

Nuclear Safety Reform Plan

FY2019Q3 Progress Report

Tokyo Electric Power Company Holdings, Inc.
February 18, 2020

TEPCO

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FOREWORD

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

On March 29, 2013, TEPCO announced its Reassessment of the Fukushima Nuclear Accident and Nuclear Safety Reform Plan to implement nuclear safety reforms. Since then we have provided quarterly updates on the progress of these reforms. The following is a report on the progress that we have made during the third quarter of FY2019¹ (October~December, 2019).

During the third quarter, nuclear preparedness training sponsored by Niigata Prefecture was held on November 8 and 9. During this training approximately 600 residents participated in evacuation training under the scenario of an accident at Kashiwazaki-Kariwa Unit 7. The purpose of the training was to enable representatives of Niigata Prefecture and its cities, towns, and villages (such as Kashiwazaki City and Kariwa Village), and approximately 55 agencies, including related government agencies and the Japan Self-Defense Force, to become better proficient in mutual coordination and preparedness techniques.

Approximately 150 TEPCO employees participated in the training. In addition to conveying power station information to the Niigata Prefecture Disaster Response Center, these trainees supported the evacuation of residents living within a 5km radius of the power station, engaged in screening and simple decontamination tasks, and took off-site radiation measurements.

We will continue to repeatedly engage in training to enable us to cooperate to the best of our ability as an operator when providing evacuation assistance in the event of an emergency.

¹ All dates hereinafter refer to 2019 unless otherwise noted.

1 PROGRESS WITH SAFETY MEASURES AT NUCLEAR POWER

STATIONS

1.1 PROGRESS OF REACTOR DECOMMISSIONING

At the fourth meeting of the Cabinet Meeting on Decommissioning and Contaminated Water Countermeasures held on December 27, the Mid/Long-term Roadmap for the Decommissioning of Fukushima Daiichi was revised.

In consideration of the "optimization of the entire decommissioning process," which includes considerations for safety, achievability, speed, and not interfering with spent fuel removal work, it was decided that fuel debris will be removed first from Unit 2 during 2021 after which the scale of removal will be gradually enlarged.

In regards to contaminated water countermeasures, we shall continue to implement preventative and multilayered countermeasures, such as the land-side impermeable wall, etc., as we aim to further reduce the amount of contaminated water being generated.

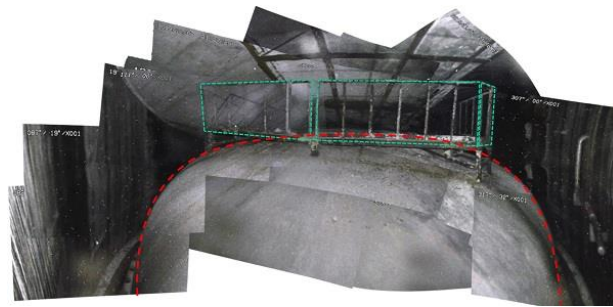
As recovery in the surrounding region gradually progresses and residents return home, we shall further reduce risks while prioritizing safety based upon our policy of "balancing recovery with decommissioning."

(1) Fuel Debris Removal

◆ Unit 1

In order to secure an access route to the primary containment vessel in preparation for an internal exploration, we bored holes in the X-2 penetration, which is a door-equipped penetration used to enter and exit the primary containment vessel. During hole-boring work conducted in the first quarter, dust concentrations increased so work to collect more data on dust concentration fluctuations was conducted in order to ascertain the impact of dust concentrations in conjunction with hole-boring work. During the third quarter, additional dust monitors for monitoring work were installed around the top lid of the primary containment vessel in order to further enhance dust concentration monitoring during work to build access routes. Brief hole-boring work was recommenced on November 25 in order to expand the amount of data we have, including data from additionally installed dust monitors. Going forward we shall analyze samples, assess data, and adjust the time spent on hole-boring work so that it does not impact the surrounding environment.

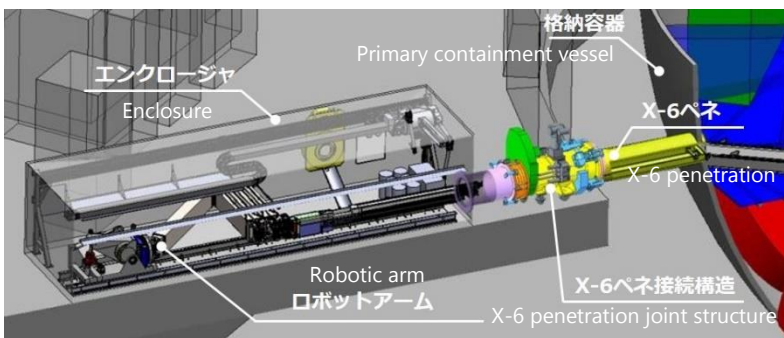
When the aforementioned dust monitors were additionally installed around the top lid of the primary containment vessel, the camera that was used to examine conditions was used to examine the condition of the top lid of the primary containment vessel. The footage obtained did not reveal any significant damage or deformation to the top lid of the primary containment vessel or its flanges.



Top lid of Unit 1 primary containment vessel (Red line: Top lid; Green line: Railing)

◆ Unit 2

In regards to fuel debris removal methods, we continued deliberating from which plant fuel debris should be removed first in consideration of the progress of primary containment vessel internal investigations and the status of work environment preparations. In consideration of the information ascertained about the attributes of fuel debris from the contact investigation performed in February 2019, and the progress of environmental preparations made on the first floor of the reactor building, we have decided that fuel debris should be removed first from Unit 2. A robotic arm will be used to begin removing fuel on a trial basis after which the removal method will be examined and verified. After this, the same mechanized device will be used to gradually enlarged the scale of fuel debris removal.



Concept drawing of the fuel debris removal device



Robotic arm

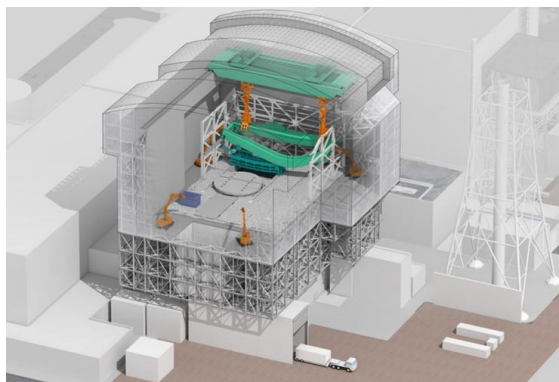
(2) Removing fuel from the spent fuel pools

In regards to the removal of fuel spent fuel pools, we are continuing with the removal of fuel from Units 5 and 6, and aim to complete the removal of fuel from the Unit 1~6 spent fuel pools during 2031.

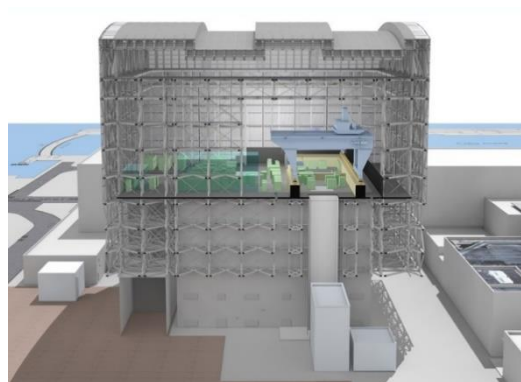
◆ Unit 1

In preparation to remove fuel from the Unit 1 spent fuel pool we have conducted investigations that examine the state of the roof collapse on the south side and also well plug contamination conditions. In January 2018, we began removing rubble from the north side of the operating floor and during the second quarter we examined the condition of the overhead crane and also conducted an examination of the well plug, which has been offset from its proper position. Based on the results of these investigations it is clear that we need to proceed carefully while paying close attention to dust dispersion. Therefore, we have deliberated two methods of fuel removal. The first entails building a fuel removal cover after the removal of rubble, and of the second entails building a large cover that encompasses the reactor building prior to the removal of rubble, and then removing rubble from underneath

this cover. During the third quarter these two methods were assessed from the perspectives of dust dispersion countermeasures, worker exposure, rainwater countermeasures, and interference with surrounding construction projects. As a result, we have selected the method that entails building a large cover that encompasses the reactor building prior to the removal of rubble, and then removing rubble from underneath this cover. Going forward we shall engage in detailed design of the selected fuel removal method, carefully move forward with the fuel removal process and strive to reduce risks.



Concept drawing of rubble removal



Concept drawing of fuel removal

◆ Unit 3

The Unit 3 spent fuel pool contains 514 spent fuel assemblies and 52 new fuel assemblies (total: 566 assemblies) and the removal of new fuel commenced during the first quarter. To date, the removal of 28 new fuel assemblies has been completed. During the third quarter we resumed rubble removal work from the spent fuel pool on September 10, and were able to examine the condition of the fuel handles now that rubble on top of the fuel has been removed (286 out of 566 assemblies). Out of the fuel handles that could be observed (including those examined in the past), we have found a total of 12 fuel assemblies that have deformed handles, but there has been no fluctuation in the quality of water and we have determined that there has been no impact on the environment. Furthermore, during fuel handling machine adjustments conducted in preparation to recommence fuel removal, we discovered nonconformances, such as crushing of the fuel handling machine mast wire rope (October 18). We have replaced the fuel handling machine mast wire rope, procured spare parts, and have tested the operation of the fuel handling machine. After confirming in this manner that we can move forward with work safely, we commenced fuel removal for the fifth time and completed removal of seven new fuel assemblies (total: 35 assemblies) on December 27 as planned. We will continue to monitor dust concentrations in the surrounding environment and move forward with this task while prioritizing safety with the aim of completing removal during FY2020.



Fuel removal work

(3) Contaminated water countermeasures

Based on the three basic policies of “removing contamination sources,” “isolating water from contamination sources,” and “preventing the leakage of contaminated water,” TEPCO is implementing preventative and multi-layered countermeasures as we aim to further reduce the amount of contaminated water being generated.

◆ Unit 1/2 exhaust stack drain sump pit water level decrease

The Unit 1/2 exhaust stack drain sump, which was constructed prior to the Fukushima nuclear accident, collects rainwater that has fallen inside the Unit 1/2 exhaust stack. When the water level of the sump pit exceeds 400mm, a pump activates and the water is transferred until the water level drops to 330 mm. In order to examine water level fluctuation trends resulting from recent rainfall, water level data from the Unit 1/2 exhaust stack drain sump pit was carefully examined and it was found that even when water was not being pumped out the water level in the aforementioned sump pit was decreasing to a certain water level (approximately 325mm) (November 26). When past water level data was examined it was found that this tendency for the water level to decrease has occurred since Typhoon Hagibis, which made landfall on October 12 (November 27). We have determined that the aforementioned phenomena conforms to Clause 18.12 (“*[The Nuclear Regulation Authority is to be notified] in the event of a leak of the nuclear fuel material, etc. (excluding gases) within controlled areas due to commercial reactor facility malfunction or other unforeseen event*”) of the Regulations concerning the Safety of the TEPCO Fukushima Daiichi Nuclear Power Station Facility and the Protection of Specific Nuclear Fuel Material (November 28). There have been no significant fluctuations in on-site drainage channel monitors, seawater radiation monitors, or radiation concentrations in the surrounding subdrain pits, and at current time we have not seen any effect on the external environment. Going forward we shall implement impact mitigation measures based upon pit leaks, such as enhancing water level monitoring, and shall install a lid on the top of the exhaust stack after completion of the dismantling of the Unit 1/2 exhaust stack in order to prevent rainwater from entering the pit.

(4) Dismantling the Unit 1/2 exhaust stack

Damage and cracks have been found in the steel tower that supports the Unit 1/2 exhaust stack, so the tower will be cut into 23 blocks and removed. During the second quarter dismantling of the top of the tower began using remotely operated equipment. During the third quarter we began dismantling of the third block on October 7 and were able to complete the task as planned, for the most part, on October 22 as the result of reflecting the knowledge we gained from dismantling the second block in the work procedures. We examined our success with the



Lowering the 4th block

third block and began dismantling the fourth block on October 27. During cutting of the stack shell on November 27, the blade of the cutting device kept binding, so workers boarded a lift and were elevated to the top of the stack shell where they used a grinder to finish cutting. Lowering of the severed portion of the stack shell was completed on

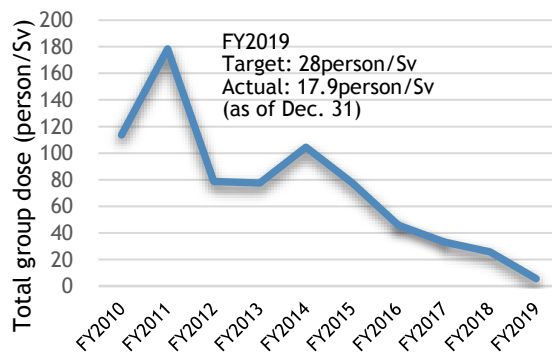
December 4. When preparing to dismantle the fourth block we experienced several nonconformances, such as the dropping of a power cable clamp (October 27), partial damage to the tower dismantling device frame (November 11), dropping of an insertion guide (November 15), and a nonconformance with the remote operations vehicle (November 22), etc., so the work procedures are being inspected and revised. Dismantling of the fifth block began on December 16, and dismantling of the sixth block was completed on December 24. Dismantling work continued thereafter and we have completed dismantling up to the 11th block (February 1). In light of our progress we have carefully examined the entire work schedule and anticipate that dismantling will be completed in May 2020, instead of the end of the fiscal year. We will continue to reduce earthquake-related risks while prioritizing safety in cooperation with ABLE Co., Ltd., a local company.

The removal of fuel from the Unit 3 spent fuel pool, and dismantling of the Unit 1/2 exhaust stack are both unprecedented and challenging tasks. However, by reflecting upon the troubles that have occurred we have been able to gradually incorporate countermeasures for identified problems into the work procedures as we continue our efforts to ascertain field conditions (and the condition of actual pieces of equipment) and improve safety/quality.

(5) Initiatives Aimed at Reducing Exposure Doses

At Fukushima Daiichi, we are striving to reduce exposure doses by predicting work-related exposure doses during the planning stages and deliberating exposure reduction measures from an engineering standpoint upon assessing the increases or decreases in risk based upon the Mid-to Long-Term Roadmap. Furthermore, during the work implementation stage, the number of remote monitoring systems introduced as a management measure was increased in order to enhance our means for managing high-dose work (March 2019). During the third quarter, remote monitoring systems] have been newly put into use for work to remove obstructions from the first floor of the Unit 2 reactor building, thereby bringing the total number of remote monitoring systems being used to five when combined with work that has continued since the first quarter. The new remote monitoring system put into use has had the same exposure dose reduction effects (approximately 10%) as seen in the past.

We will continue to proactively use the systems inside the reactor building and for high-dose work done in the vicinity.



Trends in total group dose by fiscal year

1.2 PROGRESS OF SAFETY MEASURES AT KASHIWAZAKI-KARIWA

(1) Progress with safety measures

On December 27, 2017, permission to modify the reactor installation permits for Kashiwazaki-Kariwa Units 6 and 7 was received from the Nuclear Regulation Authority. As a result, a basic design plan has been established and in accordance with this plan, detailed designs for various pieces of equipment, as well as safety measures, are being implemented at mainly Unit 6 and Unit 7 by leveraging the experience and lessons learned from the Fukushima nuclear accident. We aim to complete safety measure renovations at Unit 7 in December 2020.

<Progress with Safety Measure Renovations>

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

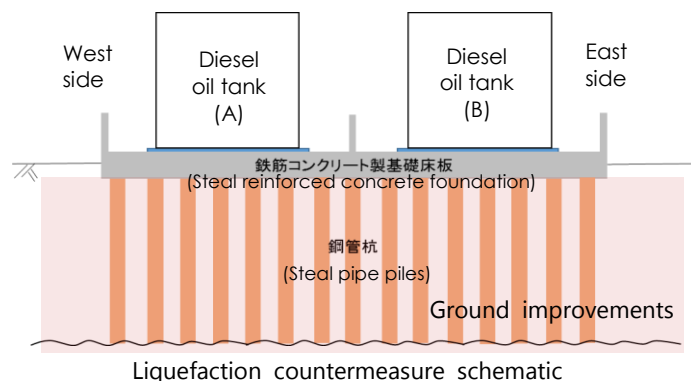
[Measures to prevent damage to the PCV and hydrogen explosions]	Installation of H2 control and hydrogen detection equipment in reactor buildings	Completed	Completed
	Installation of top vents in reactor buildings*	Completed	Completed
	Installation of corium shields	Completed	Completed
Preventing the 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	Completed	
	Installation of fire detectors in parking lots on high ground	Completed	
	Installation of fire detectors in buildings	Underway	Underway
	Installation of fixed firefighting systems	Underway	Underway
	Installation of cable wrappings	Underway	Underway
	Construction of fire-resistant barriers	Underway	Underway
Addressing external hazards	Countermeasures for building openings	Underway	Underway
	Removal of objects that could turn into flying debris as a result of a tornado	Underway	Underway
	Installation of spare bug filter for ventilation and air conditioning systems	Completed	Completed
Improvements to Main Control Room environments	Measures to reduce operator exposure in the event of a severe accident	Underway	
Strengthening emergency response	Construction and reinforcement of multiple access routes	Underway	
	Enhancement of communications equipment (installation of satellite phones, etc.)	Completed	
	Enhancement of environment monitoring equipment/additional deployment of monitoring cars	Completed	
	Construction of emergency materials and equipment warehouse on high ground*	Completed	
	Construction of Emergency Response Center in Unit 5	Underway	
Strengthening seismic resistance (including ground improvement measures to prevent liquefaction)	Seismic resistance assessment/renovations of outside equipment and piping	Underway	Underway
	Seismic resistance assessment/renovations of indoor equipment and piping	Underway	Underway

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

◆ Unit 6 diesel oil tank foundation liquefaction countermeasures

The Unit 6 diesel tank (tank for storing fuel for the emergency diesel generators) is supported by a steel reinforced concrete foundation and steel pipe piles. In October 2019, work to enhance the seismic resistance of the structure began to counter liquefaction during a seismic event. In particular, cement-based materials are being used to solidify the

ground under and directly below the diesel tank foundation in order to suppress liquefaction and prevent damage to the foundation bed and steel pipe piles. We will continue to move forward with this task while prioritizing safety with the aim of completing these countermeasures during the first half of FY2020.



(2) Field inspection by the Nuclear Regulatory Agency

The Nuclear Regulatory Agency conducted a field inspection on November 15. The objective of this field inspection was to confirm the actual installation location of equipment as part of the review of the Unit 7 work plan authorization permit. The main control room shelter, primary containment vessel internal hydrogen concentration measurement equipment, large freight entrance renovation status and locations of ground improvements were inspected. Through this inspection the Nuclear Regulatory Agency confirmed that renovations are steadily progressing.

