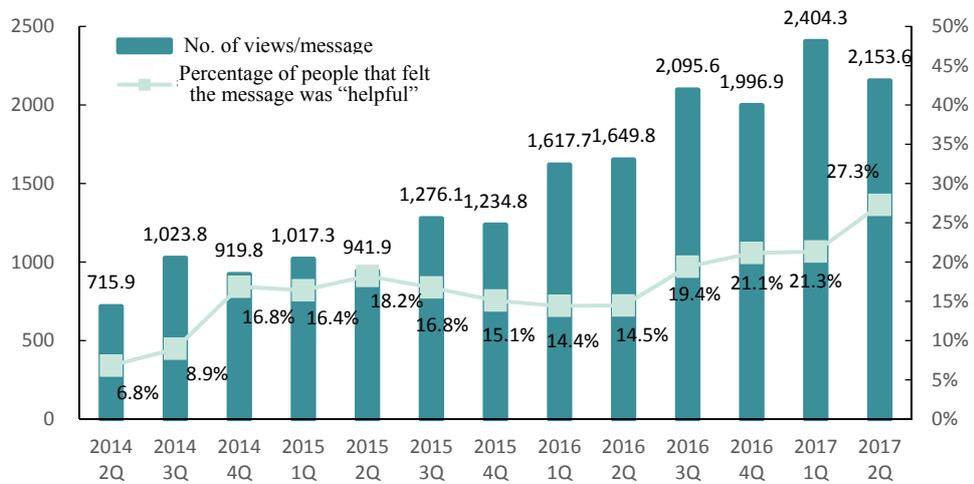
2.2.2 Other initiatives

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

- ◆ Direct dialogue between nuclear leader
 - Since the fourth quarter of FY2015, nuclear leader at headquarters (General Manager of the Nuclear Power & Plant Siting Division and other Headquarters General Managers) have been visiting power stations to engage in direct dialogue with power station executives (Site Superintendent, Unit Superintendents, Nuclear Safety Center Director, power station General Managers) in order to improve the safety awareness of the entire organization. During the second quarter, discussions were held on the topic of creating opportunities to discuss nuclear safety frankly and openly (Kashiwazaki-Kariwa: September 29; Fukushima Daini: July 20, September 21)
- ◆ Messages from nuclear leader
 - In order to promote nuclear safety reforms, nuclear leader 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 leader are leveraging video messages, intranet messages, email, meetings and

morning meetings as opportunities to convey their expectations.

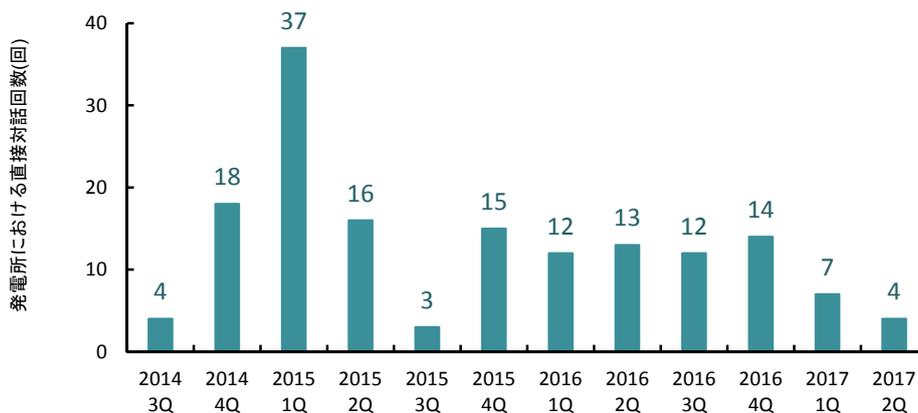
- The following graph shows the number of times that messages by nuclear leader have been read by employees via the intranet. During the second quarter, the number of employees that read each message fell to 2,150. It is assumed that this is because many messages were sent out at once on August 29⁸. On the other hand, the percentage of people who rated the message as “helpful” rose greatly to 27.3%.



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 continues even with the appointment of a new Nuclear Power & Plant Siting Division General Manager.

⁸ On August 29, 2002 it was announced that TEPCO had not disclosed the fact that cracks had been found in structures inside the reactor during an inspection (concealment of troubles). Therefore, August 29 of each year is marked as the day for remembering corporate ethics. Messages from nuclear power leaders are sent and group discussions held around this day.



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

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

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

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

(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 second quarter.

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

◆ Safety Council Meetings

- In June 2016, a Safety Council⁹ was established to enable the Nuclear Power & Plant Siting Division to discuss safety with Fukushima Daiichi Decontamination & Decommissioning Engineering Company (FDEC) management, share problem awareness, and promote the quick implementation of common countermeasures.
- During the 5th Safety Council meeting a discussion was held on the topic of “recommendations from the Nuclear Safety Oversight Office, common issues concerning AFI brought up during third-party reviews, and assessing safety culture” (September 26). A discussion was also held on the insufficient involvement of nuclear leaders in emergency response training, which was pointed out during all internal and third-party reviews, and it was decided that going forward to the various problems shall be analyzed/organized and efforts made to find a solution.

◆ Assessing the status of nuclear safety culture

- During FY2016, TEPCO’s Safety Culture Promotion Secretariat spearheaded an assessment of the status of safety culture at Fukushima Daini through interviews and field observation. Fukushima Daini used the results of this assessment as input and began a safety culture cultivation campaign in April 2017 with the cooperation of contractors that focuses on “complying with rules and procedures,” which was an issue identified as being far from ideal. (April 2017)
 - During the campaign group discussions were held to help contractors and station personnel understand the impact on safety and the environment if

⁹ The Council is comprised of the General Manager of the Nuclear Power & Plant Siting Division, FDEC President, power station site superintendents, and Head Office general managers.

rules are not complied with, and the study materials which was used during the discussions were provided to contractors.

- Furthermore, behaviors that should be habitualized were prioritized for each department and the degree of behavior habitualization is being assessed quarterly. In continuation from the first quarter, during the second quarter efforts were made to cultivate safety culture by setting standards for protecting nuclear safety (PA1) and procedure compliance (WP4) as behavior is to be habitualized.
- During FY2017 an assessment of the state of nuclear safety culture at the Fukushima Daiichi NPS was implemented in cooperation with the field diagnosis initiatives¹⁰ implemented by the Japan Atomic Nuclear Safety Institute (JANSI).

¹⁰ Field diagnosis: Employees from JANSI's Safety Culture Cultivation Support Department conduct interviews with everyone from general employees to the site superintendent in order to ascertain the state of awareness of power station personnel and point out "things noticed" from the perspective of an outside party thereby providing support for safety culture cultivation.

2.3 Measure 2 ENHANCEMENT OF OVERSIGHT AND SUPPORT FOR MANAGEMENT

2.3.1 Initiatives Related to Suggestions from the Nuclear Reform Monitoring Committee

(1) Establishment of a Nuclear Safety Advisory Board (NSAB¹¹)

A Nuclear Safety Advisory Board (NSAB) has been established to enable parties with experience¹² as General Managers and Site Superintendents at overseas nuclear operators to provide advice and instructions on organization operation and management in general to Nuclear Power Division leaders (May 24).

The Nuclear Safety Advisory Board engaged in its first activities from August 21st through the 25th at Kashiwazaki-Kariwa and Fukushima Daini after finishing preparatory meetings in May.

At the power stations board members inspected the main control rooms and spent fuel pools, and observe similar training and work in the field. The board members also interviewed approximately 90 people and engaged in group discussions. The findings of the inspection were compiled in the chairman's report on emergency response and safety measure work master plans, operation leadership, and measures to mitigate risk. In addition to this report made to Nuclear Power & Plant Siting Division General Manager Makino also included special mention of the leveraging of human performance tools, configuration management, maintenance ownership, and sufficient leveraging of CAP¹³ as well as detailed field notes from all five board members on interviews and their observations.



