# Report on TEPCO's Self-Assessment of Progress

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.

TEPCO

# INTRODUCTION

## Why a “Self-Assessment”?

Since the 2011 accident at Fukushima Daiichi, TEPCO has been moving forward on two fronts: (1) Decommissioning and decontaminating Fukushima Daiichi through the Fukushima D&D Engineering Company, and (2) implementing an overall Nuclear Safety Reform Plan, which extends to all three nuclear power stations and throughout the company’s management.

*Fukushima Daiichi Nuclear Power Station*

*Kashiwazaki-Kariwa Nuclear Power Station*

*Emergency Response Drills*

Although the company provides regular quarterly progress reports to the independent Nuclear Reform Monitoring Committee overseeing these activities and publishes them, as the three-year anniversary of the Plan’s adoption was reached, it was decided that a thorough self-assessment would be useful.

## Criteria for the Self Assessment

Criteria for the self-assessment were closely related to the objectives established by the Nuclear Safety Reform Plan. In particular, they focused on:

- Management reforms prioritizing nuclear safety
- Enhanced governance
- Enhancing supervision and support at the facilities
- Establishment of “defense in depth” through continuous learning
- Training personnel to achieve technical self-sufficiency
- Emergency response capability
- Improved communications and trust-building
- Exposure dose reduction and management

Each of these criteria was examined separately for FDEC and the Nuclear Power & Plant Siting Division, the latter being responsible for TEPCO’s overall nuclear program.

## How the Self-Assessment Was Conducted

### Subjects for the Self-Assessment and Period Assessed

Fukushima Daiichi Decontamination & Decommissioning Engineering Company (FDEC) and the Nuclear Power & Plant Siting Division (Headquarters Departments and Kashiwazaki-Kariwa and Fukushima Daini Nuclear Power Stations) were subjects for the self-assessment. The period assessed was from April 2013 through March 2016. Separate assessments were performed on each since the FDEC and the Nuclear Power & Plant Siting Division (NPPSD) have different missions and environments, but the same criteria and methodology were used for the assessment purpose.

### Setting the Elements to be Assessed

The assessment team set the "elements to be assessed" (i.e. documents and the targets for interviews and observation) based on the assessment criteria.

### Assessment

During the assessment, interviews and observations were conducted. Prior to the interviews/observations, the assessment team reviewed the documents and data so as to fully perform the assessment/verification in the field. When conducting the interviews/observations, not only the status of implementation of plans/objectives but also the way they were implemented and behaviors of the targets were assessed.

### Analysis of assessed elements/Review of Key Performance Indicators (KPI) and Performance Indicators (PI)

The assessment team analyzed the assessment results from the interviews, observation, and review of relevant documents and data. KPI/PI and their trends were also examined. Additional assessments were performed in accordance with the procedures determined in advance.

### Overall Performance Evaluation

The assessment team conducted the overall performance evaluation of both the FDEC and NPPSD in regards to the achievements and areas for improvements.

### Reporting

The overall performance evaluation and observations for each criteria were reviewed and confirmed by the Secretary General of the Nuclear Reform Special Task Force. The self-assessment results were approved by the President of TEPCO and reported to the Nuclear Reform Monitoring Committee.

## Organizations Subject to Self-Assessment

| | | |
|---|---|---|
| Fukushima Daiichi Decontamination & Decommissioning Engineering Company(FDEC) | **Power Stations** | |
| | Headquarter functions | |
| | **Fukushima Daiichi NPS** | |
| | General Administration Department<br>Project Planning Department<br>D&D Procurement Center | |
| Nuclear Power & Plant Siting Division(NPPSD) | **Power Stations** | |
| | Headquarters | |
| | **Fukushima Daini NPS**<br>**Kashiwazaki-Kariwa NPS** | |
| | Nuclear Safety Management Department<br>Nuclear Power Plant Management Department<br>Nuclear Asset Management Department<br>Nuclear Fuel Cycle Department<br>Plant Siting & Regional Relations Department<br>Nuclear Power Procurement Center | |

## Aiming for a High Ideal

In evaluating progress, TEPCO deliberately set a high ideal for itself: "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." It was understood that while TEPCO would always strive for this ideal, even global leaders in the nuclear industry with strong safety records may not always meet this ideal level of perfection.

# MANAGEMENT REFORMS PRIORITIZING NUCLEAR SAFETY

FDEC

- ✓ 47 employees received awards from the FDEC president in FY2015 for challenging themselves and achieving high goals toward the stronger nuclear safety culture.
- ✓ Additional efforts must be made to enhance contract workers' understanding that the thorough industrial safety by following the stipulated procedures and work instructions can also lead to nuclear safety.

NPPSD

- ✓ 67 people have received awards for challenging themselves and achieving high goals toward the stronger nuclear safety culture. The CNO has made 71 visits (FY 2015) to the power stations to deliver safety message.
- ✓ Intensive efforts must be made to address organizational challenges identified through the retrospective reviews.