(3) Nonconformance concerning the ability to open/close evacuation route doors

At Kashiwazaki-Kariwa, gaps in doors that lead to the outside of the reactor building and heat exchanger building, etc., were filled in with caulking* as a measure to prevent flooding implemented as part of emergency safety measures in the wake of the Fukushima Daiichi accident that occurred on March 11, 2011. During inspection thereafter it was found that a total of nine evacuation route doors in Unit 2 and Unit 4 could not be opened as a result of caulking. Therefore, a detailed inspection to look for similar cases with evacuation route doors inside Units 1~5 and the Arahama side incinerator building (controlled zones and non-controlled zones) was implemented on December 24, 2019. Inspection results found a total of 21 evacuation route doors (external doors: 10, internal doors: 11) that could either not be opened, or for which opening/closing was hindered. On December 26, a report on the cause of this problem and countermeasures was given to relevant government agencies. The caulking was removed from the nine external doors that were caulked in order to prevent flooding, and replaced with highly waterproof rubber seals. For the eight internal doors that were caulked in order to make them airtight, a new evacuation route was created by installing emergency evacuation signs (lights), and the four doors that could not be opened as a result of obstructions were cleared of obstructions to enable them to be opened and closed.

*Caulking is used to fill in gaps in buildings in order to improve airtightness and water repellence.

(4) Auxiliary boiler building fire

On October 18 a fire occurred in the power station on-site auxiliary boiler building. This

fire in the auxiliary boiler building, in which power panel inspections were being conducted, occurred when power was restored to the power panel following the inspection. However, it was quickly extinguished by contract workers on the scene. The work performed on this day was conducted according to procedures and there were no problems. Results of an inspection by the manufacturer of the power switch and burnt parts revealed that lubricant had degraded and dissipated due to aging thereby causing the fire. So, the aforementioned power switch was replaced in conjunction with power panel renovations.

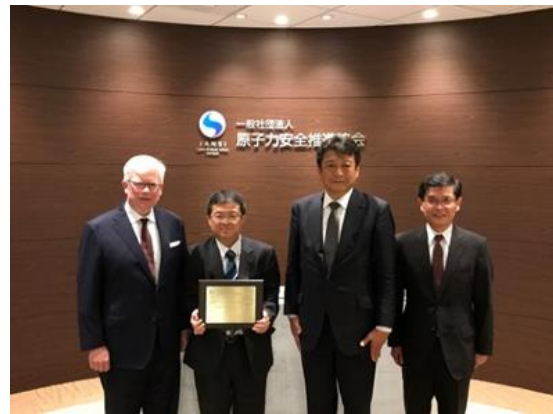
(5) Foreign material exclusion (FME) initiatives

If foreign debris, such as garbage, etc., find its way into important systems or equipment, such as reactors or spent fuel pools, it could damage fuel or have a detrimental impact on such equipment. Therefore, foreign material exclusion measures are vital for improving safety. At Kashiwazaki-Kariwa, improvement activities have been implemented to thoroughly ensure foreign material exclusion as a safety improvement initiative. In particular, we examined advanced FME activities being engaged in in the United States and at nuclear power stations in Japan, and incorporated these achievements. We have also provided education to more than 5,000 contractors that will enable them to thoroughly implement FME measures, and have started using special covers with which pipes can be covered easily. Furthermore, in conjunction with improvements to the level of management of foreign material exclusion, workloads and construction expenses temporarily increased, but we have implemented kaizen to improve quality and efficiency. These kaizen activities won second place at the company-wide kaizen grand prix.

In light of our FME initiatives, we were awarded a Power Station Special Award by the Japan Nuclear Safety Institute (JANSI) for our remarkable contribution to improving the safety of the entire nuclear power industry (November 14). Going forward we shall continue to examine conditions in the field through management observation, etc., identify issues that need to be addressed to further improve foreign material exclusion, and make improvements.



Pipe cover



Power Station Special Award ceremony

1.3 PROGRESS WITH SAFETY MEASURES AT FUKUSHIMA DAINI

(1) Agreement signed with the regional community in regards to the decommissioning of Fukushima Daini

In order to move safely and steadily forward with the long process of decommissioning Fukushima Daini we signed a new agreement with 11 cities, towns, and villages in the surrounding region, as well as Fukushima Prefecture, Naraha Town, and Tomioka Town, entitled “Agreement Ensuring the Safety of the Surrounding Cities, Towns, and Villages during the Decommissioning of the Fukushima Daini Nuclear Power Station” (December 26). After the decision was made to decommission Fukushima Daini, Fukushima Prefecture presented a draft of a new decommissioning agreement which we began discussing. The details upon which we agreed became the content of these agreements.



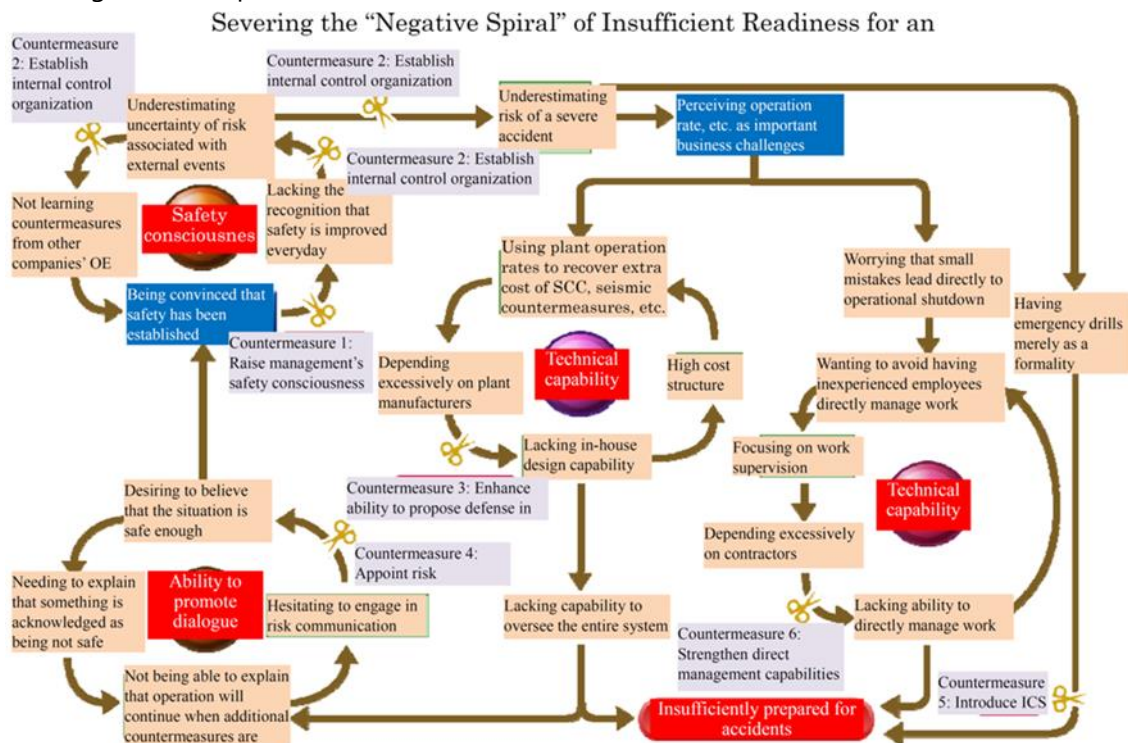
Fukushima Daini

We have also established new departments at Headquarters and Fukushima Daini that will be responsible for decommissioning measures in order to create internal mechanisms needed to safely and steadily carry out the long-term decommissioning process (December 1). These departments will engage in all the preparations, such as the creation of a Fukushima Daini decommissioning plan, etc., required for decommissioning.

In accordance with this agreement we shall move forward with procedures to start actual decommissioning while obtaining the understanding and cooperation of regional residents, and strive to disclose information appropriately from the perspective of the local community.

2 PROGRESS WITH THE NUCLEAR SAFETY REFORM PLAN

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



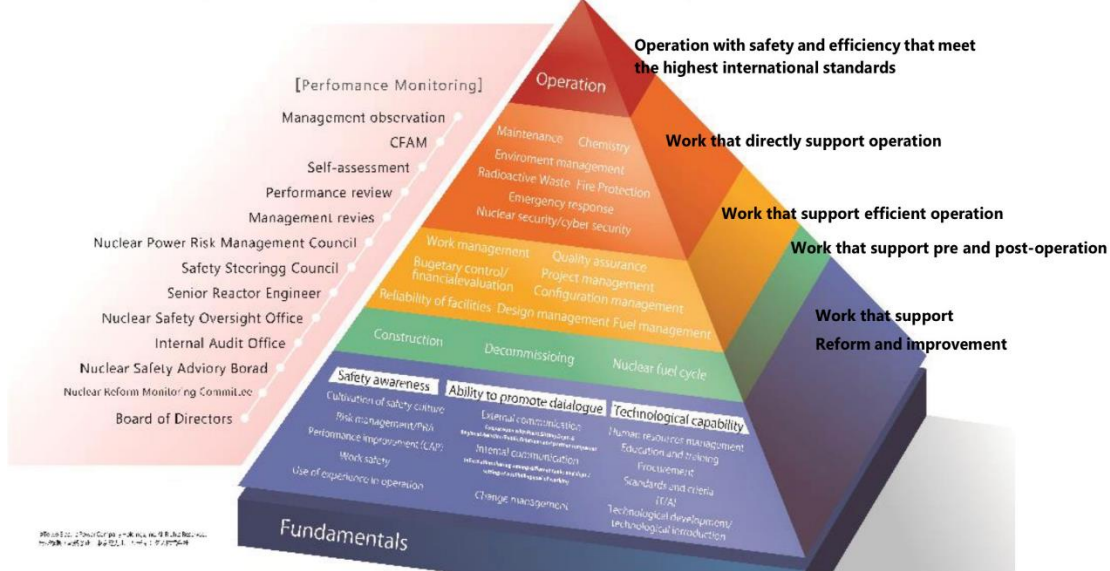
As an initiative to strengthen governance the FDEC has created a Decommissioning Promotion Strategy (September 2016). And, in the Nuclear Power & Plant Siting Division, all duties are being carried out in accordance with the Nuclear Power Division Management Model, which was created in June 2017. The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

Vision: 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 operators that keep creating unparalleled safety.

Mission: To achieve nuclear power generation with safety and efficiency that meet the highest international standards.

Values: Safety awareness, Ability to promote dialogue, Technological capability.

Basic policy to achieve goals: Constant reforms and improvements, Promotion of work under direct management by seeing, hearing and feeling



Management Model concept diagram

2.1 ACTIVITIES TO BETTER ALIGN THE VECTORS OF ALL DIVISIONS

2.1.1 Strengthening Governance

(1) Permeation of the Management Model

A Management Model was created to enable all employees in the Nuclear Power & Plant Siting Division to engage in their duties with a common understanding of the objectives of the division and each other's roles (June 2017). During FY2019 we will continue to engage in activities that aim for excellence upon creating business plans based on the Management Model.

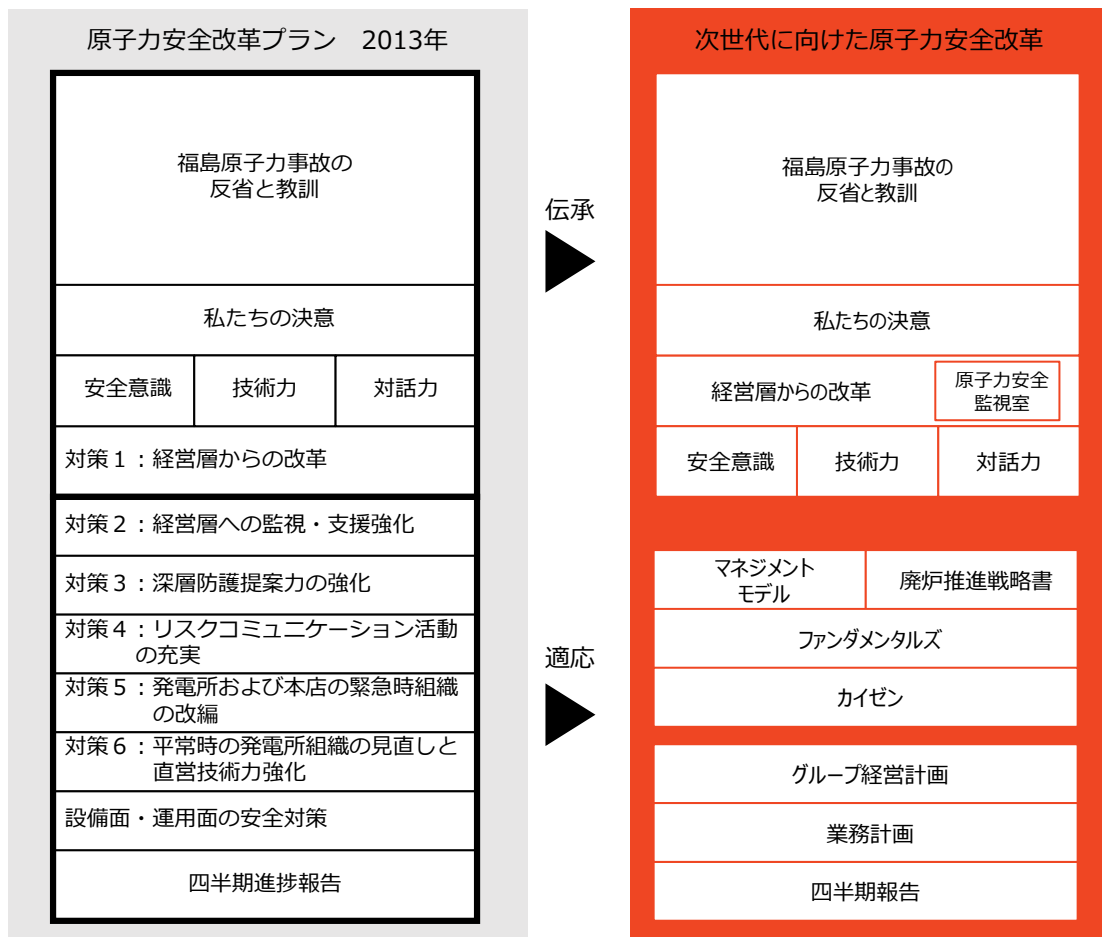
During the third quarter briefings on our policy for creating the FY2020 business plan were given and each department began hashing out the details of this plan.

(2) Nuclear safety reforms for the next generation

We have made various improvements since launching the Nuclear Safety Reform Plan in 2013, such as introducing the Management Model. At the same time, we have made progress with decommissioning, and the number of employees that were not at the company during the Fukushima nuclear accident is increasing thereby illustrating how our internal and external environments have greatly changed during this period. While adapting to these changes, we are deliberating compiling and systemizing nuclear safety reform initiatives into "nuclear safety reforms for the next generation" in order to ensure that we pass the regrets and lessons learned from the Fukushima nuclear accident on to future generations.

- Pass on our regrets and the lessons learned from the Fukushima Nuclear Accident, including our resolution, to the next generation
- Continue to implement kaizen for equipment and management safety measures in accordance with the changing environment.
- Use the Management Model and the Decommissioning Promotion Strategy to systemize work mechanisms and ways of proceeding, and promote reforms by incorporating these ideas into daily duties through the group business plan and business plan.
- Disclose these plans and progress both within and outside of the company to gather criticism and assessment that is reflected in the next plan.

Going forward we shall promote the integration of the Nuclear Safety Reform Plan, Management Model, Decommissioning Promotion Strategy, Group Business Plan, and our entire Business Plan into “nuclear safety reforms for the next generation.”



Transitioning from the Nuclear Safety Reform Plan to the Management Model

(3) Improvement activities by CFAM/SFAM

CFAMs and SFAMs have been assigned to each field of the Management Model to ascertain excellence achieved in other countries, identify key issues to be resolved, and formulate and implement improvements. Progress reports are periodically given to sponsors and the General Manager of the Nuclear Power & Plant Siting Division, and activities are being furthered while receiving advice and guidance from these parties (since

April 2015). During the third quarter, CFAM supervisor expectations for CFAM/SFAM about the roles that CFAM should play (governance, oversight, assistance) and the actions they should engage in, were further clarified (November 1).

Furthermore, in order to ascertain gaps between excellence and one's own field, CFAM in each field engaged in gap analysis in order to propose measures for eliminating these gaps and reflect them in activity plans for the next fiscal year. When performing this analysis, CFAM comprehensively examined trends within and outside the company, and areas for improvement, etc., while also reflecting upon the status of development of educational programs in their own fields and the progress with countermeasures. The analysis results will be used to set priorities for actions aimed at reaching the place we want to be in three years from now, and to manage business plans and CFAM action plans, etc.

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

◆ Enhancing risk management

In FY2018, a systematic mechanism for managing risk was created in order to enhance risk management. During FY2019, we shall focus on providing risk management education and implement effectiveness assessments. During the third quarter, members of the Risk Management Promotion Office went into the field to observe whether or not workers were behaving with awareness of risk. It was confirmed that discussions focusing on risk management are being led by team leaders during pre-work meetings, and that fieldwork is being engaged in while remaining aware of the risk countermeasures identified during pre-work meetings (Apple: using check sheets, 3-Way communication, peer checks).

Furthermore, in order to improve sensitivity to risk and knowledge about nuclear safety amongst employees and contractors, the Risk Management Promotion Office has been identifying nonconformances and operating experience from both within and outside of Japan that is considered to be vital for managing risk. And, the office has started creating risk-related operating experience data that explains these problems in an easy-to-understand manner from the perspective of safety, and is conveying this data to employees and contractors.

During the fourth quarter we plan to conduct a key self-assessment of risk management. By examining the effectiveness of risk management initiatives that have been strengthened to date, and continually making improvements upon identifying AFI, we aim to become an organization that can systematically manage risk while having all workers engaged in power station operation remain highly sensitive to risk management.

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

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

Since it is expected that workers in the operations field will lead by example and become role models for other functional fields, education that will help the idea of operational focus to permeate continues to be provided.

We've also engaged in activities to help spread the concept of operational focus amongst employees that do not work in the field of operations. During the fourth quarter, power station executives and operations CFAM will give briefings on operational focus and engage participants in group discussions that explain the relationship between their duties and operational focus.

- ◆ Improving corrective action programs (CAP)

2.2.2 Noted in the "Performance Improvements (CAP)" section

- ◆ Activities to reduce human errors

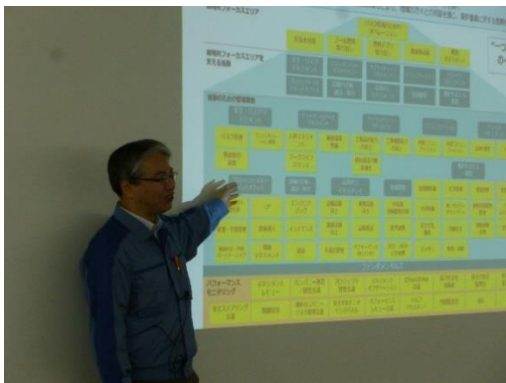
The Nuclear Power Division is engaged in efforts to minimize human error, such as by deepening understanding of human performance tools (human error prevention tools). During the third quarter, check sheets were used to ensure that equipment schematics and data necessary for examining documents related to safety measures are included in improvement proposals aimed at preventing safety measure errors at Kashiwazaki-Kariwa, which were deliberated during the second quarter, and countermeasures led by upper management were implemented. Furthermore, we continue to make preparations to implement basic education on safety measures during FY2019.

