Nuclear Safety Reform Plan
Progress Report

（4th Quarter, FY2013）

May 1, 2014

Tokyo Electric Power Company,
Incorporated

Table of Contents

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 troubles 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 "smooth and early fulfillment of compensation," "acceleration of 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" (hereafter "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 at each quarter. The current report includes the statements on progress during the 4th quarter in FY2013 (i.e., January – March, 2014), the entire summary of FY2013, and the improvement planned for FY2014.

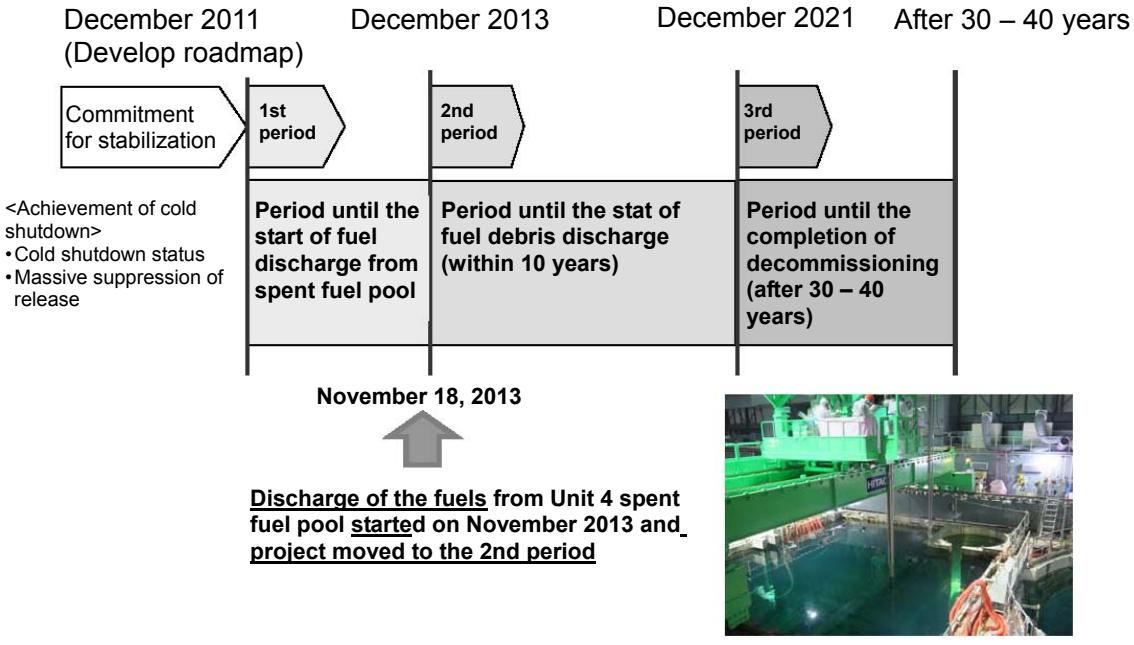
The "Current status of investigation on issues not confirmed / not settled in the Fukushima Nuclear Accident" as of 4th Quarter is described in "Reference" at the end of this report.

1. Progress of safety measures at each NPS

1.1 Fukushima Daiichi NPS

(1) Fuel removal from Unit 4 spent fuel pool

Fuel removal from the spent fuel pool on the top floor of reactor buildings in Units 1-4 is one of the most important missions to decrease the risks from Fukushima Daiichi NPS.
In Unit 4, removal of the fuels stored in the spent fuel pool adjacent to the nuclear reactor initiated on November 18 of last year, and we moved to the 2nd period of the mid-/long-term road map for decommissioning.
The removed fuels are transferred to the "shared pool" in the different building on site for centralized storage management. Among the 202 new fuels and 1,331 spent fuels accommodated in the spent fuel pool, we have completed the removal of 22 new fuels and 528 spent fuels as of March 31, this year. Completion of the fuel removal work is planned for the end of 2014.
We sufficiently prepared the equipment before starting the removal work, including the construction of fuel handling equipment, cranes for cask transport, and the gantry to support the cranes as permanent equipment.
While fuel removal in itself is a familiar operation carried out routinely in the past, it is necessary to be prepared for new situations associated with the contaminated site environment as well as to eliminate rubble. Therefore, careful preparations were made, including improvements in the operational skill level through repeated training using mock-up equipment.
Considering the anxiety and concern for the process expressed inside and outside the organization, sufficient time was spent on the safety review by a review team including external advisors, and the necessary improvement measures were taken to address any matters of concern pointed out in the review.
The smooth progress of our removal process to date is largely attributable to the aforementioned thorough preparations.
We are committed to respond to the interest of the general public in the fuel removal work through a series of communications including the following: The progress of the work has been communicated to the outside by video clips that are easy to understand as they are made full use of CG. On every Monday, progress of the fuel removal is announced via the company website.



(2) 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, urgent and thorough improvement of the situation is imperative. We have reinforced our organization (Contaminated Water / Tank Countermeasure Headquarters were established) and implemented various countermeasures. The main countermeasures include:

- Thorough risk identification and organization level reinforcement of risk management through implementation / establishment of countermeasures
- Improvement of the working environment by further reflecting the opinion of site workers
- Input of resources of the entire company and positive introduction of domestic and international knowledge and expertise
- Further improvement of safety awareness and nurturing / reinforcement of on-site capabilities

These countermeasures are further promoted vigorously by the Fukushima Daiichi Decommissioning Promotion Company established in April of this year.

Details of activities of Contaminated Water / Tank Countermeasure Headquarters (Announcement as of March 26, 2014)		
1	Underground water research analysis	• Acquisition of underground water data • Flow analysis of radioactive materials in underground water
2	Sea water research analysis / Impact assessment	• Flow analysis of sea water • Installation of sea water monitor outside the harbor
3	Contaminated Water / Tanks comprehensive risk management	• Development of contamination water leakage risk map • Development of additional countermeasures (Preventive / Multi-layer)
4	Urgent countermeasures	• 4m ground improvement • Construction of trench on east side of the building • Construction of underground drain channels / Change of channel route • Water sealing wall on sea side
5	Review of various contaminated water countermeasures	• Installation of underground water bypass equipment • Restoration of sub-drain equipment • Waterproofing wall on land side • Processing of accumulated water • Water sealing of buildings
6	Confirmation of efficacy of countermeasures / flow analysis	• Prediction based on analysis model • Underground water investigation
7	Review of long-term countermeasures	Disposal of removed tanks after tank replacement
8	Reinforcement of tank operation	• Leakage monitoring (Patrol) • Leakage monitoring (Installation of Water level gauge) • Leakage monitoring (Operation of rain gutter etc.)
9	Tank construction management	• Tank construction
10	Tank reliability improvement	• Increase of bank height around tanks • Installation of rain gutter on tank top • Monitoring of drain channels
11	Reinforcement of contaminated water processing	• Operation of Advanced Liquid Processing System (ALPS) (existing) • Installation of Advanced Liquid Processing System (ALPS) (high performance) • Installation of Advanced Liquid Processing System (ALPS) (addition)
12	Public relation	• Reinforcement of information communication to domestic and international audiences
13	Reinforcement of mobility Horizontal deployment with emphasis on actual place, actual object and actual fact	• Compilation of improvement plan for reinforcement of quality control / trouble countermeasures / enhancement of equipment reliability

The progress of the urgent safety measures announced on November 8, 2013, was as below:

1. Thorough Improvement of working environment for accelerated progress of on-site works and improved reliability	
Work safety	○ **Decontamination of plant site is currently in progress** to decrease exposure of workers Targeted radiation level in the plant site **within 2 years** (by the end of FY2015): Decrease to **5μSv/h on average**. (→See figure below) ○ Removal of 24 out of 25 vehicle debris scattered on the seaside of Units 1-4
Office building • Rest lounge	○ **New office building** (for employees＋subcontractors) currently under construction. Planned completion in June – September 2014. ○ On-site **Large rest lounge (Capacity: 1200 people)** is under construction. Temporary rest space (Capacity: 1000 people) has been constructed. ○ **On-site meal supply center** is under construction.
Working environment of workers	○ **Review of Contract Work Order System** including the application of long-term contract with giving consideration to the assurance of mid-/long- term workforce.
2. Management / System reinforcement for assurance of safety / quality	
Organization	○ Marshaling / Reinforcement of organizations related to countermeasures for contaminated water / tanks • **Inauguration of Fukushima Daiichi Decommissioning Promotion Company** on April 1, 2014
Manpower	○ **Reinforcement of workforce for contaminated water / tank counter measures** based on the system to input entire workforce inside and outside the company **(Increase of 220 people)** • Staffing from in-house divisions (Thermal Power Division, Transmission Division, Civil Engineering Division, Distribution Division etc.) and the group companies (Approx. 130 people) • Staffing from other electric companies (Approx. 20 people) • Rearrangement from Fukushima Daiichi NPS, Fukushima Daini NPS and Kashiwazaki Kariwa NPS etc. (Approx. 70 people) *Breakdown of manpower reinforcement (1) Tank installation / replacement: Approx. 110 people (2) Tank patrol :Approx. 60 people (3) Safety / Quality management : Approx. 30 people (4) Dose control (including analysis staff) :Approx. 20 people
3. Permanent installation of equipment	
○ **Staged implementation of permanent installation** for power supply equipment and on-site infrastructure equipment etc.	
4. Storage plans / countermeasures for appropriate control of contaminated water	
○ Arrangement of level meter to all number of flange-type tanks completed. ○ **Replacement with weld-type tanks** started in March, 2014. ○ **Installation of additional contaminated water tanks.** ○ **Installation of additional number of Advanced Liquid Processing System (ALPS) currently in progress.**	