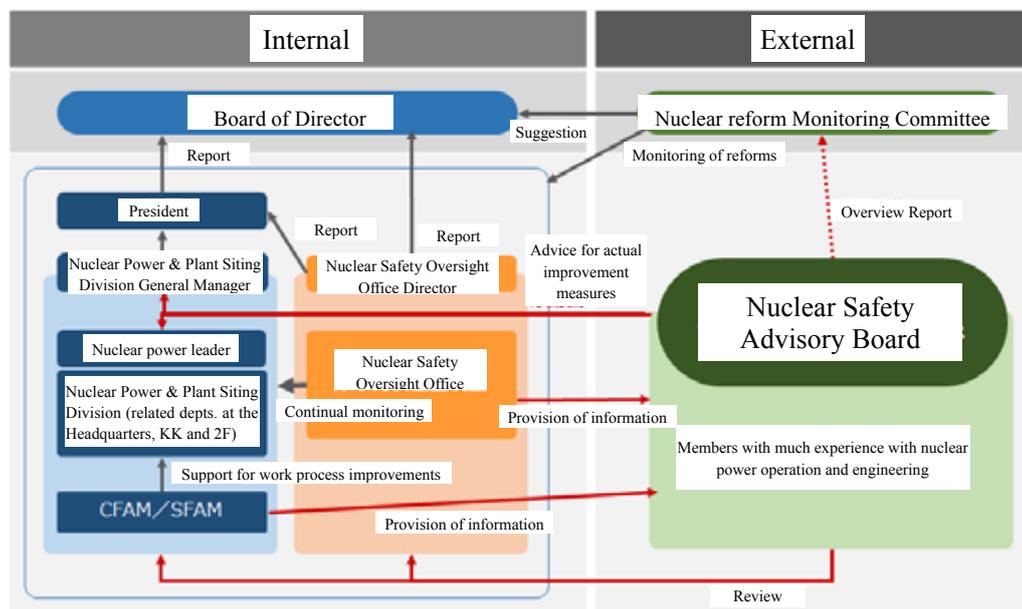
¹¹ Nuclear Safety Advisory Board

¹² Five experts from overseas were invited to be board members.

¹³ Corrective Action Program

Meeting with power station executives (Kashiwazaki-Kariwa) Field inspection (Fukushima Daini)

The Nuclear Power & Plant Siting Division General Manager shall respond to the Nuclear Safety Advisory Board in the form of submission of an improvement plan by the end of October and the Nuclear Safety Advisory Board shall perform a follow-up in December. It is in this way that we aim to become a nuclear operator with the world's highest levels of safety by emulating the excellence of overseas nuclear operators and making continual improvements by employing the PDCA cycle.



Nuclear Safety Advisory Board (NSAB) structure

(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 second quarter that were reported to the executive officer committee on October 24th and the Board of Directors on October 31st.

NSOO Quarterly Report
Nuclear Safety Oversight Office (NSOO) Quarterly Report
2017 Quarter 2 Report

Foreword

This report summarises the Nuclear Safety Oversight Office (NSOO) assessment results for 2017, Quarter 2 (July through September). 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 assessment team looked at program (PG)/project (PJ) management and individual and full-scale drills done as emergency preparedness initiatives in turn making the following observations:

- A smooth project management is one of imperative conditions to adequately manage nuclear and other risks, but currently, there is a gap in the comprehensiveness of the supporting function of project engineers (PEs) for the project managers (PMs.) It is desirable for PEs to strengthen abilities to analyse information from line organizations for further improvement, have a stronger voice over line departments and to accumulate operational know-hows to manage a project.

- There is room for improvement in field conditions and emergency preparedness procedures hastily developed when the disaster occurred. In view of change in circumstances, the relevant equipment management group should improve procedures

and field conditions alike, and verification should be conducted by the Restoration Team Leader and third parties (e.g. Disaster & Industrial Accident Prevention Department).

- Current full-scale drills are not effective, failing to improve individual and organisational competence. Consequently, past issues are being repeated. The Superintendent should clearly indicate expectations to station employees and encourage employees to participate in drills. The Nuclear Disaster Prevention Group should revise drill methods so that drills would serve as educational/coaching platforms.

SREs on site have prepared a matrix of detailed performance data in conformity with the Fundamentals. In particular they highlight:

- LCO deviation event concerning reduced sub-drain water levels

In terms of nuclear safety, insufficient awareness toward reversed in-building and underground water level events appear to be the factor behind the delayed declaration of LCO entry on August 3rd. The Operation Team Leader at the ERC misguided to the judging personnel that this was not a LCO deviation event. His safety consciousness needs to be maintained high.

- Emergency response drill (Development of tornado breakout response steps)

The site advances diversification of training scenarios, and accordingly, an emergency drill that assumed tornado breakouts was conducted for the first time in July. While step-by-step flowcharts to respond to evacuation instructions were prepared in advance of the drill, worst-case scenarios anticipating the natural hazard were not internally shared, resulting in the failure to take protection steps in preparation for potential damages on the equipment. They should develop procedures of protection steps to respond to tornado.

1.2 Fukushima Daini

The assessment team looked at emergency preparedness and responses toward external reviews:

- Findings from full-scale drills are swiftly harnessed in improvement efforts. To deliberate over further enhancement of individual drills, it is important to review preconditions that should be assumed and to raise the validity of proceedings.

- As for external review responses, recommendation and advice response policies have been set forth, and the progress of responses are being managed accordingly. It also is important to, after implementing measures, assess their effectiveness and to check their sustainability.

SREs provided to plant management detailed information concerning the performance of each functional area. Matters requiring attention in that information are provided below.

The Site Superintendent's strong leadership is driving forward reform/improvement in operations and awareness alike. Risk management has improved and station employees have bolstered their morale.

- During the Operator's Skill Competition, improved communication was observed while there were some inadequate operations. The approach to the procedures and training needs to be deliberated. Also, the Shift Supervisor's awareness should be reinforced to develop an operation-leading plant.

- As for how to achieve better performance, steadfast cause identification and more speedy and effective initiatives are needed in preventing minor but persistent human errors as well as violations of Technical Specifications which are often the recurrence of the past similar events.

- Many of the challenges on site involve contractors. Efforts to introduce error prevention tools and MO feedback have started, but there still are weaknesses in contractors' awareness and initiatives. Interactive communication and education opportunities should be enhanced to enable contractors to work more proactively.

1.3 Kashiwazaki Kariwa

The assessment team looked at the progress management of KK 6/7 safety measures, emergency preparedness, operations management, and enhancement of long-term engineering capabilities, and made the following observations:

- As for the designing and work for safety measure equipment, improvements have been made in governance and technical deliberation. This is a result of enhanced project management and separation between licensing responses and technical deliberations. The key factors are to reduce uncertainty by identifying work items, quantitatively managing progress, identifying risk, and managing actions to prevent that risk from manifesting itself.
- The Restoration Team's individual drills are actively implemented in accordance with plans, but it was found that the criteria of some drills are not matching upstream requirements. Efforts to verify procedures have begun for this matter. Procedures are used in various ways during drills; their use therefore should be reinforced by following good operator practices.
- As for operations management, there has been improvement in the weakness of corporate leadership, which was confirmed in the previous quarter. The team also confirmed a corporate-plant joint rollout of an activity aimed at establishing COO (Conduct of Operations).
- As for the reinforcement of mid-to-long term engineering capabilities, deliberations are underway on the roles and responsibilities of quality assurance functions for handling engineering in-house.

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

- In general, improvements are ongoing in the line's independence and monthly Operation Plan Progress Management Meetings, the Nonconformity Management Meeting, and in advancement of countermeasures for detrimental effects caused by sectionalism.
- It was confirmed that the required competence was not defined in the education to prevent the recurrence of cable cross-over nonconformity, and that the measures are not functioning in sufficient and effective manners.
- There are some cases in which the Operations Management Department demonstrated leadership, e.g. shift personnel communicating risk, Operations Management Department encouraging Maintenance Department to hold Prior Review Committees. Cross-functionally applying these good practices is considered effective in achieving a plant led by the Operations Department.
- There is a downward trend in significant nonconformity caused by work errors; a trend ongoing since the second half of 2016. It appears that efforts made by managers in promoting field observation and in using fundamentals are producing certain results. Accurately managing risk in daily operations would also be effective in reducing nonconformity.

1.4 Corporate

The assessment team looked at corporate assistance concerning emergency preparedness and external plant reviews.

- As for emergency preparedness arrangements, corporate functional teams make improvements by conducting individual drills in conjunction with plant drills. It should be noted that the key to cooperation of corporate functional teams cooperate is repeating drills, identifying issues, and maintaining the improvement.

- There is room for improving the Corporate Functional Area Manager's (CFAM) assistance in developing measures against external plant review-based recommendations.

Footnote to Section 1

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

2. CNSO Insights from Assessments

2.1 Emergency Preparedness at 1F

The NSOO observations show a lack of vigor in the approach to emergency arrangements at 1F. This has been exacerbated by the change in location of the TSC.

Also, the approach is not based on worst case scenarios using conservative decisions and judgment.

A real (rather than in training) example of such behaviors is seen in the inadequate response to the reversed in-building and underground water levels event of August 3rd.

CNSO encourages the CDO to take a closer interest in emergency arrangements.

2.2 Failure to ensure the Effectiveness of Actions

There is a general need to ensure the effectiveness of actions and to verify that the desired improvement has been achieved.