(4) Permeation of the Decommissioning Promotion Strategy

The Fukushima Daiichi Decontamination & Decommissioning (D&D) Engineering Company (FDEC) is carrying out its responsibilities based on the Decommissioning Promotion Strategy (initial version issued in September 2016) that stipulates the general direction and basic policies needed to move quickly forward with decommissioning in a safe and steady manner. The content of this Decommissioning Strategy is being continually revised with the second revision performed in December 2018. Furthermore, we have also decided to create a version of the Management Model for decommissioning (Decommissioning Management Model) that is based on the Management Model (which is being used as a department management governance mechanism aimed at achieving excellence in the Nuclear Power & Plant Siting Division) with the intent of strengthening not only decommissioning-related strategies, but also management. The Decommissioning Management Model incorporates the ideals and vision of the Nuclear Safety Reform Plan while remaining true to the Nuclear Power & Plant Siting Division Management Model. Innovations have also been made to make the relationship between one's own duties and the ideal state we aim to achieve easy-to-understand in light of the fact that the Management Model covers tasks that are unique to the FDEC, such as contaminated water countermeasures and fuel debris removal. In conjunction with this a decommissioning-related version of the Fundamentals will also be created. Areas that are the same as the Nuclear Power & Plant Siting Division will be kept as is while revising other areas in accordance with the nature of decommissioning tasks. During the fourth quarter, we plan to put the Decommissioning Management Model and Fundamentals into use in conjunction with revision of the Decommissioning Strategy.

At the FDEC, in-house forums are being repeatedly held in order to promote the Strategy

and help it to permeate through the organization. During the second quarter, four large-scale in-house forums attended by the FDEC President were held. In light of this, since August, mini-forums that have focused topics and have fewer participants are being held approximately twice a month. These mini-forums have focused on a variety of topics, such as long-term decommissioning plans, the Management Model, sharing information on past mistakes, why the FDEC is worthwhile, department reorganizations, and contaminated water treatment, and each presenter has been innovative in the way s/he has explained the topic to employees and exchanged opinions with them. The valuable opinions voiced during these mini-forums shall be reflected in the Strategy and the Management Model.



Mini-forum (Management Model)



Mini-forum (sunflower project)

2.1.2 Internal Communication

(1) Communication through dialogue

At Headquarters, internal information sharing meetings are held to learn about information pertinent to the Nuclear Power Division in order to transcend departmental boundaries and help convey important information in a timely manner. The topics of these meetings are determined by internal communications teams that listen to the needs of employees and select topics that are thought to be important and of great concern. In October, a meeting on the “establishment and current state of the Aomori Office” was held, and in November internal information sharing meetings were held about the “Atomic Energy Association (ATENA)” and the “Nuclear Safety Reform Plan Q2 Progress Report.” A post-meeting questionnaire indicated that participants deepened their understanding of these issues with more than 97% of respondents from all internal information sharing meetings saying that they, “understood” or, “understood for the most part” the issues discussed.

Many wish to continue these meetings, so we shall continue to transcend departmental boundaries and hold internal information sharing meetings based on important and current topics.



Atomic Energy Association (ATENA) briefing (November 11)



Nuclear Safety Reform Plan Q2 Progress Report Briefing (November 29)

At the FDEC we have started the “sunflower project” as an initiative that aims to improve motivation and create a sense of “one team” between management and general workers. This project, which does not discriminate between veterans, new employees, men, or women, etc., has recruited participants that engage in activities to share our sense of values through interviews with management and group interviews, and help these ideals to permeate throughout the organization. In conjunction with this, project members also propose and implement measures for improving the work environment at Fukushima Daiichi.

At Fukushima Daini, 12 executives in Site Superintendent, or lower, positions shared the responsibility of holding symposiums for all station personnel to discuss the decommissioning of all reactors (September 2~October 3; Total number of group discussions: 49). Many opinions and ideas (approximately 840) were received from station personnel, such as, “decommissioning is the last stage of the nuclear power business, so I want to see it through to the end,” and, “I want to help the region to recover.” These opinions and ideas will be sorted into categories, such as completing decommissioning, symbiosis with the region, and the future of Fukushima Daini, etc., and provided as feedback to the Site Superintendent while we form working groups and promote activities to enable station personnel to actively implement these ideas.

At Kashiwazaki-Kariwa we hold safety rallies every fall in order to maintain solidarity in regards to keeping the number of worker accidents and fires at zero. This year, 456 employees from 41 contracting companies, and 119 TEPCO employees (total: 575 people) participated in the rally. This year’s topic was “engaging in dialogue through which the information conveyed is easily understood” and participants pledged to be further involved in safety activities based upon the power stations safety policy of, “improve our ability to engage in dialogue, be more imaginative and keep the number of worker accidents and fires at zero.” All participants reaffirmed that we aim to be a nuclear power station with the world’s highest levels of safety and that in order to achieve this we must strongly take to heart our responsibility for the Fukushima Nuclear Accident, and leverage the technical skills we have cultivated to continually ensure and improve nuclear safety and work safety. Furthermore, participants reaffirmed that it is vital to continually improve daily safety measures so that we, the people working at the station, feel that it is safe, and swore to work safely on site.



Kashiwazaki-Kariwa safety rally (October 29)

At the Aomori Office and Higashidori briefings on the Nuclear Safety Reform Plan Quarterly Progress Report were given to employees in order to provide an opportunity to once again reflect upon the Fukushima Nuclear Accident and countermeasures. The Higashidori Construction Site Superintendent served as presenter to give an overview of the report and talked about latterly disseminating good practices from other sites so that they can be incorporated into one's own actions. A discussion with the Site Superintendent on the topic of, "what does happiness mean to you?" was held during which participants discussed motivation and the joy experience in the course of their own duties. Furthermore, we are proactively engaging in communication with contractors and striving to engage in communication activities that transcends corporate boundaries, such as the meet-and-greet with Recyclable-Fuel Storage Company held in November. Even though it was a holiday, many people participated in this event that became an opportunity to engage in beneficial communication that transcended company boundaries. A meet-and-greet between employees in the Sales Division and the Nuclear Power Division entitled, "Rooting for the nuclear power division from the front lines of sales" was held as an opportunity to communicate with other divisions. Many positive comments were received from participants such as, "being able to share our thoughts and the details of each other's jobs furthered mutual understanding," and "it helped to increase motivation." We will continue to proactively engage in these types of communication activities.



Explanation by the Higashidori Construction Site Superintendent (November)



Meet-and-greet with the Sales Division (November)

(2) Using in-house media to share information

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

- ◆ Company intranet videos
 - “Fukushima Daini Nuclear Power Station Lecture by Advisor Uchikawa ~Furthering Initiatives on our Own~ (October 3)
 - “Procurement Lecture Unit 7 blowout panel closure device installation ~Kashiwazaki-Kariwa” (October 16)
 - “RE: Method for removing fuel from the Unit 2 spent fuel pool” (November 1)
 - “Aiming to improve the ability to respond to disasters” ~Kashiwazaki-Kariwa Nuclear Preparedness Training~” (November 18)
 - Assessing the “Basic approach to the decommissioning and the recommencement of operation of the Kashiwazaki-Kariwa Nuclear Power Station” ~Kashiwazaki City Mayor (November 19)
 - One chance power battle! ~3rd Fukushima Daiichi Tug-of-War~ (November 27)
 - Kaizen lecture by Special Advisor Uchikawa ~Being more efficient~ Kashiwazaki-Kariwa~ (November 29)
 - Participating in Niigata Prefecture Nuclear Preparedness Training (December 3)
 - Young bonds that transcend division boundaries will lead to “future necessity and safety” ~Three-Prefecture Joint Kashiwazaki-Kariwa Tour~ (December 16)
 - “Passing down the story of 3/11” ~Toshikazu Machida, TEPCO HD Safety Promotion Office Awareness Group (December 19)
- ◆ TEPCO Group News Letter
 - Decommissioning Project Report #16 What preparations for typhoons have been made at the Fukushima Daiichi NPS? (Issued in November)
- ◆ “Messages from Management” sent via the intranet
 - “Learning from the Rugby World Cup” -Deputy Chairman (November 6)
 - RE: Kashiwazaki City Mayor’s assessment of the “Basic approach to the decommissioning and the recommencement of operation of the Kashiwazaki-Kariwa Nuclear Power Station” -Niigata Headquarters President (November 21)
 - “The difference between Chernobyl and Fukushima” -Deputy Chairman (November 25)

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



Videos put on the company's intranet
(Kashiwazaki-Kariwa)



TEPCO Group Newsletter
(Fukushima Daiichi)

(3) Sharing information on important tasks

Since July 2016, Site Superintendents and Headquarter general managers have been sending e-mails to all members of the Nuclear Power Division about important work issues in order to share information on these matters. During the second quarter, we continued to disseminate information while also addressing work issues brought up by readers as part of initiatives that began in FY2018.

Examples of information conveyed during the third quarter.

- Not just once a year. Submissions accepted all year round! (Nuclear Safety Management Department General Manager)
- RE: Department reorganization in the Nuclear Power & Plant Siting Division (Nuclear Power & Plant Siting Division Deputy General Manager)

2.2 SAFETY AWARENESS IMPROVEMENTS

2.2.1 Cultivating Nuclear Safety Culture

(1) Improving Safety Awareness [Measure 1]

◆ Direct Dialogue between Nuclear Leaders

Since the fourth quarter of FY2015, nuclear leaders at Headquarters (General Manager of the Nuclear Power & Plant Siting Division and other Headquarter general managers) have been visiting power stations to engage in direct dialogue with power station executives (Site Superintendent, unit superintendents, Nuclear Safety Center Director, power station general managers) in order to improve the safety awareness of the entire organization. During the third quarter, discussions were held about what a management model for a decommissioned plant should entail and key issues that should be addressed during the next fiscal year. (Kashiwazaki-Kariwa: October 31, Fukushima Daiichi: October 17, December 24)



Number of times the Nuclear Power & Plant Siting Division GM engaged in direct dialogue with each department

◆ Messages from Nuclear Leaders

In order to promote nuclear safety reforms, nuclear leaders must accurately convey their expectations, and the reasons for those expectations, so that they permeate throughout the entire organization. In order to do this, nuclear leaders are leveraging video messages, intranet messages, email, meetings and morning briefings as opportunities to convey their expectations. The following is an example of messages sent by nuclear leaders via the intranet.

The Sunflower Project Begins (Decommissioning Promotion Office GM)

I have a dream.

These are words spoken by Reverend Martin Luther King Jr. during a 1963 speech he gave urging for the abolishment of racial discrimination. This speech accelerated the civil rights movement.

I too have a dream.

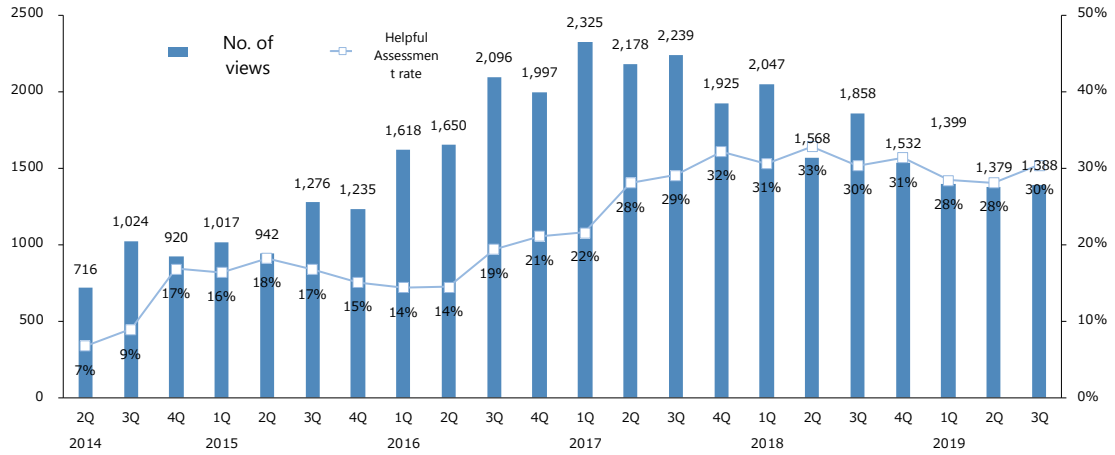
My dream is to build a good company with you. The good company I dream of is one in which everyone who works there is proud to do so. It's a company that we are satisfied to work for. And, it's a company that we can recommend to others as being a wonderful place to work.

In order to become a good company, we need to fulfill two conditions. The first pertains to the box, or in other words, the company. And, the second pertains to what's in that box, or in other words, the feelings of the people that work in that box.

(omitted)

The word "Sunflower" refers to our resolution to head towards our dreams, look up, and continue to bloom vividly. In order to incorporate various opinions, I would like to create a diverse team of veterans, new employees, women and men for this Sunflower Project. Of course, the FDEC President, Fukushima Daiichi Site Superintendent, and I will be responsible for striving to put the proposals made by the Sunflower Project into action. Through work reforms and the Sunflower Project, I hope to solidify the foundation for the future of the FDEC.

(omitted)



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

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

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

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

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

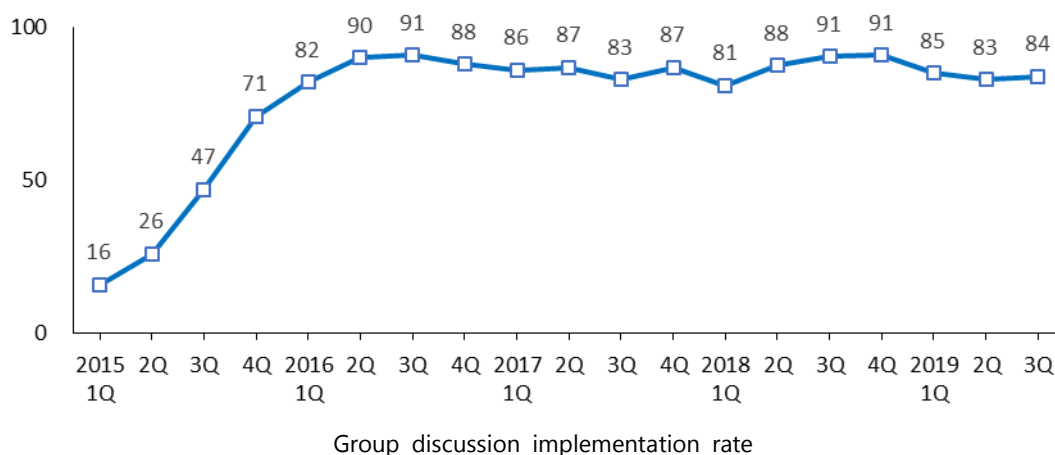
Period	HQ	1F	2F	KK
FY2015	24(2)	47	19	24
FY2016	25(1)	19	14	25
FY2017	21(2)	5	15	22
FY2018	16(2)	13	16	15
FY2019				
Q1	8(1) *	8*	3	5
Q2	1	12	3	4
Q3	4	9	2	3

Note: Q1 results for Headquarters and Fukushima Daiichi have been corrected

(2) Reflecting on the Traits 【Measure 1】

The Nuclear Power Division engages in activities aimed at making the act of reflecting upon the 10 traits and 40 behaviors (10 Traits) for robust nuclear safety culture a natural occurrence. All Nuclear Power Division personnel use the intranet system to reflect on whether or not they are embodying the Traits. Group discussions are held once every two weeks based on these results and recent performance information in order to deliberate and implement improvement actions as we continually strive to fill in the gaps between the Traits and our own behavior.

During the third quarter, we took a deeper look back at our behavior concerning law compliance and began monitoring near-miss trends in regards to work processes and relevant laws, etc. We will continue to monitor trends and accumulate data in order to steadily improve law compliance.



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

◆ Examining our “ideal state” of organizational safety culture

It is necessary that nuclear leaders display leadership in order to root the importance of safety culture in the organization. One method of doing this is to clarify the “ideal state” of robust safety culture that the organization aims to achieve, and enabling it to permeate

through the organization. We shall identify the relationships between “our resolution,” which was born from the regrets and lessons learned from the Fukushima Nuclear Accident, “the attributes of individuals, leaders, and an organization that embodies robust nuclear safety culture,” and “quality policies,” and create an opportunity to strengthen the relationship between daily duties and safety culture.

◆ Safety Steering Council

In order to ascertain the state of achievement of nuclear safety and promote improvements, nuclear leaders participated in discussions led by the President, Nuclear Power & Plant Siting Division GM, and FDEC President to discuss the causes of recent accidents/troubles, and countermeasures for them (December 14, 26).



Safety Steering Council

2.2.2 Performance Improvements (CAP)

(1) Promoting improvement through CAP 【Measure 3】

We aim to make efficient and effective improvements by using CAP to completely manage not only nonconformance and OE information, but also information useful for improving nuclear safety performance (such as management observation (MO) results, benchmarking results, third-party assessment results, near-miss information, etc.), and formulate even more fundamental countermeasures.

During the third quarter, we continued quarterly performance assessments of activities to identify weaknesses and make corrections by analyzing/assessing information entered into CAP for major areas at Kashiwazaki-Kariwa and Fukushima Daini. Furthermore, when classifying nonconformance information by importance level, in addition to managing nonconformances as usual, we are deliberating classifying this information while focusing on nuclear safety and plan to put this process into full use at Kashiwazaki-Kariwa next fiscal year.

(2) Improvements through Management Observation 【Measure 2】

In order to promote nuclear safety reforms and improve nuclear safety, TEPCO engages in management observation (MO), which is proactively employed by the best nuclear operators overseas. Through MO, managers can observe actual conditions in the field and accurately identify problems.

