

Nuclear Safety Reform Plan

Progress Report (1st Quarter, FY2014)

August 1, 2014

Tokyo Electric Power Company,
Incorporated

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Introduction

We would like to take this opportunity to deeply apologize again that the nuclear accident in Fukushima NPS and the recent contaminated water problem have caused tremendous trouble and concern among the residents in the vicinity and in the society at large. At TEPCO, we remain committed going forward at all levels to do our very best in realizing “rapid and smooth fulfillment of compensation,” “accelerated revitalization in Fukushima,” “promotion of steady decommissioning,” and “thorough implementation of nuclear safety.”

We compiled the “Summary of Fukushima Nuclear Accident and Nuclear Safety Reform Plan” (hereinafter, “Nuclear Safety Reform Plan”) on March 29, 2013, and we are promoting nuclear safety reform in accordance with the Plan. It is our policy to confirm and publicize the status of progress each quarter. The current report includes the statements on progress during the 1st quarter of FY2014 (i.e., April – June 2014¹).

¹ Hereinafter, descriptions of the date without indicating the year refer to dates in 2014.

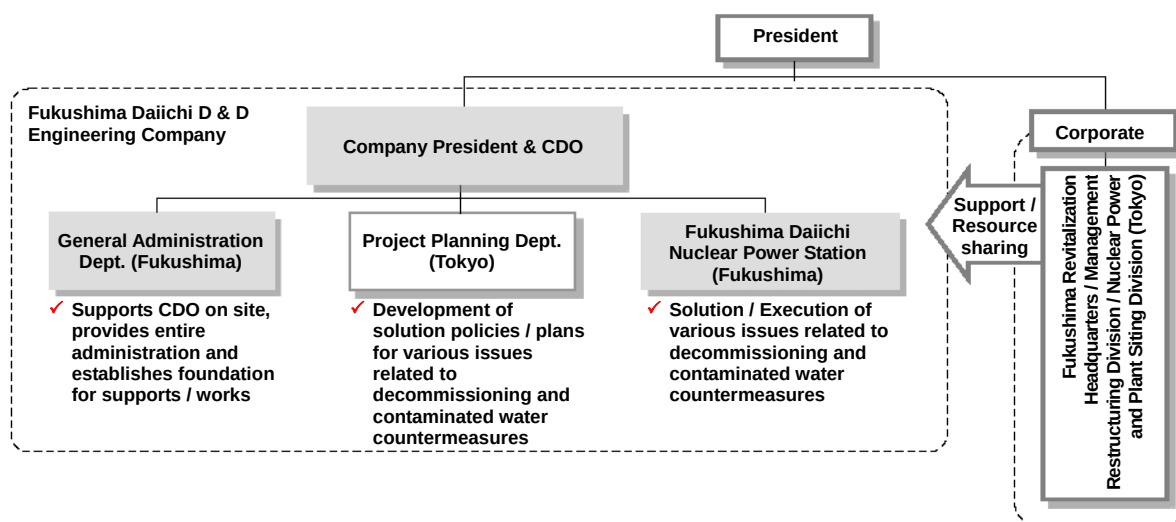
1. Progress of safety measures at each NPS

1.1 Fukushima Daiichi NPS

(1) Establishment of Decommissioning Promotion Company and reinforcement of project management

On April 1, the “Fukushima Daiichi D & D Engineering Company” was established to serve as a foundation for approaching decommissioning measures and contaminated water countermeasures on a constant basis for the long term that may extend from thirty to forty years in the future. It is an effort to improve the stability of the accident site environment from the chaotic situation immediately after the accident.

To overcome the unprecedented challenge of successfully completing decommissioning and contaminated water countermeasures that no other country in the world has ever experienced, it is imperative to concentrate the wisdom and power of people all over the country. Toward that end, three people were invited as vice presidents from nuclear power plant manufacturers. They are expected to show leadership on site drawing on their wealth of experience in nuclear power technology, the sophisticated technology owned by each manufacturer, and their global scale knowledge.



Organization chart of the Fukushima Daiichi Decommissioning Promotion Company

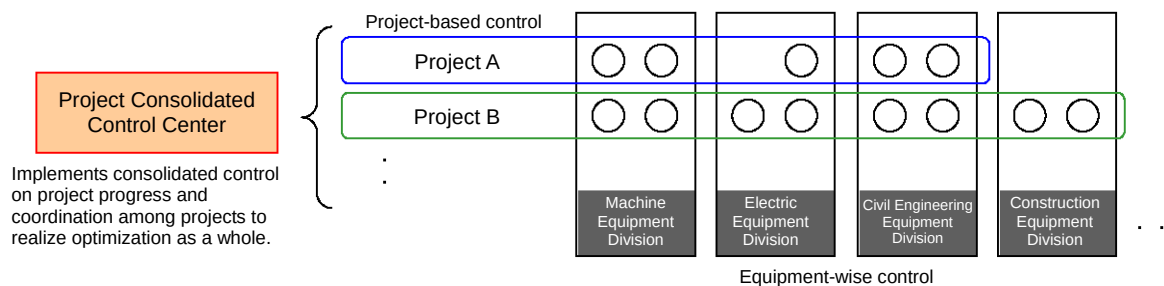
	Mr. Shigemitsu Suzuki (age 59) from Mitsubishi Heavy Industries Co., Ltd. ✓ Expert on nuclear fuels / wastes ✓ Guidance and supervision mainly for common systems across the plants including the areas such as cooling, PCV research, debris removal, and projects related to waste countermeasure
	Mr. Takuji Takayama (age 56) from Toshiba Corporation ✓ Experienced in works related to Fukushima Daiichi Nuclear Power Station for 25 years ✓ Guidance and supervision mainly for Units 2 and 3 in general, including projects such as the removal of fuels from spent fuel pools and infrastructure improvement for site decontamination
	Mr. Hiroshi Arima (age 55) from Hitachi-GE Nuclear Energy, Ltd. ✓ Deep experience in coping with trouble / maintenance work in Fukushima Daiichi Nuclear Power Station ✓ Guidance and supervision, mainly for Unit 1 and Unit 4 in general, including the project for contaminated water countermeasures

Three vice presidents invited from nuclear power plant manufacturers

In Fukushima Daiichi NPS, it is difficult to leverage the experience and expertise accumulated during the long period of engagement in conventional plant construction and operations. Nuclear safety calls for management and approaches that are different from those used for Fukushima Daini NPS or Kashiwazaki Kariwa NPS. Therefore, to ensure flexible handling of diverse challenges associated with the decommissioning works, fifteen projects in five different areas (contaminated water countermeasures, fuel removal from spent fuel pool, cooling and removal of debris fuel, waste disposal countermeasures, and improvement of infrastructure) were designated in April this year for each challenge, and we are currently engaged in the pursuit of these projects.

<Establishment of project system>

- Aside from management per equipment depending on each area of expertise, project-based managers (project manager) are designated to clearly identify the responsibility throughout the period, from plan development to implementation.
- Project Implementation Plan clearly describes the project purposes, achievement goal and milestones and is shared among the organization.
- “Project Consolidated Control Center” is established to implement consolidated control on project progress and coordination among projects.
- Projects are initiated and dissolved depending on the occurrence and resolution of issues to be addressed.



<Management level involvement>

- Three vice presidents invited from external organizations will supervise project management status for each area of responsibility leveraging their wealth of expertise and experience.
- Project Management Meeting is held periodically to review project implementation plans, progress of plans, and project outcomes, including those for inter-project issues.
- Upon receiving reports on activities for each project periodically in the Project Management Meeting, the management level of the Fukushima Daiichi Decommissioning Promotion Company promptly give guidance and approval.

These approaches have enabled cross-disciplinary problem solving and sharing of issues in the organization including the management level as well as the instruction of their countermeasures. Continuing from the previous period, we will promote plan-based implementation of the most important agenda, including trench water sealing, additional installation of tanks, and stable operation of ALPS under the project management system in conformance with safety requirements.

(2) Fuel removal from the Unit 4 spent fuel pool

Fuel removal from the spent fuel pool located on the top level of reactor buildings in Units 1-4 is one of the most important efforts to decrease the risks associated with the Fukushima Daiichi NPS.

In Unit 4, removal of fuels stored in a spent fuel pool adjacent to the reactor started on November 18, 2013.

The removed fuels are transferred into a “shared pool” located in a different building within the site, where removed fuels are stored in a centralized manner. Among the fuels stored in the spent fuel pool, 22 out of 202 new fuels and 1166 out of 1331 spent fuels had been removed as of June 30 (approximately 87% of the fuels were removed in total). Thus, the approach to reduce risks has been underway.

From July to the beginning of September, temporary suspension of fuel removal is planned due to periodical inspection of ceiling cranes and fuel handling machines (Fuel removal work is estimated to be completed by the end of 2014 as planned.)



Fuel removal from spent fuel pool



Transfer of spent fuel transportation container

(3) Approaches to address contaminated water problem

With regard to draining out the contaminated water from Fukushima Daiichi NPS to the power station harbor and the issue of contaminated water leakage from tanks, a series of countermeasures are in progress including the troubleshooting of ALPS, additional installation of tanks for storage of contaminated water, underground water bypass, frozen soil water sealing wall, and removal of retained water from the seawater piping trench.