[Reference: Schematic illustration for expansion of 5μ Sv/h area]

End of FY2013 | End of FY2014 (Prediction) | End of FY2015 (Prediction)

* Area of approx. 5μ Sv/h is marked with

Area I: Area in vicinity of Units 1-4 with particularly high dose
Area II: Area partially covered with planation and woods
Area III: Area where equipment is installed / planned to be installed
Area IV: Area already paved (road, parking space etc.)
Scope to which policy for on-site dose reduction is applicable

(3) Evaluation from outside

[Advisors of the International Research Institute for Nuclear Decommissioning]

◎Migration analysis of nuclides in radioactive materials

- Basic model should be established as early as possible. It is necessary to trace changes, because the underground water flow will change when various countermeasures (underground water bypass, water sealing wall, etc.) start.
- A map to indicate the contamination of underground water should be developed to understand the entire situation and trend analysis should be carried out to understand the phenomena.

◎ Overflow problem from contaminated water storage tank

- An objective risk evaluation should be carried out and a management system should be introduced.

◎All β and strontium measurement problem

- This problem should have been detected earlier by positive use of external organizations.
- To ask cross check, utilization of universities in Japan and foreign countries, etc. shall also be examined in addition to JAEA.

【Nuclear Reform Monitoring Committee】

・Because the type of required work is totally different between Fukushima Daiichi NPS and Kashiwazaki Kariwa NPS, different type of management is necessary in terms of nuclear safety. In Fukushima Daiichi NPS, external experts from overseas with affluent experiences of decommissioning / contaminated water countermeasures should be used positively.

・With regard to the fuel removal from Unit 4, signs of improvement in safety culture are observed, including the voluntary review before starting full-scale work. In the future as well, the work must proceed prudently and carefully with the highest priority given to safety, and information about the progress made must be communicated domestically and internationally in a transparent manner.

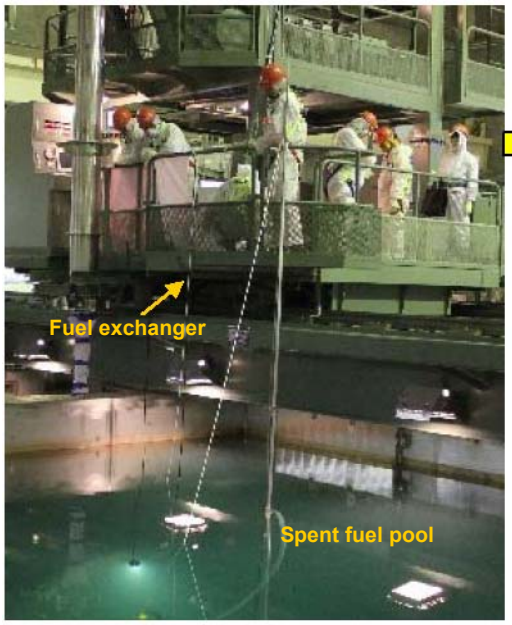
・It is a great progress that the working environment has been improved in Fukushima (meals, equipment, transportation means, etc.).

1.2 Fukushima Daini NPS

(1) Preparation for fuel transport in Unit 1

In Fukushima Daini NPS, the fuels in the reactor are planned to be transported to the spent fuel pool for centralized management from the standpoint of simplified maintenance management. Currently, the preparation is ongoing in Unit 1. As a part of this procedure, the inspection of racks (spent fuel storage rack) for the storage of spent fuels transported from the reactor took place during the period from March 3 to March 6 this year, and it was confirmed that the racks are sufficient to accommodate the fuels safely.

The inspection was conducted in the following procedure: An underwater camera was hung from the fuel exchanger above the pool and the images of the spent fuel rack and fixing bolts were recorded. These images were inspected by work supervisors. While extraneous substances such as hooks with wires were discovered in the pool during the inspection, all of them were collected (Announced on March 18, 2014). Preliminary inspections will take place also for other equipment related to fuel transport.



Hanging down a subwater camera from the fuel exchanger

Spent fuel storage rack accommodating the fuel assemblies

A work supervisor confirms the images

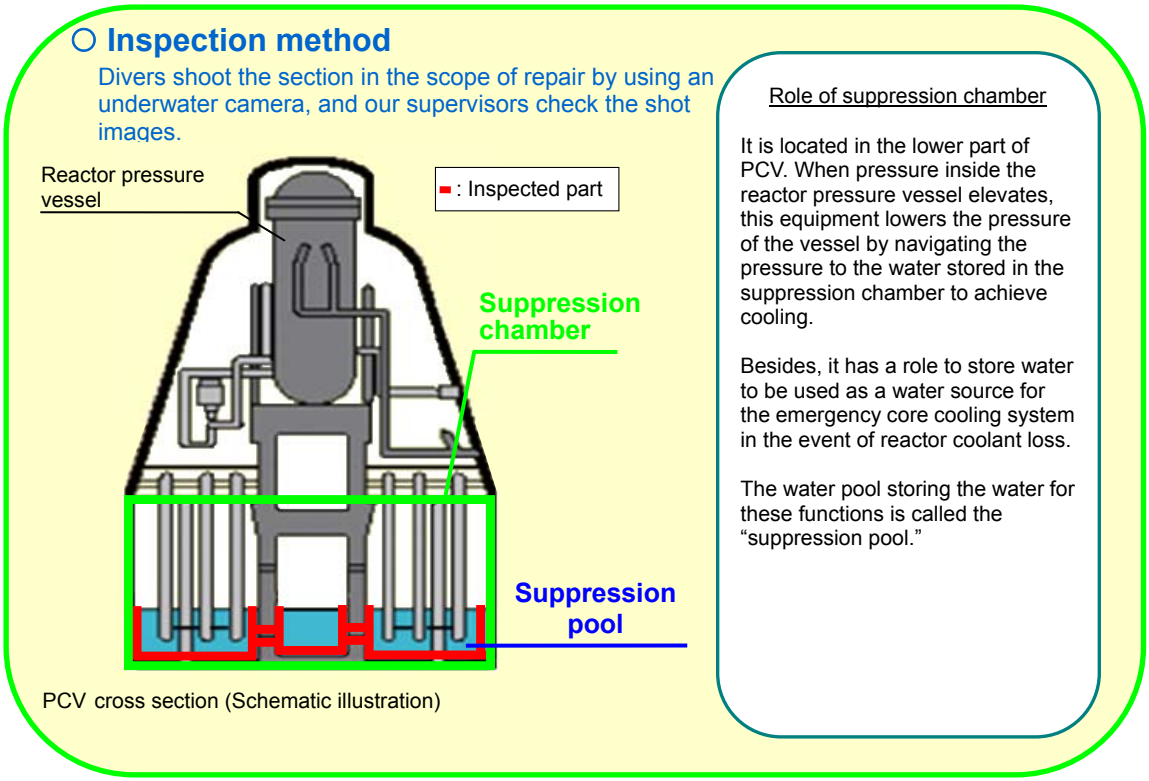
(2) Inspection of PVC suppression chamber in Unit 4