In particular at KK where, for example, one of the underlying causes of the cable events has still not been adequately addressed - i.e. The definition of the competence required by the maintenance engineers, and hence the delivery of the required training. This problem was revealed again in the recent realisation that there are defects in fire protection walls.

As pointed out earlier in the report, similar problems are also seen at 2F in response to external reviews.

CNSO encourages the CNO to take a closer interest in this aspect.

3. NSOO Performance – Closure of NSOO Recommendations

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

- Of the 143 recommendations raised prior to this quarter, 103 are closed. 1 actions closed this quarter.
- In this quarter 5 new recommendations were raised.

4. Benchmarking and Training

The NSOO made a benchmarking visit in August to Duke Energy’s headquarters and their McGuire Plant. That led to understanding the gap of: the capability of logically describing issues, and identifying behavioural tendencies. The good practices we learned will be harnessed in trainings and in improving processes.

The NSOO also held initial training for Nuclear Safety Oversight Personnel from the 4th to the 8th of September as a WANO Technical Support Mission, to which NSOO members and site SREs attended. Drawing on this training session, WANO is planning to develop a Nuclear Safety Oversight Personnel initial training for each country.

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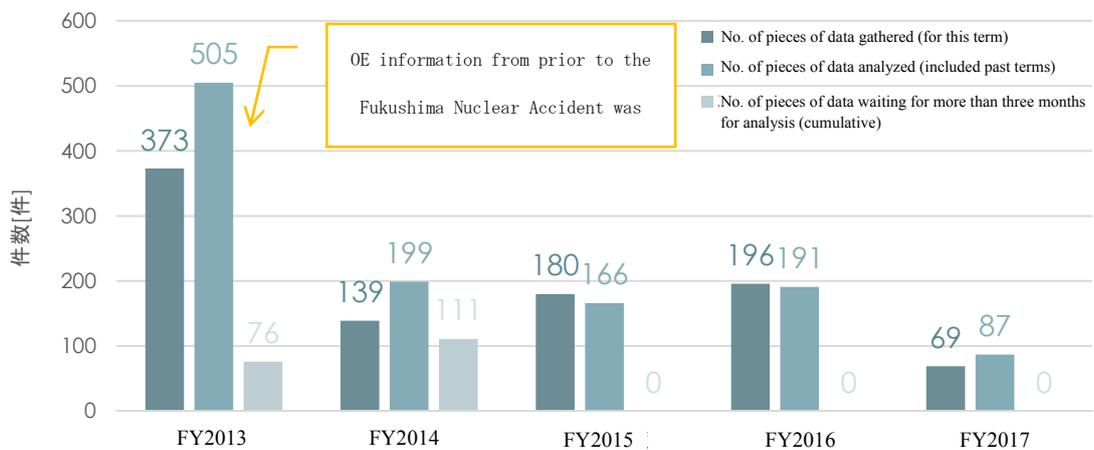
2.4 Measure 3 ABILITY TO PROPOSE DEFENSE IN DEPTH/CAPABILITY FOR PROPOSING DEFENSE-IN-DEPTH

2.4.1 Initiatives Related to Nuclear Reform Monitoring Committee Proposals

(1) Leveraging Operating Experience (OE¹⁴) from within and outside of Japan

◆ Gathering and sharing OE information

- One of the lessons learned from the Fukushima Nuclear Accident is that we must “learn from the failures of others.” Lessons to be learned are being identified and countermeasures deliberated/implemented under the premise that something that has occurred somewhere else in the world can also occur at TEPCO power stations.
- Prior to the Fukushima Nuclear Accident, the gathering of operating experience from within and outside of Japan, and the deliberation of countermeasures, were put off. Therefore, efforts are being made to promptly engage in these activities and enable everyone in the Nuclear Power Vision to leverage this information.
- During the second quarter, 20 pieces of the new OE information were gathered and 34 pieces of OE information, that includes information gathered in the past, were analyzed. We will continue to analyze this information in a planned manner to ensure that no information waits to be analyzed for more than three months



Trends in OE information gathering and analysis

- Recent OE information is posted on the company’s intranet thereby providing an environment in which all Nuclear Power Division personnel can easily access OE information.
 - The viewing rate of new OE information during the first quarter for the entire Nuclear Power Division was 78%.

◆ SOER¹⁵ and severe accident information study sessions

¹⁴ Operating Experience

- Focused study sessions on OE information of particular importance¹⁶ (severe accidents from both within and outside of Japan and SOER) are being held and the efforts are being made to provide an overview of these accidents and troubles, and understand the lessons learned from them.
 - During the second quarter, a total of 207 employees (Fukushima Daiichi NPS: September 28, 29 (51 employees), Fukushima Daini: September 28 (53 employees), Kashiwazaki-Kariwa NPS: August 31 (62 employees), Headquarters: August 29 (41 employees)) participated in a lecture on “Partial Core Meltdown at the Three Mile Island Nuclear Power Plant caused by a Cooling Malfunction” given by overseas experts. Participants commented that, “it reminded me how important it is for leaders to always keep standards high,” and “we had good discussions on effectively leveraging OE. I’m going to get the members of my group to do the same thing.”



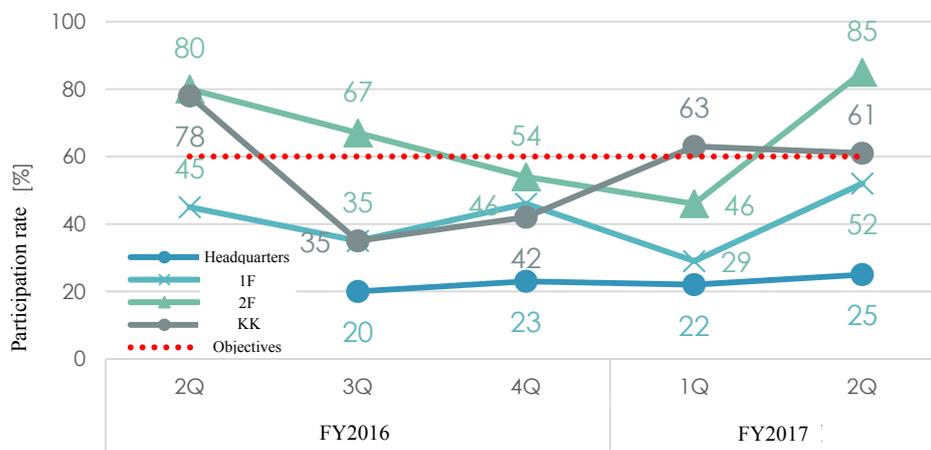
SOER study session at Kashiwazaki-Kariwa (left: Classroom study, right: Group discussion)

- The participation rate of managers in OE study sessions was measured to determine whether or not management is “taking a proactive attitude towards learning about important OE information and not just getting preoccupied with superficial causes.” During the second quarter, participation rates were as follows:
 - Headquarters: 25%
 - Fukushima Daiichi NPS: 52%

¹⁵ Significant Operating Experience Report compiled by WANO

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

Fukushima Daini: 85%
 Kashiwazaki-Kariwa: 61%



OE study session participation rate by managers

(2) Promoting improvements through CAP¹⁷

◆ 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.
- During the second quarter we began training on defining reports related to near misses and low-level issues, or rather, issues that are an indication of a potential problem.
- Starting in the third quarter, performance improvement coordinators (hereinafter referred to as, “PICO¹⁸”) in each department will begin examining MO results and the progress of issues pointed out by third-party reviews. In conjunction with this, we will begin using CAP to manage responses to MO results, and issues pointed out by internal and third-party reviews in an integrated manner as we enhance the way that indication level information is leveraged in order to prevent incident from occurring.