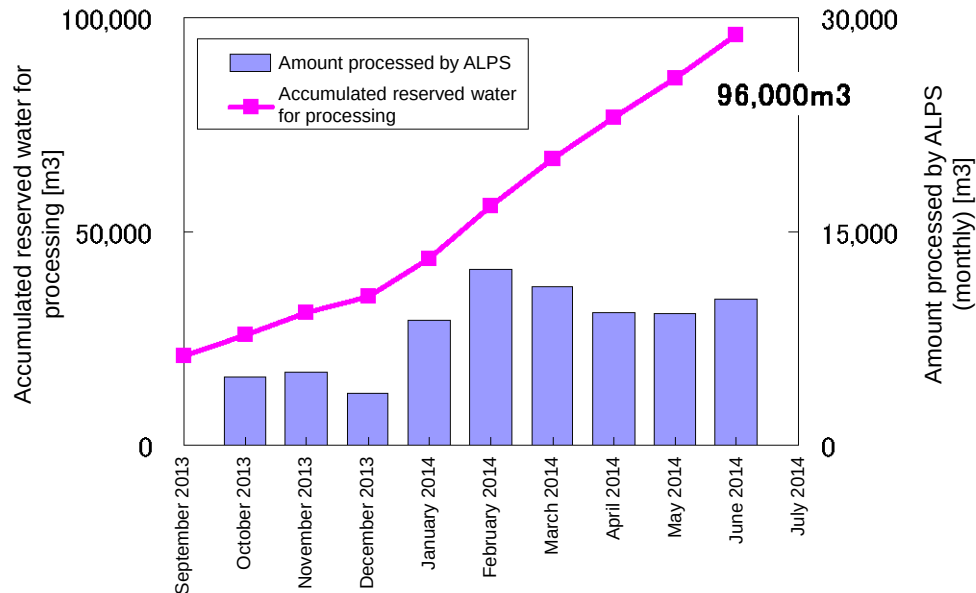
<ALPS (Advanced Liquid Processing System)>

On September 27, 2013, three lines of ALPS started their pilot operation and accumulated operation experience by overcoming several troubles that occurred during the pilot operation.

A trouble due to carbonate slurry leakage from cross flow filter occurred in March 2014², defective filters were replaced one by one with improved cross flow filters with improved material and structure of gasket. Since June 22, operations to process contaminated water have resumed in all three lines.

² The estimated cause of trouble is the brittleness of the gasket caused by its exposure to radiation. This contributed to defects or damage in the gasket by pressure pulsation and the like during backwash. during the backwashing. To prevent this trouble, the Teflon gasket was replaced by an EPDM (synthetic rubber) gasket with higher radiation resistance. Besides, to improve resistance against the pressure pulsation, the structure was changed by replacing the V seal with an O-ring. Further, the double structure of the O-ring was adopted.

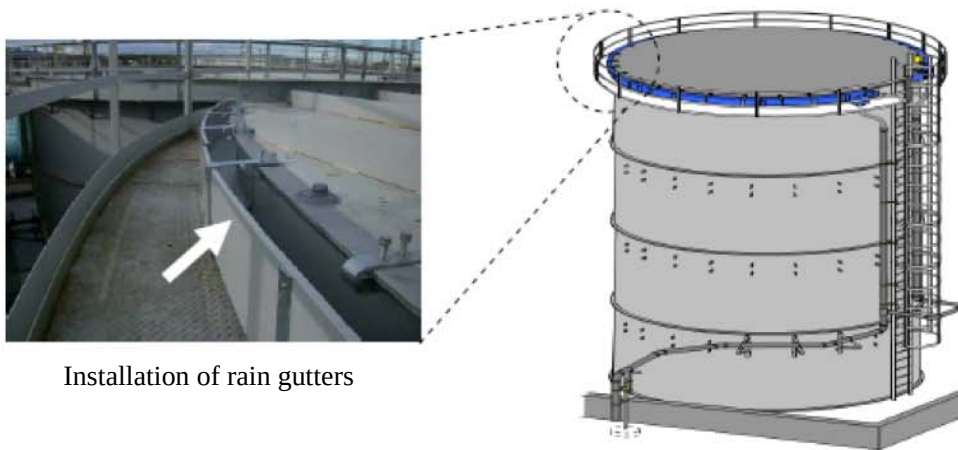
The amount of contaminated water processed by ALPS has reached about 100,000m³(approximately 20% of the contaminated water in storage) as indicated in the following graph.



Changes in amount of contaminated water processed by ALPS (outlet flow rate)

<Contaminated water storage tank>

- In southern part of the site, steel cylinder tanks with low leakage risk are to be installed additionally instead of flange type tanks. Besides, it is planned that the existing angular-shape tanks are to be replaced with new steel cylinder tanks, because storage efficiency of these existing tanks is poor.
- Procurement of tanks is accelerated to maintain adequate storage capacity in addition to the essential total storage capacity.
- Possibility of replacing the flange type tanks is examined currently to decrease leakage risk.
- Rain gutters and weir covers are being installed to control intrusion of rain water into weirs.
- To be prepared for potential leakage of stored contaminated water from tanks, double structure of tank weirs and coating inside weirs are implemented one by one.
- Drain route of discharge channels has been navigated inside power station harbor instead of outside the harbor (Switching of one route out of two routes was completed on June 14.)



Installation of rain gutters

Installation of rain gutters on tank top

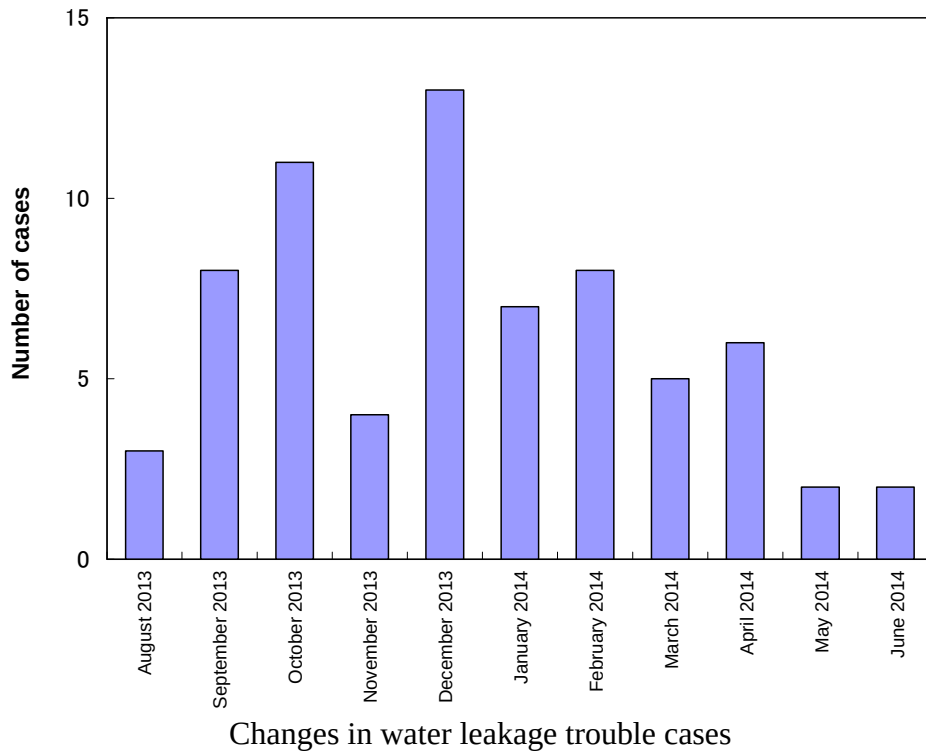


Work progress for double structure tank weirs and coating inside weirs



Work progress to switch discharge channel route

As mentioned above, since “Leakage of approximately 300 tons of contaminated water from flange-type tank in H4 tank area” identified on August 19, 2013, the countermeasure against the contaminated water leakage has been reinforced at all levels of the company. When the operation mode of drain valve for tank weir was switched to be routinely “closed,” the number of the leakage case was increased temporarily because the capacity for processing rainwater in the weir was insufficient. By steady implementation of the countermeasures, however, water leakage troubles are decreasing (including the leakage other than the contaminated water) (See graph below).



<Underground water bypass>

Underground water bypass is an approach to reduced underground water flowing into the building by pumping up the underground water flowing from mountain side (west) to sea side (east) on the power station site before it enters into the buildings and reducing the underground water level.

Since May 21, underground water pumped up in the mountainside of the building has been discharged intermittently and the water level of groundwater has been decreased gradually. Before discharging the water, a stringent operation target (tritium level of 1500Bq/L versus the 60,000Bq/L based on regulatory announcement) was established. The pumped up underground water was discharged seven times by June 30 after confirming that the tritium level is lower than this operation target (Total amount of discharged underground water: Approximately 8,600t).

With regard to the underground water bypass, explanation meetings with concerned parties in the fishery industry, etc. were held repeatedly (35 times in FY2013; 5 times in the 1st Quarter of FY2014) and moderated by risk communicators. In these meetings, movie pictures including computer graphics (CG) were used to make the detailing easy to understand by participants. Consent to discharge was obtained from the Fukushima Prefectural Federation of Fisheries Cooperative Associations (hereinafter, “Fukushima Fisheries Federation”) on April 4, and from National Federation of Fisheries Cooperative Associations on April 7. The bypass operation was started from May 21.

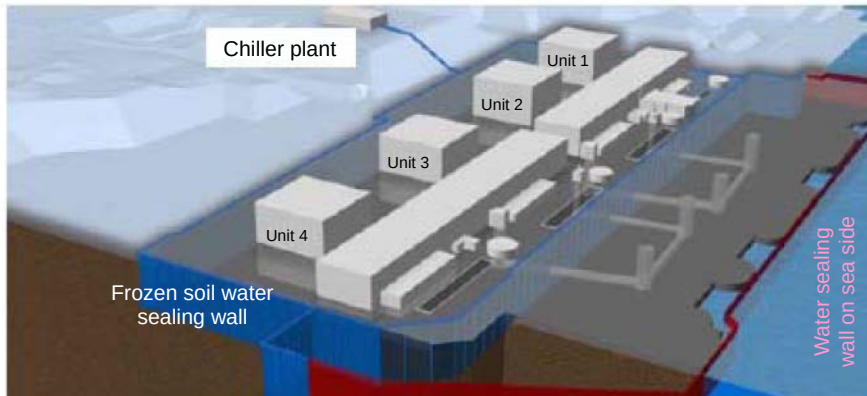
Since starting the bypass operation, detailing on the quality of water extracted from the groundwater well and analysis results of water quality before discharge as well as those in the sea area surrounding the power plant is made in the meetings of the Fukushima Fisheries Federation.

