

Keeping the Fukushima Nuclear Accident firmly in mind: Be safer today than yesterday, and safer tomorrow than today.

- To live up to the above resolution, we continue to pursue nuclear safety reforms, steadily move forward with decommissioning and engage in activities to raise our power stations to the world's highest level of safety.

Progress at Fukushima Daiichi

- Fuel was removed from the Unit 3 spent fuel pool for the second time and on July 21 the removal of 21 new fuel assemblies (total: 28 assemblies) was completed. Work also progressed with the dismantling of the Unit 1/2 exhaust stack and the construction of a seawall as a countermeasure if a tsunami were to originate in the Kuril–Kamchatka Trench, part of ongoing efforts to reduce risks associated with earthquakes and tsunamis. We also investigated the well plug that acts as a lid for the top of the primary containment vessel, part of preparations to begin removing fuel from Unit 1 in FY2023.

Training at Kashiwazaki-Kariwa

- Training to improve the skills of people in charge of status notifications were implemented to correct the notification errors made during the earthquake that occurred off the coast of Yamagata Prefecture on June 18. This training was observed by members from the local government (Oct. 14) and all employees from the power station participated in visits to all homes in the community. This was the fifth year that such visits have been made and the number of representatives visiting homes increased to 1,200 people. Joint training between the Kashiwazaki City Fire Department and the power station in-house fire brigade was held (Sep. 20) in order to prepare for compound disasters during which a nuclear accident occurs simultaneously with a fire.

Decommissioning of Fukushima Daini

- After announcing the decision to decommission the plant on July 31, we received many inquiries about the decommissioning process at Fukushima Daini and the handling of spent fuel from the community and visitors to the power station. In order to give an overview of the decommissioning process in an easy-to-understand manner, we posted explanatory materials on the Fukushima Daini website. We also gave explanations to the regional community.

Establishment of Aomori Head Office

- Aomori Head Office was established in Aomori on July 1 in order to hash out the details of the Aomori Action Plan and exchange opinions about this plan with the Higashidori Village Council (Jul. 22) and Aomori Prefecture Council (Sep. 10).

Nuclear Safety Reform Plan FY2019Q2 Progress Report Overview

Fukushima Daiichi NPS Progress of reactor decommissioning

Dismantling of Unit 1/2 exhaust stack

Part of the steel frame that supports the Unit 1/2 exhaust stack was found to be damaged in some places. Remotely operated equipment will be used to cut the top part of the exhaust stack (height: approx. 60m) into 23 blocks and then dismantle it to maintain seismic resistance. Cutting of the stack began on August 7 and the top block was removed on September 1, followed by the second block on September 26. During this time we experienced unanticipated problems with malfunctioning communications equipment and chip saw wear, so work processes were revised to address each issue. With the cooperation of ABLE Co., Ltd., a local contractor, we aim to complete dismantling by the end of the fiscal year and move forward with earthquake risk reductions while prioritizing safety.



Lowering a piece of the exhaust stack

Construction of seawall as countermeasure for Kuril-Kamchatka Trench tsunami

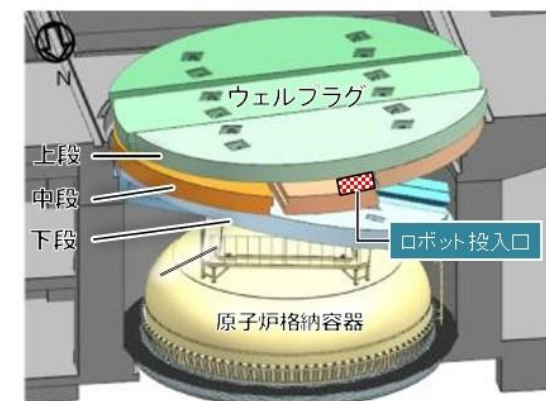
As a voluntary safety measure, we began construction of a seawall to counter a potential tsunami originating from the Kuril-Kamchatka Trench, which is said to be likely to occur in the near future. The L-shaped steel reinforced concrete wall will be approximately 600m in length and will be joined to the existing outer tsunami wall on the south end of the site. The maximum anticipated height of the tsunami is 10.3m, and the height to the top of the wall from the ocean surface, which includes the L-shaped retaining wall, will be 11.0m. During the second quarter the concrete foundation was completed (September 19) and work on the first section of wall, which is approximately 80m long, began on September 23 to construct the L-shaped retaining wall. We aim to have the seawall be completely functional by the first half of FY2020, helping to reduce tsunami risks as quickly as possible.