◆ Activities for improving nuclear safety (inputted into CAP)

¹⁷ Corrective Action Program

¹⁸ Performance Improvement COordinator

- 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, PICO began selecting good things observed to during MO as “Good MO.” During the third quarter we will make the degree 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. From the second quarter PICO have been analyzing fundamentals-related weaknesses from the results of MO inputted into the system and enhancing activities to make improvements before these weaknesses manifest into troubles or human errors.
 - We have also started adjusting MO initiatives that leverage fundamentals so that they can be employed at contracting companies.
 - We received a favorable assessment during the 2017 IAEA-OSART follow-up review that stated that, “improvements to these MO programs have improved the ability to make field observations and has caused changing in behaviors to identify problems.”
 - Management observation implemented during the first quarter is as follows

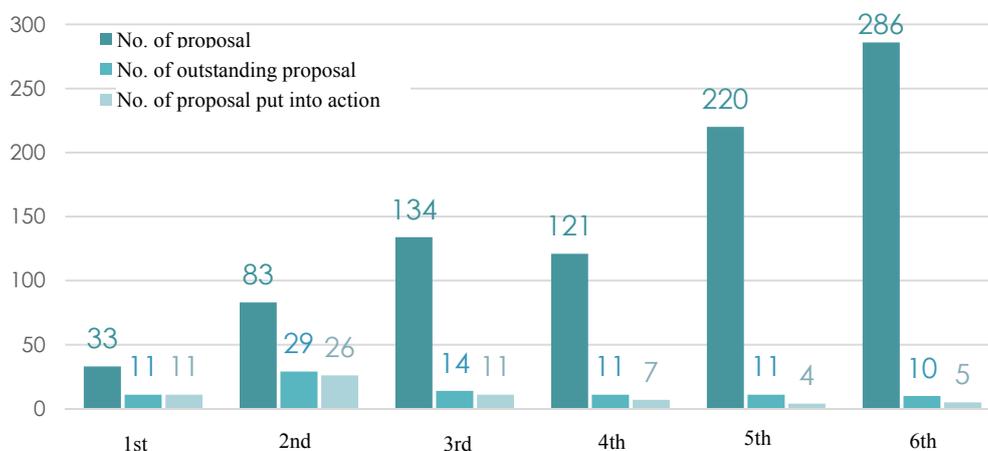
	Headquarters	F1	F2	KK
No. of times implemented	27 times	282 times	938 times	1,699 times
No. of times per person/month	0.21 times/month/person	0.63 times/month/person	4.56 times/month/person	5.51 times/month/person

2.4.2 Other Initiatives

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

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

- During past competitions (3rd competition and after) excellent proposals were selected by vote and also by a panel of judges, and the number of excellent proposals selected was set at a maximum of approximately three for each power station because the focus was on putting these proposals into practice. However, as a result of this, it is possible that there may be excellent proposals that could contribute to improving nuclear safety lying in wait in the approximate 900 proposals that were not selected in the past.
- Therefore, the 7th competition to be held in the third quarter will comprise of a repechage for unselected proposals that were deemed as effective countermeasures during past competitions (as assessed from the perspectives of enhancing core damage prevention/impact mitigation/emergency response and preventing discharges of radioactive substances). The plan is to uncover and employ excellent proposals that can contribute to improving nuclear safety.
- At current time, “enhancing means for determining core damage in the event that CAMS (Containment Vessel Atmospheric Monitoring System) is rendered unusable” and “storage of portable safety measure equipment in robust warehouses” will be subjected to voting.



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

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 second quarter are as follows:
 - 4th competition: Out of the 11¹⁹ outstanding proposals submitted, one has been put into practice since the last report (cumulative total: seven proposals).
 - 6th competition: Out of the 10 outstanding proposals submitted, one was put into practice. (cumulative total: five proposals)

<4th Competition>

- Small motorcycles have been deployed in order to quickly check conditions of roads and conditions in the field in the event of a disaster, such as an earthquake, even if roads have been damaged. (Kashiwazaki-Kariwa)



Training on small motorcycles deployed as part of emergency countermeasures

¹⁹ Countermeasures for the “fears about water leaking into the Unit 5/6 underground electrical equipment room (influx of groundwater)” brought up during the 2nd competition were implemented as part of “Groundwater Countermeasures for the Unit 5/6 SWGR rooms” proposed during the 5th competition. Also, as a result of examining the details of the excellent proposal from the 4th competition to “install snow melting equipment on the roof of the reactor building” it was found that the required amount of water to melt snow cannot be secured from sub-drain water, so implementation of this measure was canceled. As a result, the total numbers of excellent proposals implemented from the 2nd competition and 4th competition were changed to 29 and 11, respectively.

<6th Competition>

- In order to improve the reliability of power supplies from generator trucks a switch that will enable quick startup depending on the conditions even in the event of a minor incident will be added and the risks of generator truck trips caused by magnetizing inrush current resulting from soft startup (zero voltage startup). (Kashiwazaki-Kariwa)



Generator truck improvements (left: Exterior view, right: Control panel)

- During the third quarter “increases in the number of proposals and increases in the number of excellent proposals put into practice” will be set as a performance indicator.
- We will continue to monitor the process by which outstanding proposals are put into practice and follow-up in instances where the 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.

- Issues that should be addressed in order to improve nuclear safety were selected in accordance with the guide. In particular, in order to identify those topics that may have a direct impact on nuclear safety 165 issues were identified from the following viewpoints using “field observation reports from each power station for last fiscal year (monthly chief reactor engineer report, monthly Nuclear Safety Oversight Office report),” “manager reviews

(nonconformance analysis results, issues pointed out during safety inspections, third party review results, maintenance management effectiveness assessments, etc.),” “nuclear safety KPI analysis results,” “trouble examination reports,” and “other nuclear safety concerns” as input.

- a. Issues that reduce the ability to respond to natural phenomenon such as external/internal flooding and fires, volcanoes, tornadoes, and forest fires, etc.
 - b. Issues that reduce the reliability of equipment and systems vital for safety
 - c. Issues that may cause a loss of function of barriers for protecting radioactive substances
 - d. Issues that may reduce the effectiveness of severe accident countermeasures (equipment-related, procedure-related)
 - e. Issues that may reduce the ability to respond to terrorism or aircraft collision
 - f. Issues that may reduce the reliability of power sources
 - g. Issues that may reduce the reliability of emergency responses
- Next, the degree of impact that each of the identified issues on nuclear safety was assessed in terms of the degree of risk ((frequency of occurrence) x (degree of impact)) and those issues that can be expected to improve nuclear safety by making improvements from the perspective of defense-in-depth while considering countermeasures already being implemented were selected. The topics selected by each power station and the reasons for those selection are as follows:
 - Fukushima Daiichi: Effectiveness assessments after risk management revisions

Effectiveness assessment of maintenance management processes was selected in consideration of the weaknesses with identifying risks prior to beginning work during maintenance management processes that were found, and the revisions made to the way that risk management is conducted in April 2017, which were implemented in order to examine risk information in a unified manner at risk management meetings.
 - Fukushima Daini: Pool cooling equipment reliability

This was selected because based on multiple cases of identified large risks, it is assumed that there are latent weaknesses at Fukushima Daini with the physical protection of equipment vital for safety and the power sources for that equipment, and with fire protection.

- Kashiwazaki-Kariwa: The impact that field work has on plant safety functions

This was selected because whereas improvements were made to the “mechanisms” for confirming the impact that field work has on plant safety functions in the wake of the insufficient separation of cables under MCR floors, there are currently still issues with the skill of the “people” that make up these mechanisms and the creation of “tools” to be referenced when employing these mechanisms.

- Going forward, the perspective from which reviews are implemented shall be examined closely in preparation for implementation, the plans and manuals shall be created in order to systematically implement reviews.

(3) Using hazard analysis to construct improvement processes

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

- At Kashiwazaki-Kariwa the analysis of approximately 30 identified hazards was completed in FY2014 and countermeasures are being deliberated in accordance with the created plan.
- During the second quarter we examined handling the impact of an electromagnetic pulse created by a high-altitude nuclear explosion. This was discussed at the meeting of the hazard analysis team and it was decided that further countermeasures to improve reliability should be identified through the field surveys.

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

- The seven newly appointed Risk Communicators were subjected to presentation training in order to improve communication activities (July). Skills were assessed by external instructors to help each individual become aware of their strengths and weaknesses. This training will help to improve the participants' ability to give easy-to-understand explanations at press conferences and meetings outside of the company and to gather information, and also promote participation in study sessions.
- Training for all 41 Risk Communicators was implemented during which group discussions were held based upon case studies from other companies and also incidents that have occurred both within and outside the company in order to improve logical thinking and increased sensitivity to reputation risks (August 25, September 1, 15). Participants commented via a post-training questionnaire that, "sharing information about and discussing incidents that have occurred both inside and outside the company in a timely manner enabled us to see the social impact," and that, "I was able to share my thinking with other Risk Communicators." Some participants also commented that they would like training that focuses on how risks may change in the future in conjunction with decommissioning.



Risk Communicator training

◆ Improving the risk communication ability of employees

- Continuous awareness reform training that uses examples of problems that have occurred at TEPCO related to information disclosure and communication was commenced for the Headquarters Nuclear Power Division, Niigata Headquarters and Kashiwazaki-Kariwa as part of “Improvement Measures Noted in the Niigata Prefecture Report on The Insufficient Handling of New Regulatory Requirement Compliance Inspections at Kashiwazaki-Kariwa.”
- In addition to this problem, a training plan that examines important information disclosure-related issues was created using the cases of the failure to disclose information about drainage channels at Fukushima Daiichi and the failure to notify/report core meltdowns during the Fukushima Nuclear Accident. During the second quarter power station Risk Communicators served as instructors for seven training sessions for all site personnel that were implemented beginning on September 11th. This training will also be implemented for the Niigata Headquarters and Headquarters Nuclear Power Division.