<Frozen soil water sealing wall>

The frozen soil water sealing wall is a technology to prevent intrusion of underground water into buildings by generating frozen water sealing walls around the building by freezing underground water using chiller piping (depth: approximately 30m). Chiller pipes are installed at approximately 1m intervals surrounding the reactor buildings and turbine buildings of Units 1~4.

A demonstration test (freezing test) was started on March 14 and successful freezing was observed.

Excavation work was started on June 2 to install chiller pipes in the northwest area of Unit 1, targeting the start of freezing operation within FY2014.



Schematic illustration of frozen soil water sealing wall



Demonstration test equipment



Status of chiller piping installation work

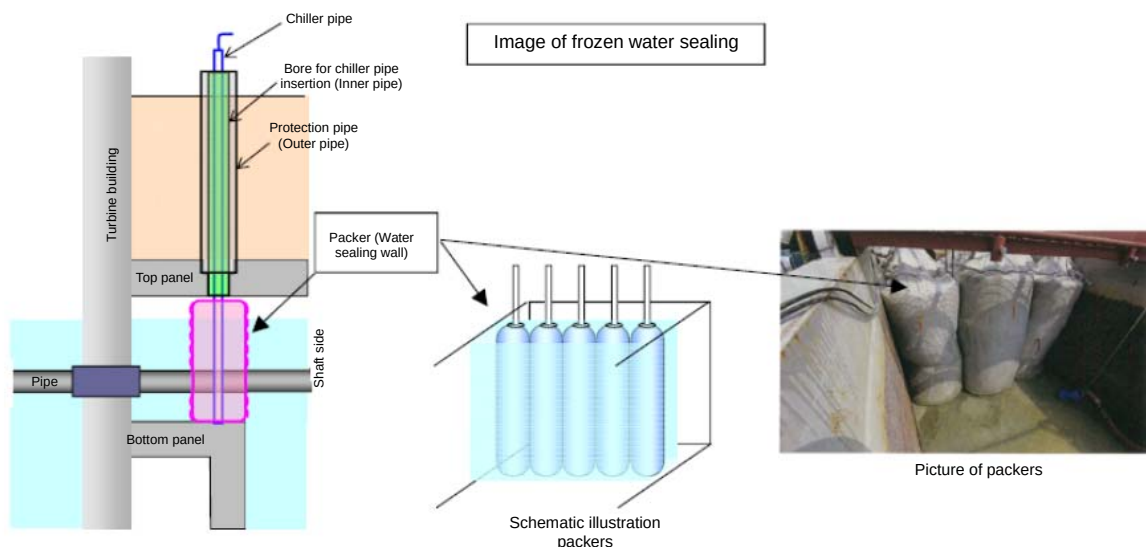
<Removal of retained water from seawater piping trench in Units 2 & 3>

Water sealing at the interface between turbine building and seawater piping trench was necessary to remove contaminated water accumulated in the trench. Therefore, the water sealing work was started on April 28 by freezing the surrounding water using chiller piping and packers (nylon bags).

However, additional countermeasures are necessary for secure freezing because the presence of the cable tray and the like in the installation location of the water sealing wall causes disturbance to packer insertion, and the migration of water between turbine buildings inhibits successful freezing.



Layout of seawater piping trench



Schematic illustration of frozen soil water sealing system

(4) Approaches to improve the working environment

- Expansion of area possible to work without full-face mask
Because decontamination in Tank Yard J in the south section of the site was completed, the area in which it is possible to work without a full-face mask has been expanded. Further, since May 30, it has become possible to use disposable dust masks for tank installation work that does not involve the handling of contaminated water.



- Installation of temporary ex-site rest station
A temporary rest station that can accommodate approximately 1000 people was constructed on the west of the access control facility. Operation of the rest station started on April 7. Planned completion of the permanent large-scale rest facility is in the end of FY2014.



Temporary ex-site rest station (External view / Inside)

- Building of new office building
Prior to the main office building planned to be completed in the end of FY2015, building of a new office building has started (planned completion in the end of September) on Fukushima Daiichi NPS site so as to ensure information sharing and rapid response to trouble. Because a part of the building has been completed, office operation in the building has started from July 22.
- Building of Fukushima Meal Supply Center
With the purpose of improving / enriching the daily diet of workers in the Fukushima Daiichi jobsite, it is planned to build Fukushima Meal Supply Center in Ogawara District of Okuma Town by the end of FY2014. The center has the capacity to supply meals of 3,000 servings at a time. The building inauguration ceremony took place on May 29 and construction work was started.

(5) Response to evaluation by external parties

1) Suggestions and proposals from the Nuclear Reform Monitoring Committee

The following proposals were given by Nuclear Reform Monitoring Committee.

Trouble related to the contaminated water and the like has occurred many times in Fukushima Daiichi NPS to date. The rapid establishment of safety control system suitable for the “decommissioning process of failed reactor” is imperative. To achieve this purpose, it is necessary to benchmark operations and safety control of similar decommissioned reactor facilities overseas. At the same time, it is necessary to improve the situation promptly based on leveraging the abilities of external organizations.

To achieve radical solutions to the contaminated water problem, it is necessary to approach the establishment of a comprehensive and consolidated control plan in a close tie-up with the national government and siting communities.

With regard to the benchmarking of overseas cases, an agreement was entered into with Sellafield, Ltd. (UK) to exchange information on both operational and technological aspects. Sellafield, Ltd. is in the process of decommissioning its nuclear reactors and radioactive waste-related facilities. Prior to the closure of formal Information Exchange Agreement, both parties signed the Declaration for Cooperation on May 1 that described significance and purpose of the Agreement. A safe and steady decommissioning process is promoted in the future on both facilities through positive information exchange concerning the issues shared by both companies.



A scene from ceremony for signing Declaration for Cooperation

Upper left: Edward Davey, Secretary of State for Energy & Climate Change, UK

Upper right: Shinzo Abe, Prime Minister of Japan

Lower left: Tony Pryce, CEO of Sellafield Ltd.

Lower right: Naohiro Masuda, President and CEO of Fukushima Daiichi Decommissioning Promotion Company

Further, with regard to the comprehensive and consolidated control plan to address the contaminated water problem, the following agenda is currently being reviewed:

- Promotes the understanding / clarifying of the inventory status of contaminated water.

- Performs the risk evaluation associated with contaminated water.
- Establishes a comprehensive and consolidated control plan for the contaminated water based on the risk evaluation.

The progress of the above agenda and the control plan are reported to stakeholders in national government and siting communities through “Decommissioning Driving / Contaminated Water Countermeasure Team meeting + secretariat meeting.” We are committed to compiling a control plan as continued efforts, by reflecting feedback from various stakeholders.

2) Suggestions and proposals from the Nuclear Safety Oversight Office

Upon acceptance of the following proposals from Nuclear Safety Oversight Office, Fukushima Daiichi D & D Engineering Company is currently reviewing the countermeasures.

- a. The framework to manage safety aspects of Fukushima Daiichi NPS has not been defined. Further, the method of assigning priority to the works related to safety hazard and the approval process are unclear.
- b. Fukushima Daiichi Decommissioning Roadmap includes no assessment of safety-related risks (particularly, exposure dose) and the activities to control exposure dose is insufficient.
- c. No clear procedures are implemented for managing changes (=change management). Change management has not been applied to the organization changes that are currently in progress either. As a consequence, there is no defined method that evaluates the achievement of objectives to establish Fukushima Daiichi D & D Engineering Company or the method to identify risks associated with reorganization and countermeasures to address the risks.

(6) Countermeasures against human disasters

Full control of human disasters could not be achieved in the 1st quarter. Even after the “fatal accident of a worker engaged in foundation pile repair³” occurred in March 28, four cases of human injuries requiring emergency transportation occurred during the 1st quarter. The disaster cause is attributable to the insufficient framework for adequate training and education for workers not familiar with procedures that have become necessary in the special circumstances of Fukushima Daiichi NPS after the accident.

To improve this situation, we are committed to enhance the quality of the safety management education by, for instance, participating in third party training programs to acquire the know-how and experiences of other industries.

Further, we introduced a “Self Risk Anticipation Sheet” for our employees and the contractors’ employees. By using the Sheet, individual workers “anticipate potential risks by themselves” before starting operations. This activity contributes to the enhancement of awareness and ability for self-protection.

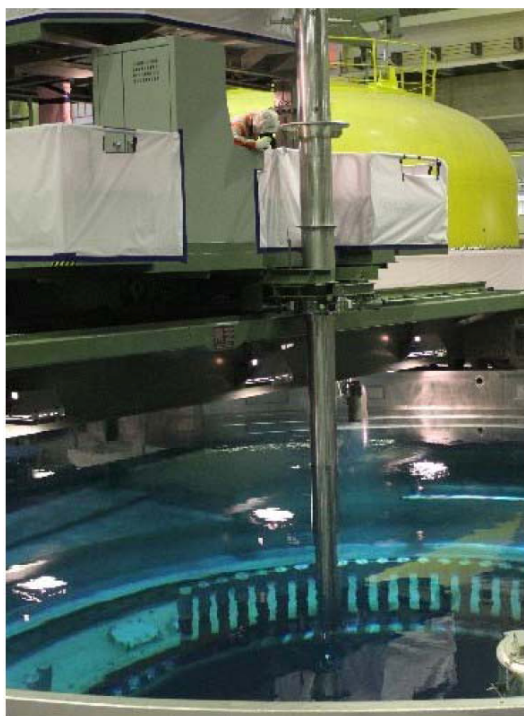
Besides, a “human disaster eradication task” has been established. As a part of this initiative, a Toolbox Meeting (for risk anticipation) based on the actual disaster cases has been implemented, and our on-site supervisor is participating in these meetings.