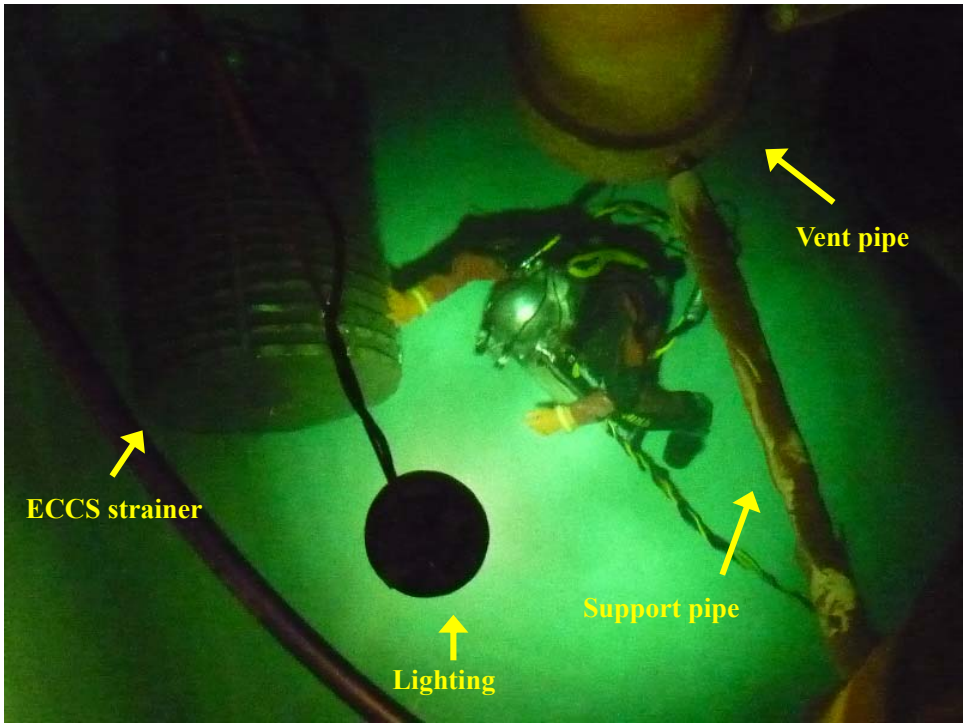
Fukushima Daini NPS maintains the stable status of cold shutdown as continued, currently. The inspection and repair of PVC suppression chamber in Unit 4 was recently completed. Because elevation of pressure was observed in Units 1, 2 and 4 in Fukushima Daini NPS during the earthquake disaster, steam inside the reactor was evacuated to the pressure suppression chamber located in the lower section of PVC.

At that time, the temperature of the chamber elevated to the very high level (above 100℃), the evaluation was carried out by using Unit 4 as a typical case (Possibility of Unit 1 and Unit 2 evaluations is in review separately based on the result of the current evaluation).

Visual inspection was carried out in February and March last year on each equipment of the chamber as well as a part of walls and floors in vicinity by using an underwater camera. The inspection revealed rust and detached coating on some parts of the observed surfaces. Based on the results of previous inspections, visual inspections using an underwater camera were carried out from January 20 this year by expanding the scope of inspection to the entire part of the walls and floors of the underwater section (suppression pool) in the chamber. The inspection was completed on February 21. Meanwhile, the detachment of

coating observed in the current inspection was repaired.





Checking of the Unit 4 suppression pool
(Photographing: February 17, 2014)

(3) Approaches to severe accidents (Reinforcement of power supply by deployment of power source vehicles, etc.)

Based on the experience of the total blackout accident in Fukushima Daiich NPS during the earthquake disaster, 9 power source vehicles and 2 sets of large capacity gas turbine generator vehicles are deployed to ensure the necessary power to maintain cooling of the reactors and spent fuel pools.

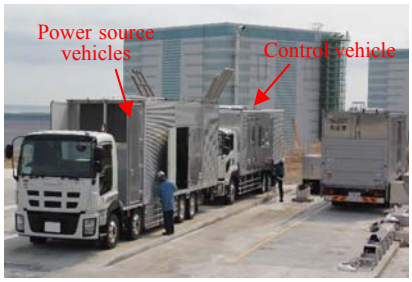
In the event of power shortage, the power source vehicles are moved to the space close to the plant to be used for power source of pumps supplying water to the reactor, etc.

Gas turbine generator vehicles are arranged on the hill (approx. 46m above sea level) being connected with each plant via cables. They are used for applications requiring a relatively large amount of power, such as the systems to maintain reactor cooling. Generators, etc. are boarded on a truck to ensure mobility so that the equipment can be transported whenever necessary. Besides, underground tanks to accommodate fuels for approx. seven days are deployed on the hill.

Pulling out cable from power source vehicle

Actuation operation of gas turbine generator vehicle

Power source vehicle : Power generation capacity (500kVA) is equivalent to power consumption of approx. 160 households.



Gas turbine generator vehicle:
Power generation capacity (4,500kVA) is equivalent to power consumption of approx. 1,500 households.

Training by using power source vehicles and gas turbine generator vehicles

(4) Improvement of fire extinguishing skills through fire drills using fire engines

Based on the experience of Niigata Chuetsu-oki Earthquake in 2007, we perform drills periodically centered on the in-house fire brigade so that we can take prompt initial phase actions in the event of fire. Fire fighting equipment has been arranged on site (2 fire engines, fireproof suit, air bomb etc.) so that we can carry out the fire extinguishing activities securely.

On March 19 this year, a fire drill was conducted to improve the fire extinguishing skills of the in-house fire brigade as a joint effort with Tomioka Fire Station. About 40 power station employees participated in the drill. The drill started from the report of fire (simulated telephone call via 119) by a reporter who discovered the fire. A series of fire extinguishing activities were simulated from dispatch of fire engine to the water injection by the in-house fire brigade. By performing this drill in collaboration with Tomioka Fire Station, training much closer to the actual situation could be achieved. The drill will also be repeated in future to improve judgment and take the appropriate action based on the situation.

Initial phase fire extinguishing drill using fire extinguisher
(in-house fire brigade)

Fire extinguishing drill
(in-house fire brigade)

Fire extinguishing drill
(Tomioka Fire Station)

Debriefing meeting by Tomioka Fire Station

(5) Support of decommissioning work in Fukushima Daiichi NPS

Fukushima Daini NPS is engaged in the support of decommissioning work for the Fukushima Daiichi NPS.

In FY2013, patrol of contaminated water tanks and pilot operation of decontamination robots (implemented in Fukushima Daini NPS) were carried out. Besides, we were engaged in a series of radiation control procedure including on-site radiation measurement and sample analysis, assistance to weld inspection associated with the additional installation of contaminated water tanks, supports to fuel removal work from Unit 4 spent fuel pool and the shift attendance.

Supports by Fukushima Daini NPS to help Fukushima Daiichi NPS overcome its challenges, more employees can participate in the decommissioning work and support very demanding on-site works.

We are committed at all levels to do our best in the steady performance of decommissioning works going forward as well.

1.3 Kashiwazaki Kariwa NPS

(1) Implementation of various training sessions

In Kashiwazaki Kariwa NPS, various drills are conducted repeatedly to make the power station safer based on the lessons learned from the accident in Fukushima Daiichi NPS. Since the Fukushima nuclear accident, comprehensive drills were conducted 22 times. In addition, individual drills based on the assumption of various emergency situations (night time, snow weather, etc.) were carried out about 2,740 times in total by the end of March this year.

Rubble removal training

Gas turbine generator cars operation training

Satellite communication car operation training

(2) Implementation of safety countermeasures

Based on the lessons learned from the Fukushima Nuclear Accident, Kashiwazaki Kariwa NPS has been engaged in various safety countermeasures to prevent floods caused by the Tsunami, security of power source and cooling functions, and the measures to prevent the accident from spreading. The lessons learned, implemented safety countermeasures, as well as their progress status are described below:

[Lessons learned from the Fukushima Nuclear Accident]

- Preparedness against Tsunami was insufficient → ①
- Means to address power recovery, water injection to reactor and reactor cooling in the event of total blackout were insufficient → ②
- There has been no sufficient means to reduce emission of radioactive materials and hydrogen generated in the event of reactor damage → ③

① Prevents flood caused by Tsunami

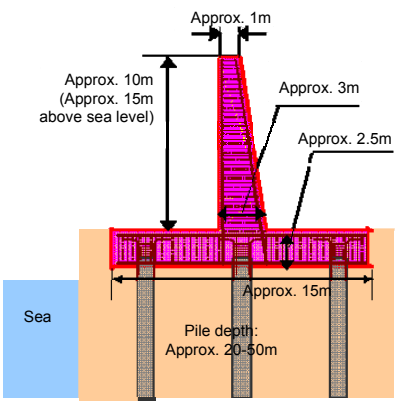
Estimated Tsunami height :Max.6m at water inlet of NPS (Max. 8.5m for level elevation)

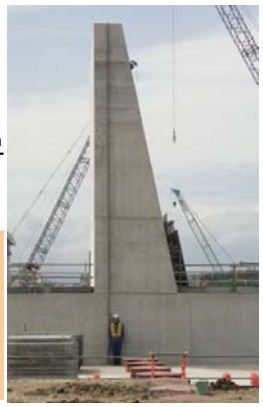
Revised from conventional 3.3m based on concept of new regulation standard came into force in July 2013.