Seawall construction

Well plug investigation in preparation for spent fuel removal from Unit 1

The Unit 1 well plug, which is a lid for the top of the primary containment vessel (well), was knocked out of alignment by the hydrogen explosions during the 2011 accident, leaving a gap that, along with the misalignment, hinders the removal of fuel from the spent fuel pool. Robots were used to perform investigations via remote control (July 17 to August 26) and the results confirmed the positional relationship between the top and middle sections of the plug, showing that the plug is tilted, and also indicated that radiation levels around the center of the middle section of the plug are high. Based on this information, we shall carefully assess, manage and reduce work-related risks as we move toward fuel removal in FY2023.



Well plug status (diagram)

Nuclear Safety Reform Plan FY2019Q2 Progress Report Overview

Kashiwazaki-Kariwa NPS Progress of safety measures

Countermeasures to correct notification errors made after earthquake in June

As a countermeasure to correct the notification errors made on June 18 when an earthquake occurred off the coast of Yamagata Prefecture, we increased the number of shift members from six to eight, and implemented training in order to improve the skills of shift members. These steps were observed by representatives of the local government of the siting community on August 14. Furthermore, all power station employees, including engineers, participated in visits to all homes in the community. As such, the number of employees taking part in these visits this year, the fifth year in which visits have been made, increased from 300 (last year) to 1,200. Many station personnel commented positively about the experience. One person said, "It was a good opportunity to directly hear the opinions of community members." We shall continue to engage in operations with awareness of how we are being viewed by society.



Representatives of local government in siting community observing skill training

Joint firefighting training with Kashiwazaki City Fire Department

Joint firefighting training involving the Kashiwazaki City Fire Department and in-house fire brigades was held on September 20 to prepare for possible compound disasters during which a nuclear accident and fires occur simultaneously. Based on lessons learned from the past, the training included filling out and sending notification forms, connecting fire trucks to external hydrants and setting up smoke exhaust fans in anticipation of smoke-filled areas. The Kashiwazaki City Fire Department Chief commented, "The level at which the power station can fight fires has improved so it's important to continue this type of training in the future." We will continue to hold training for various fire scenarios and joint firefighting to improve our fire-response capabilities.



Field command center during Kashiwazaki City Fire Department and TEPCO in-house fire brigade joint training

Fukushima Daini Disseminating information on decommissioning

After the decision to decommission Fukushima Daini was announced on July 31, we received many inquiries from the siting community and visitors to the power station regarding the decommissioning process and the handling of spent fuel. To give an overview in an easy-to-understand manner, we posted explanatory materials with illustrations on the Fukushima Daini website (September 9) and provided explanations to the regional community. A member of the siting community commented, "We've gained a good understanding about the entire decommissioning process and the safety of storage." We will continue to use our regularly published information magazines to convey information in an easy-to-understand manner to the siting community and every member of the cities, towns, and villages surrounding the power station. Also, opinions and requests from community members will be reflected in various public relations activities.

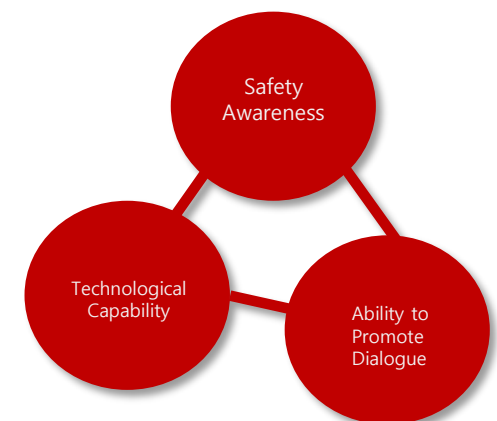


Explanatory materials providing overviews of the decommissioning (example: PR magazine)

Nuclear Safety Reform Plan Progress Report

Nuclear Safety Reform Plan Progress Report Management

- During the second quarter, the World Association of Nuclear Operators (WANO) performed a corporate peer review (CPR) of the entire Nuclear Power Division, focusing on Headquarters, pointing out areas needing further improvement. We also carried out action-plan measures to improve communication and strengthen human resource training, which were pointed out in a self-assessment in FY2018.
- To improve communication, a special website was created by the Niigata Headquarters to enable as many people as possible to view virtual-reality content explaining the safety measures being implemented at Kashiwazaki-Kariwa. We will continue to strive to convey information in an easy-to-understand manner while listening to the opinions of community residents in order to transition from simply “conveying information” to “conveying information that is easily understood.”
- To strengthen human resource training, we engaged in various research and *kaizen* improvement activities, and started to see the effects of these educational activities, such as an increase in the number of people who have passed the licensed reactor engineer exam in recent years.