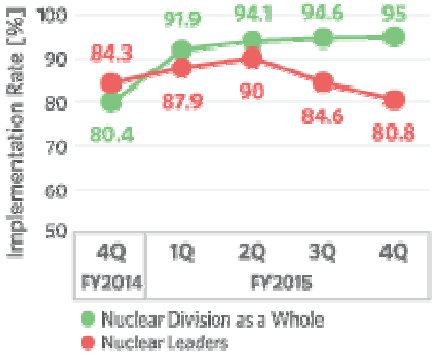
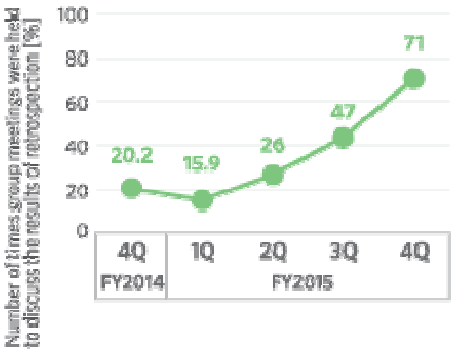
### Criteria for Self-Assessment

TEPCO's approach, prior to the accident, should be changed. Previously, nuclear safety was assumed to have been fully established and priority was given to business issues such as improving the availability ratio. With sincere reflection on the Fukushima Nuclear Accident, the Nuclear Safety Reform Plan requires management to place nuclear safety as the paramount business challenge, making sure that all employees are aware of safety and work on continuous improvement.

## Overview

- Chief Nuclear Officer (CNO), Chief Decommissioning Officer (CDO) and site superintendents stipulated in the action policy and expectations about "prioritizing nuclear safety." The idea has permeated throughout the organization as a result of direct dialogue and conveying messages through the intranet, email, and morning meetings.
- Retrospection using the 10 traits is taking root, but weaknesses in the organization were yet sufficiently identified.
- With regard to industrial safety, potentially dangerous locations and unsafe behavior are being identified and corrected through management observation and field patrols, which are in turn enabling the idea of prioritizing nuclear safety to permeate through contractors. Communication with field workers about nuclear safety, however, may be insufficient.
- It is of importance for management to take the initiative to prepare an environment for internal communication. At 1F, communication tools (e.g. the 1 For All Japan website, the Monthly 1F newsletter) have been created in an attempt to foster a sense of unity and reliability throughout the entire power station, including TEPCO employees and contractors.

TEPCO

| PI | RESULTS | PI | RESULTS |
|---|---|---|---|
| Implementation rate of retrospection using the traits<br><br>**TARGET:** 100% |  | Number of times group meetings were held to discuss the results of retrospection<br><br>**TARGET:** More than 70% of departments/groups meet more than twice a month |  |





## Action Plans/Actions Being Implemented

In order to convey ideas and attitudes that are not easily put into messages delivered through the intranet, the CNO and CDO have continued to engage in a direct dialogue with power station and headquarters employees. In addition to the direct dialogues, the “expectations for nuclear safety reforms” and the message that “the starting point for TEPCO’s present nuclear safety is the lessons learned from the Fukushima Accident” have been directly conveyed in the group manager and new employee training sessions. The follow-on dialogues have been initiated by email with each training participant.

In order to enhance the contractors’ understanding of nuclear safety reforms and their embrace of a nuclear safety culture, safety liaisons from the head offices of 18 contractors have been invited to a session of the Nuclear Safety Information Liaison Meeting. At the Liaison Meeting, group discussions have been held to engage in interactive communication, share retrospection of Fukushima Accident, thoughts for nuclear safety reforms and TEPCO’s expectations for contractors on nuclear safety.

# ENHANCED GOVERNANCE

FDEC

- ✓ Mid-and-Long-Term Roadmap is used to develop work plans and projects in addition to managing existing objectives, and FDEC the president reviews the progress and results of these plans.

NPPSD

- ✓ Work plans and objectives are being proposed and determined based on the benchmarking of world standards and best practices.

## Criteria for Self-Assessment

There must be improvements for overall nuclear risk management, which was not sufficient for a company that deals with the unique risks associated with nuclear power. The roles, responsibilities, and authority of each department need to be clearly defined, and a framework of checks and follow-ups needs to be put in place as well as the compliance with the basic rules of nuclear safety.