In the event of Tsunami beyond estimation?

Tidal wall of 15m above sea level was constructed on sea side of the plant site.
The structure is different between Units 1-4 side and Units 5-7 side because of the different ground altitude.

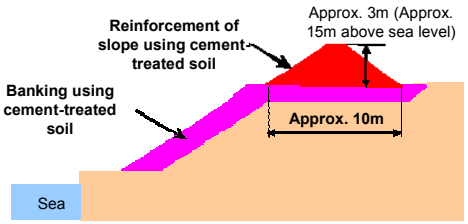
Tidal wall of Units 1-4 side





Reinforced concrete flooding embankment of approx. 10m height (approx. 15 m above sea level) was constructed on the ground of altitude 5m above sea level.

Flooding embankment of Units 5-7 side

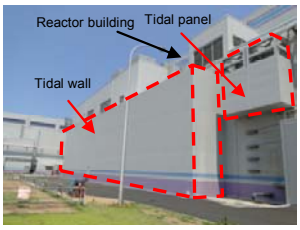


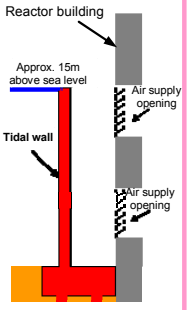
Flooding embankment of approx. 3m height (approx. 15m above sea level) was constructed by using cement-treated soil on the ground of altitude12m above sea level.

What if Tsunami exceeded the flooding embankment?

Even if the site is flooded, space inside the reactor building is protected from flooding.

Tidal wall / Tidal panel





Air supply ports on the side of reactor buildings are covered by tidal walls, and the structure was changed so that the air is supplied from the openings located higher than 15m.

What if the flooding occurs in the building?

Rooms accommodating important components are protected from flooding.

Water-tight door

Door of the rooms accommodating important components are protected from flooding by water sealing doors.

Waterproofing of pipe penetration

Water sealing treatment is performed by using silicon rubber material etc. on the sections where piping and cables penetrate the wall.

Even if the flooding cannot be prevented

② Power source and cooling function are secured

Multiple types of power source are available

As a countermeasure of situation where emergency power sources in the plant (external power source, emergency diesel generator) cannot be used, emergency high voltage distributors were installed. Then, air-cooled gas turbine generator vehicles that allow prompt power supply and multiple mobile power supply vehicles as their back-up were deployed on the 2 points of hill top (approx. 35m above sea level).

Air-cooled gas turbine generator vehicles (GTG)

Power is generated at hill top by rotating turbines using combustion gas from light fuel oil. This system is comprised of one control vehicle and one generator vehicle.

3 sets have been installed

Power supply vehicles

Power can be supplied from hill top to each reactor unit. It is also possible to supply power from the location closer to the reactor unit based on excellent mobility.

23 vehicles have been arranged

Emergency high voltage power distribution panel

Power is supplied to each unit from hill top.

Underground light fuel oil tank

Light fuel oil is stored in 3 tanks with capacity of 50000 L each dedicated for GTG

Diverse water injection and cooling means are available.

Diverse equipment and means for water injection to reactors and spent fuel pools have been secured.
(1) Water injection from existing pumps using emergency power source (2) Fresh water injection by fire engine
(3) Seawater injection by fire engine

Fire engines

Water injection to reactor etc. is possible even without power source.

42 vehicles have been arranged
(including 3 for fire extinguishing)

Alternative seawater heat exchanger

It serves as a substitute of component that cools down reactor coolant with seawater.

7 vehicles have been arranged

Reservoir

Fresh water reservoir of approx. 20000 capacity has been created to cool down reactors etc. in the event of emergency.

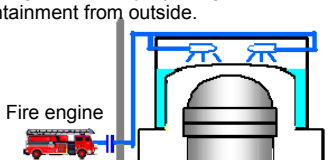
Even if an accident occurred

③ Escalation of accident is prevented

Hydrogen explosion and diffusion of radioactive materials are prevented.

Water filling equipment on containment top

Leakage of hydrogen is prevented based on reactor cooling achieved by injecting water on top of the containment from outside.

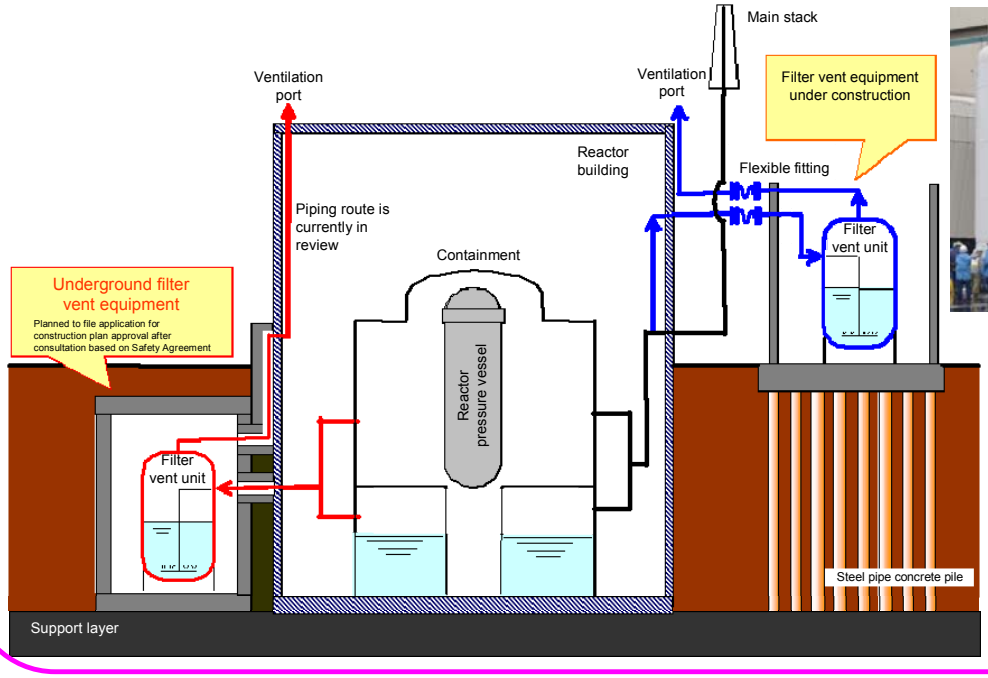


Hydrogen treatment equipment in reactor building

A system to decrease hydrogen concentration based on catalyst action without using electric power for the hydrogen leaked out from reactor containment into the reactor building.

Filter vent equipment

This system achieves significant reduction of soil contamination by eliminating 99.9% of the particulate radioactive substances (radioactive cesium) during the process of filtering out steam and hydrogen in the reactor containment to outside in the event of containment pressure elevation.



Filter vent unit

Accident response base is improved

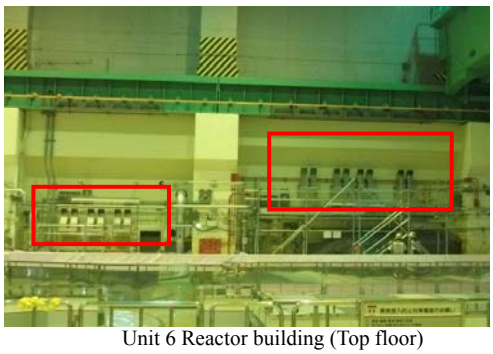
Improvement of important aseismic building

Emergency Response Room (at drill)

Because the important aseismic building installed based on the reflection of the Chuetsu-Oki Earthquake experience can reduce the shaking in the order of magnitude 7 to 1/3 – 1/4 level, it can serve as Accident Response Base in the event of accident.
Based on the lessons learned from Fukushima Accident, countermeasures are taken to prevent expansion of contamination inside the building and to protect workers from radiation exposure.