Awareness reform training that uses examples of problems with information disclosure and communication (Kashiwazaki-Kariwa)

2.5.2 Other Initiatives

(1) Engaging in risk communication

◆ Communicating with the siting community

- Activities in the Fukushima area
 - The third installment of *Hairomichi*, which provides information to the

residents of the local community on the decommissioning of Fukushima Daiichi, was issued on August 10 (approximately 10,000 copies). We also continue to provide the 1 FOR ALL JAPAN website for the families and workers at Fukushima Daiichi as well as the Monthly 1F newsletter (20,000 copies).

- At meetings of the Fukushima Council on Decommissioning and Decontamination Measures (July 31, September 29) explanations were given of the revisions made to the Mid-and-Long-Term Roadmap Towards Decommissioning of TEPCO Fukushima Daiichi Nuclear Power Station Units 1 to 4. And, at the meeting of the Prefectural Council on Ensuring the Safety of Decommissioning of Fukushima Nuclear Power Stations, an explanation of the sub-drain notification issue was given (September 5). At the International Forum on Decommissioning the questions and concerns that the local residents have about decommissioning were discussed and opinions exchanged with experts (July 2, 3).
- Since August 1st equipment and instrument malfunctions found during normal inspections at Fukushima Daiichi have been posted on the website. As of the end of September, 46 troubles have been posted.
- During the second quarter 2,593 people were given tours of the Fukushima Daiichi nuclear power station (cumulative total for FY2017: 5,549).
- Activities in the Niigata area
 - On July 21st, Headquarters Nuclear Power Division managers started participating in the following activities for the purpose of directly feeling the uneasiness that the local residents harbor towards nuclear power generation and TEPCO and as of the end of September, 38 managers have participated in these activities.
 - Visits to households in Kashiwazaki City and Kariwa Village.
 - Explanations given to visitors to communication booths at various locations within the prefecture



Public briefing by Nuclear Power Division managers (Niigata City)
 [Left: Nuclear Power & Plant Siting Division General Manager Makino]

- Participants of 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.” These initiatives will continue.
- At the community meeting (held on the first Wednesday of each month), a report was given on communications initiatives at Kashiwazaki-Kariwa and opinions elicited. We will continue to give updates on our efforts and make improvements that reflect the opinions received.
 <Primary issues reported on> (July 5, August 2, September 6)
 - The seismic resistance of the 6 at Kashiwazaki-Kariwa.
 - Earthquake faults under the Kashiwazaki-Kariwa site, etc.
- At the inspection plan review meetings and inspection information sharing meetings, which are held every day by Headquarters departments handling inspections, communications departments receive inspection-related information without delay and are able to identify issues that may have a large social impact as well as examine how information on these issues should be conveyed in a timely and easy-to-understand manner. The following three primary improvements were made during the second quarter.
 <Primary improvements>
 - In regards to emergency response, brochures that use cartoons to explain emergency response training were created in response to a

request to “provide information and easy-to-understand manner.”

- Special edition of the *News Atom* newsletter was issued to give prior notice of the areas in which household visits will be made in response to a request to give such information in advance.
- Questions frequently asked by residents of the community are responded to in a Q&A format in the TEPCO Newsletter.



News Atom (special edition)

TEPCO Newsletter (4th issue)
Q&A section

- Departments at the Niigata Headquarters and Kashiwazaki-Kariwa responsible for giving explanations to the local government hold weekly information sharing meetings based upon the status of initiatives in order to identify important issues and discuss the information to be explained to the local government. During the second quarter an explanation of the “criteria for deciding to shut down containment vessel venting,” which was an issue discussed at the Kashiwazaki-Kariwa Unit 6/7 new regulatory requirement compliance inspection meeting, was given.
- During the second quarter a total of 4,006 people were given tours of the Kashiwazaki-Kariwa NPS (cumulative total for FY2017: 6,902)
- In order to get the local community to feel more connection with Kashiwazaki-Kariwa a summer event was held at the Service Hall (August 11-15) and tours of the power station were given (total number of visitors: 3,051). A similar autumn event was held at Service Hall from September 16~18 and again tours of the power station were given (total number of visitors: 1,664).
- “*Fureai* Talk Salons” have been opened at Service Hall, TEPCO *Fureai* Salon Ki-na-se, and Energy Hall to engage primarily women in the siting community and hear their opinions (held a total of 4 times, 33 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 Kashiwazaki City and Kariwa Village TEPCO employees visited the homes of residents for the third time since the accident. These visits present us an opportunity to directly engage in dialogue with residents, apologize for, and explain, the insufficient handling of new regulatory requirement compliance inspections at Kashiwazaki-Kariwa, and listen to their fears and concerns as well as their opinions about the power station. As of the end of August 29,260 homes (approximately 71%) had been visited.
- We had taken commercials off the television and radio on February 17th of this year in consideration of the Main Seismic Isolation Building problem. However, it is still our responsibility to widely convey information to all of Niigata Prefecture and after receiving requests to put the commercials back on the air we started running the commercials again on August 14th.
- Communication initiatives on behalf of management
 - Members from new management including Chairman Kawamura and President Kobayakawa, etc., visited the governments of the siting community to introduce themselves. The chairman and President expressed their resolution to move forward with nuclear safety reforms from the perspective of the local community while prioritizing safety (Fukushima region: June 26~28, July 4; Niigata region: July 25; Aomori region: July 31, August 1).
- ◆ Communicating with overseas parties
 - Washington State University Professor Onishi, who has a great deal of knowledge about decontamination and waste processing at the Hanford Site in the US (nuclear production complex in Washington state) was invited to give a lecture to TEPCO management and Risk Communicators about communication as it concerns the Fukushima Nuclear Accident (August 4). In conjunction with various opinions were also exchanged in regards to how to communicate and build better relationships with local residents in order to move forward smoothly with decommissioning. Professor Onishi suggested that it was important to allow not only experts but also members of the local community to participate in meetings where plans are formulated to foster

better acceptance of final decisions.

- Disseminating information overseas
 - A leading television station in Spain (Canal Cuatro TV) did a story on the current conditions in Fukushima and the initiatives underway at the Fukushima Daiichi NPS (August 4). The documentary will air this fall during prime time.
 - A video of the interview with IAEA OSART team leader Peter Tarren who was in Japan was posted on TEPCO's Facebook page (August 16).
 - During a side event on the decommissioning of Fukushima Daiichi held in conjunction with the 61st IAEA General Conference FDEC President Masuda gave a presentation on the status of decommissioning of the Fukushima Daiichi NPS (September 18)



Presentation given by FDEC President Masuda (September 18)

- Chinese journalist, Mr. Jian Fuon, (who has more than 800,000 followers on Weibo, China's version of twitter) did a story on Fukushima Daiichi (September 19) that was published in a tabloid magazine owned by the Chinese newspaper *People's Daily* with a circulation of two million copies and also on the Internet site for the same magazine ("*Huanqiu*").
- BBC News, a leading television and radio news station in the UK, reported on the challenges and technical innovations for decommissioning Fukushima Daiichi, and the work environment (September 23). The piece was aired on the BBC program "Click" on October 14th.

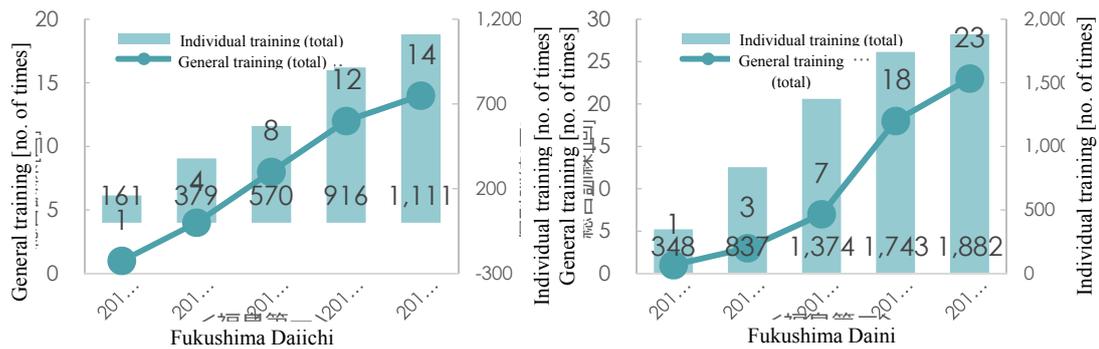
2.6 Measure 5 ENHANCEMENT OF POWER STATION AND HEADQUARTERS EMERGENCY RESPONSE CAPABILITIES