³The accident occurred in a vacant container warehouse in the solid waste storage-related facility. The team was excavating the ground to check damage of foundation piles as a preliminary work to repair building foundation piles damaged during the Tohoku-Pacific Ocean Earthquake (the accident site was approx. 1.7 m lower than ground level). While the victim was removing a leveling concrete layer discovered when excavating the lower part of the foundation, the leveling concrete and the excavated soil collapsed on him, resulting in a fatal accident.

1.2 Fukushima Daini NPS

Fukushima Daini NPS has established a policy of centralized management of fuels based on the standpoint of simplifying equipment maintenance⁴. The fuels in the reactors have been transported to the spent fuel pools.

In Unit 1, where fuels were ready to be transported, the reactor was opened during the period from May 12 to May 27, and the process to move all 764 fuels to the spent fuel pools was started on June 2 and completed on July 10.



Monitoring operator to check core from above the fuel handling machine with binoculars



Monitoring operator to check entire status from the operation room of the fuel handling machine

1.3 Kashiwazaki Kariwa NPS

(1) Status of safety measures implementation

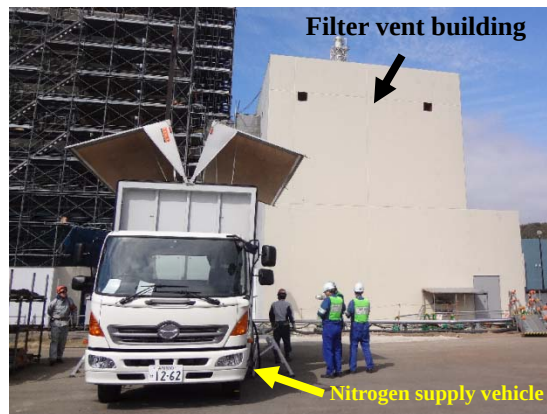
Kashiwazaki Kariwa NPS is promoting various safety measures by reflecting the lessons learned from Fukushima Nuclear Accident including the following: -Measure to prevent flooding caused by tsunamis, -Measures to secure power source, cooling function, -Measure to prevent escalation of an accident. The main progress in the 1st quarter of FY2014 includes completion of performance test for Unit 7 filter vent system⁵ (April 10), and the installation of a water filling system⁶ on the top of Unit 6 reactor containment vessel (May 21).

⁴ As of now, fuel transfer of Unit 2 and Unit 4 has been completed.

⁵ A system that protects the reactor core from damage by venting steam and hydrogen from reactor containment. This system also has a role in achieving significant reduction of the soil contamination off-site by eliminating 99.9% of the particulate radioactive substances except noble gas during the process of filtering steam and hydrogen in the reactor containment in the event of core damage.

⁶ In the event of a serious accident such as core damage, water is filled on the external top of the reactor containment vessel with the purpose to prevent overheating or damage of the containment top interface. In this way, leakage of hydrogen and the like from the top of the reactor containment vessel can be prevented.

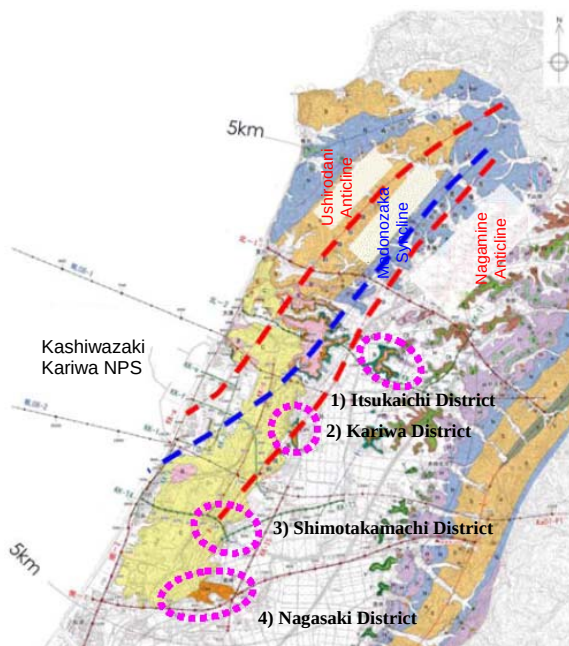
The performance of Unit 7 filter vent system was tested in three aspects, i.e. pressure resistance test, valve operation check and ventilation test. With completion of the ventilation test on April 10, it was verified that main functions of the system were securely ensured.



Unit 7: A scene from filter vent performance test

(2) Additional geological research

With regard to Unit 6 and Unit 7, a series of applications were filed with the Nuclear Regulatory Commission on September 27, 2013 as below to accept audit for compliance to the new regulation standard: Approval of alterations in reactor establishment license, approval of construction plan and approval of alterations in Technical Specification for Nuclear Reactor Facility. Thereinafter,, in the review meeting by Nuclear Regulatory Commission held on January 24, 2014, submission of additional data was requested. To comply with this request, we planned an additional geological research on activities of folding structure in vicinity of the plant site as well as an additional research for on-site confirmation of faults in the plant site. As a part of this plan, subsurface prospecting was started on May 20 in the area outside the plant site. Field prospecting work was completed for two measurement lines out of four so far. We will further address this issue flexibly based on the research findings so that we can gather sufficient data with making report to Nuclear Regulatory Commission on appropriate timing.



Areas in the scope of subsurface prospecting



Subsurface prospecting in the vicinity of the plant site (Itsukaichi District)

(3) Further approaches to improve safety

We have submitted application for approval of alterations in reactor establishment license for Units 6 & 7 of Kashiwazaki Kariwa NPS in order to receive assessment on conformance of these reactors with the new regulatory standards along with the promotion of introducing various safety improvement measures for these units. On top of these, we are promoting the following initiatives based on the lessons learned from the Fukushima Nuclear Accident to achieve higher level of safety.

1) Development of highly heat resistant seal material

As reported previously⁷, the release of radioactive materials during the Fukushima Nuclear Accident was likely to be attributable to the damaged sealing of top head flange on the containment vessel.

Integrity of the concerned section had been tested by electric utilities and national organizations in the past, and it was considered that the integrity would be secured within a certain range of temperature / pressure (i.e. less than twice of the max. operating pressure, and lower than 200°C).

While it was confirmed that pressure of the containment vessel at Fukushima Nuclear Accident was lower than twice of the max. operating pressure. However, the temperature was likely to exceed 200°C due to loss of containment spray function etc. It is considered that such an excessive temperature resulted in the damage of the concerned section.

To address this issue, we are developing a new sealing material with durability to the temperature higher than the current temperature. We confirmed in our test that this sealing material had heat resistance performance superior to those of the conventional sealing materials. In addition, we have conducted a test to simulate an environment inside the containment in the event of accident and confirmed that the seal function could be preserved.

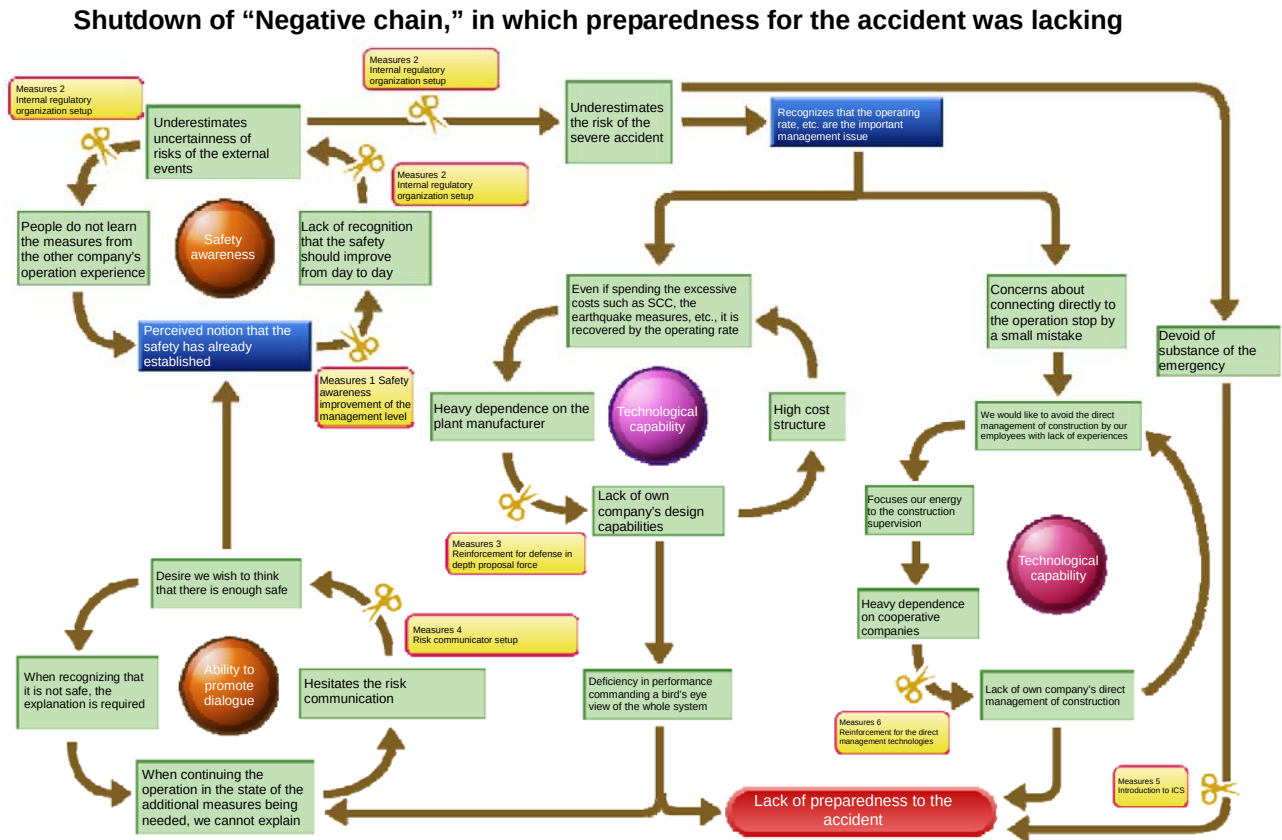
2) Comprehensive understanding of risks

To understand the nuclear power station risks comprehensively based on the reflection of lessons learned from Fukushima Nuclear Accident, we carry out assessment of external events (earthquake, Tsunami) for Units 6 & 7 of the Kashiwazaki Kariwa NPS in addition to the probabilistic safety assessment for the internal events. Summary of these assessments will be compiled soon. We also started the probabilistic safety assessment for fire or internal flooding supported by an U.S. consulting company, while the assessment for these events are yet to be done in the domestic industry.