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

	1F	2F	KK
# of times implemented	1,047	711	1,068
# of times per month per manager	3.7 times/month/person	4.0 times/month/person	3.4 times/month/person
Good MO rate *	—	70%	66%

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

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

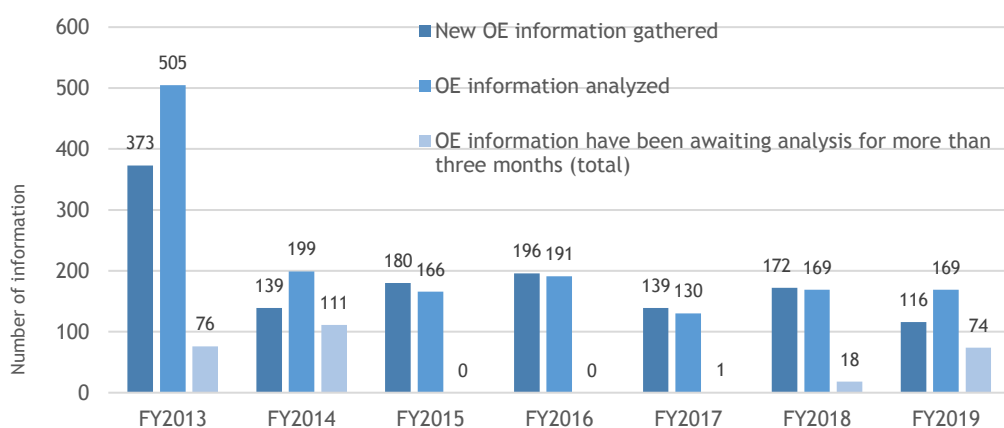
2.2.3 Leveraging Operating Experience 【Measure 3】

In light of the Nuclear Regulation Authority's determination that insufficiencies with preventive measures at Headquarters identified at the Fukushima Daini Nuclear Power Station during the third safety inspection of FY2018 constitute a safety regulation infraction, further cause analysis of these infractions is underway and countermeasures, such as leveraging IT tools for monitoring, and recurrence prevention measures, etc., are being proposed and implemented. During the third quarter, an update on these initiatives was given to the Nuclear Regulatory Agency during its safety inspection.

(1) Gathering and sharing OE information

One of the lessons learned from the Fukushima Nuclear Accident is that we must "learn from the failures of others." Lessons to be learned are being identified and countermeasures deliberated/implemented under the premise that something that has occurred somewhere else in the world can also occur at TEPCO power stations. Prior to the Fukushima Nuclear Accident, the gathering of operating experience from within and outside of Japan, and the deliberation of countermeasures, were put off. Therefore, efforts are being made to promptly engage in these activities and enable everyone in the Nuclear Power Division to leverage this information.

During the third quarter, 31 pieces of new OE information were gathered thereby increasing the total number for this fiscal year from 85 in the second quarter to 116. Furthermore, analysis of 53 pieces of OE information has been completed thereby raising the total number of cases that have been analyzed for the fiscal year from 116 in the second quarter to 169. We will continue to strive to quickly gather and analyze OE information so that it can be utilized.



OE data gathering and analysis performance trends

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

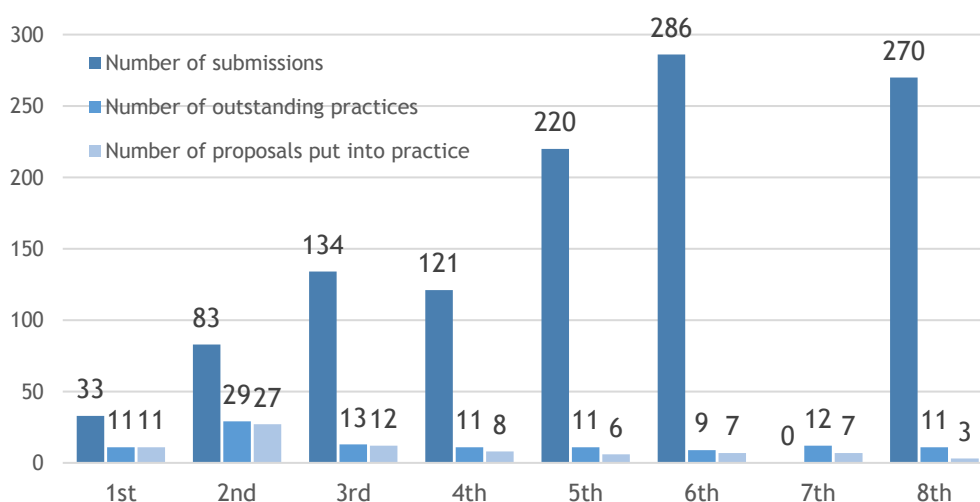
2.2.4 Improving the Ability to Propose Defence-in-Depth Measures (Risk Management)

(1) Competitions to Enhance the Ability to Propose Safety Improvement Measures [Measure 3]

◆ The status of competition initiatives

TEPCO has been holding Safety Improvement Proposal Competitions so that personnel may, in addition to conducting multi-faceted reviews from the perspective of defence-in-depth, acquire the technical ability to propose cost-effective safety measures and have these proposals put promptly into practice. During the third quarter, we began accepting proposal submissions for the 9th safety improvement measure competition. Proposals will be accepted until the end of the fiscal year and submitted for judging.

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



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

(Note 1: During the 7th competition we conducted a repechage for unselected proposals so the number of new proposals submitted was 0.)

◆ Outstanding proposals that have been put into practice

During the third quarter, two outstanding proposals from the 8th competition were put into practice as noted below thereby reducing field risks.

- Changing interlocks in order to reduce the risk of fuel pool cooling function loss (Fukushima Daiichi)

Prior to the accident, two auxiliary cooling water pumps were needed to cool the fuel pools, and one was kept on standby, however since the accident only one has been in operation since the heat load required for cooling is less. When only one auxiliary cooling water pump is in operation, if this pump were to shut down as the result of malfunction, there is the risk that fuel pool cooling function would be temporarily lost (until the spare pump is started up in the field after shutdown of the pump). Therefore, safety will be improved by changing interlocks so that the spare pump automatically starts up thereby avoiding an unnecessary loss of fuel pool cooling function.

- Changing lubricating oil tank refueling procedures in order to reduce the risk of oil leaks (Kashiwazaki-Kariwa)

When refueling emergency diesel generator lubricating oil tanks, oil is taken from the lubricating oil storage container in the field and put into an oil refueling container that is moved by hand to the emergency diesel generator lubricating oil tank that is then refueled. Since this procedure entails moving oil between different tanks twice and then moving the oil refueling container by hand, there was great risk for oil leaks. Therefore, procedures were changed so that the existing refueling pump and lubricating oil sump tank are used to refuel the lubricating oil tank by starting up the pump and manipulating valves. Furthermore, in order to prevent human error when changing the method of refueling to this method that involves starting up the pump and manipulating valves, a new lubricating oil level gauge that enables the amount of oil being transferred to be checked during refueling was installed, and rules were created that require field operators to notify the main control room during refueling and engage in field monitoring during the refueling process.



Changing lubricating oil tank refueling procedures to reduce the risk of oil leaks (Kashiwazaki-Kariwa)
Right: Opening tank refueling valves Left: Checking tank refueling levels

(2) Using hazard analysis to construct improvement processes [Measure 3]

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

During the third quarter, we discussed safety margins for hazards that exceed design standards and our ability to respond to these hazards, and began constructing a mechanism for continual improvement (creating a mechanism for examining the suitability of current countermeasures and deliberating additional countermeasures when obtaining new knowledge about hazards).

(3) Risk Informed Decision Making (RIDM)

It is important to identify plant vulnerabilities using risk information, such as knowledge obtained through probabilistic risk assessments (PRA) and maintain/improve plant safety by implementing security measures to make up for these vulnerabilities.

The Risk Informed Decision-Making (RIDM) process is extremely effective for managing power station risk and entails making decisions related to plant renovations and operation based on knowledge from conventional deterministic evaluation mixed with the knowledge obtained from probabilistic risk assessments.

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

Going forward we shall clarify the specific areas in which risk information is to be leveraged and related issues, and create an interdepartmental system for promoting these activities. The potential areas of use that are being deliberated are as follows.

- Using the results of probabilistic risk assessments (PRA) to identify equipment and operations that are important for nuclear safety, and informing the Operations and Maintenance Divisions of this, will aid in improving technological capability.
- Improving the reliability of operations by reflecting important operational information in plant operating procedures.
- Leverage the latest risk information during equipment maintenance in order to focus maintenance on important pieces of equipment.
- Contribute to improving effective emergency response capability during emergency response training by considering information obtained from PRA during scenario creation for emergency response training. During the third quarter, newly obtained PRA results were used to create scenarios that consider accidents that have a large impact on the frequency of core damage. Going forward we will continue to deliberate how to leverage these scenarios during actual emergency response training.

2.3 IMPROVING THE ABILITY TO PROMOTE DIALOGUE

2.3.1 Communication with the Siting Community [Measure 4]

(1) Activities in the Fukushima region

- ◆ Providing information that is easily understood
- Posting videos that explain the methods for removing fuel from the Fukushima Daiichi Unit 1 and 2 spent fuel pools

We have posted videos that explain the methods for removing fuel from the Fukushima Daiichi Unit 1 and 2 spent fuel pools in order to convey information that is easily understood through visual means (Unit 1: December 19, Unit 2: October 31). The video uses CG and illustrations to give an overview of the methods for removing fuel, which prioritize the safety of the communities surrounding the power station. We will continue to strive to disseminate information about the progress of decommissioning in an easy-to-understand manner.



Unit 1 explanatory video



Unit 2 explanatory video

- ◆ Communication with stakeholders

- Fukushima Daiichi tours

At Fukushima Daiichi many visitors, such as decommissioning engineers, government officials and members of the press, as well as visitors from the siting community, educational institutions and overseas have been able to deepen their understanding of the decommissioning process, fuel debris, and the work environment through tours of the site. METI Minister Kajiyama visited the site on November 3. The minister commented that, "I can feel that progress is being made with work environment improvements and decommissioning. There is still a lot of important and serious work to be done so I'd like you to continue to remain vigilant. And, please continue to contribute to society and work to regain its trust."

On October 18, 15 members of the Japan Electrical Manufacturers' Association (JEMA) were given tours of the Decommissioning Archives, Fukushima Daiichi Units 1~4, and the inside of the Unit 5 primary containment vessel. When inside the Unit 5 primary containment vessel, JEMA representatives were shown the bottom of the reactor pressure vessel, where fuel debris exists in Units 1~3. Upon seeing this, the JEMA representatives commented that, "When we went inside the primary containment vessel we got a real sense for the difficulties of the work environment and how hard it must be to engage in decommissioning when we imagined the numerous layers of safety measures that have been implemented and the work that must be done in such a confined space." Going

forward we shall continue to strive to get as many people as possible to visit Fukushima Daiichi in order to deepen understanding about the progress of decommissioning and the conditions of the work environment.



Visit by METI Minister Kajiyama



At the bottom of the Unit 5 reactor pressure vessel



◆ Decommissioning Archives

As of December 1, more than 50,000 people have visited the TEPCO Decommissioning Archives, which opened on November 30, 2018, thereby greatly exceeding our annual prediction of 20,000 visitors. We will continue to improve exhibits and provide better explanations based upon these opinions.



Visitors to the Decommissioning Archives

◆ Published Info Magazines

	Hairomichi	Announcement from Fukushima Daini
		
Date of issue	October, December	October, December
Circulation	Approx. 35,000 copies	Approx. 14,000 copies
Overview	<ul style="list-style-type: none"> • Work environment improvement initiatives • Initiatives for handling waste generated in the course of decommissioning • New employee introductions 	<ul style="list-style-type: none"> • Decommissioning overview • Fuel storage and cooling status • With the community ~Tomioka fishing port opens for the first time in eight years and four months~

(2) Activities in the Niigata area

◆ Providing information that is easily understood

- Posting of the web video, "The Whats and Whys of Energy" on the company website
- The Niigata Headquarters is using various forms of media for public relations to inform as many people as possible about TEPCO's efforts. Many visitors to communication booths in various locations in Niigata Prefecture have commented that they, "...want TEPCO to be more proactive in its dissemination of information about Japan's energy situation." Therefore, we have posted a series of web videos on our website entitled, "The Whats and Whys of Energy" (December 16). The same series has been printed in paper media, such as free papers, etc., and readers have commented that, "The content is easy to understand," and that, "The cartoon format makes it easy to read." Going forward we will continue to strive to disseminate information that is easy-to-understand while listening to the opinions of community residents.



"The Whats and Whys of Energy"

◆ Communication with stakeholders

• Community Council on Ensuring Transparency at the Kashiwazaki-Kariwa Nuclear Power Station

Since May 2003, TEPCO representatives have attended meetings of the Community Council on Ensuring Transparency at the Kashiwazaki-Kariwa Nuclear Power Station (Community Council) as observers. During these meetings, TEPCO representatives have given reports on, for example, safety measure renovations at Kashiwazaki-Kariwa and the progress of communications activities, and listened to the opinions of Council members. On November 19, TEPCO President attended the annual information sharing meeting attended by prefectural, city, and village leaders. The President gave an update on the status of safety measure renovations at Kashiwazaki-Kariwa and also explained that all Kashiwazaki-Kariwa station personnel participated in visits made to all homes in the community during FY2019. This was done in effort to cultivate, in all individuals, the ability to look at matters from the perspective of the community and society, and as a fundamental countermeasure to the errors made on the notification form sent after the earthquake that occurred off the coast of Yamagata Prefecture on June 18. Going forward we shall continue to seriously engage in dialogue with community residents and improve the safety of Kashiwazaki-Kariwa based on the opinions we receive.

• Engaging in communication through home visits

In an effort to meet as many community residents as possible and listen to their true feelings, such as the concerns and opinions about Kashiwazaki-Kariwa, representatives from Niigata Headquarters visited approximately 33,000 homes in Kashiwazaki City and Kariwa Village between August 28 and December 8 as part of its communication initiatives. More than 16,000 valuable opinions were received during these visits. Many questions and opinions were received about the operation of Kashiwazaki-Kariwa and about the troubles that have occurred, and the safety measures being implemented, on site. We will continue to earnestly listen to the opinions of community residents with the awareness that it is the residents of the community that should assess the safety and quality of work being done at Kashiwazaki-Kariwa, and we shall leverage these opinions to improve internal and external communication, and power station management. For approximately 70% of station personnel, this is the first time that they had participated in such home visits in which participation was made mandatory this year. As a result, many station personnel commented that it was, "a good opportunity to strengthen awareness," and said that it was a valuable opportunity to learn how community residents feel about their work and think about how they can themselves leverage these opinions [in the course of their own duties]. Going forward we shall continue to value opportunities to engage in dialogue with community residents, improve the quality of our work, and strive to convey information about the power station without fail.



Home visits by power station personnel



Home visits by new employees

- Furthering understanding amongst the general public through events
 TEPCO set up a booth at the "Honcho Market," an event organized by the Kashiwazaki Chamber of Commerce in order to revitalize urban areas in Kashiwazaki City (October 27). At this year's Honcho Market, TEPCO set up a booth at the Second Annual Kashiwazaki Autumn Harvest Festival (sponsored by Kashiwazaki City), a huge event that centers around the food of Kashiwazaki. Approximately 200 visitors comprised of mainly women and children visited the TEPCO booth and tried our virtual reality (VR) tour. Results of a questionnaire given to visitors showed that it was the first time that 70% of respondents had visited a TEPCO booth. During this event many people visited the booth for the first time and had the opportunity to learn about safety measures at the power station through the virtual reality (VR) tour. As a result, the average number of people who "better understand nuclear safety" and "know more about TEPCO" increased greatly from 79% before this event to 93% after. Promoting understanding through regional events like this helps to improve the recognition of TEPCO and understanding about nuclear power generation. We also feel that these events are highly effective for conveying information and we will continue to strive to engage in dialogue with community residents through opportunities to participate in various events in the future.





Furthering understanding using virtual reality (VR)



TEPCO booth

◆ Info Magazine Stats

	News Atom	TEPCO Times
		
Date of Issue	October, November, December	October, December
Circulation	Approx. 31,000 copies	Approx. 650,000 copies
Overview	<ul style="list-style-type: none"> • This month's power station news • RE: Participation in Niigata Prefecture Nuclear Preparedness Training • Info on visits to community households • Interviews with station employees 	<ul style="list-style-type: none"> • RE: Participation in Niigata Prefecture Nuclear Preparedness Training • Corporate communications and opinion gathering activities in Niigata Prefecture • Introduction of "TEPCO Newsletter" app for smartphones

(3) Activities in the Aomori region

◆ Communication with stakeholders

• Communicating through company visits

The Aomori Head Office has engaged in communication activities during which visits were made to all homes and the approximate 2,300 companies in Higashidori Village, which is the siting community (November 5~November 28). These visits were made in order to express our appreciation for the understanding and cooperation received in regards to our daily business management and also to convey the status of progress of our projects and reflect the opinions from the community in these projects. In conjunction with these visits we have also given an overview of the Aomori Office established in July in our PR magazine *Yukishiromizu*, in which we also explained the status of progress of geological surveys that have been underway since August 2018. In addition to the positive response received from community members about the establishment of an office, many residents also said that they expect us to proceed with this project saying that, "We want you to recommence construction of the power station quickly." This is the first activity we have engaged in since establishment of the Aomori Office and we plan to have all employees participate in visits twice a year so that each and every employee has an opportunity to directly engage in dialogue with community residents. Through this initiative we shall also build trust with the community and "proactively disseminate information, engage in dialogue, and strengthen our self-reliance."

- Aomori Prefecture Nuclear Policy Committee

On October 28, the 28th meeting of the Aomori Prefecture Nuclear Policy Committee was held. This Committee was established in Aomori Prefecture in 2003 in order to ensure the safety and peace of mind of prefectural residents and suitably respond to future nuclear policy upon listening to opinions about various issues related to nuclear power, such as the government’s nuclear policy, the safety of nuclear power facilities sited in the prefecture, and regional recovery, etc., from various perspectives. At the meeting, TEPCO gave updates on geological surveys and the Higashidori project, gave an overview of the Aomori Action Plan and also explained the status of regional communication initiatives being implemented by the Aomori Office. Committee members posed questions about our approach to improving safety, recent trends concerning consortiums and two-way communication with the regional community thereby deepening mutual understanding.

We will continue to seize various opportunities to engage in dialogue and communicate with regional residents while also disseminating information and engaging in dialogue on an even wider scale as we strive to maintain and improve trust.




Dialogue through visits



28th meeting of the Aomori Prefecture Nuclear Policy Committee

◆ Info magazine publication

Yukishiromizu	
Date of issue	October
Circulation	Approx. 3,200 copies
Overview	<ul style="list-style-type: none"> • Greetings from the Aomori Office General Manager and the Higashidori nuclear power plant construction Site Superintendent • Geological survey updates • Introduction of Higashidori Head Office • Learning more about Higashidori Village ~Shimokita Geopark~



(4) Communication activities by management

The Nuclear Power & Plant Siting Division General Manager attended the Group N20, which consists of nuclear experts from Japan and France, and gave explanations of the current conditions at Fukushima Daiichi, the progress with dismantling of the Unit 1/2

exhaust stack, the management of ALPS-treated water, the status of fuel removal from the spent fuel pools, and initiatives underway in preparation for fuel debris removal (December 4). The Group N20 has met alternately in Japan and France since 1991 to enable nuclear experts in France and Japan to exchange opinions and information about nuclear development plans, the basic policies that serve as the foundation for these plans, and various issues related to them, in an effort to promote mutual understanding and cooperation, and contribute to the smooth promotion of the development of nuclear power for peaceful purposes around the world. Following the explanations, a lively question and answer session ensued about the current state of Fukushima Daiichi and much interest was expressed about TEPCO CUUSOO, which seeks innovative ideas and was the reason why it was decided to dismantle the exhaust stack. Going forward we will continue to not only convey information about new technologies, such as decommissioning technologies used for fuel removal and in high-dose environments, but also strive to disseminate information so that various stakeholders can correctly understand the issues at hand.