## Overview

- A change management method has been introduced to control risks in the event of making changes on work. However, the method is not yet applied to a sufficiently wide range of operations.
- At Fukushima Daiichi, the Mid-and-Long-Term Roadmap is used to develop work plans and projects in addition to managing existing objectives, and the president reviews the progress and results of these plans. With regard to reactor decommissioning and waste processing technologies, the monitoring/assessment/improvement of performance has been promoted by signing agreements with overseas companies and agencies. On the other hand, the improvement is required in regards to “establishing standards for operation, maintenance, etc., that are as high as those for nuclear power stations in operation.”
- At NPPSD, work plans and objectives are being proposed and determined based on the benchmarking of world standards and best practices. Adequacy of these plans and objectives are discussed once a year, but insufficiencies exist in the concern and effort given. Performance monitoring, assessment and improvement based on the work plan is managed in a precise fashion, but there were observed numerous opinions of employees such as: “Work processes remain the same” or “Without being provided with priorities, we are instructed to ‘carry out every step because they are all important’.” This may generate a sense of fatigue and decrease worker motivation, and thereby challenge the development of a sound nuclear safety culture.

## Action Plans/Actions Being Implemented

In order to firm up the governance, integrated management for mutually related key activities is necessary, so that every segments in the organizational structure, from nuclear leaders to frontline workers, may carry out the tasks, monitor the progress and take corrective actions if necessary with common vision and principles. The Management Model Project (MMP) was launched to drastically revise the management structure in nuclear divisions in line with the concept. Through MMP, common gaps in key functional areas have been identified against what TEPCO desires in order to achieve excellence, and fundamentals for each functional area (9 areas) have been developed and implemented.

In order to maintain strong leadership in mid and long-term and maintain consistency in governance, the basic steps for succession planning were commenced including the description of required qualifications and expertise for individual positions, creation of a centrally managed career and training database, and a selection process for candidates for nuclear leaders.

# SUPERVISION AND SUPPORT

FDEC

- ✓ Progress has been made in risk identification, implementation of countermeasures and performance improvement by cooperation with the overseas operators (e.g. Sellafield UK).
- ✓ Change management method needs to be expanded beyond organizational design..

NPPSD

- ✓ Stricter safety rules are no longer being resisted based on cost, and experts in each functional area are overseeing and engaging in the improvements gaining support from the international experts.
- ✓ More questioning in the field, Management Observation and communication efforts are needed.

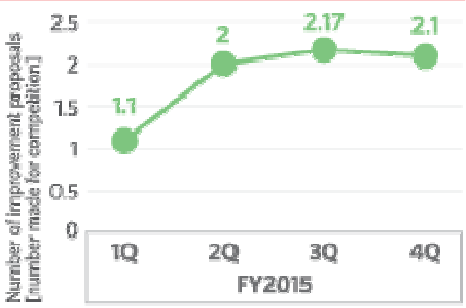
## Criteria for Self-Assessment

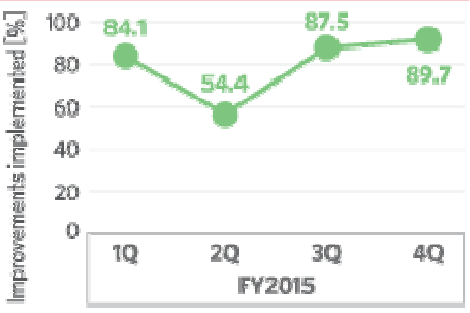
Actions should be taken to prevent complacency about compliance with regulations and guidelines, and to reinforce the conviction that further improvement in nuclear safety is always necessary. The latest knowledge needs to be pro-actively obtained. Nuclear safety needs should be reassessed based on site-specific conditions and management capacity so that on-site nuclear risks are clearly understood and necessary countermeasures are promptly implemented.

## Overview

- Countermeasures and identified risks have been improved based upon experience with the accident and the lesson learned from it, and stricter safety regulations are not perceived through the lens of operating rates and cost.
- At Fukushima Daiichi, in regard to work environments, radiation exposure has been greatly reduced by advancing decontamination efforts, and other improvements have also been made such as the construction of a large rest area and also expansion of the area in which workers only need to wear general work clothes. The field work observations by managers have been introduced and enhanced industrial safety.
- At NPPSD, CNO is dealing with changing conditions, such as by revision risk management, and coordination with related agencies is being strengthened. In regard to inappropriate cable laying and issues concerning core meltdown notifications/disclosures, nuclear leaders have instructed to disclose them without hesitation in the event of discovering such matters in the future.
- Risk management and performance monitoring/assessment/improvements are moving steadily forward. Human resource skills need to be developed, and emergency response capability needs to be enhanced.

TEPCO

| PI | RESULTS |
|---|---|
| Number of improvement proposals based on MO<br><br>**TARGET:**<br>More than one/times implemented |  |

| PI | RESULTS |
|---|---|
| Percentage of improvements implemented within one month after proposal<br><br>**TARGET:**<br>More than 70% |  |

## Action Plans/Actions Being Implemented

At Fukushima Daiichi, it was decided to change direction from an “emphasis on speed” to an “emphasis on risk reduction” that seeks to reliably reduce risks over the long-term and proceed safely with the work in a prioritized manner. The “Fukushima Daiichi D&D Engineering Company Strategy 2016” combines implementation measures for long-term efforts and policies essential for reliably promoting reactor decommissioning. It includes step-by-step goals, which will build a foundation when implementing policies.