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

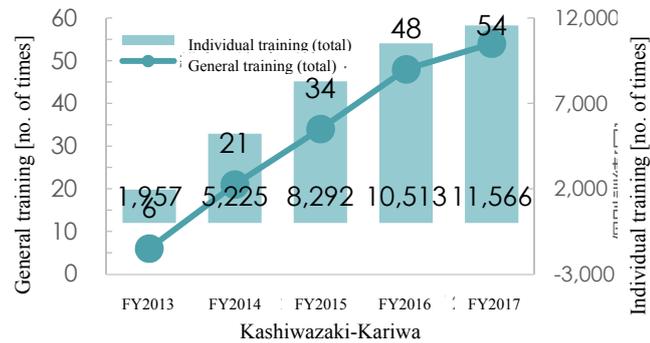
Training is being implemented in a planned manner in consideration of the assessment of last fiscal years' training programs and basic plan, and based on the Mid- to Long-Term Plan that was revised in April. Since it was deemed that Fukushima Daini, Kashiwazaki-Kariwa and the Headquarters have almost 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 (achieved 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 ability of the plan to respond to emergencies has not achieved the objectives of the basic plan (STEP-1). 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:



※Numbers for Fukushima Daiichi FY 2016 individual training have been corrected



◆ Fukushima Daiichi

- During general training held on September 1st the Emergency Response Center in the main office building was used to train on how to respond to troubles stemming from terrorism or sabotage. How workers create teams to respond to sabotage by terrorists and repair equipment was examined.
- Information was shared within the Emergency Response Center in the new main office building by using a whiteboard to write the location, response status, and handling plan for events resulting from sabotage by terrorists. Furthermore, briefings were used to bring everyone up to speed on the safety priorities based on changing reactor parameters in light of the recent problem of repair delays caused by mistakenly assuming instrumentation malfunction.
- We will continue to implement training on various scenarios, identify problems and propose/implement improvements as we improve the repetition.



Fukushima Daiichi Emergency Response Center (new main office building)

- ◆ Fukushima Daini
 - General training was held on August 30th based on a harsh scenario that combines an earthquake with sabotage by terrorists.
 - In response to sabotage by terrorists, participants trained on assembling, evacuating, determination and notification of EAL as well as how to respond to equipment damage caused by explosions and also confirm the safety of personnel. Information on the location of intruders was shared using announcement equipment until the intruders were eventually apprehended.
 - As part of the training scenario, a power loss and damage to the spent fuel pools from an earthquake was simulated after the intruder was apprehended and while recovery teams were checking plant conditions and engaging in repairs. It was determined that an EAL had occurred and notification was given properly.
 - As with at Fukushima Daiichi, we will continue to implement training on various scenarios, identify problems and propose/implement improvements as we improve the repetition.
- ◆ Kashiwazaki-Kariwa
 - General training was held on July 21st, August 25th and September 28th.
 - The Emergency Response Center in the Unit 5 reactor building was used for the first time during general training in September. Even though the Unit 5 reactor building Emergency Response Center (ERC) is still under construction and the installation of microphones for sharing information with the main building and lights has yet to be completed, it was possible to use the center to appropriately engage in procedures required to handle an accident. Sound equipment and information sharing tools will be further developed so as to enable even smoother information sharing within the ERC.



Unit 5 Reactor Building Emergency Response Center

◆ Headquarters

- Individual training was implemented on August 25th, and general training was implemented on October 4th.
- The individual training in August focused on quickly and appropriately conveying information from the Headquarters to the Nuclear Regulatory Agency. During training participants practiced giving explanations to representatives of the Nuclear Regulatory Agency (simulated) via teleconferencing. Members of Headquarters government agency liaison teams appropriately shared information with the Nuclear Regulatory Agency based upon predetermined procedures, however they had trouble answering questions from the Nuclear Regulatory Agency. Improvements were made by creating a mechanism by which Headquarters teams can share information on questions from the Nuclear Regulatory Agency that have yet to be answered so that these unanswered questions are managed appropriately.
- The general training held in October marked the first time that training was implemented after department transfers in July. Individual training was implemented for the newly appointed General Managers and commanders in the form of study sessions on preparedness team-related manuals and viewing of videos from past training sessions, however efforts will be made to improve the ability to communicate within departments since some members were not very accustomed to actually speaking up. Furthermore, when examining the effectiveness of the mechanism newly created in order to appropriately manage unanswered questions from the Nuclear Regulatory Agency problems were found with personnel deployment and the degree to which tools can be used

easily, so further improvements will be made.



Headquarters Emergency Response Center (Left: ERC manager, Right: Deputy ERC manager)



Training on sharing information with the Nuclear Regulatory Agency (simulated)

2.7 Measure 6 DEVELOPMENT OF PERSONNEL FOR ENHANCING NUCLEAR SAFETY

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

(1) Initiatives to improve individual technological capability

◆ Reconstructing education and training programs based on SAT

- The Nuclear Human Resources Training Center has adopted the Systematic Approach to Training (SAT), which is recognized internationally as a best practice, and is providing education and training programs necessary for personnel development throughout the entire Nuclear Power Division.
- 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 second quarter, meetings of the Curriculum Review Board and Power Station Education and Training Committee were held. During these meetings requests concerning education and training implemented at power stations were made thereby helping to make continual improvements.
- During each training session, trainees were made aware of the related fundamentals (basic behavior) in an effort to help understanding of fundamentals permeate throughout the organization.
- In an effort to create educational programs that help to acquire a high degree of expert knowledge we have implemented in-house rehearsals in order to prepare for the oral exam to be certified as a licensed reactor engineer²⁰. Support was also provided for the next written exam (scheduled for March of next year). Study sessions for the licensed electrical engineer exam began in June and will be held periodically going forward.
- Simulator training was provided to a wide variety of 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. Human factor and human performance tool training was also provided for members of the

²⁰ This fiscal year 19 out of 87 applicants passed the exam. Out of the 87 people nationwide who took the exam this year only 12 passed.

maintenance departments at Fukushima Daini. Training was also commenced for the maintenance department managers and group managers at Kashiwazaki-Kariwa in September. Going forward this training will also be provided for all personnel at Kashiwazaki-Kariwa and Fukushima Daiichi.



Human factor and human performance tool training for maintenance personnel

- ◆ Introduction of a Human Resource Development Management System
 - In order to manage the data that will be the foundation for long-term human resource development we have introduced a new nuclear human resource development management system for recording the results of education and training and managing the certifications and skills of individuals. The system was put into use in April after setting system functions and preparing data.
- ◆ Middle management training
 - Since FY2015, TEPCO has been providing training for middle managers from the standpoint that middle-managers need to be aware of, and have the ability to, thoroughly fulfill their responsibilities jointly with nuclear leader while remaining sufficiently aware of their own responsibilities to nuclear safety.
 - Group manager training
Training was provided for new group managers and shift supervisors in September in conjunction with periodic department transfers that occurred over the summer. Through lectures and discussion trainees gained a better understanding of the expectations of TEPCO leadership and management. The same training is planned again for October.



Group manager training

(Left: FDEC President Masuda and Nuclear Power & Plant Siting Division Manager Makino, Right: Group discussions)

- Power station manager training
During the second quarter, follow-ups were performed for the action plans created by the managers that underwent new department manager training (11 managers) and department managers that underwent second and third-year department manager training (12 managers) last fiscal year in order to improve the leadership of department managers. During this fiscal year second and third-year department manager training will be held in October, and new department manager training will be held in December.
- ◆ Status of initiatives to improve in-house technological capability of power stations (maintenance/operation field, etc.)
 - Maintenance personnel initiatives
 - Fukushima Daiichi NPS
We are continually implementing training to develop in-house technical ability (training on the operation of power supply cars, temporary laying and connecting of hoses, and training on the use of heavy equipment, etc.) in order to improve the ability to respond to emergencies. As part of mobile crane operation training implemented during heavy equipment operation training, the point where the suspended load is to be relocated and the area in which the load is to be lowered was limited thereby increasing the level of difficulty each time training is poor.
 - Fukushima Daini NPS
In order to improve the ability to respond to emergencies we are conducting repetitive training drills with four teams (① debris removal/road repair,② generator replacement,③ temporary cable

connecting,④ coolant pump repair). During temporary cable connection training cables were prepared and connected in dark places thereby simulating working at night when vision is limited. We will continue training to develop creativity and innovation so as to be able to flexibly deal with a variety of circumstances.