⁷ Review on the estimated status of core / containment vessel and the issues not settled about Units 1-3 of Fukushima Daiichi NPS: The 1st Progress Report (December 13, 2013)

2. Progress Review for Nuclear Safety Reform Plan (In terms of management)

As to the progress review of the nuclear safety reform plan (in terms of management), we summarized these as, “Implementation of the 1st quarter” and “Future plan” by every 6 measures in order to cut off “Negative chains,” so to speak, that engender the structural problems which the nuclear power division has.



2.1 Countermeasure 1 Reforms from the management level

(1) Implementation of the 1st quarter

- Expectations of General Manager of Nuclear Power and Plant Siting Division and Fukushima Daiichi D & D Engineering Company President were clearly defined as, “Action Guidelines of Nuclear Power Division.” Based on these, nuclear power leaders started to announce the importance of nuclear power safety through their actual actions such as “sharing a certain time for discussion on the safety when starting a meeting” along with reflecting the Guidelines into FY2014 operation plans.

[Action Guidelines (Extract)]

- 1) Pursuit of safety and quality without compromise
- 2) Construction of a trusting relationship with the general public
- 3) Implementation of improvement and reformation based on inventive ideas
- 4) Fostering and reinforcement of individual ability and enhancement of organizational power

- Monitoring reflection of expectations in FY2014 operation plans and their status of implementation. With regard to the monitoring, emphasis is placed on:
 - Establishment of “Safety Steering Meeting” as an opportunity for monitoring
 - Clarification of personnel in charge of implementation to coordinate between Headquarters and each power station
 - Replenishment of a walk-down to confirm actuation situation of the plant site and the like

In addition, monitoring the announcement status of the expectations (frequency, diversity of communication means) is also implemented so that they securely penetrate each level of organization.

- The Nuclear Reform Monitoring Committee suggested a proposal as below. To accommodate the proposal, we will establish Key Performance Indicator (KPI) and the establishment of necessary systems.

It is vital to establish a specific Key Performance Indicator (KPI) promptly to allow quantitative measurement of the level of progress for each reformation agendum. The reformation should be promoted with monitoring its penetration level into the entire organization. Further, any system necessary for this purpose should be established.

First of all, in order to establish the Key Performance Indicator (KPI), the states of organizations and individuals to be targeted were stipulated as described in “States of Organizations and Individuals to be Realized for Setting Up and Achieving Overall Objectives (Progress Report of the 4th Quarter in FY2013: Attachment 6).” By using this statement as a basis, international standards such as “Traits of a Healthy Nuclear Safety Culture⁸” and “WANO⁹-PO&C¹⁰” should be used to compare and evaluate ourselves with the specific behavior examples indicated in Traits and PO&C.

The result of this self-evaluation should be applied to the Key Performance Indicator (KPI) system. The monitoring is carried out centered on this output to gauge how the “safety awareness,” “technological capability” and “ability to promote dialogue” are being improved. With regard to “safety awareness” and “ability to promote dialogue,” Traits is used, while PO&C is used for “technological capability.”

While the result of this self-evaluation is processed to generate an indicator as KPI, scoring is not a purpose of this system. It is the purpose of this system to use this activity itself as training for self-evaluation and self-reflection so that they are integrated into our life habits. With regard to the improvement of technological capability, step-by-step progress is considered important. Instead of just controlling the frequency of countermeasure implementation and the like, outcome-based indicator should be established separately as an outcome of accumulated efforts. In addition to the aforementioned framework, external evaluation is added.

Therefore, the monitoring is carried out based on the following three approaches:

- Self-evaluation result
- Evaluation based on indicator
- Third party evaluation by Nuclear Reform Monitoring Committee, Nuclear Safety Oversight Office and international expert organizations and the like (Continued implementation as a total evaluation)

⁸ While document is not open to the public, the analogous document has been published as NUREG-2165 by U.S.NRC.

⁹ World Association of Nuclear Operation

¹⁰ Performance Objectives & Criteria (not open to the public)

- As an essential system to promote reformation, we resolved to support the reformation in the Nuclear Power Division by monitoring the role of the Secretariat of Nuclear Reform Special Taskforce (hereinafter, “TF Secretariat”) and the PDCA of Nuclear Power Division from the viewpoint apart from the line side. Particularly, with regard to the factors inhibiting the reform as well as the factors that delay speed of the reform, we have assigned five dedicated staff (as of July 1) additionally to solve these problems because:
 - It is vital to understand these factors precisely through monitoring from the line side etc.
 - In order to address the cause, it is necessary to precisely eliminate the disturbance without being hindered by existing framework (awareness of limit).
 To achieve these objectives, TF Secretariat started the activities as below:
 - While continuing the direct dialog between the middle management level of the nuclear power station and the top executives started in February this year, direct dialog with TF Secretariat is implemented based on a plan with the purpose to understand challenges for the people working on the frontline on site and the barriers to overcome the challenges.
 - Root causes are explored by implementing self-evaluation and measuring outcome indicator, and by conducting analysis and evaluation of the information collected by interviewing the understanding / penetration team.
- To improve nuclear safety governance, benchmarking of management system in Exelon Corporation (USA) has been started as a good practice overseas. Our team including the top management visited the Exelon Corporation from June 2 to June 6 this year for the research of a series of aspects including the improvement of safety awareness, ability to propose defense in depth, reinforcement of ability to address emergency and efficacy of on-site technological capability etc. Analysis of difference between our company and Exelon Corporation is planned in future to approach management improvement.
- Training for new executive officers was implemented on June 7 and June 14 to enhance knowledge about nuclear safety (safety design of nuclear power station, lessons learned from Fukushima Nuclear Accident and the countermeasures for prevention, nuclear power disaster prevention system). Further, relevant persons of the Fukushima Daiichi D & D Engineering Company received a training to enhance essential knowledge about safety for nuclear power leaders (knowledge on plant operation for Fukushima Daiichi NPS) on May 23, May 26, June 18 and June 26. These trainings have been integrated into our training plan since the last fiscal year.



Nuclear power safety training for new executive officers



Nuclear power safety training for relevant personnel from Fukushima Daiichi D & D Engineering Company

- With regard to the nurturing of nuclear power leaders, it was found that the “360 degrees evaluation regarding the action index” conventionally used to evaluate efficacy was difficult to use for people in the scope of evaluation who have fewer opportunities to communicate with in routine work, because evaluation for those people tend to be stereotype. Therefore, we will examine the possibility of improvement by combining the self-evaluation based on the Traits.
- The direct dialog with the level of management and each electric power station middle management was started from February. There was feedback by the middle management that their understanding on the thoughts of management level and their understanding of the Nuclear Safety Reform Plan were enhanced by directly hearing the elaborate explanations from the management level without time limitation. In this sense, the direct dialog contributed to the understanding of Nuclear Safety Reform Plan by the electric power station middle management. Therefore, the direct dialog is to be continued also in future by expanding its scope to the Headquarters middle management.

On the other hand, to make all the members understand the Nuclear Safety Reform Plan in the same way, electric power station middle management needs to explain the Plan with associating it with their own works or integrated it in their operation plans. Therefore, we will promote penetration of the Plan into the entire organization while providing supports to the electric power station middle management. To achieve this purpose, the TF Secretariat will identify the type of supports necessary for the electric power station middle management and review / implement the approaches to reinforce them.

- Through the above-mentioned approaches and so forth, efficacy of awareness reformation in nuclear power leaders can be observed. For instance, opinions from various viewpoints are observed in the meetings to discuss / determine the safety of nuclear power stations.

(2) Future plan

The introduction of Key Performance Indicator (KPI) and implementation of PDCA cycle based on this Indicator represent a significant improvement of the management system. Therefore, instead of promoting the initiative in a uniform manner, a change management plan should be applied so that the applicable scope of operation could be expanded gradually based on the horizontal deployment plan. In this method, the initiative is promoted with confirming the evaluation approach and efficacy. Based on this, the TF Secretariat will provide proposals for further improvements by confirming the progress of Nuclear Safety Reform Plan and the achievement level of the nuclear safety reform.

2.2 Countermeasure 2 Monitoring/support reinforcement at the management level

(1) Implementation of the 1st quarter

The Nuclear Safety Oversight Office has summarized the following evaluations and reported to the Board of Directors as a result of oversight activities.

- Evaluation result for Nuclear Power & Plant Siting Division
 - Evaluation was made in terms of addressing suggestions / proposals from external organizations and the implementation status of several items in the Nuclear Safety Reform Plan. While individual commitment was started, the progress is not sufficient because of the absence of powerful leadership. Further efforts are needed to promote the commitment by reinforce supports to the plant site.
 - With regard to the governance of nuclear safety, there is still room for improvement in terms of depth / frequency of discussions in the meetings sponsored by the Corporate (Headquarters) as well as the depth of doubt and challenges. However, the challenges approached by the Nuclear Generation Safety Committee (the top level meeting in the organization to discuss / determine the safety issues of nuclear power stations) have increased the depth.
 - Improvements are in progress such as the establishment of “Safety Steering Meeting (chaired by president)” as a new meeting body for safety.
 - Evaluation results for Fukushima Daiichi NPS
 - Activities of the new Fukushima Daiichi D & D Engineering Company have started smoothly. Establishment of the management system and improvement of safety performance under the leadership of the company president are underway.
 - With regard to the management of radiological protection, some activities to decrease exposure dose have begun. However, there are some improvement opportunities including the necessity to clearly identify the guidelines for radiological protection and the dose targets.
 - It was confirmed that fuel debris generated by the Earthquake or Tsunami and the damage probability of fuels in the spent fuel pools were of low level. However, contaminated water is reserved in the contaminated water storage tanks and the potential flowing out of the contaminated water into environment due to large-scale earthquake or tornado should be considered. Further, there are still some hazardous substances and inflammables (grease cans and spent cloths) not governed in the plant site. There are still significant risks associated with the fire caused by these substances.
 - In March 2014, there was a mortal disaster. Besides, accident troubles occur sometimes. These facts show that:
 - People failed to learn from the experiences of accident troubles in the past.
 - Processes tend to be regarded as more important than safety.
 - There are still challenges in the security of safety in operation management.
- An excuse “We cannot help it because Fukushima Daiichi NPS is still in a critical situation” is not acceptable. Urgent improvement is imperative.