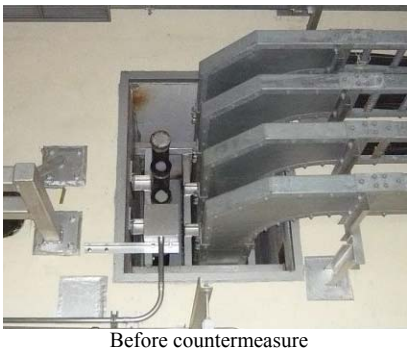
As the main progress in the 4th quarter, installation work for the vessel unit of the Unit 6 filter vent system[1] was initiated. Besides, installation of the hydrogen processing system[2] in the reactor building in Unit 5 and Unit 6 was completed.

Unit 6 Installation of filter vent unit



Unit 6 Reactor building (Top floor)

Unit 6 Reactor building hydrogen processing system



Before countermeasure

After countermeasure

Unit 1: Cable tray waterproofing measure (Improvement of reliability for flood prevention measure)

[1] 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.

[2] A system to decrease hydrogen concentration through binding with oxygen based on a catalyst action without using electric power for the hydrogen leaked out from reactor containment into the reactor building.

Implementation of Safety Countermeasures at Kashiwazaki Kariwa NPS

As of March End 2014

Item	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7
I. Installation of flooding embankment	Completed				Completed		
II. Flood prevention in buildings etc.							
(1) Installation of tidal wall (Including tide panel)	Completed	Completed	Completed	Completed	No opening exists below 15m above sea level		
(2) Water-tight door for reactor building etc.	Completed	In review	In review	In review	Completed	Completed	Completed
(3) Flood prevention measure for heat exchanger building etc.	Completed	Completed	Completed	Completed	Completed	-	
(4) Installation of tidal wall for switchyard*	Completed						
(5) Improvement of reliability for flood prevention countermeasure	Under construction	In review	In review	In review	Under construction	Under construction	Under construction
III. Further reinforcement of heat removal / cooling functions							
(1) Installation of water source	Completed						
(2) Installation of reservoir dam	Completed	In review	In review	In review	Completed	Completed	Completed
(3) Additional deployment of air-cooled gas turbine generator vehicles etc.	Completed						
(4)-1 Installation of high voltage power distribution panel for emergency use	Completed						
(4)-2 Installation of permanent cable to reactor building	Completed	Completed	Completed	Completed	Completed	Completed	Completed
(5) Arrangement of alternative underwater camera and alternative seawater heat exchanger	Completed	Completed	Completed	Completed	Completed	Completed	Completed
(6) Installation of high pressure alternative water injection system*	Under construction	In review	In review	In review	Under construction	Under construction	Under construction
(7) Installation of filter vent equipment	Under construction	In review	In review	In review	Under construction	Under construction	Under construction
(8) Installation of top vent equipment in reactor building	Completed	Completed	Completed	Completed	Completed	Completed	Completed
(9) Installation of hydrogen processing system in reactor building	Completed	In review	In review	In review	Completed	Completed	Completed
(10) Installation of equipment for filling water on containment top	Completed	In review	In review	In review	Under construction	Under construction	Completed
(11) Reinforcement of environment monitoring equipment / Additional arrangement of monitoring vehicles	Completed						
(12) Establishment of warehouse for emergency materials and equipment on the hill*	Completed						
(13) Aseismic reinforcement work for pure water tank on Ohminato side	-				Completed		
(14) Arrangement of concrete pump vehicles	Completed						
(15) Reinforcement of access road	Completed	-	-	-	-	-	-
(16) Environment improvement for aseismic important buildings	Completed						
(17) Reinforcement of the foundation of power transmission tower* / Aseismic reinforcement construction for switchyard equipment etc.*	Under construction						
(18) Installation of Tsunami monitor camera	Under construction						

* Countermeasures which are taken as voluntary actions in our company

(3) Current status of audit for compliance to the new regulation standard

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. Thereafter, a full-scale audit was carried out by Nuclear Regulatory Commission, and the review meeting was held on January 24, 2014, to discuss the geology and the geological structure of the plant site and its vicinity regarding Unit 6 and Unit 7. Further, the site investigation by Nuclear Regulatory Commission was conducted on February 17 and 18. We will take necessary actions so that the audit can be conducted in an appropriate manner.

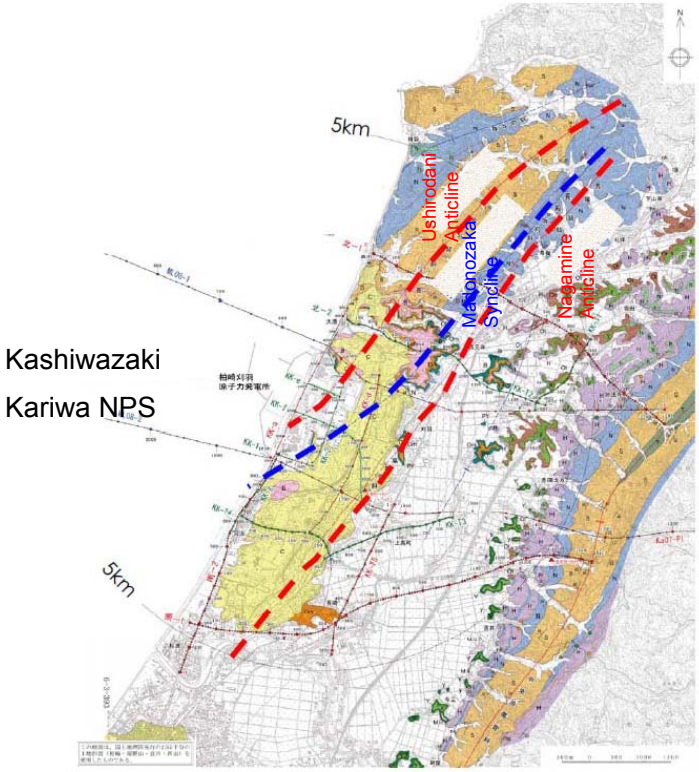
a. TEPCO's evaluation on geology and the geological structure of the plant site and its vicinity

① Geology / Geological structure in vicinity of plant site

Folding structures[3] are observed on Kashiwazaki Kariwa NPS site and its vicinity, where presence of three geological features (Ushirodani Anticline, Matonozaka Syncline, Nagamine / Takamachi Anticline) are observed. With regard to these folding structures, geological research was conducted including the seismic reflection survey[4] and the boring survey. The result demonstrated no dislocation or deformation in the stratum from middle to late Pleistocene Epoch covering the folding structure. It was also found that no activity after the late Pleistocene Epoch (120,000 – 130,000 years ago) was observed at least, while the activity after this period is regarded as an active fault. Based on this ground, we consider that these geological features are not active faults based on our evaluation.

[3] Folding is the deformation of stratum caused by force applied from side direction of the stratum that causes bending of the stratum. The protruding section of the bent stratum is called "anticline" and the trough section is called "syncline."

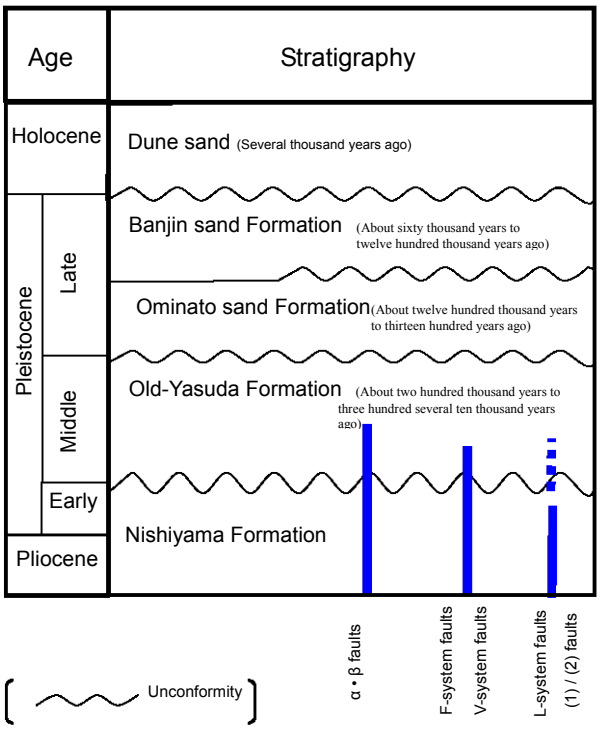
[4] Seismic reflection survey is the method to survey underground structure by generating artificial waves (vibration / sonic waves) on surface and measuring and analyzing waves reflected from underground.