# DEFENSE IN DEPTH

FDEC

✓ Daily meetings are helping share information and improve safety. Results on analysis of “near misses” need to be leveraged more effectively.

NPPSD

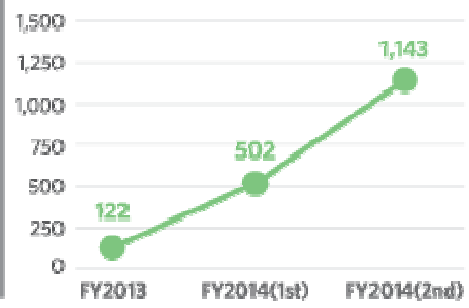
✓ Various activities to promote defense in depth are taking root (e.g. sharing of operating experience, competition for safety proposals), but more systematic management is needed for data on “near misses” and best practices from global leaders.

## Criteria for Self-Assessment

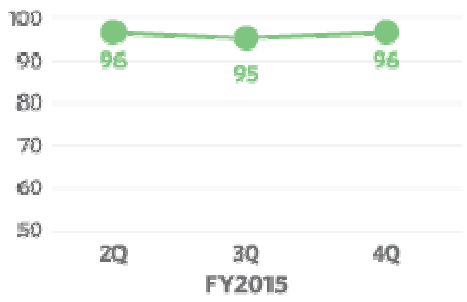
The passive approach prior to the accident should be changed to taking appropriate action to incorporate information and operating experience (OE) from domestic and overseas power stations and other nuclear facilities. Nuclear safety needs to be continuously enhanced to achieve international excellence through the following activities: analyzing the root cause of on-site incidents, applying measures to prevent the occurrence of similar incidents, analyzing the OE from the failures and successes of other companies and examining the countermeasures required at TEPCO. Those actions should be proactively communicated to the domestic and international stakeholders.

## Overview

- Through safety review, efforts are being made to implement improvements. The framework of safety review has yet to be systematized, and improvements are required. It is important to enable organized or systematic reviews.
- Efforts such as daily meetings have been made to leverage operation experience (OE) information. The method for sharing OE information is being improved and enables the employees to voluntarily look at the information and share it with each other. On the other hand, the OE information has yet to be sufficiently leveraged. One underlying factor is that information contributing to performance improvement, such as OE information, third-party review comments, benchmarking results and information on near-misses, is not being managed in an organized or systematic manner, which makes it difficult to effectively make improvements. Changes are currently underway through the corrective action program (CAP) to change how this information is managed.
- At NPPSD, reviews from IAEA, WANO and JANSI have been actively conducted, and their assessments and improvement proposals have been accepted. Seasoned experts from overseas nuclear power stations with excellent safety records have been invited to provide advice related to their fields of expertise.

| PI | RESULTS |
|---|---|
| Number of times the competition to enhance the ability to make safety improvement proposals was held<br>X (Average assessment points)<br>X (Six-month completion rate of excellent proposals)<br>**TARGET:** More than 1,500 |  |



| PI | RESULTS |
|---|---|
| Operation experience (OE) information utilization rate<br>**TARGET:** 100% |  |



## Action Plans/Actions Being Implemented

TEPCO has initiated intensive study sessions to focus on important OE data (severe accidents from both inside and outside Japan and the Significant Operating Experience Report of WANO) to further enhance understanding of the lessons learned. The intensive courses on major accidents (including the fire at the Browns Ferry Nuclear Power Plant) have been provided to its personnel by inviting a team of overseas experts as a part of continuous effort for improved competence of the entire nuclear division.

In order to strengthen improvement activities, Performance Improvement Coordinators (PICO) have been assigned to power station departments. PICO personnel screen non-conformance and improvement data on daily basis and support trend monitoring and root cause analysis. By collectively handling information by PICO personnel in each department, an integrated analysis is being conducted to identify underlying problems and organizational issues and share these in a timely fashion to their own departments. Furthermore, PICO personnel in each department have frankly exchanged opinions with each other, leading to the precise determination of causes and effective countermeasures.

# TRAINING AND SELF-SUFFICIENCY

FDEC

✓ Education and training are being implemented with careful planning and personnels are acquiring required skills. Systems for maximizing human resources are still needed toward the world's excellence.

NPPSD

✓ Education and training are being implemented with careful planning and personnels are acquiring required skills. Systems for maximizing human resources are still needed toward the world's excellence.

## Criteria for Self-Assessment

There must be a reversal of the decline of in-house technical skills, which was caused by increased dependency on outside technology vendors. The use of outside sources need not be terminated but must be optimized, both for emergency response and for the operations and maintenance in normal conditions. The knowledge, expertise, and skills demanded of in-house personnel need to be clearly defined, acquired and maintained.