Temporary cable connection training simulating nighttime conditions

- Kashiwazaki-Kariwa NPS

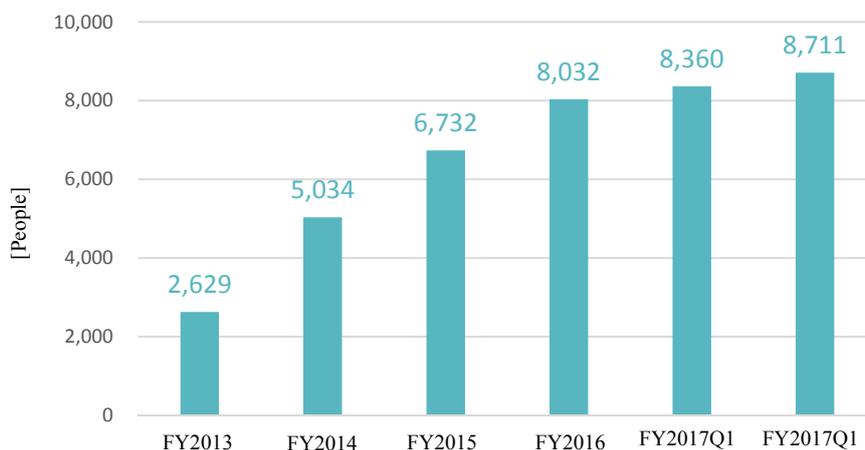
In order to improve in-house technological capability and thereby prevent severe accidents from occurring, we are conducting various types of training such as on assembling and disassembling scaffolding, welding/cutting/grinding, high voltage cable preparation and splicing, bucket truck operation and valve/pump disassembly inspections. We have also newly commenced mobile crane operation training in effort to improve our abilities to respond to an emergency by increasing safety awareness and improve the skills required to relocate and operate heavy machinery used for removing debris, etc., in the event of an emergency. We will continually implement repetitive training in order to maintain and improve technological capability.



Mobile crane operation training (left: Outrigger extension, right: Low relocation training)



High-voltage cable connection training (pressure joining) Scaffold assembly/disassembly



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 FY 2014. As of the end of September, 32 operators had been certified on the operation of fire engines thereby exceeding our 34-operator goal (80% of the 40 operators in the field) (fill-rate: 125%, one person decrease over Q1), and 44 operators had been certified on the operation of power supply cars (fill-rate: 125%, one person decrease over

Q1). 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 September, 26 operators have been certified on the operation of fire engines thereby meeting our 23-operator goal (80% of the 28 operators in the field) (Fill-rate: 113%, increase of one operator from Q1), and 24 operators had been certified on the operation of power supply cars (fill-rate: 104%, decrease of seven operators over Q1).

- Kashiwazaki-Kariwa

Fire engine and power supply car operation training commenced during FY2013. As of the end of September, 99 operators have been certified on the operation of fire engines thereby exceeding our 96-operator goal (80% of the 120 operators in the field (Decrease of 10 operators as a result of Q1 transfers)) (Fill-rate: 103%, decrease of 12 operators from Q1), and 106 operators had been certified on the operation of power supply cars (fill-rate: 110%, decrease of 14 operators over Q1). 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 September, 152 instructors (decrease of six operators from Q1) had been trained. Efforts are also being made to improve the ability of not only maintenance personnel but also operators to diagnose equipment troubles in conjunction with the increase in the number of operators that has occurred in order to handle emergencies. These operators have obtained internal certification on equipment diagnostics and are now continually sampling data for approximately 140 pieces of rotating equipment at Unit 7. This has led to an improvement in the abilities of field workers, such as the acquisition of a wide variety of knowledge related to equipment and also an increased interest in equipment status.

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

Power Station	Fire Engine		Power Supply Truck	
	Number of skill certifications (compared with the last quarter)	Fill rate	Number of skill certifications (compared with the last quarter)	Fill rate
Fukushima Daiichi	40 people (-1)	125%	40 people (-1)	125%
Fukushima Daini	26 people (+1)	113%	24 people (-7)	104%
Kashiwazaki-Kariwa	99 people (-12)	103%	106 people (-14)	110%

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

◆ Deliberation of the Establishment of a Nuclear Engineering Center

- By integrating the engineering functions of the 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 second quarter we determined the relationship between the division of duties between groups that comprise the Nuclear Engineering Center and the duties of existing departments. The revision of related internal manuals has also commenced.
- The timing for opening of the Nuclear Engineering Center will be determined in accordance with the status of new repertory requirement compliance inspections but in the meantime, we're moving forward diligently with necessary manual revisions.

The Main Roles of the Nuclear Engineering Center

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

◆ Cultivating system engineers

- In order to promptly and safely stabilize a reactor when there is an emergency, personnel need to quickly ascertain the circumstances of the accident and make accurate decisions. Therefore, engineers are being trained to be proficient in design, laws and regulations, standards, operation, maintenance and other areas pertaining to facilities important for safety.
- System engineers formulate system monitoring programs, which stipulate monitoring targets and standards for monitoring system performance degradation, in order to monitor whether or not primary plant systems are fulfilling design requirements. These monitoring activities also serve to identify areas in which reliability can be improved, which leads to overall improvements.
- During the second quarter, 20 systems at Kashiwazaki-Kariwa Units 6 and 7 subject to monitoring were continually monitored and it was confirmed that there are no performance abnormalities. Kashiwazaki-Kariwa system engineers presented the achievements of system monitoring activities at a technology exchange session of the Japan Society of Maintenology held in August which commended the efforts as helping to reduce risk.



Presentation about system monitoring activities at the Japan Society of Maintenology technology exchange session

- We currently have five system engineers (Kashiwazaki-Kariwa). Going forward, we shall implement education and training to expand the scope of expertise of existing engineers and maintain their skills with the goal of having five system engineers for each reactor. Since system engineers serve as the core personnel responsible for plant management we will expand the scope of personal training at the Nuclear Engineering Center.
- ◆ 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 standard documents, the details of the Design Guideline Creation and Management Guide (tentative title) written during the first quarter were subjected to stringent review and a formal guide (first edition) was created. Furthermore, during the second quarter we completed selecting the systems, structures and common design issues that should be prioritized when writing design standard documents. Going forward we will accelerate our efforts to create design standard documents for those systems, etc., identified as priorities.
 - In the course of deliberating configuration management processes, the applicability of processes is being examined by applying past cases to the management procedures that were created last fiscal year. Through this process we will make necessary changes and move forward with creation of

detailed work procedures (work manuals).

- In regards to the development of a system for supporting configuration management processes, we have completed design and development and are moving forward with transferring equipment schematics data and system operation training. We will put the system into use in conjunction with the opening of the Nuclear Engineering Center.
- Since this will be the core process for design work at the Nuclear Engineering Center will move forward with the cultivation of engineers that can handle this task appropriately.

2.8 KPI/PI Performance and Assessment

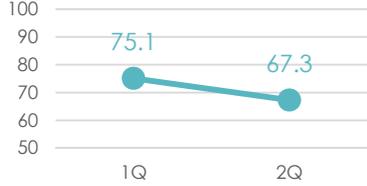
2.8.1 KPI/PI Performance

(1) KPI Performance (FY2017Q2)

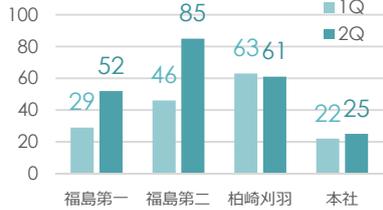
KPI	Target	Performance	Notes
Safety awareness			
Safety awareness KPI (nuclear leader)	70 points	64.0 points	
Safety awareness KPI (entire Nuclear Power Division)	70 points	54.7 points	
Technological capability			
Technological capability (in times of normalcy)	100 points	To be assessed at the end of the fiscal year	
Technological capability (in times of emergency)	100 points	97 points	
Ability to promote dialogue			
Ability to promote dialogue (internal)	70 points	69.9 points	
Ability to promote dialogue (external)	Increase over last fiscal year	To be assessed at the end of the fiscal year	

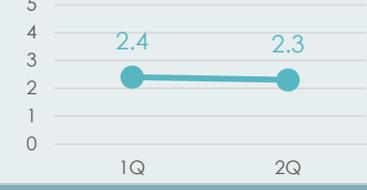
(2) PI Performance (FY2017Q2)