Geology and the geological structure in vicinity of plant site

② Geology / Geological structure of plant site

In plant side, small faults are distributed including α・β fault and V-system fault of high angles as well as F-system fault and L-system fault of low angles. Based on the results of pilot boring and the boring survey carried out at reactor installation, after the Chuetsu-Oki Earthquake and the additional boring survey in last year, it was confirmed that these faults reached only to the Old-Yasuda Layer that precipitated during the mid-Pleistocene covering the faults and did not reach the Ohminato Sand layer (precipitated approx. 120,000 – 130,000 years ago). Because there is no geological activity newer than the completion of Old-Yasuda Layer precipitation (approx. 200,000 years ago), we consider that these faults are not active faults based on our evaluation.

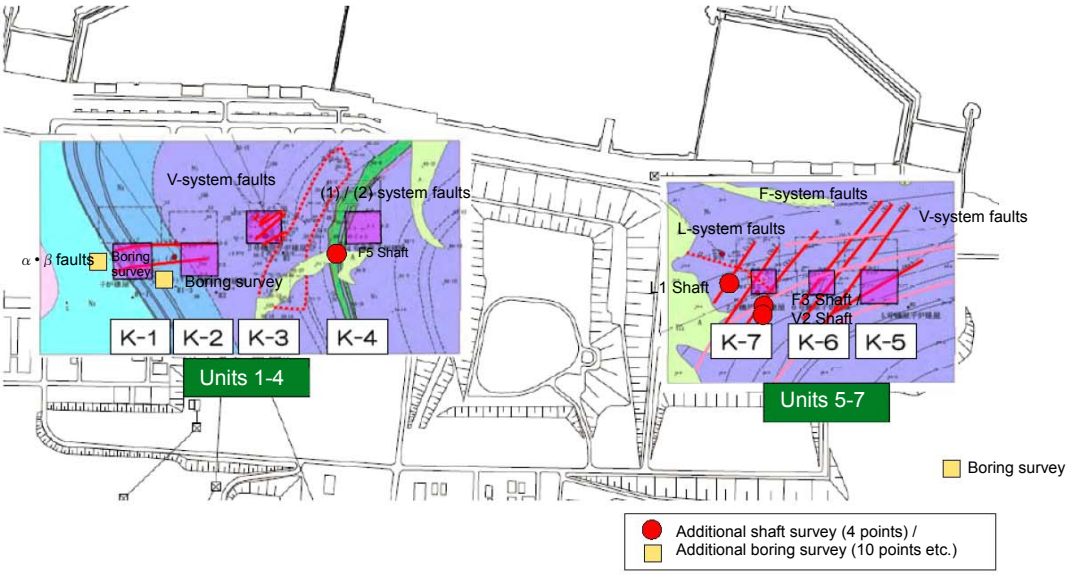


Order of strata in plant site and past evaluation

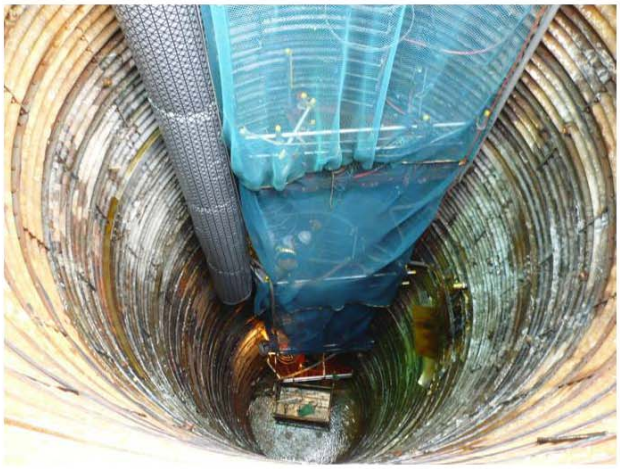
b. Additional geological survey

In the review meeting of Nuclear Regulatory Commission held on January 24, 2014, we were requested to submit additional data. Upon this request, we developed additional geological survey plan related to the activity of folding structure in vicinity of the plant site and the additional survey plan related to the direct confirmation of faults in the plant site. At the on-site survey by Nuclear Regulatory Commission on February 17 and 18, the contents of these plans were judged as mostly appropriate.

We will have elaborate consultation with the Nuclear Regulatory Commission about the additional survey and will ensure to obtain sufficient data.



Distribution of faults in plant site and additional geological survey plan



Additional boring of F3 shaft

(4) Evaluation from outside

【Nuclear Reform Monitoring Committee】

- Comprehensive drills as well as drills for individual equipment are conducted repeatedly as preparedness for emergency. Many improvements were observed based on the results of drills in the past.
- In future, it is necessary to implement drills under wide variety of conditions or those as joint efforts with external parties.
- Multi-layered safety countermeasures based on the lessons learned from the accident in Fukushima Daiichi NPS are promoted steadily and improvement of safety is observed.

2. Summary of important accidents / troubles in FY2013

2.1 Cause of accidents / troubles and their countermeasures

In FY2013, following accidents / troubles[5] followed in mainly in Fukushima Daiichi NPS.

A: Shutdown of spent fuel pool cooling due to power interruption caused by rodent. (Occurred on March 18, 2013)

B: Ground power fault during the work for preventing recurrence of power interruption caused by rodent. (Occurred on April 5, 2013)

C: Contaminated water leakage from underground water tank (Identified on April 5, 2013)

D: Detection of high density tritium from groundwater sampled from east side of turbine building (Announced on June 19, 2013)

E: Issue related to announcement of contaminated water discharge into nuclear plant harbor. (Announced on July 26, 2013)

F: Leakage of approx. 300 ton contaminated water from flange-type tank in H4 area tanks. (Identified on August 19, 2013)

G: Leakage of contaminated water from top plate of tank in B-South area (Identified on October 2, 2013)

H: Leakage from desalination device (reverse osmosis membrane apparatus) RO-3 in contaminated water processing system (Occurred on October 9, 2013)

I: Delay in announcement of Strontium 90 analysis result (Announced on January 8, 2014; Investigation result announced on February 5, 2014), and underestimation found (Announced on February 6, 2014)

J: Failure of Unit 2 reactor pressure vessel thermometer caused by applying inappropriate voltage (Occurred on February 18, 2014)

K: Leakage of approx. 100 ton contaminated water from top plate of tank in H6 area. (Identified on February 20, 2014)

L: Shutdown of Unit 4 spent fuel pool cooling due to damage on the buried cables. (Occurred on February 25, 2014)

M: Contamination of processed water tank in J1 area caused by elevated radioactive concentration at outlet water of Advanced Liquid Processing System (B) (Identified on March 18, 2014)

As systematic countermeasures to solve these problems, the following measures have been implemented:

◎ “Emergency Response Headquarters for Reliability Improvement at Fukushima Daiichi Nuclear Power Station”

On April 17, 2013, the “Emergency Response Headquarters for Reliability Improvement at Fukushima Daiichi Nuclear Power Station” was established head by our president as CNO. The H.Q. understands the equipment risks based on thorough field investigation, narrows down the problems associated with operation management, review countermeasures, determines priorities and implements them in a systematic manner.

[5]For details of individual accidents / troubles and specific description of countermeasures, please refer to TEPCO website: http://www.tepco.co.jp/index-j.html

We will carry out further equipment improvement such as the provision of protection to piping and cables systematically also in FY2014.

◎ "Countermeasure Headquarters for Contaminated Water / Tanks"

On August 26, 2013, “Countermeasure Headquarters for Contaminated Water / Tanks” direct reporting to the president was established. This is the framework to reinforce the organizational power and to achieve project management based on clearly defined purposes / objectives, scope and schedule for each team under the guidance / advice of project management leaders.

This system serves as a basis for improving the current status without being disturbed by “conventional framework (awareness of limit).” By positive use of its organizational power, general risks related to the contaminated water issue were identified and preventive, multi-layered countermeasures are implemented steadily.

○Thorough risk identification and organization level reinforcement of risk management through implementation / establishment of countermeasures

・Decrease of exposure dose during the fuel removal work from Unit 4 spent fuel pool

Shields were installed and average exposure dose was decreased by approx. 56%.

The exposure dose on fuel exchanger trolley was decreased by approx. 55% from 0.055mSv/h to 0.025mSv/h.

○Improvement of the working environment by further reflecting the opinions of site workers

・Drastic improvement of working environment for smooth operations on site and improved reliability

Decontamination in plant site: Decontamination of south area of plant site targeting for 5μSv/h on average

Tree trimming, removal of surface soil, replacement of soil layer and asphalt paving are currently in progress.