## Overview

- Skills required for tasks are defined by internal manuals, and basic annual plans for education and training have been created and executed. However, the defined skills and training curriculum are insufficient as an expectation for cultivating personnel aiming to achieve the world's highest level of safety.
- The Head Office drafted a plan to cultivate engineers, and has been fostering personnel. An internal certification system has been established for field engineers engaged in fieldwork, a three-level training curriculum has been prepared, and cultivation plans have been drafted and executed. However, there are major issues to deal with in regard to the systematic cultivation of human resources, including work knowledge required to ensure nuclear safety, organizational operation, and management methods. In order to deal with these issues, required skills are being readjusted, and deliberation is underway on making improvements to education and training programs in conjunction with the establishment of a Nuclear Human Resources Training Center.
- Leaders (CFAM, SFAM) covering 19 fields of expertise have been appointed at the Head Office and power stations, and they are engaged in efforts to identify problems and to propose solutions. The CNO of Nuclear Power and Plant Siting Division directly checks the progress, but quantitative assessments based on the arranged performance indicators have yet to be implemented. Furthermore, definitive methods for training personnel of CFAM/SFAM have yet to be seen, and nuclear power leaders must accordingly exercise leadership and commitment.

| PI | RESULTS |
|---|---|
| Number of certified system engineers (SE)<br>**TARGET:** 5/reactor | **3** (End of FY2015) |
| Number of people with in-house skill certifications in the fields of operations, maintenance and safety<br>**TARGET:** 100% achievement of planned training | **106%**<br>(End of FY2015) |
| Number of employees with external certifications in fields such as electrical engineer first class, hazardous material level IV, and oxygen deprivation, required by the company (approximately 15 qualifications)<br>**TARGET:** All or the number required for each field by the end of FY2015 | **70%**<br>(End of FY2015) |
| Number of people with certifications recommended by the company such as high pressure gas manufacturing safety, and construction machinery operation (approximately 15 qualifications)<br>**TARGET:** More than 30% in each field by the end of FY2015 | **70%**<br>(End of FY2015) |
| Number of people that have obtained external certifications such as licensed reactor engineer, first-class radiation handling chief engineer, and engineer (nuclear power/radiation)<br>**TARGET:** 100% achievement of planned human resources development | **85%**<br>(End of FY2015) |

## Action Plans/Actions Being Implemented

Nuclear Human Resources Training Center is being established and to develop education and training programs for each department based on a systematic approach to education and training needs. The Center adopts the Systematic Approach to Training (SAT), which is recognized as the international best practice, for providing education and training programs necessary for personnel development throughout the entire nuclear division. Some SAT-based education and training programs have been developed and actual education and training is being provided (e.g., the programs providing basic engineering training for intermediate training for new employees).

In the area of operations, while referencing to the SAT-based education and training programs of U.S. nuclear operators, TEPCO has continuously worked to make improvements by adding actual plant information to the course contents as well as skills to be acquired in training. Lesson plans are also being developed for operators with regard to response operations. With regard to nuclear safety, lesson plans are being developed for ‘overview of nuclear safety’, ‘risk assessments’ and ‘safety assessments (safety analysis)’, and training is being commenced.

TEPCO is also moving forward in preparations for the establishment of an engineering center, reconstructing organizations based on the functional requirements (including strengthening the work management functions).

# EMERGENCY RESPONSE

FDEC

- ✓ A new incident command system is being introduced similar to the one used by NPPSD, introducing global best practices.
- ✓ Diverse risk scenarios for comprehensive drills need to be further considered.

NPPSD

- ✓ Training based on demanding scenarios is being repeatedly implemented based on lessons of Fukushima accident.
- ✓ Head office capabilities need to be raised to match those on sites.

## Criteria for Self-Assessment

Actions should be taken to ensure the improvement in emergency response training that was insufficient before the accident. This includes the need for a clear chain-of-command response. Advance preparations need to be made for personnel, facilities, operating procedures, and a clear chain of command to satisfy emergency response requirements. Effectiveness needs to be improved through repeated, systematic and practical training with clear objectives, assuming various hazard conditions.

## Overview

- Kashiwazaki-Kariwa was first to introduce the Incident Command System (management system developed in the US for use in the field during disasters and accidents). It has developed severe scenarios such as simultaneous disasters affecting multiple units and limited emergency response equipment. It has brought a steady increase in the number of personnel that has the required skills. Kashiwazaki-Kariwa also put the know-how they obtained into documentation and shared it with other stations.

- At Fukushima Daini, a new function was established that is responsible for the management of emergency response materials/equipment and their regular inspection. The risks unique to the station have been addressed.