Group N20 meeting

The Deputy Chairman has given lectures on the current conditions in Fukushima and the lessons learned from the nuclear accident. On October 30, participants from research institutes and nuclear power-related companies (total: approximately 200 people) attended one of these lectures given at the annual conference of the Chinese Radiation Protection Association that was held in Fuzhou City, Fujian Province, China. After the lecture, event sponsors commented that it was a very valuable opportunity. In addition, during the third quarter, a total of approximately 170 experts in energy and nuclear power listened to these lectures that were given in five locations centering on mainly think tanks in the United States (November 12~14). Going forward we will continue to convey information about the current conditions at Fukushima Daiichi while being innovative and incorporating the concerns and interests of the audience and the nations and regions in which these lectures are given.



Lecture at the Chinese Radiation Protection Association

(5) Disseminating information overseas

- ◆ Conveying information that is easily-understood
- In an effort to proactively disseminate information we continue to convey information through English press releases, social media platforms, such as Facebook and Twitter, etc., and email magazines are being sent to overseas media outlets and intellectuals. During the third quarter, eight press releases and one email magazine were issued, 16 posts were made to Facebook, and 128 tweets were made on Twitter. We will continue to disseminate information at appropriate times while paying attention to the concerns of overseas media outlets and trends in the overseas media coverage of TEPCO.



Facebook post
(Visit to Fukushima Daiichi by overseas
VIP)



Twitter tweet
(Visit to Fukushima Daiichi by overseas
VIP)

2.3.2 Opinions of the people (assessment by regional society)

(1) Results of a questionnaire on nuclear communication activities

A questionnaire was distributed to people to which information is regularly provided by TEPCO (people in Fukushima, Niigata, Aomori, the Tokyo Metropolitan area, and overseas) in order to have people outside the company give an objective assessment of TEPCO's nuclear-related communication activities that will lead to work improvements.

◆ Questionnaire overview

Survey questions:	Written directly on questionnaire (anonymous)
Assessment questions:	"Quantity/quality of information provided," "Approach to an awareness of corporate communications and public opinion"
Assessment method:	Numbered assessment of the level of improvement given on a seven-point scale from -3~+3 ("0" noted if no change noticed) from the perspective of, "Compared with one year ago, to what extent do you think there has been improvement?"
Response period:	August through December 2019

Total number of responses received: 198 (questionnaire return rate: 81%)

◆ Questionnaire results overview

Overall assessment was +1.0 thereby indicating a continuous positive increase year-on-year. (Target: Assessment of ability to promote dialogue, questionnaire results, positive increase year-on-year <+0.9 or higher>)

Compared with last year, the degree of improvement for the survey questions, "Quantity/quality of information provided," and "Approach to an awareness of corporate communications and public opinion" increased +0.9→+1.0 and +0.9→1.1, respectively.

	Fukushima	Niigata	Aomori	Tokyo	Overseas	All areas
Overall assessment	+1.0	+0.8	+1.4	+1.0	+2.8	+1.0
"Quantity/quality of information provided"	+1.0	+0.8	+1.3	+0.9	+3.0	+1.0
"Approach to an awareness of corporate communications and public opinion"	+1.1	+0.9	+1.5	+1.3	+2.5	+1.1
Number of respondents	82	50	29	35	2	198

While some commented that, "the information has become easier to understand," and "I can feel that you're trying to convey information," others commented that, "the information is technical and difficult to understand," and "you need to look more from the perspective of the people receiving the information." Therefore, through regular communication we shall seize opportunities to learn about "the concerns of the people," and "what information the people want" as we strive to convey information that is "easily understood."

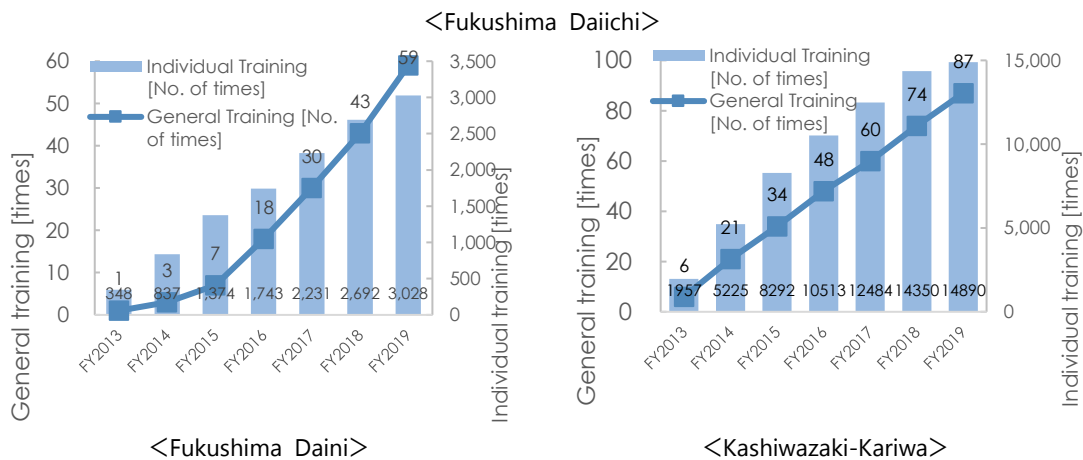
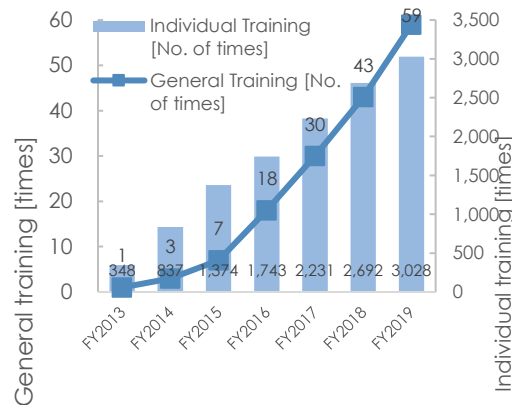
2.4 IMPROVING TECHNOLOGICAL CAPABILITY

Although initiatives are underway to improve technological capability individuals still do not have enough technological capability to check the quality of current equipment and work processes and make improvements on their own. Therefore, we have started various training and kaizen initiatives.

2.4.1 Strengthening Technological Capability (during times of emergency)

(1) Enhancement of Power Station and Headquarter Emergency Response (Organizational) Capabilities [Measure 5]

Training was performed at each power station as follows:



- ◆ Fukushima Daiichi; Third Quarter General Training: October 28, November 6, November 25, December 18, December 23

On October 28 we held training on responding to facility damage caused by a passing tornado, which has been implemented since the second quarter. This training session was implemented with the objective of learning how to respond to an emergency in which conditions make it difficult for responders to assemble in the main anti-earthquake building in light of problems that were identified during the second quarter. As a result, trainees were able to set up an emergency response center in the new main administration building that equals the one in the main anti-earthquake building and respond to the simulated emergency. On the other hand, even though improvements were implemented to address issues concerning the sharing of information between each functional unit and the Emergency Response Center, which was identified as a problem during training held in the second quarter, there is still room for improvement in regards to infrastructure and team preparation, so we will continue to make improvements.

- ◆ Fukushima Daini; Third Quarter General Training: October 23, November 6, November 25, December 11, December 18, December 23

Training on October 23 consisted of evacuation training in the event of a large tsunami warning caused by massive earthquake, and responding to an emergency from the Emergency Response Center on high ground. During training drones were used to check the state of damage caused by the tsunami and equipment used in the Emergency Response Center on high ground (satellite phones and transceivers, etc.) were actually used

as means of communication. Notifications were actually given to the shift supervisor and checks were conducted to confirm the accuracy of the notification and that it had actually been sent. This training session revealed that there is still room for improvement in regards to methods for gathering and sharing information so improvements will be made going forward.

- ◆ Kashiwazaki-Kariwa; third Quarter General Training: October 11, October 25, November 1, December 18

During general training on November 1 emergency response drills were held under the observation of members from the Nuclear Regulation Authority. Until October, individual training has been repeatedly conducted in order to rotate all personnel and not just experienced teams, newly create and improve information sharing tools, and better coordinate during actual field training. As a result, we are able to address issues that had been pointed out, such as improving the skill of team members who are not as experienced, and sharing information between the power station and Headquarters, to the same degree as last year. The training scenario consisted of a scram caused by malfunctioning equipment at Unit 6, which is in operation (simulated), thereby activating an emergency response, such as requiring preparedness personnel to assemble at both the power station and Headquarters. After that, a large earthquake caused simultaneous accidents at multiple units, such as the shutdown of the reactor cooling water supply due to an automatic scram of Unit 7, which was in operation (simulated), and a decrease in water levels in the Unit 1 (shut-down) spent fuel pool, in an attempt to make the scenario more complicated. In the Emergency Response Center, complicated information was organized and strategies for creating repair plans and setting priorities were determined during the objective determination meeting. In particular, whereas it was determined that core damage had occurred at Unit 6, which had experienced a (simulated) severe accident, the decision was made to prevent the containment vessel, and information sharing tools were leveraged to share information between the power station and Headquarters in regards to the severe accident response, which was an objective of training, there is still room for improvement in regards to notification methods, so we will continually implement training.

◆ Joint nuclear preparedness training with Niigata Prefecture; November 8, November 9

During nuclear preparedness training held by Niigata Prefecture (November 8, 9), approximately 600 residents participated in evacuation training, and approximately 55 agencies including the Self-Defense Force, government agencies, and agencies from various cities, towns, and villages, such as Niigata Prefecture, Kashiwazaki City, and Kariwa Village, etc., responded to a simulated accident at Kashiwazaki-Kariwa Unit 7 in order to improve coordination and become even more familiar with disaster prevention skills. Approximately 150 TEPCO employees participated in training. These TEPCO employees conveyed information about the power station to the Niigata Prefecture disaster response center, aided with evacuation of residents living within a 5 km radius of the power station, engaged in screening and simple decontamination tasks, and took radiation measurements outside of power station site boundaries. We will continue to repeat such training to enable us, the operator, to cooperate to the best of our ability and aid with evacuations in the event of an emergency.



Joint nuclear preparedness training with Niigata Prefecture

◆ Headquarters

On November 1, joint emergency drills were held between Headquarters and Kashiwazaki-Kariwa. In order to increase the number of experienced responders, training participants and the roles of each participant have been changed since last year at both the power station and Headquarters, and training has been repeatedly implemented. As a result, trainees were able to respond on a level at par with last year. Furthermore, common condition maps, which were used last year at Fukushima Daiichi and Fukushima Daini, were shared within the company, improved and used during this training session. When an explanation of the simulated accident, which consisted of damage to multiple reactors, was given to the Nuclear Regulatory Agency during training, the explanation focused on the reactors that were in the worst shape and there was a lack of information given about the events at the other reactors, which is an issue that needs to be addressed. By implementing training on handling simultaneous disasters this fiscal year at Fukushima Daiichi and Fukushima Daini we shall clarify areas for improvement and examine how to address these issues.

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

◆ Fukushima Daiichi

Since FY2014, Unit 5/6 operators have been trained on the use of fire trucks and power supply trucks. As of the end of December, 37 people had been trained on fire trucks thereby fulfilling our goal of 33 certified personnel (80% of field personnel (41 workers) (no change over quarter two)), and 35 people had been certified on the use of power supply trucks (see the chart below for details). Acquiring skills needed to manage the operation of

reactor cooling water injection equipment and contaminated water treatment equipment has been prioritized for Unit 1~4 equipment operators and water treatment equipment operators.

◆ Fukushima Daini

Fire engine and power supply car operation training commenced during FY2014. As of the end of December, 28 operators have been certified on the operation of fire engines thereby exceeding our 29-operator goal (90% of the 33 operators in the field (increase of one operator since the second quarter)), and 30 operators had been certified on the operation of power supply cars (see the chart below for details).

◆ Kashiwazaki-Kariwa

Fire engine and power supply car operation training commenced during FY2013. As of the end of December, 109 operators have been certified on the operation of fire engines thereby exceeding our 87-operator goal (80% of the 109 operators in the field (decrease of two operators since the second quarter)), and 92 operators had been certified on the operation of power supply cars (see the chart below for details). As of the end of December, the number of instructors in shift departments was 137 (increase of one operator since the second quarter) thereby achieving third quarter goals.

Power Station	Fire Engines		Power Supply Trucks	
	No. of certifications (comparison with last quarter)	Fill rate	No. of certifications (comparison with last quarter)	Fill rate
1F	37 (+1)	112%	35 (±0)	106%
2F	28 (+4)	96%	30 (±0)	103%
KK	109 (+13)	125%	92 (+2)	105%

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

(3) Status of initiatives to improve the in-house technological capability of power stations (maintenance) [Measure 6]

◆ Fukushima Daiichi

We are continually implementing training on responding to a loss of on-site power (cooling water injection equipment operation training, such as training on the operation of power supply cars, emergency generator operation training, and concrete pump truck operation training) in order to improve the ability to respond to emergencies. During the third quarter, a focus was put on training to respond to damage to reactor coolant injection equipment caused by a tsunami, which consists of restoring coolant injection if reactor coolant injection equipment were to be damaged by a tsunami. Furthermore, training on the operation of power supply trucks and how to connect to these trucks was implemented during actual training in the field in order to improve coordination between the field and the Emergency Response Center. During actual field training the electrical repair team went into the field as instructed by the Emergency Response Center in order to connect power supply trucks to the electric power panels, and training was held on reporting field activity status to the Emergency Response Center thereby maintaining skills required during emergencies.



Laying hoses (training on responding to reactor coolant injection equipment damage)



Power supply truck operation/connection training

◆ Fukushima Daini

In order to improve the ability to respond to emergencies we are conducting repetitive training drills with four teams (① rubble removal/road repair, ② generator replacement, ③ temporary cable connecting, ④ coolant pump repair). During the third quarter, in order to maintain and further develop the skills of response personnel, members of the motor replacement team and temporary cable connection team were switched during training. Furthermore, we are further improving work quality by incorporating new soft skills (personnel basic behavior and human error prevention tools, etc.) into the work procedures for other teams. We will continue to be innovative in our approach to training to enable a flexible response amidst various conditions.

◆ Kashiwazaki-Kariwa

During an emergency, technological capability is required to be able to respond to an emergency for a certain period of time before assistance is received from outside parties. In the Maintenance Division various training to improve in-house technological capability is being implemented in order to improve the in-house technological capability of maintenance personnel. At the Kashiwazaki-Kariwa, various types of training is being implemented, such as training on the operation of power supply trucks (training on adjusting load by connecting power supply trucks to high-voltage load equipment), training on responding to gas turbine generator malfunctions, training on cable end preparation and connection, training on the operation of mobile cranes, training on the assembly and disassembly of scaffolding, and training on welding, cutting, and grinding, etc. During the third quarter, changes were made to training on responding to gas turbine generator malfunctions from the replacement of all engine parts, which was implemented during the second quarter, to the replacement of auxiliary engine parts (sensors and fuel filters, etc.). By identifying malfunctioning parts and limiting the scope of the response we can improve efficiency and further shorten repair times. We will continue to implement repeated training as we aim to maintain and improve in-house technological capability.



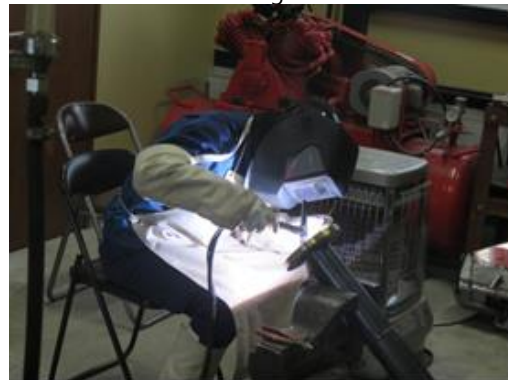
Power supply truck operation training



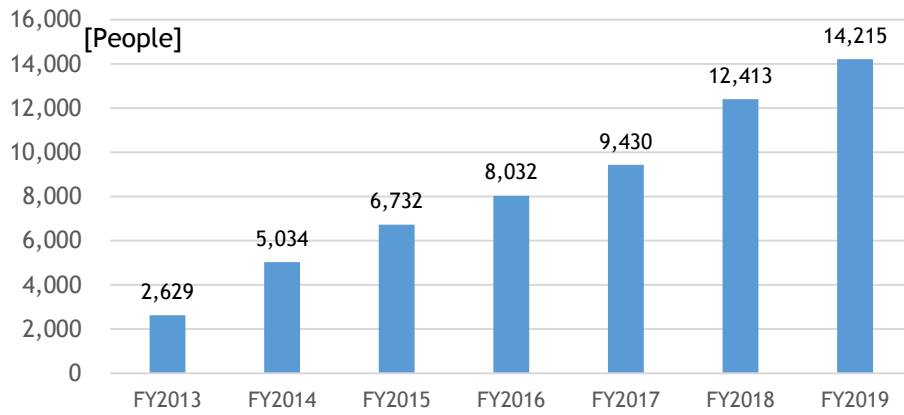
Gas turbine generator malfunction response training



Mobile crane operation training



Welding, cutting, grinding training



Trends in the number of maintenance personnel that have undergone in-house training (totals for Fukushima Daiichi, Fukushima Daini and Kashiwazaki Kariwa)

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

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

- ◆ Reconstructing education and training programs based on SAT

The Nuclear Education and Training Center has adopted the Systematic Approach to Training (SAT), which is recognized internationally as a best practice, and is providing education and training programs necessary for personnel development throughout the entire Nuclear Power Division. In order to continually improve education and training we have created three tiers of review bodies consisting of the Nuclear Power Division Education and Training Committee, Power Station Education and Training Committee, and Curriculum Review Meeting. These three bodies effectively put education and training programs through the PDCA cycle based upon SAT.



Tiered review committees

- ◆ Opening of the Fukushima skill training center

Prior to the Fukushima nuclear accident training and education on required skills was provided to employees from Fukushima Daiichi and Fukushima Daini in the Fukushima Daiichi skill training building in order to maintain nuclear safety. However, since the skill training building was rendered unusable by the Fukushima nuclear accident, education and training had been continued by temporarily using a part of the existing facilities at Fukushima Daini. During the third quarter, a Fukushima skill training facility was established within the Fukushima Daini contractors building and an opening ceremony was held (October 10). With this large improvement to the education and training implementation environment, we will use the Fukushima skill training center to continually develop education and training for employees as we strive to further improve technical skill and ability.