Installation of new office building and large rest lounge

Increase of premium for wages of site workers

○Input of resources of entire company and positive introduction of domestic and international knowledge and expertise

・Reinforcement of workforce for countermeasures based on the system to input entire workforce inside and outside the company (Increase of 220 people)

○Further improvement of safety awareness and nurturing / reinforcement of on-site capabilities

・Establishment of “Safety Management Function” to control safety and quality management

◎ "Fukushima Daiichi Decommissioning Promotion Company"

Both of these headquarters were absorbed in “Fukushima Daiichi Decommissioning Promotion Company” on April 1, 2014. However, their functions have been succeeded as reinforcement of project management system based on the consolidation of the head office and the jobsite.

To appropriately address diverse challenges associated with decommissioning works, the top management of the Company will indicate the specifications of project purpose, goals and outcome based on “Projection Definition Document” with the purpose to clearly identify the responsibility and the scope of responsibility for each project.

Further, with the purpose to allow the assignment completion system to work effectively based on cross-functional project, the Company President will nominate “project

managers" who promote their project on their own responsibility by managing / coordinating schedule, risks and budget to achieve project objectives as a separate organization from other sections or groups that are managed on equipment basis.

◎ Company level support system

Among aforementioned approaches, with regard to Emergency Response Headquarters for Reliability Improvement at Fukushima Daiichi Nuclear Power Station and Contaminated Water / Tank Countermeasure HQ, site investigation have been conducted by a multifunctional site investigation team comprised of Transmission Division, Distribution Division, Construction Division and Thermal Power division depending on the type of targeted equipment with the purpose to identify the residual risks on Fukushima Daiichi site.

Further, since September last year, reinforcement of manpower (220 people) for contaminated water countermeasure was implemented. Among these, approx. 130 people from in-house divisions (Transmission, Distribution, Construction and Thermal Power) and subcontractors have been input to support Nuclear Power Division.

In this way, decommissioning of Fukushima Daiichi NPS has been implemented as an entire company project and this system has been succeeded even after the establishment of Fukushima Daiichi Decommissioning Promotion Company to promote this initiative as a concerted effort of entire company functions.

2.2 Root causes of accidents / troubles

People in Fukushima Daiichi NPS are faced with unprecedented challenges to decommission multiple reactors at the same time under the severe environment of high radiation dose. For 1 -2 years immediately after the accident, works were implemented under the emergency situation, where many kinds of new equipment were brought in and people were engaged in various types of works in rather confused manner. Due to this reason, we were not allowed have sufficient time to carry out adequate design review for new equipment or adequate training to be familiar with equipment operation.

In FY2013, after two years from the accident, we were supposed to be departed from the chaotic situation and get back to the ordinary safety control level for the nuclear facilities. Nevertheless, the aforementioned successive accidents and troubles disturbed our smooth rehabilitation.

The contributing factor common to all of these accident troubles is the failure to take appropriate actions based on the observation of actual place, actual object and actual fact, which resulted in insufficiency of management.

With regard to the root causes that disturbed sufficient control, we analyzed the factors from thee viewpoints "safety awareness," "technological capability," and "ability to promote dialogue," as we consider that the deficiency in these three factors are the root causes for inability to prevent the Fukushima Nuclear Accident. The analysis result showed that similar problems were observed respectively as described below (Attachment 1, Attachment 2).

"Safety awareness"

In the Fukushima Daiichi site, people have no room to get back to the ideal working mode being trapped by severe working environment and emergency-base integration of equipment with being challenged by time limitation after the accident. However, the

managements and the nuclear power leaders[6] could not terminate the vicious cycle of time-spurred operation further aggravated by repeated accidents / troubles. Therefore, we should have discarded our compromised "safety awareness" ("Because Fukushima Daiichi is under special situation, we have to be satisfied with lower level of safety than other ordinary nuclear facilities) earlier by enhancing the "safety awareness" of individual workers as well as the entire organization.

"Technological capability"

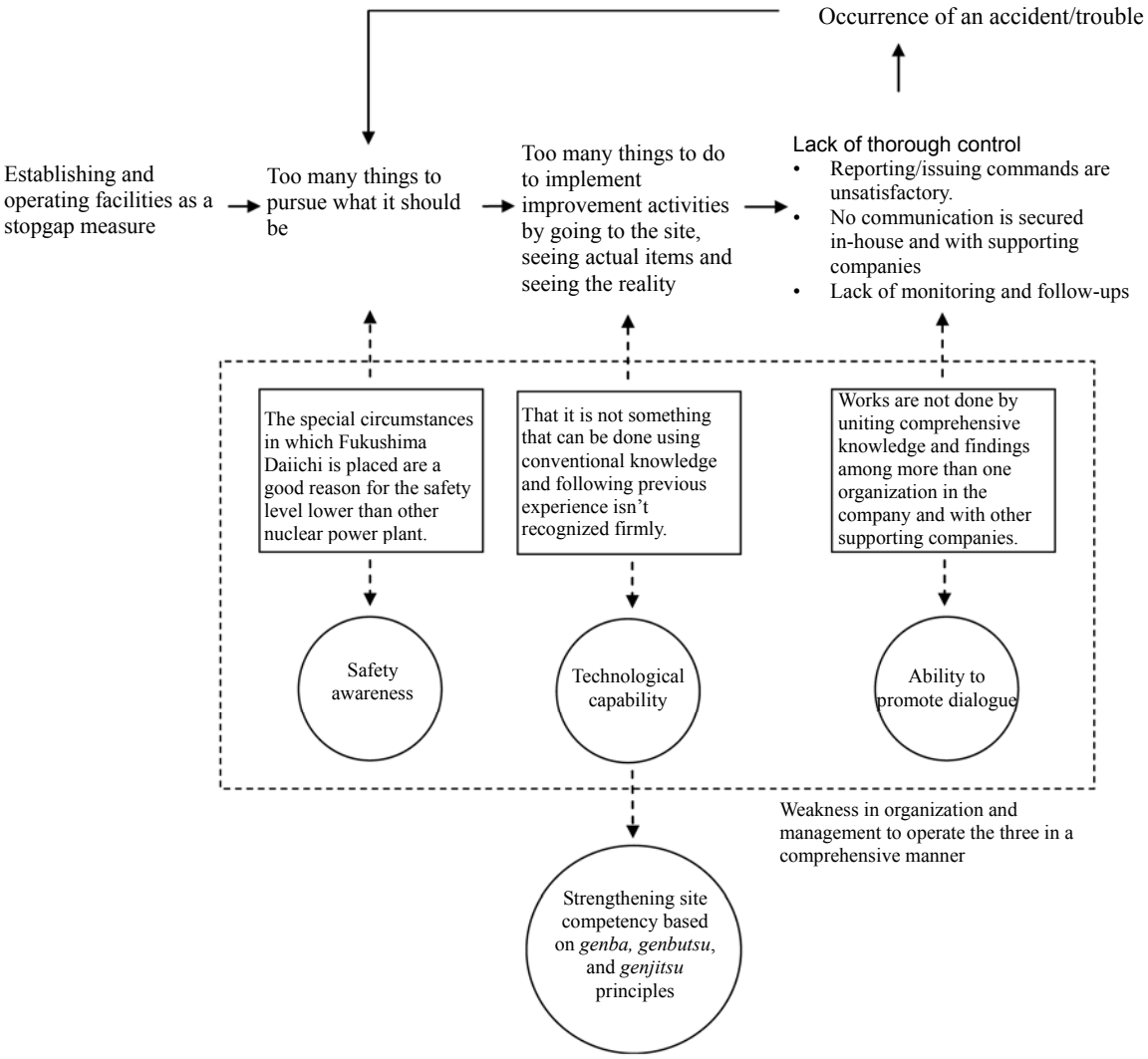
Unlike the works in ordinary power stations where the equipment is maintained in optimal status, people working in Fukushima Daiichi NPS are engaged in the decommissioning under unprecedented conditions as a result of extraordinary experiences including hydrogen explosion of the reactor building and discharge of radioactive materials, external cooling, and generation of contaminated water. Besides, it is not allowed for workers to use their knowledge nurtured in long experiences in the construction and power station operation, because it was necessary to install the temporary equipment rapidly.

On account of this, the reality is that many new makeshift facilities have been brought in, and many intricate tasks are being performed under the pressure of meeting work schedules.

It is essential to have a clear awareness that the equipment currently under construction or in operation cannot be sufficiently addressed by conventional knowledge or experience. It is needed for individual workers to exert their "on-site capabilities" by faithfully following the basic principles upon clear observation of "actual place, actual object and actual fact" depending on the extraordinary working environment of Fukushima Daiichi NPS.

This cannot be done overnight. A steady company level commitment is imperative.