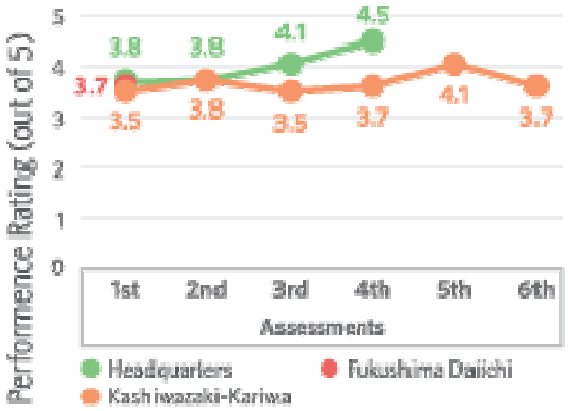
- At Fukushima Daiichi, efforts have been made to prepare for disasters and accidents by introducing ICS, and drills have been repeated with emphasis on preventing the leakage of contaminated water and securing cooling water injection into the reactor. On the other hand, the number of personnel required to respond to various risk scenarios is yet to be made clear. It is necessary to identify training needs and systematically analyze the drills.

- The role of headquarters during an emergency has clarified. Further improvement is needed on the methods by which information is shared between the headquarters and the power stations, and within each power station itself.

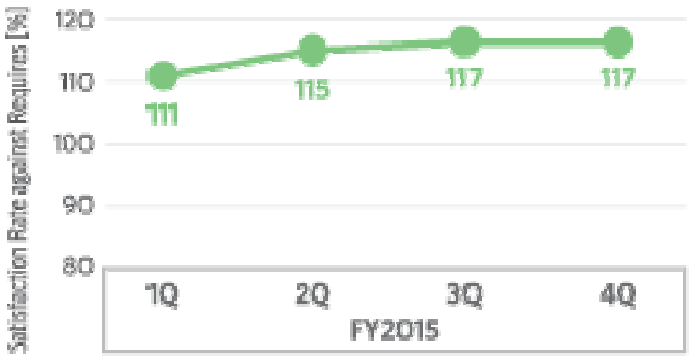
- The ability of individuals to respond to emergencies is improving steadily as a result of the skills required of each functional unit being stipulated in internal manuals and through repeated training. However, skill management and development concerning headquarters personnel is left to each functional unit. Discrepancies exist between units, and cases were found in which education is not being sufficiently implemented.

TEPCO

| PI | RESULTS |
|---|---|
| Self-assessment based on PO&C EMERGENCY RESPONSE FIELDS (EP.1~EP.3)<br><br>**TARGET:** More than 4 points out of 5 rating | **Headquarters**<br>FY2015<br>Q1: 3.8 Q2: 3.8<br>Q3: 4.1 Q4: 4.5<br><br>**Fukushima Daiichi NPS**<br>FY2015<br>Q4: 3.7<br><br>**Fukushima Daini**<br>No assessment<br><br>**Kashiwazaki-Kariwa**<br>FY2015<br>Q2: 3.5 Q3: 3.8, 3.5<br>Q4: 3.7, 4.1, 3.7 |




| PI | RESULTS |
|---|---|
| Number of emergency response personnel that have been certified in-house on the use of fire engines, power supply cars, cable connections, radiation surveys, wheel loaders, and unic truck operation.<br><br>**TARGET:** More than 120% of required number of personnel certified at the end of FY2015 | |




## Action Plans/Actions Being Implemented

The teleconference between power stations and the headquarters during an emergency have been designed to be audio and video recorded. Those records through the drills are used for retrospection and the review for improvement.

Additional measures are being taken for the ‘effectiveness of the emergency response’ and ‘manner in which external communication should be conducted during an emergency’. For the ‘effectiveness of the emergency response’, TEPCO has conducted frequent drills based on severe scenarios, such as multiple events requiring notification taking place in parallel. It has also conducted enhanced training for nuclear disaster prevention personnel and reflected those results in skill management. The ‘manner in which external communication should be conducted during an emergency’ has also been reviewed. The CNO has been designated to make a technical determination on the terms used. The rule is being implemented that the director of external communication makes proposals regarding the external communication to the president.

# COMMUNICATIONS

FDEC

- ✓ Radiation data is being fully disclosed, and communication tools are developed on work environment, onsite workers and the tasks being done.
- ✓ Communications need to expand to address the concerns of general public. Dialogues with stakeholders by nuclear leaders and risk communicators need to be enhanced.

NPPSD

- ✓ Kashiwazaki-Kariwa is improving communications with local stakeholders toward build trust through tours, talk salon and information booths.
- ✓ Information and dialogue on risks inherent to the power station must be enhanced beyond the announcement of incidents and troubles.

## Criteria for Self-Assessment

There must be fundamental changes in the passive approach to disclosure of information. During the accident, a gap existed between the company's criteria for information disclosure and what was expected by the general public. Efforts need to be made to disclose risks and information promptly and appropriately in a straightforward and understandable manner to address the needs of the general public and the technical community. There needs to be continuous interaction with all stakeholders.