Fukushima skill training center opening ceremony



Classroom for desk work and practice



Instrument calibration training



Valve used for disassembly inspection training

◆ Training for nuclear leaders and middle management

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

Power station general manager training has been provided for middle managers in order to accelerate nuclear safety reforms and reconstruct the roles and mission of general managers in charge of departments with as many as 250 people. During the third quarter, 18 general managers that have been in office for two years were subjected to second-year general manager training in order to improve their leadership skills to the level expected of general managers that have had a year of experience since the general manager training implemented last year. Furthermore, general manager/shift supervisor training was implemented for 70 new managers and shift supervisors. Through lectures and discussions, the trainees deepen their understanding of TEPCO leadership and the expectations for management.



Second-year general manager training



Group manager/shift supervisor training

◆ New employee training

Since new employees that joined the company in FY2019 have completed all training curriculum at each power station they were assigned to positions at each of the power stations in November. Each power station revised its method for subjecting new employees to this fiscal year's training curriculum. At Fukushima Daiichi, where there are a lot of new employees, and at Kashiwazaki-Kariwa, training was provided in small groups of about 10 employees. At Fukushima Daini the method of training was switched from lectures to group

discussions. Furthermore, training unique to each power station was also provided in light of the differing conditions at each plant as a new initiative. At Fukushima Daiichi, training was provided on equipment unique to that plant, and at Fukushima Daini training was provided on measures to decommission the JAPC Tokai Power Station. Similarly, at Kashiwazaki-Kariwa training was provided on safety measure equipment. In regards to training needs, many of commented that they wish to acquire knowledge about safety rules and how to read design schematics that are used frequently, such as pipe instrument wiring diagrams, etc., so we are deliberating training that provides not only equipment knowledge, but also basic knowledge required to engage in actual duties, and will make improvements to the next fiscal year's training plans.



Training on equipment unique to Fukushima Daiichi



Training on measures to decommission the Tokai Power Station at Fukushima Daini

(2) Cultivating and certifying system engineers [Measure 6]

In order to promptly and safely stabilize a reactor when there is an emergency, personnel need to quickly ascertain the circumstances of the accident and make accurate decisions. Therefore, engineers are being trained to be proficient in design, laws and regulations, standards, operation, maintenance and other areas pertaining to facilities important for safety. System engineers formulate system monitoring programs, which stipulate monitoring targets and standards for monitoring system performance degradation, in order to monitor whether or not primary plant systems are fulfilling design requirements. These monitoring activities also serve to identify areas in which reliability can be improved, which leads to overall improvements.

There are currently seven system engineers at Kashiwazaki-Kariwa that monitor 26 systems at both Units 6 and 7, and there have been no abnormalities with system performance. During the third quarter, monitoring of four new systems began. During the fourth quarter three more additional systems will be added to those being monitored. We will continue to increase the number of systems to be monitored and the train personnel with the objective of having five system engineers for each operational plant.

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

(3) Enhancing configuration management [Measure 6]

Configuration management is a process for maintaining the safety of the plant and ensuring that power station equipment has been manufactured, installed, and is being operated as designed. Deliberations continue on constructing a systematic process for maintaining and managing a state in which design requirements, actual equipment, and equipment schematics all match.

In order to improve accessibility to information on design requirements and design basis, we are examining how to compile this information into design standard documents. During the second quarter we finished creating design standard documents for systems required to maintain plant shutdown (residual heat removal system, spent fuel pools, emergency AC power systems, etc.), which had been deemed priority equipment, and during the third quarter we began examining other important safety systems.

In regards to the configuration management process (design change management process), we continue to make revisions based upon benchmarking information from US operators, and during the third quarter, we prepared manual revision drafts with the intention of applying them to the current system. After coordinating with relevant departments, we plan to put these manuals into use during the fourth quarter. We are also revising systems that support the use of this process so that designs comply with the content of revised manuals and shall move forward with development and installation during the fourth quarter.

In regards to human resource training (education), we continue to create educational materials to enable each individual to understand the role that they play in achieving configuration management.

(4) Improving project management skills

We have created projects for resolving problems that exist across all departments involved in decommissioning at Fukushima Daiichi and safety measure implementation at Kashiwazaki-Kariwa, and are striving to resolve trans-departmental issues. During the third quarter, common e-learning educational materials for the Nuclear Power & Plant Siting Division and the FDEC were created in addition to conventional classroom education in order to apply this knowledge to actual projects and educate all parties about project management methods as we aim for a “consistent approach to nuclear power.” We shall cultivate experienced project managers by providing basic education and practical education to all employees through basic education and OJT, and increase the amount of human resources that can use the methods they have learned to think in a project-oriented manner.

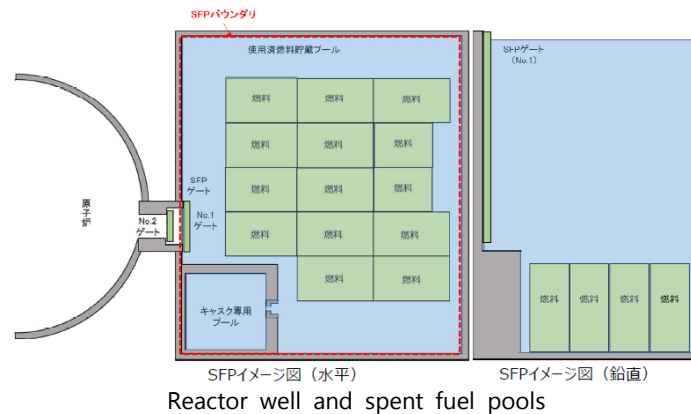
(5) Improving nuclear safety and productivity through Toyota-type kaizen

◆ Nuclear Power & Plant Siting Division: Kaizen examples

Kaizen for improving nuclear safety are being engaged in for not only fieldwork, but also desk work, such as analyses. Assessments of desk analyses have been entrusted to plant manufacturers and engineering companies up until now, but we have begun initiatives to perform analysis assessments in-house so that in-house assessments will lead to improvements in technological capability.

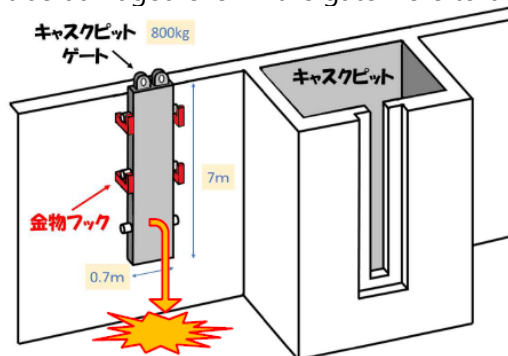
- Spent fuel pool gate integrity assessment (Fukushima Daini)

During an integrity assessment of the gates between the reactor wells and spent fuel pools at Fukushima Daini it was confirmed that sloshing of pool water during an earthquake would not result in a leak of water from the spent fuel pool into the reactor well, even at levels of seismic motion equal to the disaster. Two gate integrity assessment were performed; a conservative primary assessment using numerical analysis, and a more realistic secondary assessment using an analysis code. The primary assessment was conducted by Fukushima Daini, and the secondary assessment was performed by the technical research Institute thereby enabling both assessments to be performed in-house without having to consign them to a manufacturer.



- Assessing the potential for the cask pit gate to fall off (Kashiwazaki-Kariwa)

In the spent fuel pools at Kashiwazaki-Kariwa there is a gate (cask pit gate) between the spent fuel pools and the cask pit which is the area where casks into which spent fuel is put are placed. Normally, the gate is hooked to a metal fixture on the inner wall of the fuel pool. An analysis of the integrity of this cask pit gate has shown through numerical analysis that the gate would not become unhooked and fall even during sloshing caused by seismic motion equal to that experienced during the disaster. The assessment also proved that the inner pool liner would not be damaged even if the gate were to become unhooked and fall.



Cask pit inside the spent fuel pool

3 PROGRESS ASSESSMENT

3.1 SELF-ASSESSMENT OF KEY ISSUES

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

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

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

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

3.1.1 Improvement Initiatives based upon Self-Assessments

(1) Improving human resource training (technological capability)

- ◆ Developing safety/quality improvement kaizen activities

2.4.2 (5) Noted in “Improving nuclear safety and productivity through Toyota-type kaizen”

- ◆ Constructing education/training programs

We are continuing to construct engineer education curriculum that covers seven areas (design, systems, equipment/programs, equipment diagnostics, procurement, safety, and fuel) and have begun using those curriculums for which preparations have been completed. During the third quarter, basic training on equipment reliability (“using degradation mechanism organization charts,” “sampling and assessing as-found data”), which is a process for continually improving equipment reliability, safety, and performance, was started for Nuclear Power Division engineering personnel as a further initiative.

◆ Design/procurement improvement initiatives

The Fukushima Daiichi Decontamination & Decommissioning (D&D) Engineering Company (FDEC) is striving to improve design/procurement in light of the nonconformities with the Unit 3 fuel handling machine. As part of these initiatives we engaged in procurement-related benchmarking with other companies (two companies during the third quarter). Knowledge that should be incorporated as we move forward with the decommissioning of Fukushima Daiichi, such as “overseas products and general industrial product quality management,” “information that should be noted in specifications to clearly convey requirements to vendors” and “precautions when procuring from overseas” was obtained. In light of the knowledge that was obtained, we deliberated proposals for improving design and procurement processes, and created a draft of a design management guide that reflects these proposals. Furthermore, we have put guideline revision proposals into trial use for important procurements, such as items procured from new overseas vendors, etc., and will examine effectiveness.

◆ Initiatives to strengthen quality management

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

(2) Communication improvements

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

Since August 2019 we have been holding group discussions in all departments in the Nuclear Power Division using “the results of questionnaires regarding information disclosure awareness” and “past cases of incompetency regarding the dissemination of information” in order to cultivate awareness about information disclosure in the course of one’s daily duties. Furthermore, as an initiative to promote those in the field to think for themselves and implement kaizen, each power station is examining kaizen measures based upon the cause analysis of nonconformances related to internal/external communication, and is gradually implementing these measures. At Kashiwazaki-Kariwa, all station personnel participated in communication activities that consisted in visiting homes in Kashiwazaki City and Kariwa Village. This provided an opportunity for employees to listen to the honest thoughts and opinions of community residents and think about how they can leverage these opinions in the course of their own duties thereby cultivating awareness about the perspective from which we are viewed by society.

◆ Improving the awareness of corporate communications departments

During the third quarter, new corporate communications officers were subjected to media training using information on nuclear power-related issues in order to provide them with the knowledge and skills required to “convey information that is easily understood.”

◆ Using case studies for information disclosure training

At Fukushima Daiichi, information disclosure training conducted jointly by the Nuclear Power Division and the Corporate Communications Division is being held monthly to ensure that information flows smoothly in the event of unforeseen circumstances. At Kashiwazaki-Kariwa and Fukushima Daini, notification training is being continually held for night shift members in order to improve the response of the night shift. During the third quarter, training was held every day, in principle, at Kashiwazaki-Kariwa, and on weekends and holidays, in principle, at Fukushima Daini

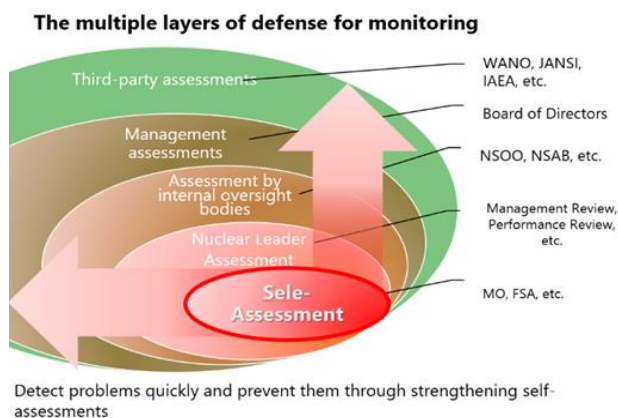
◆ Strengthening monitoring by risk communicators

In order to enhance the monitoring of each department from the perspective of society, training on “Strengthening Monitoring” was held in October 2019 for risk communicators (RC), who serve as liaisons between the Nuclear Power Division and corporate communications. This quarter, an expert in risk communication was invited to be an instructor to study cases in which there is question over whether or not information should be disclosed. This enabled risk communicators to deepen their knowledge about determining whether or not information needs to be disclosed in the event of extraordinary circumstances.

3.2 SELF-ASSESSMENT BY THE NUCLEAR POWER DIVISION

(1) Key self-assessments [Measure 2]

In the pursuit of excellence and to make improvements that enable assessors to identify for themselves those issues that should be improved, a Key Self-Assessment Implementation Guide that compiles standard self-assessment methods used by the world’s finest operators, such as including external parties and representatives of other sites as assessors, etc., has been created and put into use.



Assessment defence-in-depth and self-assessments

This fiscal year we performed a self-assessment of the suitability of Headquarter functions based upon the Key Self-Assessment Implementation Guide and identified areas for improvement, such as, “strengthening the ability of Headquarters to confirm power station status.” In addition, we seek advice from overseas experts, such as the Nuclear Safety Advisory Board (NSAB), etc., reflected that advice into action plans in order to make improvements, and transitioned to the execution stage. Going forward we shall strive to strengthen self-assessments in order to further root the behavior of learning and making improvements on our own.

Key self-assessments performed during the third quarter are as follows.

◆ Operations (Operational Decision-Making)

In the operations field we performed a key self-assessment of the operational decision-making (ODM) process at Kashiwazaki-Kariwa. Operational decision-making refers to making decisions to suitably respond to decreases in plant safety and operational reliability that is not clearly defined in approved procedures even though signs of abnormality have been recognized at the plant, and is a process for keeping the plant safe while solving these issues with effective methods. Members from Headquarters (including experts from the United States), Fukushima Daiichi, Fukushima Daini, and Kashiwazaki-Kariwa participated in this self-assessment that was carried out while making comparisons to ODM process check sheets used by the nuclear industry in the United States. As a result, although no large weaknesses were found in the process itself, such weaknesses as the failure to perform regular reviews, and unclear aspects about the criteria for determining whether or not to transition to the ODM process, were found. Therefore, we will continually improve the ODM process such as by clearly noting this information in the ODM guide.

◆ Maintenance

In the maintenance field a key self-assessment was performed of human error prevention tools at Fukushima Daini (November 28~29). In accordance with World Association of Nuclear Operators Performance Objectives and Criteria (WANO PO&C) and Japan Nuclear Safety Institute (JANSI) guidelines, etc., the self-assessment was performed by interviewing TEPCO employees and contract workers, performing field observation, and conducting process reviews. Assessment results showed that a strength is the fact that human error prevention tools to be used and important steps have been clearly noted in the manual based upon the guide that was created this fiscal year, and an area for improvement is the fact that human error prevention tools are not being consistently used during fieldwork. Therefore, going forward, countermeasures shall be proposed and improvements made.

◆ Configuration management/design management (design management)

In the design management field, a key self-assessment was performed of design management at Kashiwazaki-Kariwa. When changes are made to equipment designs, it is necessary to not only examine the piece of equipment in question, but also look at the issue from a wide point of view and examine the impact that such changes may have on related areas, such as, the functions of surrounding equipment and whether or not the operation of such equipment will be hindered. Usually, internal experts intimately familiar with each field deliberate these issues, but during this self-assessment experts from Kashiwazaki-Kariwa and Headquarters participated and referred to check sheets used by the nuclear industry in the United States to confirm that issues are being examined from a broad enough point of view. As a result, it was determined that improvements need to be made in regards to the perspectives from which operators and maintenance personnel examine design changes, so countermeasures, such as improving education, will be implemented going forward.

◆ Material procurement (procurement infrastructure level diagnosis)

In the material procurement field, a key self-assessment was performed for procurement infrastructure, which is required to strengthen procurement capabilities at Headquarters. When performing the assessment, the assessment of an external consulting firm was used. As a result, it was found that participation during the planning stage upstream of procurement, which is a key action, is progressing and leading to a certain degree of cost reductions. Going forward we will continually improve procurement infrastructure in order to develop initiatives related to quality and quantity.



Key self-assessment (material procurement)

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

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

NSOO -19-019
30th January 2020

Nuclear Safety Oversight Office - Quarterly Monitoring Evaluation Report FY2019 Q3

Introduction

This report summarizes the evaluation results of the third quarter of FY2019 (October to December) of the Nuclear Safety Monitoring Office (hereafter “NSOO”). NSOO had discussion with each department in charge about the recommendations, advices and observation results reported in this report. NSOO proposals were accepted by management layer of the line departments and the countermeasures are being examined or started.

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

NSOO HQ team and the chief engineer of reactors (hereafter “Senior Reactor Engineer”) observe steady improvement of nuclear safety in many areas. In this chapter, particularly important recommendations are stated based on the observations in the current period for further improvement.

1.1

Lack of consideration for nuclear safety in waste management (Kashiwazaki-Kariwa/ Fukushima Daini)

[Issues confirmed]

With regard to the temporary accumulation site for wastes in the plant, comprehensive judgment of appropriateness in terms of safety has not been made including the considerations to the protection of important-to-safety facilities and security of access routes, etc.

If this state continues, collapse of the accumulated wastes and fires could result in the compromised nuclear safety and human safety in the plant.

[Considerations and possible causes]

(Cases)

- • A temporary accumulation site for non-combustible wastes had been set up near the important facilities (seismometers) of the Kashiwazaki-Kariwa Unit 2 reactor building (R/B) after application and permission.
- • In the annexes for Unit 1 reactor building in Fukushima Daini, a temporary accumulation site of combustible and noncombustible wastes was applied for, permitted, and installed in the staircase as an access route and an evacuation route.

The attributable cause is as follows:

- There is a degree of freedom in the area permitted to establish a temporary accumulation site for wastes, and it is troublesome to make a judgment on safety at each installation timing.

[Recommendations]

The NSOO recommends the following to the General Manager of the Radiation Safety Department (Kashiwazaki-Kariwa) and the General Manager of Emergency Planning and Industrial Safety · Radiation Safety Department (Fukushima Daini).

- So that the safety should be secured, limited areas should be determined in which the establishment of the temporary accumulation site is permitted and the permission should be made within the area.

1.2

Weakness of change control in 1F organizational reform (Fukushima Daiichi)

[Issues confirmed]

D&D Engineering Company does not apply the change management process rigorously to the planned organizational reform. The Company does not take sufficient measures to prevent emergence of risks associated with the maintenance of core organizational functions and secondary risks (occurrence of errors through interface change, etc.).

If this situation continues, the Company may fail to achieve the expected effect for organizational reform sufficiently and the risks may become evident.

[Considerations and possible causes]

(Cases)

- Each staff in charge of preparation recognize that there are insufficiencies in the examination of some organizational functions (e.g. maintenance of emergency response function). However, as far as confirmed by NSOO, the secretariat has not created any place for sharing the issues among / solving the issues by the stakeholders.
- Most of the statements by the secretariat and each staff in charge of preparation were about the matters without change (e.g. most of working level staff for individual work are maintained even after the organizational reform). There were only few statements on the risks that may occur through the changes (e.g. changes in the interface among organizations in conducting tasks).