PI	Target	Performance	Notes						
Safety awareness									
Nuclear leader									
< Safety-1 > Rate of implementation of retrospection leveraging the traits	100%	78.0% <table border="1"> <tr><th>Quarter</th><th>Performance (%)</th></tr> <tr><td>1Q</td><td>81.4</td></tr> <tr><td>2Q</td><td>78</td></tr> </table>	Quarter	Performance (%)	1Q	81.4	2Q	78	
Quarter	Performance (%)								
1Q	81.4								
2Q	78								
< Safety-2 > Number of times emails have been sent by nuclear leader in order to share information	More than once a week	13 times in 12 weeks (108.3%) <table border="1"> <tr><th>Quarter</th><th>Performance (times)</th></tr> <tr><td>1Q</td><td>91.7</td></tr> <tr><td>2Q</td><td>108.3</td></tr> </table>	Quarter	Performance (times)	1Q	91.7	2Q	108.3	
Quarter	Performance (times)								
1Q	91.7								
2Q	108.3								
< Safety-3 > Number of times nuclear leader participated in preparedness training	More than twice a year	5 times (76.9%) <table border="1"> <tr><th>Quarter</th><th>Performance (times)</th></tr> <tr><td>1Q</td><td>46.2</td></tr> <tr><td>2Q</td><td>76.9</td></tr> </table>	Quarter	Performance (times)	1Q	46.2	2Q	76.9	
Quarter	Performance (times)								
1Q	46.2								
2Q	76.9								
< Safety-4 > Number of times nuclear leader went into the field (to engage in MO or exchange opinions with workers)	More than twice a month	1.3 times/month <table border="1"> <tr><th>Quarter</th><th>Performance (times/month)</th></tr> <tr><td>1Q</td><td>1.8</td></tr> <tr><td>2Q</td><td>1.3</td></tr> </table>	Quarter	Performance (times/month)	1Q	1.8	2Q	1.3	
Quarter	Performance (times/month)								
1Q	1.8								
2Q	1.3								
< Safety-5 > Number of benchmarked issues for which nuclear leader 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						

PI	Target	Performance	Notes
Entire Nuclear Power Division			
< Safety-6 > Percentage of groups that discuss the results of trait retrospection	100%	86.8% 	
< Safety-7 > Percentage of messages from nuclear leader that have been read	More than 80%	67.3% 	
< Safety-8 > Number of times managers engaged in management observation	Target values to be set by each organization	1F: 0.63 times 2F: 4.56 times KK: 5.51 times Headquarters: 0.21 times 	No. of times per person per month
< 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%	Fukushima Daini: 38.6% Kashiwazaki-Kariwa: 17.2%	To be measured from Q2
< Safety-10 > Percentage of corrective measures completed before deadline	100%	1F: 51.7% 2F: 42.9% KK: 77.5% Headquarters: 100%	At Fukushima Daiichi human error-related nonconformances were measured

PI	Target	Performance	Notes															
		<table border="1"> <caption>Performance Data (Top Chart)</caption> <thead> <tr> <th>Location</th> <th>1Q</th> <th>2Q</th> </tr> </thead> <tbody> <tr> <td>福島第一</td> <td>37</td> <td>51.7</td> </tr> <tr> <td>福島第二</td> <td>33</td> <td>42.9</td> </tr> <tr> <td>柏崎刈羽</td> <td>61</td> <td>77.5</td> </tr> <tr> <td>本社</td> <td>60</td> <td>100</td> </tr> </tbody> </table>	Location	1Q	2Q	福島第一	37	51.7	福島第二	33	42.9	柏崎刈羽	61	77.5	本社	60	100	
Location	1Q	2Q																
福島第一	37	51.7																
福島第二	33	42.9																
柏崎刈羽	61	77.5																
本社	60	100																
< Safety-11 > Number of recurring GII or higher nonconformances	0	<p>1F: 11 2F: 0 KK: 0 Headquarters: 1</p> <table border="1"> <caption>Performance Data (Bottom Chart)</caption> <thead> <tr> <th>Location</th> <th>1Q</th> <th>2Q</th> </tr> </thead> <tbody> <tr> <td>福島第一</td> <td>5</td> <td>11</td> </tr> <tr> <td>福島第二</td> <td>0</td> <td>0</td> </tr> <tr> <td>柏崎刈羽</td> <td>0</td> <td>0</td> </tr> <tr> <td>本社</td> <td>0</td> <td>1</td> </tr> </tbody> </table>	Location	1Q	2Q	福島第一	5	11	福島第二	0	0	柏崎刈羽	0	0	本社	0	1	
Location	1Q	2Q																
福島第一	5	11																
福島第二	0	0																
柏崎刈羽	0	0																
本社	0	1																
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																
< 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																

PI	Target	Performance	Notes
< Engineering-7 > Number of personnel that have external certifications such as Licensed Reactor Engineer (LRE), Class 1 Chief Radiation Handler, Engineer (Nuclear and Radiation Dept.), etc.	Training objective achievement rate: 100%	To be assessed at the end of the fiscal year	
< Engineering-8 > Participation rate in important OE training	More than 60% of managers	1F: 52% 2F: 85% KK: 61% Headquarters: 25% 	
< Engineering-9 > View rate of newly arrived OE information	More than 75%		
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,	More than 120% of the necessary number at each power station	120% ^{**} 	

PI	Target	Performance	Notes						
wheel loaders, and unic trucks									
< Engineering-11 > Percentage of “A” assessments given during emergency response training	More than 80%	75.5% 【 Breakdown 】 F1: 72.2% (8/11 categories) F2: 76.9% (10/13 categories) KK: 76.9% (10/13 categories)	FY2016 assessment						
Ability to promote dialogue									
Internal									
< Dialogue-1 > Percentage of employees that feel that messages from nuclear leader are “helpful”	More than 50%	27.3%  <table border="1"><thead><tr><th>Quarter</th><th>Percentage</th></tr></thead><tbody><tr><td>1Q</td><td>21.6</td></tr><tr><td>2Q</td><td>27.3</td></tr></tbody></table>	Quarter	Percentage	1Q	21.6	2Q	27.3	
Quarter	Percentage								
1Q	21.6								
2Q	27.3								
< Dialogue-2 > Response rate to questionnaire on the information conveyed by nuclear leader	More than 70%	44.1%  <table border="1"><thead><tr><th>Quarter</th><th>Response Rate</th></tr></thead><tbody><tr><td>1Q</td><td>39.7</td></tr><tr><td>2Q</td><td>44.1</td></tr></tbody></table>	Quarter	Response Rate	1Q	39.7	2Q	44.1	
Quarter	Response Rate								
1Q	39.7								
2Q	44.1								
< Dialogue-3 > Degree of understanding of information conveyed by nuclear leader	More than 2.5 points	2.3 points  <table border="1"><thead><tr><th>Quarter</th><th>Points</th></tr></thead><tbody><tr><td>1Q</td><td>2.4</td></tr><tr><td>2Q</td><td>2.3</td></tr></tbody></table>	Quarter	Points	1Q	2.4	2Q	2.3	
Quarter	Points								
1Q	2.4								
2Q	2.3								
External									
< 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 discrepancies between 1F, 2F and KK, and are therefore not included.

2.8.2 KPI/PI Assessment

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

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

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

Conclusion

During the second quarter of FY2017 we took large steps forward at the Fukushima Daiichi and Kashiwazaki-Kariwa. At Fukushima Daiichi, we commenced freezing of the last unfrozen section of the land-side impermeable wall (Ice wall) on August 22nd in preparation for complete closure. In conjunction with the continued operation of sub-drains this Ice wall is helping to suppress the amount of groundwater flowing into buildings. Furthermore, at the September 26th meeting of the Ministerial Council on Decommissioning and Contaminated Water Countermeasures the Mid-and-Long-Term Roadmap Towards Decommissioning of TEPCO Fukushima Daiichi Nuclear Power Station Units 1 to 4 was revised for the first time in two years. We will continue to move forward safely and steadily with decommissioning based upon the newly revised roadmap.

At Kashiwazaki-Kariwa the application to modify the reactor installation permit for Kashiwazaki-Kariwa Units 6/7, the inspection record that shows that the new regulatory requirements have been complied with was approved at the 41st meeting of the Nuclear Regulation Authority on October 4th and a call for scientific and technical opinions was made. Prior to this meeting at the 33rd meeting of the Nuclear Regulation Authority on August 30th, TEPCO management explained the details of the documents submitted on August 25th and promised that the opinions exchanged shall be noted in the safety regulations for nuclear reactor facilities and that the actions mentioned shall be carried out without fail into the future by TEPCO, the operator of these nuclear facilities. We will continue to sincerely engage in all required procedures and improve safety by taking independent action that goes above and beyond the regulatory requirements.

In regards to the Nuclear Safety Reform Plan (Management), nuclear safety reforms, which immediately following the Fukushima Nuclear Accident were seen as special duties, have taken root within the organization and become part of our daily activities. We will implement reforms and improvements in order to improve nuclear safety based upon the Fukushima Daiichi Decommissioning & Engineering Company's (FDEC) "Decommissioning Promotion Strategy (September 1, 2016)" and the Nuclear Power & Plant Siting Division's "Management Model (June 26, 2017)."

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 keeps 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. Visit our website²¹ for more information.

End of Document

²¹ <https://www4.tepco.co.jp/ep/support/voice/form.htm>