## Overview

- At Fukushima Daiichi, lessons learned in regards to information provision have been identified based on past accidents and trouble, and the "Standards for Notifications and Public Announcements" was created in September 2013 and put into use. In the wake of the February 2015 issue concerning drainage K, steps have been taken to disclose all data on radioactivity measurements. Risk communicators are also engaged in efforts to prevent recurrence by raising awareness in regards to information disclosure, gathering risk information, and making proposals to both prevent risks from manifesting and prevent information that should be disclosed from being overlooked.

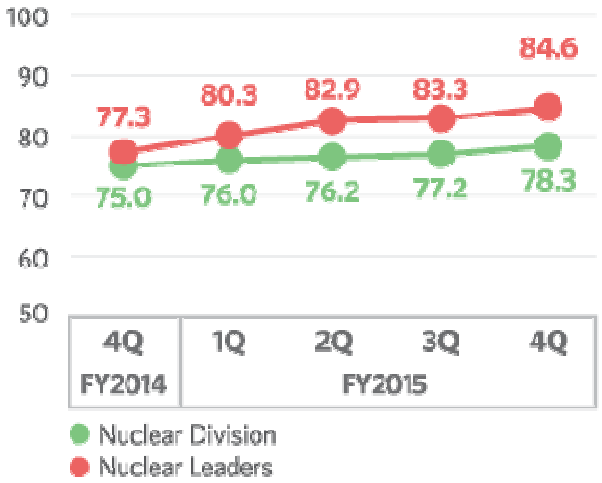
- At Fukushima Daini and Kashiwazaki-Kariwa, similar latent risks exist as that with Fukushima Daiichi. The power stations need to promptly disclose information on accidents and troubles that have occurred, and amplify both dialogue and explanations about the extent to which safety measures are implemented and about information on risks.

- It is necessary to improve the skills of management, Social Communication Office and risk communicators. It is also required to stipulate in a manual that, in an effort to improve how information is disclosed during an emergency, the director of external responses (Director of Social Communication Office) is to propose in a first-hand manner about communication to address the expectation of the general public to the Headquarters Emergency Countermeasures Center Chief (corporate president) and the Deputy Chief (CNO).

**Ability to Promote Dialogue KPI (Internal)**

KPI related to the state of interal communication

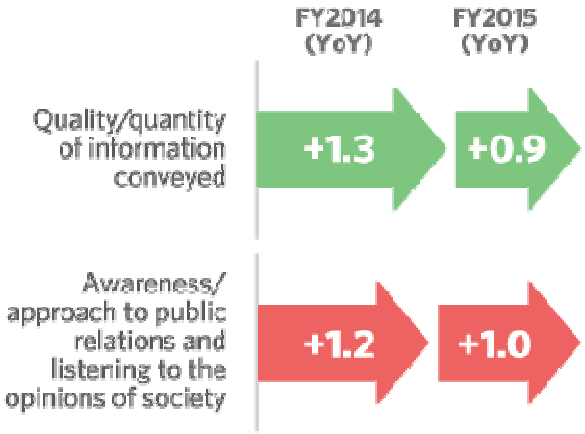
**TARGET:** Upward trend




**Ability to Promote Dialogue KPI (External)**

KPI related to external assessments of the information disseminated by TEPCO

**TARGET:** Positive increase over the previous year




## Action Plans/Actions Being Implemented

To enhance workers' awareness of safety and other important initiatives, mechanisms for internal communication are being strengthened. Site superintendents and general managers have made efforts to ensure that important information is regularly distributed by email to all personnel within the nuclear division. These internal communications include information about reports issued for external use, as well as the status of crucial issues.

As is already noted in the 'Emergency Response Capability', for the external communication during emergency situation, the CNO has been designated to make a technical determination on the terms used, and the rule is being implemented that the director of external communication makes proposals to the president to fully address the expectation of general public.

# DOSE REDUCTION AND MANAGEMENT

FDEC

- ✓ Site radiation levels are greatly reduced, enabling the elimination of masks and protective equipment in 90 percent of the site. Exposure levels remain above normal, however, and should be reduced to “as low as reasonable achievable.”

NPPSD

- ✓ Exposures at Fukushima Daini and Kashiwazaki-Kariwa are being kept low by the management based on annual exposure plans.
- ✓ Improvements suggested by the external reviews at Kashiwazaki-Kariwa should be leveraged at Fukushima Daini.