The attributable cause is as follows:

- Supervising function of the change management is not working sufficiently.
- Understanding for the importance of change management has not been penetrated.

[Recommendations]

The NSOO suggests Decommissioning Promotion Team General Manager to:

- It is necessary to establish a place to share and solve the issues recognized by each staff in charge of preparation so that important issues should be solved before implementation of the organizational reform.
- Importance of risk control through change management should be penetrated in the D&D Engineering Company.

(For D&D Engineering Company, change management depending on the progress of works is essential, and the improvement of change management capability is needed more than the case of operating ordinary reactors.)

1.3

Resolution of potential issues in operator performance (Kashiwazaki-Kariwa)

[Issues confirmed]

In confirming the behavior of operators, it was verified that the auxiliary equipment operators implement very secure oversight and control in the field tasks including the application of the human error prevention tools.

On the other hand, in the simulator training, insufficient ability for guidance in Shift Managers and non-conformance of procedures by supervisors, etc. were observed. The operation department has not solved these issues as a potential problem of the organization.

If this condition continues, there is a concern of not achieving the global level benchmark that all the operation teams perform secure oversight / control under any circumstances.

[Considerations and possible causes]

(Cases)

- In the simulator training, the supervisor prioritized the restoration of the residual heat removal function, while he should have carried out the rapid depressurization of the reactor pressure vessels (RPV) through restriction of heat capacity in the suppression chamber based on the operating procedure manual.*

(Non-conformance of operating procedure, non-conservative decision making)

* : The supervisor paid attention to the problem solving, while it was more appropriate to realize a safe and steady plant status.

- In the above-mentioned case, the shift manager did not correct the judgment of the conductor, recognizing that the rapid depressurization was the priority.

(Lack of guidance skill)

- The external training instructors who are widely engaged in the observation and instruction of TEPCO's operators in Operational Shift Team have pointed out that the instructions of supervisors tend to be vague when addressing the field situations. The cause was evaluated as "Lack of image due to lack of field experience". (Lack of skill level)

The cause of this is that shift supervisors or managers do not demonstrate the leadership skills for the improvement, such as showing the ideal form and sharing over the group and the unit, and do not sufficiently develop the systematic activity.

In the U.S., where plant operating experience has been accumulated, the periodic deterioration of the operator performance such as conservative decision making becomes a problem. Recently, the problem recognition has been made on the skill of the operator (Proficiency) achieved by enhancing security of basic operating rules, and the activity has been implemented as a recommendation common to the nuclear power industry.

[Recommendations]

The NSOO recommends the Operation CFAM (Corporate Functional Area Manager) to do the following:

- To grasp potential problems on operator performance under plant operating conditions and plan efforts for improvement, referring to recommendations common to the industry in the United States*.

* : "Promotion of conservative decision making" "Awareness of the lack of proficiency and its mitigation", etc.

2. Other recommendations during this quarter

Among the observations made by the NSOO HQ Teams and the Senior Reactor Engineers in this period, noteworthy recommendations except for those described in Chapter 1 are as follows:

2.1 Fukushima Daiichi

- ① Weakness of issue setting in mockup test plan (HQ Team)
- ② Weakness in extracting issues through field training exercise (HQ Team)
- ③ Weakness in the operation of task control process (Senior Reactor Engineer)
- ④ Redefinition of plant standard conditions towards improving plant control (Senior Reactor Engineer)

2.2 Fukushima Daini

- ① Promotion of fire risk reduction through enhancing the understanding of legal requirements (Senior Reactor Engineer)
- ② Enrichment of human error prevention measures focusing on weaknesses in management (Senior Reactor Engineer)

2.3 Kashiwazaki Kariwa

- ① Clarifying some of requirements in the process of verifying construction permit application. (HQ Team)
- ② Lack of strategic planning for RIDM* introduction (HQ Team)
- ③ Weakness in effectiveness review in performance improvement area (Senior Reactor Engineer)
- ④ Weakness in detecting interior flooding and reducing the impact during implementation of the task (Senior Reactor Engineer)

* : RIDM : Risk Informed Decision Making

Making safety related decisions based on the knowledge of conventional deterministic assessment and the knowledge of probabilistic risk assessment.

3. General Manager of Nuclear Safety Monitoring Office's view based on evaluations

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

The occurrence statuses of similar events in the Nuclear Department have been analyzed continuously for the internal and external items pointed out including the NSOO's recommendations (289 cases in the past about 6 years). Following the "emergency response" and "fire protection" in the previous quarter, we will state our thoughts on the "Area of Leadership" and "Area of Organizational Effectiveness" in this period as the subjects for which frequent occurrence of similar events are reported.

[Area of Leadership]

- The activities by managements of departments have taken root for the leadership in the areas of "penetration / promotion of safety culture" and "announcement of policies for operation improvement across the department", for which issues had been pointed out frequently until four years ago.

(Communication of leader's message, behavior of leaders, establishment of the written management model decommissioning strategies, etc.)

- Meanwhile, insufficient "guidance and instructions in practical matters" are observed in the management of combustible materials and the protection of human errors. It is necessary to analyze the effectiveness of the guidance skill* of management layer (HQ managers, managers in power stations / group managers) in practical matters for each task.

* : ①Are policies clearly indicated? ②Is ability of members enhanced?

③Are members proactively engaged?

④Are decision making on risks / risk management in place?

⑤Are results achieved continuously?

[Area of Organizational Effectiveness]

-
Weakness continues in the area of "change management". In the case of reorganization of Fukushima Daiichi supervised by NSOO in this period, issues were observed in the following: "Standard of the way of thinking" (setting of the core competences to be maintained / reinforced), "Implementation framework for changes" (liaison, split of role between HQ and sites), and "Risk assessment" (impacts through the changes in task interface between groups, etc.). The cause is attributable to the lack of stringency in the procedures and operation of change management method.

- With regard to "risk management", risks are identified for daily tasks in the power station and the risk sensitivity has been enhanced through the information analysis including new knowledge and change in social circumstances in the HQ. However, there are still issues in the response to risks from the perspective of society in general, and it is necessary to further enhance the effectiveness of activities.

- With regard to the "Leader's commitment to nuclear safety", an improvement is observed in terms of the indication of good examples by leaders. However, the oversight of the safety culture is still insufficient. Therefore, a new oversight process has been introduced to address the inconsistency of understanding / awareness among groups and to improve lack of consolidated analysis of related information. It is necessary to evaluate the effectiveness in oversight of safety culture by leaders in future.

The General Manager of Nuclear Safety Oversight Office (NSOO) will deploy its oversight activities to prevent recurrence of weakness from the clear perspective based on these knowledge.

3.2 Focus on the important-to-nuclear safety activities in true sense - Use of risk information

Since the Fukushima Accident, Kashiwazaki-Kariwa station has established new safety measure facilities and reinforced the operation processes under the management model. This reinforcement led to the considerable increase of work load compared to the level before the Fukushima Accident. In

future, it is imperative to focus on the truly important activities to continue the safety.

In the nuclear industry in the United States, regulatory agencies and the industry have been based on the common awareness that it is essential to focus on the important-to-safety matters and the ineffective activities should be eliminated. From the latter half of 1990s, the scope of implementing the “RIDM : Risk Informed Decision Making” has been widened.

As a result of being able to make judgment on the effectiveness of activities and the severity of risks, achievements have been obtained such as reduction of exposure through reassessment of the scope of inspection and the improvement of work quality by fulfillment of in-service component maintenance (stable staffing of skilled workers), etc. Ultimately, these activities will lead to the co-existence of the nuclear safety and the plant availability.

Also, in Japan, full deployment of “Risk Informed Decision Making” is expected through the introduction of new inspection system to be started from April this year. When NSOO checked the review status in TEPCO, it was excellent that the HQ is promoting the development of policies in timely manner.

Based on this, to further develop the activities across the department steadily as a basis for future safety and quality, it is necessary for the HQ to establish a good plan with clear definition of specific activity items, timing and challenges to which precious resources will be input.

Fortunately, there are affluent accumulated information already including the practice in the United States and studies based on collaboration among TEPCO and other electric licensees. Further, in the domestic arena, collaboration framework across the industry has been constructed centered on Central Research Institute of Electric Power Industry (CRIEPI) and Nuclear Energy Commission. General Manager of Nuclear Safety Oversight Office (NSOO) hopes that the multi-disciplinary promotion framework will be established under the leadership of HQ and specific activity items and issues for RIDM will be clearly identified as the first step of the focus on activities that are truly important to nuclear safety.

4. Status of completion of the recommendations presented by the NSOO

Line Department has been continuing good activities in general towards the completion of Recommendations by NSOO.

- Of the 186 recommendations presented so far, 163 recommendations have been completed. In this quarter, 6 recommendations were completed.
- In this term, 7 recommendations were presented.

5. Benchmarking and training

NSOO held independent nuclear power safety oversight trainings from October 21 to 29, under technical supports from World Association of Nuclear Operators (WANO), like the last year. In this fiscal year, the training was carried out in two parts, including the training for practical skills that had been an issue. The target of the first part was CFAM, in addition to the new NSOO members, and they studied oversight assessment methodology as a part of study training of basic matters. In the second half, reeducation was given for those experienced in oversight operations through discussion with the purpose of competence acquisition and maintenance and improvement.

End of Document

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

Since 2017, TEPCO Nuclear Power Division leaders have received advice and guidance from the Nuclear Safety Advisory Board (NSAB), which is comprised of people who have experience as general managers or site superintendents at overseas nuclear power companies with outstanding reputations that have been invited to participate in the NSAB. During the third quarter, NSAB members visited Kashiwazaki-Kariwa and Headquarters.

At Kashiwazaki-Kariwa, TBM-KY during fieldwork was observed to confirm that these meetings are being conducted properly and that there are no problems with work safety, and the results were presented to the power station executives as feedback. Furthermore, discussions between relevant parties were held on the topics of risk management and operational focus, etc., and opinions were exchanged about the progress of activities and areas that still require improvement.



Explanation by the NSAB (Kashiwazaki-Kariwa)

At Headquarters, a lecture was given on the “behavior required of leaders in order to cultivate safety culture.” In conjunction with this, a discussion was held about emergency response and CFAM systems, and opinions were exchanged with Headquarter general managers, and upper management from the Nuclear Power & Plant Siting Division and the FDEC.

In summary, the NSAB commented that, “further perseverance is needed to increase the speed of progress, but the improvements to issues that were examined are all moving in the right direction. And, Kashiwazaki-Kariwa leaders and personnel should be commended for their enthusiasm in regards to these initiatives.” However, this is not cause to rest on our laurels and TEPCO will leverage the advice and things noticed by the NSAB as we strive to continually improve nuclear safety.

3.5 NUCLEAR REFORM MONITORING COMMITTEE ACTIVITIES

Since 2012, the Nuclear Reform Monitoring Committee, which is comprised of Japanese and overseas experts and the TEPCO Chairman, and serves as an advisory body to the Board of Directors, has monitored and supervised reform initiatives aimed at transforming TEPCO into a nuclear operator that has the ability to promote dialogue with society, as well as the world's highest levels of technological capability and safety awareness from a third-party point of view.

In October, Chairman Klein visited Fukushima Daiichi and was given a tour of the tanks in which treated water, which is contaminated water that has been purified with multi-nuclide removal equipment, etc., is being stored. Chairman Klein also observed decommissioning work underway at Units 1~4, where radiation levels reduction measures have progressed, from high ground on the west side of the buildings. After his visit, Chairman Klein commented that, "The decommissioning of Fukushima Daiichi is progressing and I was very impressed with how the environment has improved."

In November, NRMC member Mr. Sakurai observed emergency response drills at Kashiwazaki-Kariwa and commented that, "Compared to before, information sharing tools have been improved and overall improvement can be seen. Good training is training during which many problems are found. You should remember this and make training worthwhile."

In December, Chairman Klein and NRMC member Mr. Sakurai visited Kashiwazaki-Kariwa to observe the status of progress of safety renovations. Chairman Klein and Mr. Sakurai were given a tour of the large freight entrance on the Unit 7 reactor building, which is undergoing seismic-resistance enhancement renovations, and the site of installation of above-ground filter vents at Unit 7 which are being newly added, as we aim to complete safety renovations in December 2020. After the tour, Chairman Klein commented that, "Initiatives are underway to further improve seismic-resistance and strengthen safety, thereby improving safety not only during normal operation but also when faced with various accident scenarios. Workers are aware of safety and the safety renovations at Kashiwazaki-Kariwa are proceeding smoothly." We will continue to move steadily forward with safety renovations while prioritizing safety based upon the comments from the NRMC.

At the meeting of the Nuclear Reform Monitoring Committee on February 4, the report was given on the status of improvements to address key issues identified through self-assessments, and the committee commented that, "We can see that you are performing even stricter self-assessments, and making large strides to strengthening the organization and governance." We will continue to implement "nuclear safety reforms for the next generation" so that we can become an organization that can identify weaknesses and issues on our own and make improvements before they are pointed out by external parties.



Tour of Fukushima Daiichi



Tour of Kashiwazaki-Kariwa

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

(1) Safety culture assessment by the Nuclear Regulatory Agency

In regards to FY2018 nuclear power station safety culture cultivation activities, we have received a “General Assessment of Initiatives Related to Safety Culture and the Prevention of Corporate Climate Deterioration” (November 22). In the general assessment, initiatives related to safety culture in the prevention of corporate climate deterioration were said to, “be improving as planned initiatives continue.” In regards to safety culture and signs of the deterioration of corporate climate, the assessment also said that, “continual monitoring is necessary to further watch trends.” The assessment received by Fukushima Daiichi was equal to the assessments received by Kashiwazaki-Kariwa and Fukushima Daini in the first quarter. In accordance with the safety culture basic plan, we shall create safety culture cultivation activity plans, and put into practice the ways of thinking and acting that are expressed by the Traits.

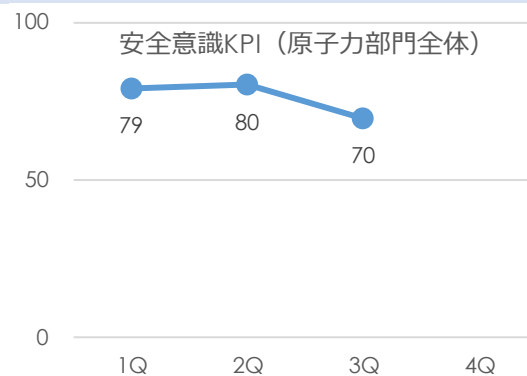
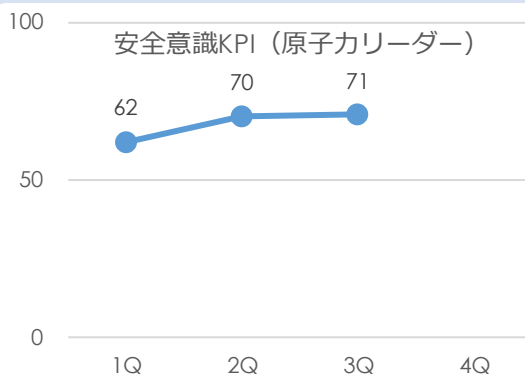
4 KPI/PI RESULTS

4.1 FY2019 KPI/PI

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

4.2 KPI RESULTS

Safety Awareness KPITarget	
Safety Awareness (Nuclear leaders)90 Points	Safety Awareness (Entire Nuclear Power Division) 80 Points



Note: Values are the most recent but do not include the last month of the fourth quarter. Past "latest numbers" have been replaced with verified numbers.

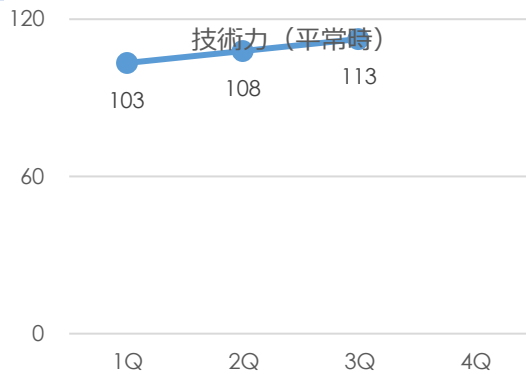
Ability to promote dialogue KPITarget	
Ability to promote dialogue (Internal) ..80 Points	Ability to promote dialogue (External) 100 Points



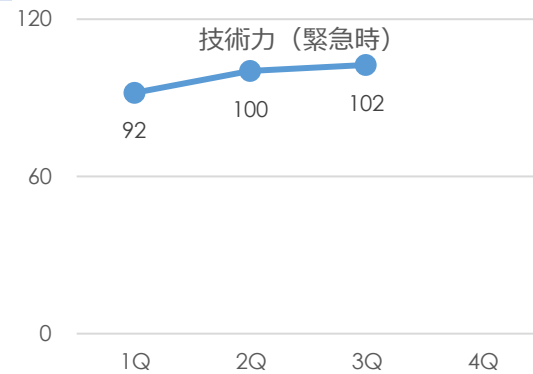
Note: Values are the most recent but do not include the last month of the fourth quarter. Past "latest numbers" have been replaced with verified numbers.