- Evaluation results for Kashiwazaki Kariwa NPS
 - In Kashiwazaki Kariwa NPS, efforts are being made to achieve the global level nuclear safety by improving the nuclear safety culture by showing the leadership for nuclear safety.
 - As an example of problems, Nuclear Safety Oversight Office found scaffolding during the plant walk-down above and surrounding of important-to-safety systems in operation. While it did not directly impact the operation of the concerned systems, it indicated a weak side of the safety culture, when considering its impact in the event of emergency. Nevertheless, the Kashiwazaki Kariwa NPS promptly took action and leveraged this case as an opportunity to improve the nuclear safety review before starting daily work with referring to the overseas good practices. They are committed to listen to the opinions from external parties.
- Approaches to address suggestions / proposals from Nuclear Safety Oversight Office
 - Upon receiving the report from the Nuclear Safety Oversight Office, the Board of Directors determined to request executive officers to submit report on the development and progress of action plans for the proposals on March 26. In this way, reinforcement of the Board of Directors' governance on the executive officers in terms of nuclear safety is sought.
 - The executive officers implemented the following improvements:
 - “Safety Management (Corporate Officer)” to administer the safety of the entire nuclear power division was established on April 1. Further, to accelerate various actions plans including the Nuclear Safety Reform Plan to target the global top-level safety, “Safety Steering Meeting (Chair: President) was established on June 6 with the purpose to increase the commitment of management level and to increase impedance.
 - With regard to the recommendation by Nuclear Safety Oversight Office about the management of radiological protection and the decrease of fire risks (management of hazardous substances) in the Fukushima Daiichi NPS, the action policy and the specific countermeasure will be examined by the end of July.
 - In order to ensure horizontal deployment of improvement case with regard to the inappropriate scaffolding in Kashiwazaki Kariwa NPS, improvement of internal rule is planned with referring to the INPO¹¹ Guideline (to be completed during the 2nd quarter).
 - The following proposal was made by the Nuclear Safety Oversight Office. As a process of change management, “Change Management Guide” was created (March 3) with referring to the international good practices. Based on the Guide, it has become possible to offer the concepts and tools (format) for evaluation of risks associated with the concerned changes, minimization of the impact and the corrective action for problems.

To promote “Nuclear Safety Reform Plan” steadily, process for change management (including mechanism to monitor and analyze the current status, implementation plan based on facts of the plant site, and the plan to penetrate understanding) should be established urgently and these projects should be promoted effectively.

¹¹ INPO: Institute of Nuclear Power Operations

(2) Future plan

Nuclear Safety Oversight Office will reinforce oversight function as continued with repeating the educations and trainings of the staff. Through this action, Nuclear Safety Oversight Office will continue oversight activities and suggestions / proposals for important activities in terms of nuclear safety such as verification for validity of “Safety Management” and “Safety Steering Meeting,” and status of applying change management process to the actual projects.

The Board of Directors continues to confirm reports from executive officers and Nuclear Safety Oversight Office.

While the Nuclear Power Division has started implementation of the improvement items on safety culture and organization management proposed by Nuclear Safety Oversight Office, the speed of the improvement will be accelerated.

2.3 Countermeasure 3 Reinforcement for the defense in-depth proposal force

(1) Implementation of the 1st quarter

➤ Competition of reinforcing the safety improvement proposal force

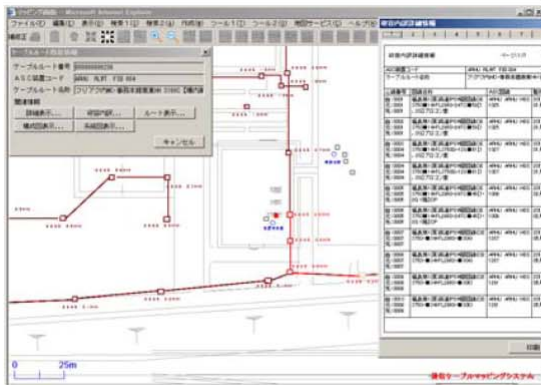
- While this initiative is in the stage of realizing the excellent proposals adopted in FY2013, considerable time is spent on the examination before actually starting the work or construction, because consideration should be given to the assignment of priority compared with the other works in addition to the intention to start countermeasure operation with high accuracy. Therefore, with the purpose to penetrate the concept that the proposals should be promptly put into practice wherever their realization is possible and the method should be improved on a continuous basis along with the operation process, the competition secretariat has taken action to accelerate the realization by encouraging each party in charge of the countermeasure implementation.

Among 12 excellent proposals in FY2013, eleven proposals were reported in the 4th Quarter Report in FY2013 that they would be realized one by one within six months.

Among these, following five proposals were realized during the 1st quarter of FY2014:

- In order to improve reliability of routine parameter monitoring and to promptly secure communication line in the event of emergency, usage of communication cables in plant site should be investigated and the investigation results should be compiled as database (Fukushima Daiichi NPS).
 - So that the cooling water can be supplied from waste processing system in the event of accident, material and equipment such as compressed air bomb and connector hose should be arranged in order to supply compressed air directly into the drive section of air-operated valves (Fukushima Daini NPS).
 - To communicate site situation promptly in the event of accident, PHS with camera should be introduced (Fukushima Daini NPS).
 - So that the judgment based on overview of the entire plant or the entire power station is possible when taking action in the event of accident, design information etc. related to water injection into reactor and reactor cooling etc. should be extracted and compiled as a drawing. This drawing should be deployed in the technical support room at ERC (Kashiwazaki Kariwa NPS).
 - Movies for the emergency procedures should be created and installed on each PC so that they can be used for education / training or in actual emergency countermeasures (Kashiwazaki Kariwa NPS).
- The first competition in FY2014 was open for approximately two months from March to May. The proposals were recruited and there were 83 applications in total (It was 33 proposals in three months in FY2013). Screening is in process currently.
 - This time, we newly introduced the system to recruit things (Needs) to be

considered that the improvement has a connection to improve the nuclear power safety. We also started to recruit the matters that “suggest specific concern perceived by people on plant site, even if they don’t know the specific countermeasure.” With regard to the countermeasure for the needs focused in this competition, proposals are invited from wide range of audience. With regard to the one out of seven applications in the current competition, improvement approach was proposed by the one other than the applicant of the needs. We continue to use internal knowledge and experiences from a broad range of people in the company.



Investigation / Management of communication cable usage (Fukushima Daiichi) (Display screen of cable roots etc.)



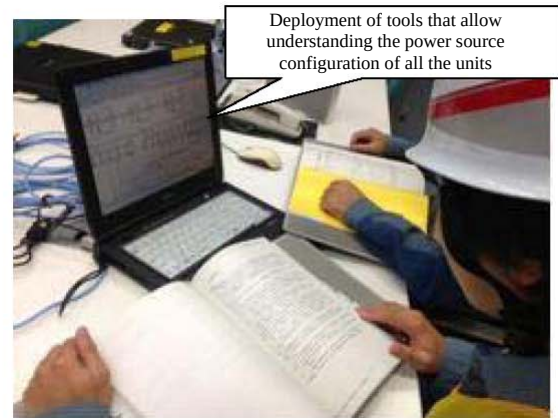
Deployment of equipment and materials for forced operation of air-operated valves (Fukushima Daiichi) (Compressed air bomb, Connection hose, connection parts etc.)



Import of images



Deployment of PHS integrating a camera (Fukushima Daiichi) (Photographed images are sent to terminals)



Deployment of drawing that consolidates design information (Kashiwazaki Kariwa) (Training using the drawing)



Installation of movies for emergency procedures on PC (Kashiwazaki Kariwa) (Learning of emergency procedure by using movies)

- Information of domestic and international Operation Experiences (OE)
 - Analysis was completed for 81 OE information collected during the 1st quarter of FY2014. Among the four cases judged as requiring impact evaluation, the evaluation was completed for one case and the countermeasure was instructed to the power stations.
 - Collection and analysis of OE information are implemented as planned. The OE information is registered into “Nuclear Power Maintenance Integrated Management System” promptly upon acquisition for realization of information sharing (The operation started in May 2014). Further, efforts are made to ensure easy access to the OE information by every power station staff by uploading the OE information on the top page of the intranet as “New OE Information” (The operation started in June 2014).
 - In the conventional screening meeting, all the collected OE information was included in the scope of discussion. Therefore the participation of the meeting was less frequent by people in line division from both Headquarters and plant site. The center of the meeting was the function that marshaled the OE information. Therefore, to enhance involvement of the line division, specialization screening meeting on OE information has been started by splitting the information into area of specialty such as “mechanical area,” “electrical area,” and so forth (The operation started in June 2014). As a result, participation of staff from line division and from group manager class has increased, and more useful screening focusing on the risk management has become possible compared to the previous screening.
- Hazard analysis

As continuation from the activities in FY 2013, impacts on nuclear power stations have been analyzed in the event of any hazard beyond the design base with regard to approximately 30 events selected one by one as the scope of analysis. Analysis on four additional cases was completed recently including the analysis on slope collapse and turbine missiles (17 cases in total). The analysis result and the review of countermeasures are as follows:

- With regard to the slope collapse, while impacts including poor access due to intrusion of soil into plant site roads and the loss of external power supply due to damage of power transmission system are considered, cliff edge¹² is considered unlikely. However, with regard to the countermeasure against the loss of external power supply caused as a result of slope collapse (measures to ensure power source / water source for long term and the like), reviews are to be continued.
- While probability of turbine missile is extremely low, occurrence of cliff edge may be considered, if the missile should drop into a spent fuel pool, resulting in a leakage of pool water that exceeds the supply water volume. Examination of the measures to control the leakage of pool water is to be continued.