Nuclear Safety Reform Plan Progress Report

Promoting improvements based on self-assessments

- In the pursuit of excellence, we have been working to identify needs on our own and make such corresponding improvements. We implemented self-assessments using standard methods employed by the world's finest operators, including by inviting people from outside the company, or from other branches, to come in and perform assessments. This fiscal year, in our assessment of Headquarters functions, we identified needs for stronger capabilities to confirm conditions at power stations. Additionally, we received advice from overseas experts, such as members of the Nuclear Safety Advisory Board (NSAB), and incorporated their opinions in action plans. We are now executing those plans for improvements. By strengthening our self-assessments, we are continuing to enhance our capabilities for learning and making improvements on our own.



NSAB activities (Fukushima Daini)

Corporate Peer Review (CPR)

- In the third CPR by the World Association of Nuclear Operators (WANO), the review team assessed current conditions in our Nuclear Power Division with a focus on Headquarters. Reviewers examined the adequacy of Headquarters governance, and whether or not conditions and departments are being examined and corrections made, power stations are being accurately supported, and Headquarters is proactively taking action and producing results. The review team, which is comprised of global nuclear experts with extensive experience, commended us for the improvements that we have made, such as our implementation of self-assessments, but also pointed out areas requiring further improvement.

Internal Oversight Department Activities

The Nuclear Safety Oversight Office, which is an internal oversight department, made the following suggestions in pursuit of excellence:

- Clarify in writing the methods for quantitatively managing temporarily stored flammables, the objectives of such management, and the methods for ensuring that all related personnel understand this information (Kashiwazaki-Kariwa)
- Create plans for detecting and handling abnormalities involving important equipment in locations that are difficult to access (Fukushima Daiichi)
- Referring to examples from the United States, create a checklist to plan, prepare and execute maintenance of vital safety equipment out without fail (Kashiwazaki-Kariwa)

Nuclear Safety Reform Plan Progress Report

Initiatives to Improve Safety Awareness

To ensure that future generations understand the importance of fulfilling our responsibilities with respect to Fukushima, we have been holding training to convey to all employees the facts and lessons learned from the Fukushima Nuclear Accident since July 2018. As of the end of the second quarter, 16,210 employees (53% of all employees) have participated in this training. We plan for all employees complete the training by July 2020. Furthermore, in light of requests for retraining, we have revised the training system and content to enable people to train two times, helping to further incorporate such learning in our departments and the daily duties of employees.

On August 29 of every year we conduct “8.29 Rehabilitation Day” activities to look back upon the scandal of 2002. This year, we organized messages from nuclear leaders, moral discourse by directors and executives, and group discussions. These activities help to promote understanding and awareness of the need to never let scandals happen, as well as lessons from the past including the Fukushima nuclear accident and other incidents, to improve safety awareness.



Training for all employees (circle discussions)



8.29 Rehabilitation Day (Kashiwazaki-Kariwa)

KPI Results - Safety Awareness

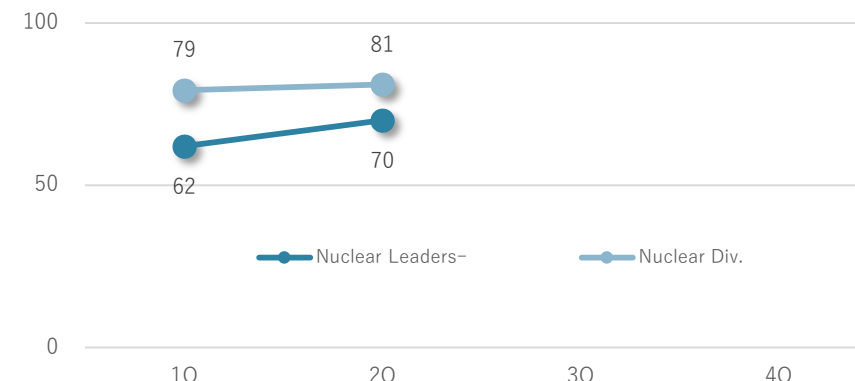
Four new PIs were added to the FY2019 KPIs based on changes in policy (mentioned in the FY2018 Q4 progress report). These PIs are now being monitored to achieve targets by the end of FY2019.