Technological Capability KPITarget

Technological Capability (Times of non-emergency) 110 points



Technological Capability (Times of emergency) 110 points

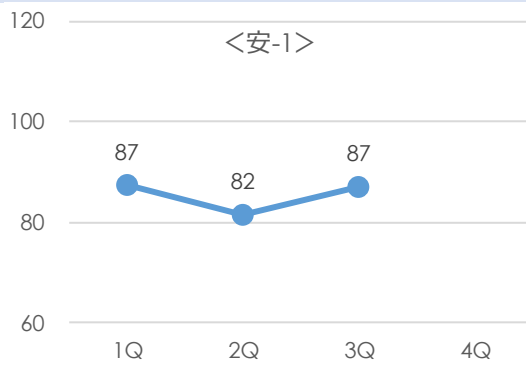


4.3 PI RESULTS

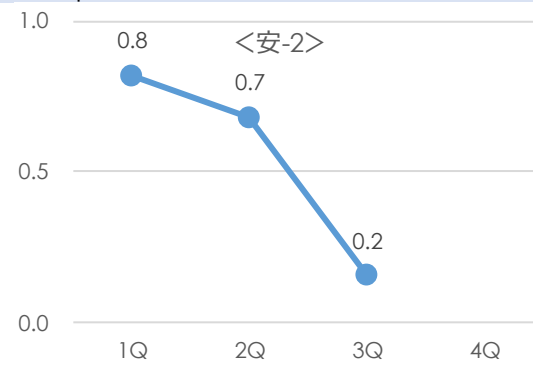
Safety Awareness PITarget

Nuclear Leaders

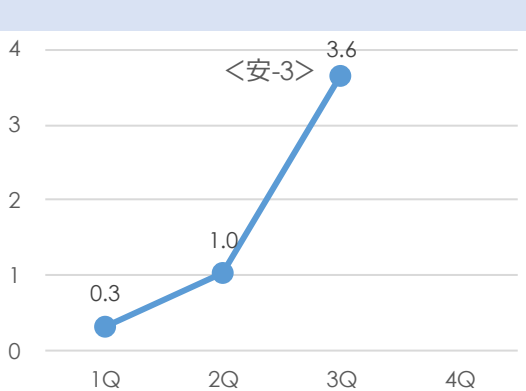
Rate of implementation of retrospection on the traits by Nuclear leaders 100%



Number of times emails have been sent by nuclear leaders in order to share information Once a week/person



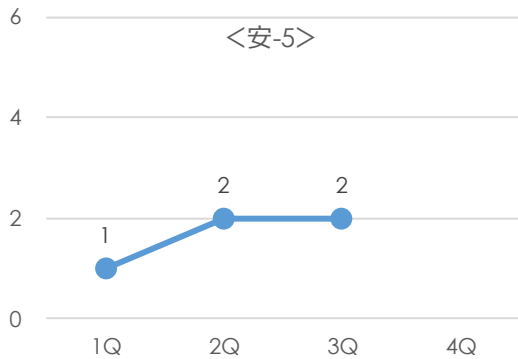
Number of times nuclear leaders participated in training according to plan Twice/year/person



Number of times nuclear leaders went into the field Twice a month

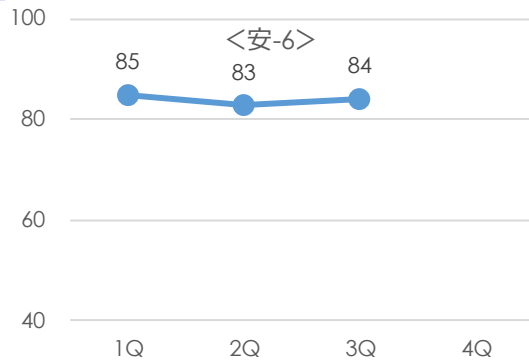


Number of benchmarked issues for which nuclear leaders are responsible that were put into practice4/year

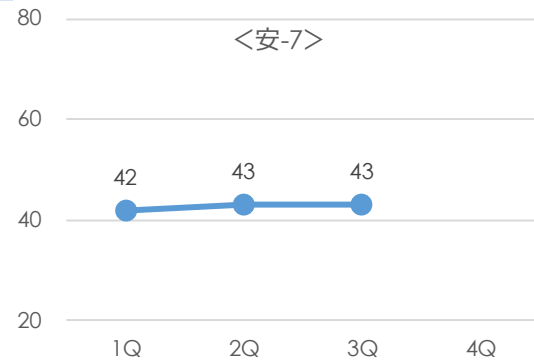


Entire Nuclear Power Division

Implementation rate of group discussion about Traits 100%

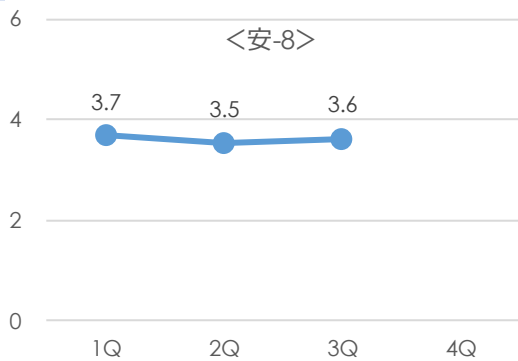


Percentage of intranet messages from nuclear leaders that have been read80%

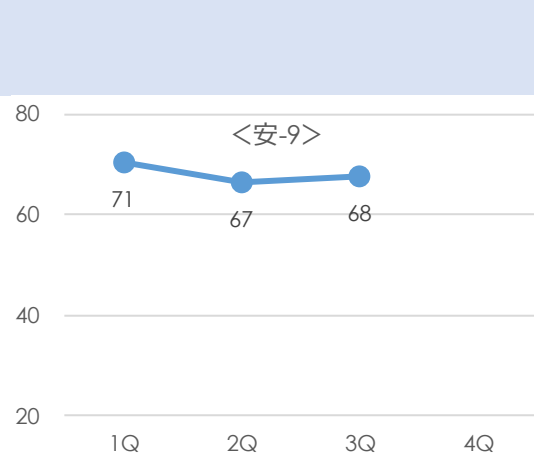


Note: Values are the most recent but do not include the last month of the fourth quarter. Past "latest numbers" have been replaced with verified numbers.

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



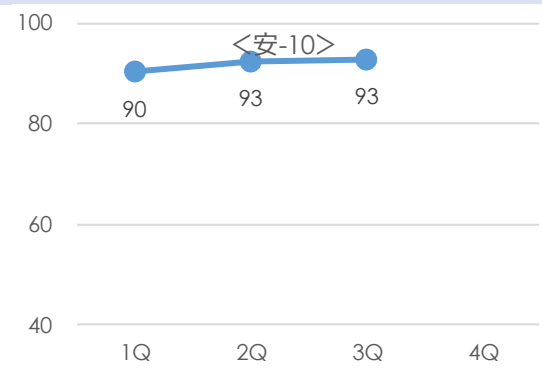
Good MO reporting rate50%



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

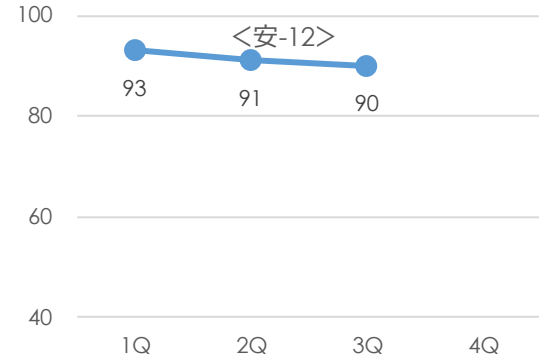
Note: Weighted average for Fukushima Daini and Kashiwazaki-Kariwa

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



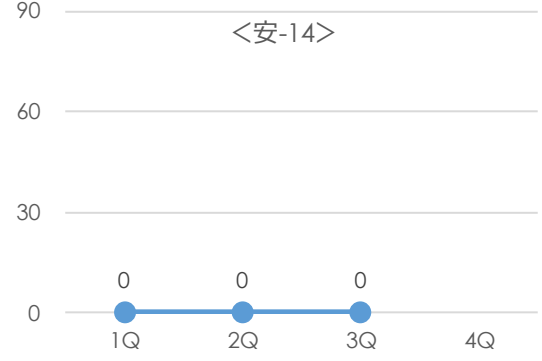
Note: Weighted average for HQ, 2F and KK

Nonconformance voucher period achievement rate 80%



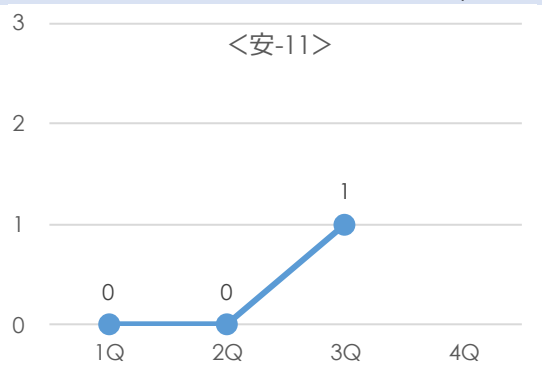
Note: Weighted average for HQ, 2F and KK

Significant OE training participation rate 60%



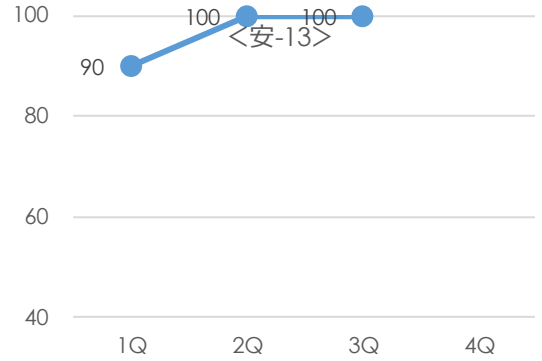
Note: To be implemented in Q4

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



Note: Total for HQ, 2F and KK

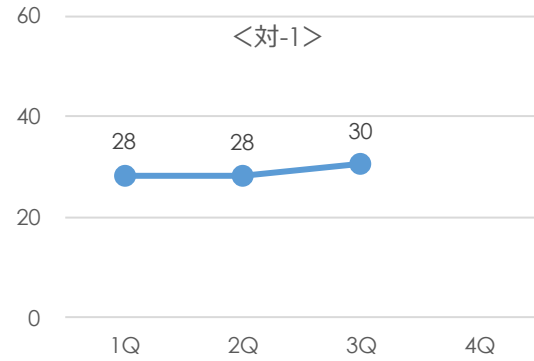
Preventative measures completion rate (within deadline) 90%



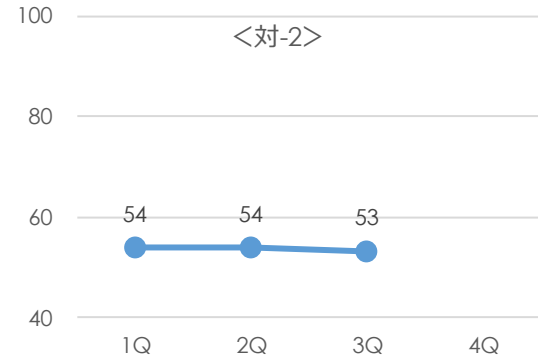
Ability to promote dialogue PITarget

Internal

Percentage of employees that feel that intranet messages from nuclear leaders are "helpful"50%

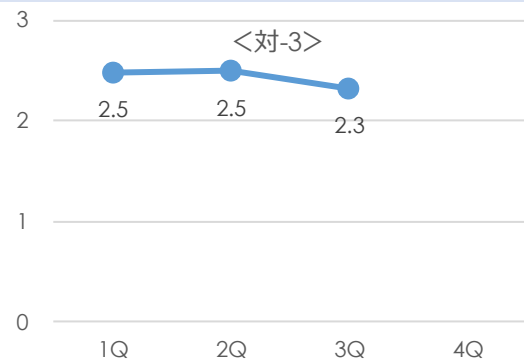


Response rate to e-mail questionnaire on the information conveyed by nuclear leaders.....70%



Note: Values are the most recent but do not include the last month of the fourth quarter. Past "latest numbers" have been replaced with verified numbers.

Degree of understanding of information conveyed by nuclear leaders.....2.5 Points



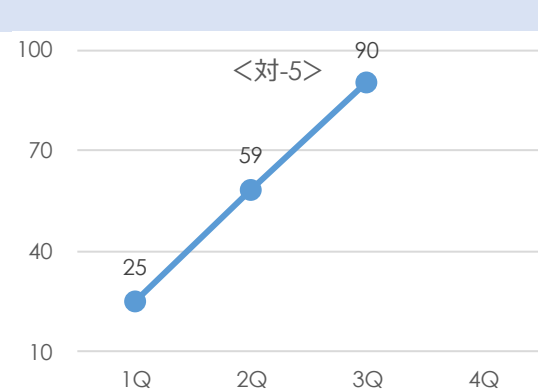
External

Ability to promote dialogue assessment questionnaire results
..... Positive increase over last fiscal year

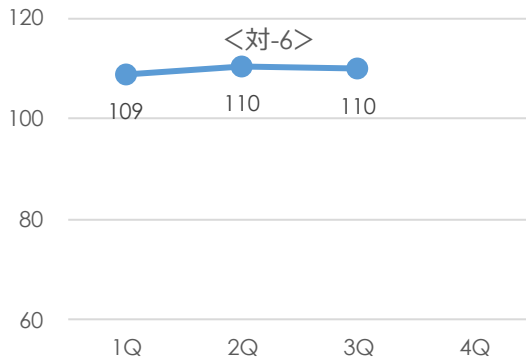
<Dialogue-4> + 1.0

Note: Assessment is conducted annually

Progress rate of dialogue activities aimed at furthering relationships..... 100%



Dialogue activity questionnaire assessment..... 100 points

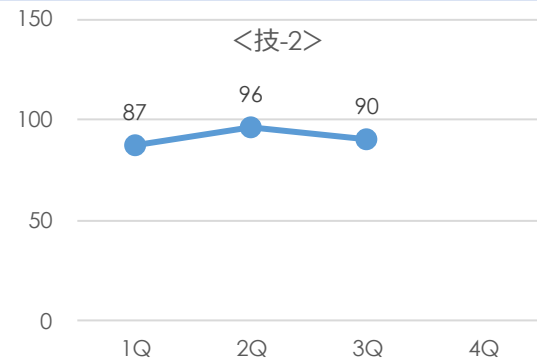
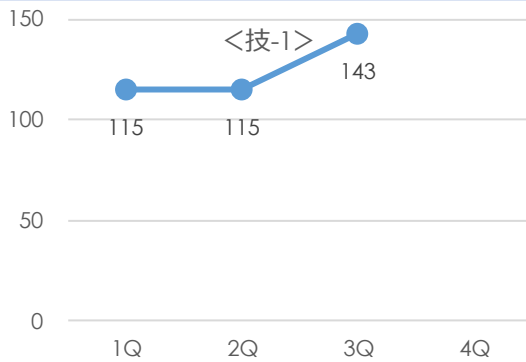


Technological Capability PI Target

Times of non-emergency

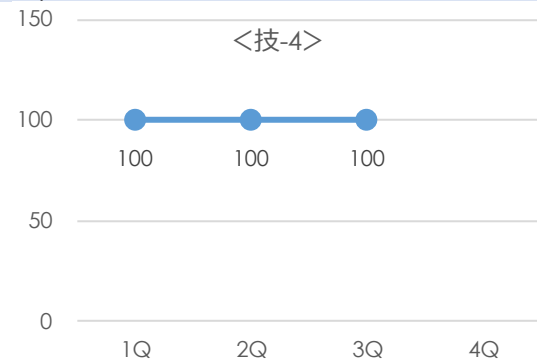
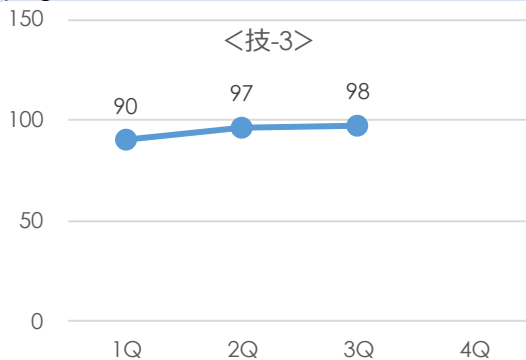
No. of workers certified in operations/maintenance/engineering/radiation and chemistry/fuel/safety, no. of external certification holders..... 110 Points

Education/training issue resolution rate.....80%



Rate of participation in design-related educational programs90%

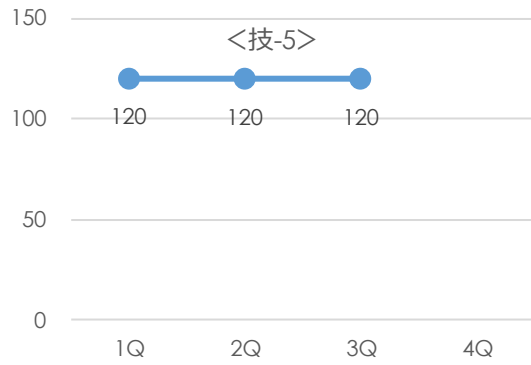
Safety/quality improvement kaizen implementation rate.....90%



Times of emergency

No. of in-house certified emergency personnel (fire trucks, power supply trucks, cable connecting, radiation surveys, wheel loaders, Unic trucks, etc.) 120%

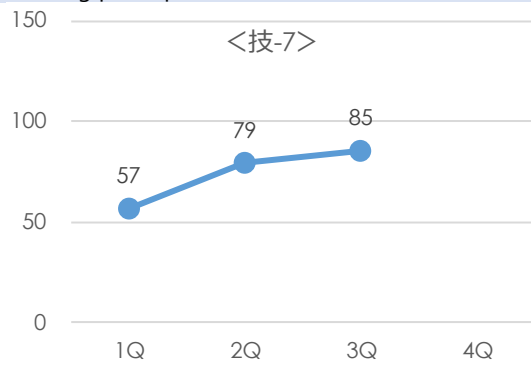
Percentage of "A" assessments given by the Nuclear Regulatory Agency for emergency response training categories80%



<Technological-6> 90%

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

Training participation rate90%



CONCLUSION

With firm resolution to, **“keep the Fukushima Nuclear Accident firmly in mind; we should be safer today than we were yesterday, and safer tomorrow than today, and become an operator that continues to create unparalleled levels of safety,”** we continue to promote nuclear safety reforms while subjecting ourselves to objective assessments by the Nuclear Reform Monitoring Committee².

The Mid/Long-Term Roadmap for the Decommissioning of Fukushima Daiichi was revised at the fourth meeting of the Cabinet Meeting on Decommissioning and Contaminated Water Countermeasures held on December 27.

As recovery in the surrounding region gradually progresses and residents return home, we shall further reduce risks while prioritizing safety based upon our policy of “balancing recovery with decommissioning” in accordance with the revised Mid/Long-Term Roadmap.

Please visit our website³ if you have any opinions and comments about nuclear safety reforms.

² <http://www.nrmc.jp/index-j.html>

³ <https://www4.tepco.co.jp/ep/support/voice/form.html>

ABBREVIATIONS

- ATENA : Atomic Energy Association
- ALPS-treated water: Water treated with multi-nuclide removal equipment (Advanced Liquid Processing System (ALPS))
- As-Found data: Data that indicates pre-inspection/maintenance equipment status
- CFAM : Leader at the Head Office that aims to achieve the world's highest level of excellence for each aspect of power station operation (Corporate Functional Area Manager)
- CAP : Corrective Action Program
- CR : Condition report. Used to enter things noticed and nonconformance information in a database in order to share it.
- HD : Tokyo Electric Power Company Holdings, Inc.
- JANSI : Japan Nuclear Safety Institute
- KPI : Key Performance Indicator
- MO : Management Observations
- N-20 : The group N-20
- NSAB : Nuclear Safety Advisory Board
- NSOO : Nuclear Safety Oversight Office
- ODM : Operational Decision-Making
- OE information : Operating Experience
- PDCA : Plan-Do-Check-Act cycle
- PI : Performance Indicators
- PICO : Performance Improvement Coordinator
- PRA : Probabilistic Risk Assessment
- RIDM : Risk Informed Decision-Making)
- SAT : Standard education and training method proposed by the International Atomic Energy Association (IAEA) (Systematic Approach to Training)
- SFAM : CFAM counterpart at power stations (Site Functional Area Manager)
- SNS : Social Networking Service
- TBM-KY : ("Tool Box Meeting") Meetings by small groups of workers held prior to engaging in a task in order to predict danger and decide on safe work methods.
- Traits : 10 Traits and 40 behaviors indicative of robust nuclear safety culture
- VR : Virtual Reality

WANO : World Association of Nuclear Operators

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

3Way Communication: Refers to the three steps of communication (conveying, repeating, confirming)