With regard to the above-mentioned analysis result concerning the presence / absence of cliff edge property, decision making on the countermeasure implementation is necessary. To achieve this objective, a dedicated team to make decision on the countermeasure policy has been established with in the “Nuclear Power Risk Management Committee” regard to the analysis results. Through this arrangement, the processes from analysis to decision making have been clearly identified. The team’s meeting was held twice to date and the countermeasure policy has been determined for three cases (e.g., collision of meteorite etc.) out of the above-mentioned 17 cases.

¹² An extensive loss of safety functions at a time due to common factors generated when a load exceeding a certain level is applied such as the case of Tsunami that largely exceeds design-base postulation.

➤ Safety review

In Kashiwazaki Kariwa NPS, marshaling of review results for FY2013 was carried out and the feedback to the concerned functions and follow-up for improvements were carried out with regard to the selected suggestion items. The plan for FY2014 was developed based on FY2014 Plan. Education related to reactor safety and the like will be included in the scope of review, and it is planned to examine the countermeasures against the external events that can cause serious impact due to uncertainty of occurrence frequency. Based on this plan, review was started to discuss the preparedness for the external events in June.

In Fukushima Daiichi NPS and Fukushima Daini NPS, an examination was started to introduce the safety review based on the achievements in Kashiwazaki Kariwa NPS with reflecting the specific situation of each power station.

➤ Review of the role of manuals for Headquarters and power stations

As a result of manual analysis, there was almost no description considered to stipulate an excessive work. Besides, according to the results of survey based on the interviews, the cause of perceived stress was considered to be illegibility and unintelligibility of the manuals. Therefore, the following improvements are made to address this issue:

-Situation that requires collation between the Headquarters manual and the power station manual in performing a work should be avoided; -Difference should be made between the requirements to be complied with (Headquarters) and the knowhow / procedures (power station); -Reflection of knowhow and change of procedure in the manuals should be made easier on the side of power station where the work is actually carried out.

➤ Introduction of IT in the maintenance work process

To realize introduction of MAXIMO¹³ (Phase 2), a system for rationalization of the entire maintenance process (IT-based systematization of a series of works such as development of audit plan, procurement, inspection, acceptance and the like), by the first half of FY2016, detailed review for each business process is carried out. This initiative is promoted in stages by appropriately reflecting the changes within the extent where introduction is possible.

(2) Future plan

➤ Competition of reinforcing the safety improvement proposal force

Because the actions have demonstrated their efficacy to penetrate the concept that the proposals should be promptly put into practice by, for instance, starting operation one by one wherever their realization is possible, we will continue these actions.

➤ Information of domestic and international Operation Experiences (OE)

By implementing monitoring on secure deployment / penetration of OE information, positive use of the OE information is further ensured.

➤ Hazard analysis

While promoting hazard analysis by the dedicated team under the “Nuclear Power Risk Management Committee,” countermeasures are developed one by one.

➤ Safety review

Kashiwazaki Kariwa NPS continues to implement the review based on the developed annual plan. Fukushima Daiichi NPS and Fukushima Daini NPS will examine the system and the implementation approaches related to the safety review.

¹³ An IT solution to realize strategic asset management.

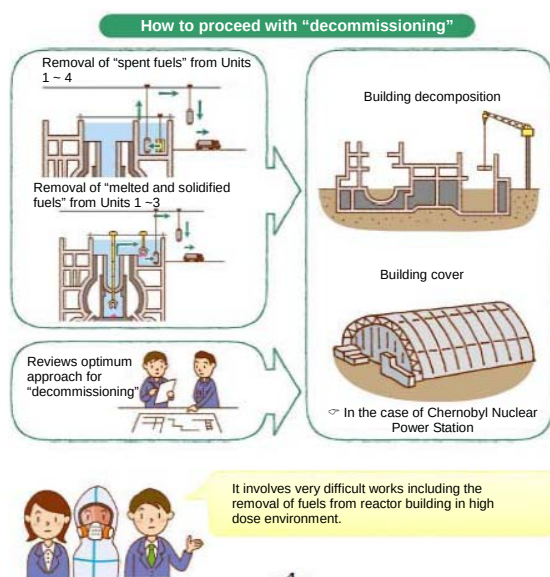
2.4 Countermeasure 4 Enrichment of risk communication activities

(1) Implementation of the 1st quarter

- As continuation from previous period, risk information in the Nuclear Power Division is collected and the recommendation is given to the management level and Nuclear Power Division about the publicizing of risks and the detailing policy related to the countermeasures.
- As continuation from previous fiscal year, following actions are taken as a part of efforts to realize information communication easy to understand.
 - We listen to the opinions from local community in Fukushima about how to promote decommissioning and the requests on the information offering / communication in the Decommissioning / Contaminated Water Countermeasure Fukushima Council ¹⁴(2nd meeting: April 14, 3rd meeting : June 9) to respond to their requests. For instance, the detailing of materials on how to proceed with decommissioning was developed with reflecting the options of female groups in Fukushima (For the entire text, see Reference 1 of the materials distributed for the 3rd meeting of the Fukushima Council).

Q What is “Decommissioning”?

A “Decommissioning” means “safe storage” or “decomposition / disposition.” When we decommission the Fukushima Daiichi NPS, we will proceed with “decommissioning” in an optimum way with giving consideration to the final disposal method under domestic and international cooperation.



Material distributed for Decommissioning / Contaminated Water Countermeasure Fukushima Council and a scene from the Council meeting.

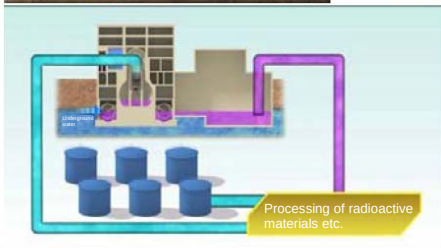
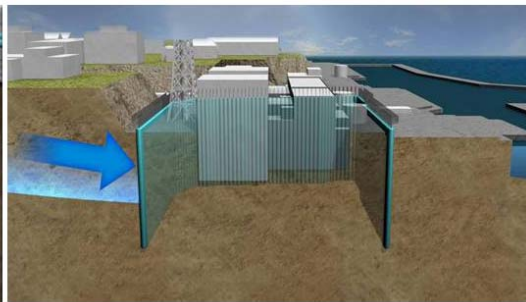
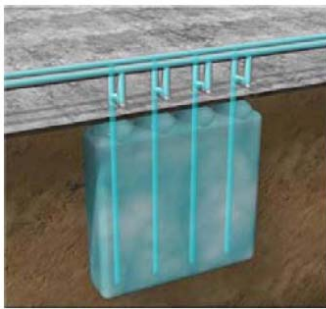
- As a measure to reinforce information communication to overseas, we visit foreign embassies to Japan and explain current status of the Fukushima Daiichi NPS. Besides, an inspection tour to Fukushima Daiichi NPS was implemented (31 people from 12 countries took part in the tour).

¹⁴ Established in February 2014, chaired by Kazuyoshi Akaba (Vice Minister of Economy, Trade and Industry). The Council is comprised of the members from Fukushima Prefectural Government, local authorities in vicinity, local stakeholders, thought leaders, regulatory agencies, Decommissioning / Contaminated Water Countermeasure Team Secretariat and TEPCO.



Inspection of Fukushima Daiichi NPS by Embassy staff to Japan

- With regard to the current status of the contaminated water processing and the progress of decommissioning work in Fukushima Daiichi NPS, materials including movie pictures using computer graphics (CG) have been developed one by one to make the detailing easy to understand and publicized via company website etc. In 1st quarter, three movies were created and publicized (-The frozen groundwater sealing wall for land side; -Installation of completed type tanks; -Interview with our employees and contractor employees engaged in the decommissioning).



Detailing materials for Fukushima Daiichi NPS using movie and CG

- To promote collection / analysis of risk information, reinforce ability to communicate information and to realize plan-based self-development of risk communicators, the number of risk communicators was increased to 37 people¹⁵ (as of July 1) and particularly the system in Fukushima Daiichi NPS was reinforced.

¹⁵ 31 people were arranged as of July1, 2013.



Scenes from risk communicator training

- To respond to the interests of general public in decommissioning and so forth, Headquarters (Nuclear Power Information Center•Risk Communicator), each branch office and service office (approximately 70 sites) are connected via teleconference system and information sharing with nuclear power public relations staff is achieved (1st meeting: May 21, 2nd meeting: June 5 [a monthly meeting is planned]).



Information sharing with nuclear power public relations staff

- The following proposals were given by the Nuclear Reform Monitoring Committee. Under the guidance / advice from external experts, we plan to include a training related to response to the external parties in the emergency response comprehensive drill planned to be held during this fiscal year.

Every risk scenario should be examined as a team, including the technical staff, and a fact-based drill should be conducted from the standpoint of risk communication as well.

(2) Future plan

Social Communication Office collects risk information in a unilateral manner inside and outside the power station from the entire company (particularly from Nuclear Power Division), carries out analysis and review in collaboration of Fukushima Revitalization Headquarters, Social Communication Office, risk communicators and technical staff to reinforce information communication. We continue to reinforce clear communication by leveraging movies and computer graphics and the communication of information to overseas.