Nuclear leaders: **70 points**

(Target: 90 points)

Entire Nuclear Power Division: **81 points**

(Target: 80 points)



*Improvement promoters in each field (Headquarters: CFAM, Power stations: SFAM)

Nuclear Safety Reform Plan Progress Report

Initiatives to Improve Communication Abilities

The Niigata Headquarters has created virtual-reality content that introduces safety measures being implemented at Kashiwazaki-Kariwa. The content is displayed at the Kashiwazaki-Kariwa Service Hall and in communication booths in various locations. Many people who have seen the content have commented that more people should see it. In response, we have set up a special page on our website entitled “KKVR Visit the Kashiwazaki-Kariwa Nuclear Power Station in a virtual reality!” Going forward, we will continue to convey information in an easy-to-understand manner while listening to the opinions of community residents, aiming to transition from just “conveying information” to “conveying information that is easily understood.”



Virtual-reality (VR) content

On July 5, the president of the Fukushima Daiichi Decontamination & Decommissioning Engineering Company visited Fukushima University to talk to new students about recovering Fukushima and the decommissioning process that is underway. We heard comments such as, “I have a clearer view of future recovery plans for Fukushima now that I understand the decommissioning process.” We will continue to convey information on current conditions at Fukushima Daiichi while considering the interests and concerns of our audiences.



Lecture at Fukushima University

KPI Results - Ability to Promote Dialogue

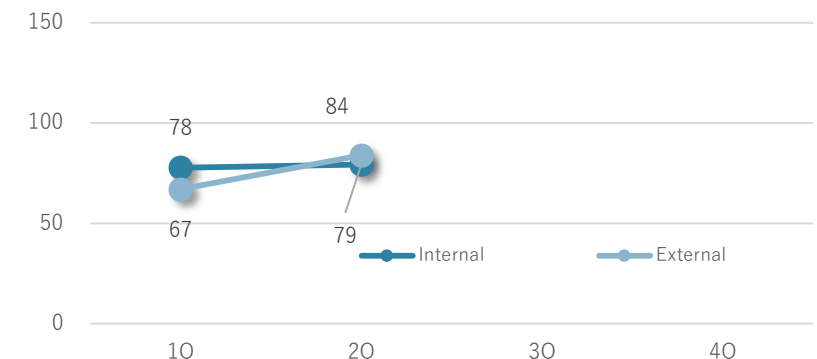
Four new PIs were added to the FY2019 KPIs based on changes in policy (mentioned in the FY2018 Q4 progress report). These PIs are now being monitored to achieve targets by the end of FY2019.

Internal: **79 points**

(Target: 80 points)

External: **84 points**

(Target: 100 points)



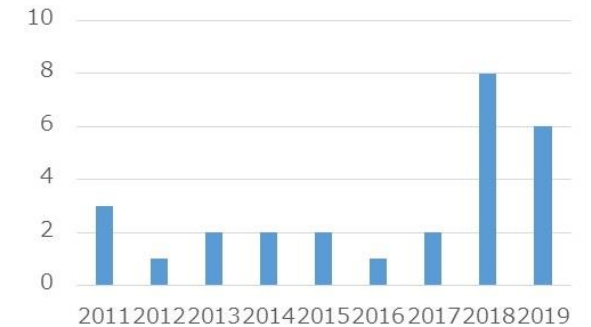
Nuclear Safety Reform Plan Progress Report

Initiatives to Improve Technological Capabilities

We conducted various training programs and *kaizen* improvement activities to strengthen technical deficiencies in examining the quality of equipment and work processes, and in make improvements on our own. In response to damage caused by Typhoon No. 15, power trucks were dispatched from three power stations and personnel were mobilized to support restoration work.

To support employees studying the oral portion of the licensed reactor engineer exam (secondary exam), we distribute textbooks with problems from previous exams and conduct mock oral exams in-house. As a result of these efforts, the number of people who passed the exam continues to grow in recent years. During this fiscal year, six people passed.

As part of initiatives to improve the technical skill of operators, workers from the Operations Division have been sent to work at PWR plants that are in operation in Japan, enabling them to gain direct experience working at a site where the reactors are in operation (Online Reactor Experience Training). During the second quarter, operators from Kashiwazaki-Kariwa were sent to the KEPCO Takahama NPS, providing them with a valuable opportunity to better understand working at a plant in operation.



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



Online Reactor Experience Training (Takahama NPS)

KPI Results - Technological Capability

Four new PIs were added to the FY2019 KPIs based on changes in policy (mentioned in the FY2018 Q4 progress report). These PIs are now being monitored to achieve targets by the end of FY2019.

Times of non-emergency: **108 points**

(Target: 110 points)

Times of emergency: **100 points**

(Target: 110 points)