## Criteria for Self-Assessment

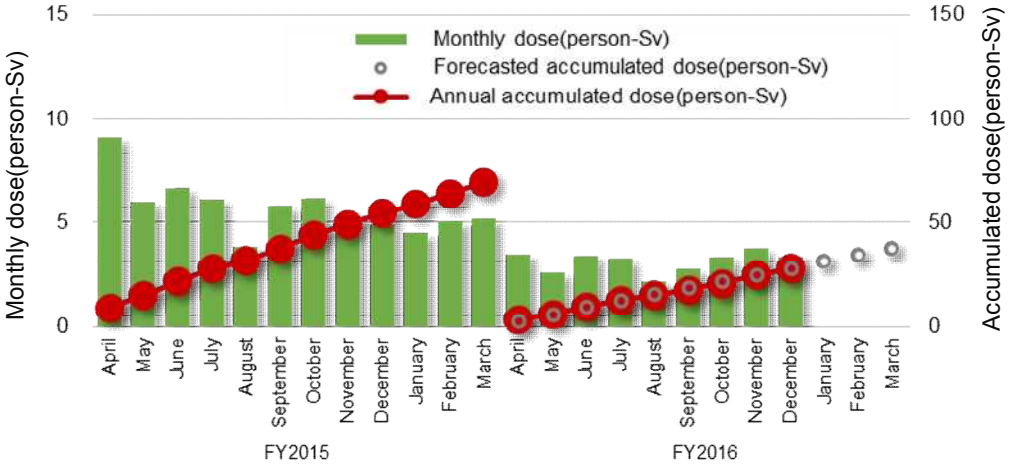
There must be continuous improvement in working conditions, which became an important issue in the process of reactor decommissioning and contaminated water management at the Fukushima Daiichi Nuclear Power Station. The work that involves a high risk of exposure should be identified and the number of workers and employees should be optimized. The radiation exposure limits for departments and individuals need to be set, assessed, and managed to be as low as reasonably achievable, and in accordance with international standards.

## Overview

- At Fukushima Daiichi, the Mid-and-Long-Term Roadmap finalizes work priorities by comparing the decrease of radiation risks on the environment against the increase of workers’ risks concerning radiation and industrial safety. Work-related radiation exposure is calculated in an accurate fashion when the timing for the work draws near, and the feasibility of the work is decided after assessing changes in the risks. In regard to works that have been decided to be conducted, deliberations and proposals have been made in the ALARA meeting for an engineering countermeasure to reduce as much as reasonably possible the radiation exposure of works that exceed one person-SV, and these efforts have proved to be effective. It is necessary to thoroughly permeate awareness on the idea
of “As Low As Reasonably Achievable” not only throughout TEPCO but to contractors as well.

- In accordance with the NPPSD’s annual radiation level plan, power stations create annual radiation exposure plans and radiation control plans for each construction project, and have the manager of the group in charge check these radiation exposure countermeasures. Radiation exposure results are also assessed after the work is completed. On the other hand, it is necessary to work on improvement efforts such as creating a plan to reduce radiation exposure at Kashiwazaki-Kariwa and Fukushima Daini, enabling personal dosimeter alarms to be set to a more sensitive level, and posting radiation dose maps in each work area.

## Trend of Monthly/Annual Dose at Fukushima Daiichi




Accumulated dose 69.3 person-Sv
(Average number of workers：
Approx.10,600persons/month)

Approximately 28.0 person-Sv
(Average number of workers：
Approx.9,400persons/month)

Against TARGET
100 person-Sv

TARGET for FY2016:
40 person-Sv

# Action Plans/Actions Being Implemented

An international technical advisor has been invited, since October 2016, to regularly visit Fukushima Daiichi, Fukushima Daini and Kashiwazaki-Kariwa, review the status of onsite dose management and coach the managers who conduct the Management Observation. Leverage of corrective actions and good practices has also been enhanced with follow-ups.

At Fukushima Daiichi, reflecting the improvement of environmental dose rate associated with the progress of radiation shielding, the lower/more stringent dose level is planned to be applied for the screening of projects for ALARA meeting.

# SELF-ASSESSMENT PROCESS GOING FORWARD

Through the self-assessment, it was considered that the Nuclear Safety Reform Plan drove TEPCO into the right direction, and has been embodied in various activities. Among the areas for improvements, the following areas were identified, especially where further intensive efforts are needed to accelerate the progress.

**1. Enhanced governance and supervision**
•To enhance proactive questioning attitudes
•To further strengthen the governance where clear chain of command and consistent monitoring of the execution of orders are in place

**2. Skills and management capacity to achieve the world's excellence in safety**
•To establish Nuclear Human Resources Training Center and accelerate restructuring into the systematic education and training programs

It was also found that the areas where notable progress was observed were characterized by "high acceptance by the organizations and individuals in regards to its necessity and objectives aimed for", "initiatives and thorough instructions by the nuclear leaders" and "active engagement by each employee involved in the activities."

With those learnings from the self-assessment process, TEPCO will move forward to implement the action plans. TEPCO will also continue self-assessment practices with focus on additional activities in the pursuit of a higher level of safety. TEPCO will continuously engage in the improvement of communication and social trust-building as another area of focus.

The basis of nuclear safety reform is our strong determination to never let a severe accident happen again. The management, nuclear leaders and every single employee in the company are firmly committed to push forward with nuclear safety reform: "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."

# TOWARD CONTINUOUS IMPROVEMENT AND GLOBAL LEADERSHIP IN NUCLEAR SAFETY: REPORT ON TEPCO'S SELF-ASSESSMENT OF PROGRESS

TEPCO