2.5 Countermeasure 5 Reinforcement of Power Station and Headquarters Emergency Response Capability (Organizations)

(1) Implementation of the 1st quarter

- Emergency response organization based on ICS¹⁶ has been implemented in each power station in the following details: Emergency response organization for Kashiwazaki Kariwa NPS has been operated since January 2013. Emergency response organization for Headquarters has been operated since March 2013. Emergency response organizations for Fukushima Daiichi NPS and Fukushima Daini NPS have been operated since October 2013.
- In Kashiwazaki Kariwa NPS, comprehensive drill was implemented on April 24, May 7, May 12, May 23, May 29 and June 25. Besides, individual drills such as power supply drill using gas turbine generator vehicles and heavy machinery operation drill have been implemented on continuous basis. Compared to the previous drills, a certain improvement in the ability to operate emergency response organization is observed, supported by clarification of the command system and rapid information sharing, including those for local authorities. The improvement is considered to be attained by sorting out decision-making concept through the repeated performance of drills.



Scenes from a drill in Kashiwazaki Kariwa NPS

- As a result of comprehensive drill implemented in March 13 in Fukushima Daiichi NPS, some challenges were identified including the poor understanding of ICS and problems in basic behavior of emergency response staff (command announcement etc.). Therefore, a training session given by external experts to improve understanding of ICS and its basic concept as well as the training to improve basic behaviors in the event of emergency response was held on May 26, targeting the commander class in the power station. Thereinafter,, a comprehensive drill (with the participation of Headquarters) was held on June 11. Compared to the previous comprehensive drill, clarification of role assignment and command system was achieved.

¹⁶ Incident Command System (On-site command system in disaster situation which is adopted as standard in the United States and the like)



Scenes from a drill in Fukushima Daiichi NPS

- In Fukushima Daini NPS, individual drills such as power supply drill using gas turbine generator vehicles and heavy machinery operation drill have been implemented on continuous basis. Improvement of ability in emergency response has been accelerated. Individual drill was carried out about 50 times and about 100 staff in total took part in the drills.



Scenes from a drill in Fukushima Daini NPS
(Power Supply Drill using gas turbine generator vehicle)

- In the Headquarters, a training session given by external experts to improve understanding of ICS and emergency response judgment drill to improve basic behaviors in the event of emergency response were held on May 10 targeting for commander class of the Headquarters emergency response organization. It is the training similar to those conducted in Kashiwazaki Kariwa NPS. Further, on June 11, the Headquarters conducted the first comprehensive drill together with Fukushima Daiichi NPS after the Earthquake Disaster. Improvement opportunities in the support system by Headquarters were identified.



Scenes from a drill in Headquarters

- While the operation of emergency response organization has been improved in Kashiwazaki Kariwa NPS, inadequacies are still observed at Headquarters, Fukushima Daiichi NPS and Fukushima Daini NPS in terms of the learning of basic behavior in emergency response and the understanding of ICS.
- The following proposals were given by the Nuclear Reform Monitoring Committee. In the future trainings, multiple scenarios are developed and implemented including those other than the conventional accidents associated with earthquake or Tsunami with referring to the domestic and international accident trouble cases. Further, in addition to the support for power stations as an emergency response, activities targeted for external parties such as tie-up with external organizations and information disclosure are to be tested.

It is necessary improve redundant / multi-layered safety by, for instance, repeating joint drill with external parties based on the assumption of various scenes.

- Investigation of ICS training program established as a system in the United State is implemented. Japanese version textbook¹⁷ has been compiled and made available. In future, we will research its contents and use it positively.

(2) Future plan

We will improve the emergency response system based on ICS, repeat drills under the guidance of external experts, and identify the challenges and develop solutions for them. Further, in Headquarters, Fukushima Daiichi NPS and Fukushima Daini NPS, trainings related to basic concept of emergency response by external experts and the drills based on ICS are conducted on continuous basis to enhance ability for emergency response. Particularly, individual drills should be repeated for further improvement in terms of specific announcement of commands or response.

At Headquarters, activities to address the external parties such as inquiries from mass media etc. are tested. In addition, coordination with related organizations is promoted and joint drills with related organizations are planned / carried out.

We will expand the mechanism in future as a risk management centered on ICS so as to include advance preparation, backup system, training approaches and tie-up with external organizations.

2.6 Countermeasure 6 Reinforcement of Emergency Response Capability (Individual) and Reinforcement of On-Site Capability

(1) Implementation of the 1st quarter

- In order to develop a training curriculum that serves as an education curriculum for nurturing promising system engineers (classroom lectures, hands-on training etc.), we started to examine effective items to improve abilities based on the experience of conducting current training plans.
- The system engineers has developed their approaches to improve reliability by monitoring not only from the component level viewpoint but also from the wider system level viewpoint that the main systems including the important-to-safety systems are performing expected functions / performance concerned as a part of plant oversight activities. A pilot operation of the periodical integrity monitoring activity

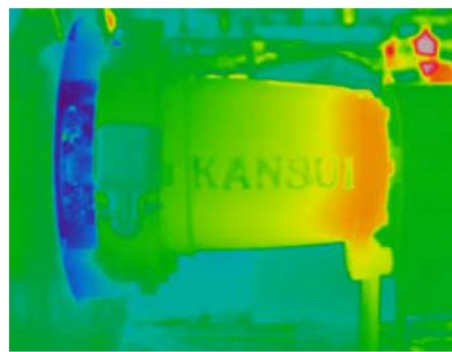
¹⁷ Incident Command System (ICS) Basic Guidebook Japan Medical Association (Issued on June 20, 2014)

has been started by selecting four systems from Unit 6 and Unit 7 of the Kashiwazaki Kariwa NPS. In this approach, trend monitoring is carried out by specifying the monitoring parameters effective to detect mechanism to cause performance degradation of system functions in the simulation. Full-scale operation of the system will be started from January 2015.

- Operators in Kashiwazaki Kariwa NPS have started participation in the drills implemented by emergency response organization for connecting power supply cars since July 2013 (As of end of June 2014, 13¹⁸ members attended the training with Units 6 and 7 compared to 39 target deploy personnel). In parallel, we will start trainings to develop ability of the leader level and the drills for connecting power supply cars will be managed directly by operators themselves. Fire engine connecting drill also started from October 2013 (as of the end of June, 41 members attended the training with Units 6 and 7 compared to 39 target deploy personnel). Furthermore, facility diagnosis by operators has been conducted for Units 6 and 7 rotating equipment with regard to about 260 rotating equipment per plant. Collection of data directly by operators has been started.



Scenes from power supply car training



Data collection administered by operators (Example: Diagnosis using infrared thermograph)

- For maintenance personnel, enhancement of basic technologies (annealed wire/rope handling training and the like), and training through direct management of work (inspection of power supply cars/gas turbine generator cars/alternative heat exchanger cars, training of temporary hose pull out of emergency action and electric cable

¹⁸ A temporary fluctuation due to personnel adjustments. As mentioned later, it is expected to be restored by “drills for connecting power supply cars administered directly by operators themselves” and the like.

connection training, exchange of electric motor, pump bearing disassembly/assembly, ground leveling by heavy machinery and on the like) has been performed from last July at each power station. These drills are continuing in the 1st quarter (as of the end of June, total of 3,260 members at 3 power stations have attended the training: 103 at Fukushima Daiichi, 1,979 at Fukushima Daini, 1,178 at Kashiwazaki Kariwa).

- As mentioned above, as a result of the system engineer educations and the drills managed by operators themselves, personal and organizational abilities for emergency response have been improved with reflecting the lessons from Fukushima Nuclear Accident.
- In Fukushima Daini NPS, “Direct Management Work Project Team” was established to expand the direct management work as a part of emergency response and the training was started from July 1, 2013. As a milestone for one year from the training start, General Convention for Trainings and Skills for Direct Management Works was held from June 10 to June 26. It was an opportunity to demonstrate technological capabilities obtained through the trainings. The participants were comprised of four teams (Debris Removal / Road Restoration Team, Motor Replacement Team, Temporary Cable Connection Team, Cooling Water Pump Restoration Team) and the executives witnessed that the teams could carry out the requested works safety and securely. Operators who working actually on-site and the commander side in Emergency Response Center mutually confirmed their abilities.



Debris removal / Road restoration training
(Debris removal)



Motor Replacement training (heating operation
to remove coupling)



Temporary cable connection training
(Cable installation)



Cooling Water Pump Restoration training
(bearing assembly)

- With regard to the performance reinforcement of on-site workers, it was perceived last year that the comprehensive enhancement of general technological capabilities was necessary. Based on this reflection, we redefined and marshaled the abilities requested for on-site workers in our company. Upon confirming the approaches made so far, we started to review the specific action plans to reinforce the abilities of people working on-site including education programs / curricula.

(2) Future plan

We consider that the comprehensive enhancement of general technological capabilities beyond the ability for direct management work is necessary. We continue to expand the scale of educations for system engineers and the trainings for direct management works. Further, upon establishing education programs / curriculums to strengthen the defined abilities for on-site staff, the development of this initiative will be started with targeting young population within the first half of this fiscal year with the purpose to promote individual and organizational technological capabilities.

Last statement

This is the beginning of the second year since we compiled the “Summary of Fukushima Nuclear Accident and Nuclear Safety Reform Plan (March 29, 2013)” last year. In the Nuclear Safety Reform, we feel it is imperative to reinforce the monitoring function to understanding our challenges precisely and to accelerate speed of planning and implementing the improvement measures.

Further, besides confirming the progress of each countermeasure, we will evaluate the outcome and measure how the improvements in “safety awareness,” “technological capability” and “ability to promote dialogue” are being achieved. We believe we can accelerate our Nuclear Safety Reform by quantitative evaluation based on the measurement results.

Under the strong determination of ‘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,’ we shall keep addressing nuclear safety reform, while receiving objective evaluations by the Nuclear Reform Monitoring Committee.

We would be more than happy to receive your valuable opinions and comments on our website or directly to us about our ongoing reform.

End