6 Executive directors, management officers in charge of nuclear power, President & CEO of Fukushima Daiichi Decommissioning Promotion Company, Superintendent of Fukushima Daiichi Stabilization Center (until March 31, 2014), superintendents of NPS, Construction managers, people in general manager position or upper level in charge of nuclear power (except fellows) in the head office (Corporate) and the Fukushima Daiichi Decommissioning Promotion Company.



Analysis for root causes of accidents / troubles

"Ability to promote dialogue"

A lack of discussion skill has been pointed out as one of the root causes of Fukushima Daiichi Nuclear Accident on our side. Insufficient discussion skill is perceived as the cause of "Safety Myth" generation, which general public was forced to believe. To address this problem, we are trying to establish an attitude to disclose all risks from the viewpoint of general public and to make explanations easy to understand by general public.

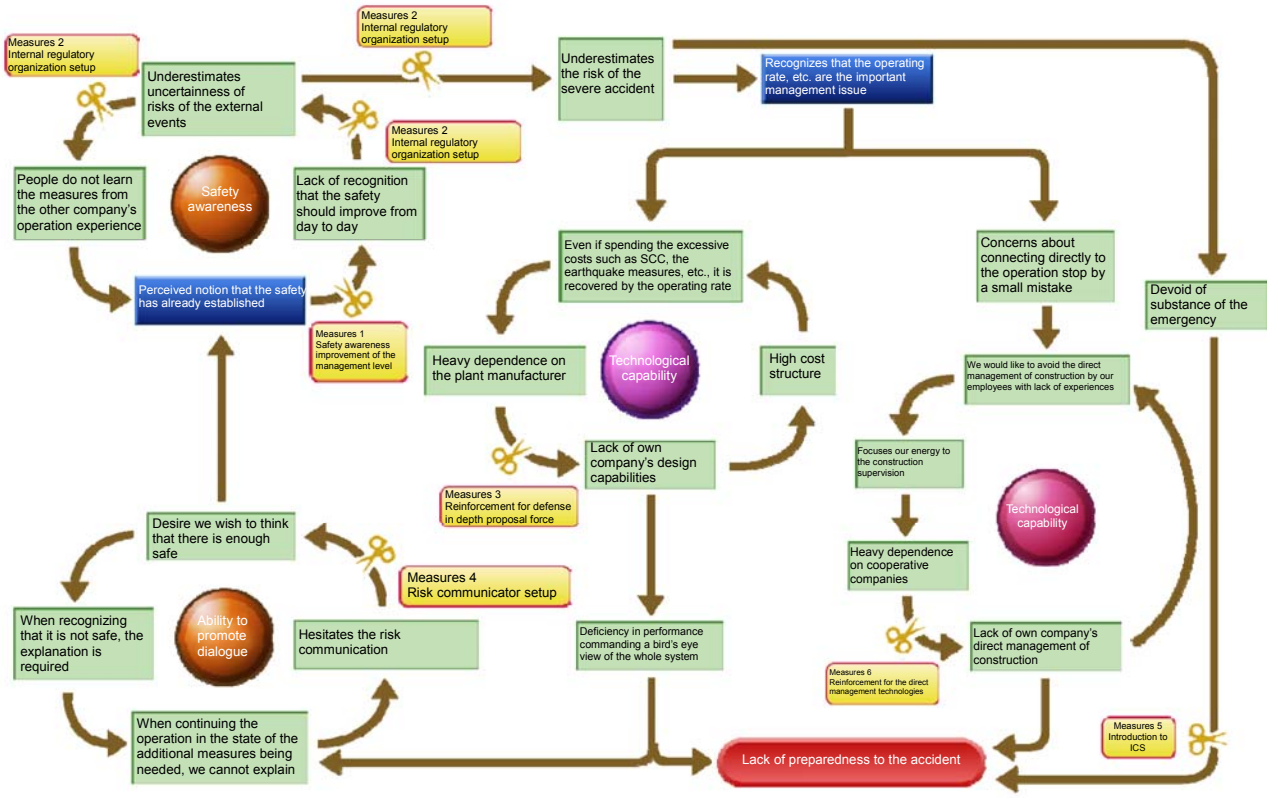
Looking back the accident troubles in Fukushima Daiichi NPS, it was obvious that the discussions among intra-company functions as well as those with subcontractors were insufficient in addition to the insufficiency of communication with external parties.

In the Fukushima Daiichi jobsite, the new types of equipment are incorporated and people from inside and outside the organization need to join for workforce consolidation to address the situation that changes day by day. To address such a situation, it is imperative to have adequate "ability to promote dialogue" so that sharing of knowledge and findings as well as close relationship in addressing assignment could be established among multiple organizations including subcontractors. However, we failed to establish this culture.

3. 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 as "Implementation of the 4th quarter", "Self- evaluation in fiscal year 2013" in the respective fiscal year 2013 by every 6 measures in order to cut off "Negative chains" , so to speak, which facilitates the structural problem which the nuclear power division has. Furthermore, the attached document 3 shows the evaluation and the problem of the specific action plan of the measures 1-6.

Shutdown of "Negative chain," in which preparedness for the accident lacked



3.1 Countermeasure 1: Reforms from the management level

(1) Implementation of the 4th quarter

- "360 degrees evaluation regarding the action index" (Evaluation target period: Oct. 1 – Dec. 31 last year) against the nuclear power leader was carried out in January this year. The action observation results by superiors, co-workers and subordinates were collected and summarized, and they were feed backed to principal so as to recognize the gap of the action index and the principal awareness.
- The group discussion by the nuclear power leaders was implemented on February 17. They declared each "Commitment against the nuclear safety" as an output. The major commitments are as follows.
  - Points out the direction to move forward explicitly, and accelerates its movement or continuously improves.
  - Becomes the nuclear operators having the world highest safety awareness, technological capability and ability to promote dialogue force by continuing to heighten the safety level on a daily basis.
- Followed by commitment by the nuclear power leaders, the group discussion by the level of management and each group over from February to March was implemented sequentially, and all staff members of the nuclear power division carried out the

commitment against the nuclear power safety. The main commitments are as follows.

- When taking on the operation, we practice prioritizing the safety taking the attitudes of asking questions and the attitudes of learning after having been strongly aware of without forgetting the aspects of the safety always.
- Being aware that each person's operation connects to the nuclear power safety, we address the operation bearing responsibility.

➢ The direct dialog with the level of management and each electric power station middle management was started from February. In the direct dialog with the nuclear power management level and the middle management, there were opinions as follows;

- The fact of "Reading" and "Understanding" the "Nuclear safety reform plan" is different in level. At this time, the understanding made progress by listening to the explanations having taken time from the nuclear management level anew, but we wanted to have been implemented early on.
- If we fail, we are exposed to criticism. We keep aloof to challenge because of this.
- We understand that nuclear power safety reform is important, but we are uncertain how we can fit for the business plan since the relationship between the reform plan and own business is thin.
  We want support by the special task force secretariat for the nuclear power reform.

The above opinions are coming out, and we will address focusing on as the points to be improved.

➢ We implemented (March 28) the training (Nuclear disaster prevention of Fukushima Daiichi, etc.) to heighten knowledge regarding the safety necessary for the nuclear power leaders toward the target person of the decommissioning reactor promotion company.

(2) Self-evaluation in fiscal 2013

From April onward, we implemented the activity to create the common recognition through the discussion among management level and nuclear power leaders about the summary of the Fukushima Nuclear Power Accident. In addition, we implemented the training for the knowledge acquisition regarding the nuclear disaster prevention and for learning the technique of the safety culture self-assessment by IAEA.
As a result, the discussion among management level and nuclear power leaders became active than ever before, but it has not yet reached to the improvement of the safety awareness of the whole organization.
As the cause, the thorough discussion lacked about "Nuclear power safety reform plan" and the relationship of the background and the safety awareness of the accident troubles occurring repeatedly at the Fukushima Daiichi, technological capability (Field site power) and the ability to promote dialogue among the nuclear power leaders.
Further, the expectation matters in order for the safety culture improvement have not been explicitly transmitted toward the whole organization from the management level and the nuclear power leaders.

3.2 Countermeasure 2: Monitoring/support reinforcement to the management level

(1) Implementation in the 4th Quarter

- The nuclear power division attempted for improvement against the improvement proposal issued from the Nuclear Safety Oversight Office in January this year in terms of the fuel removal from the spent fuel pool of the Fukushima Daiichi Unit 4 and management. To be more specific, we installed the additional shield in the fuel removal working area, and performed improvement for reduction of exposure. In addition, as far as the proposal regarding the management is concerned, we are executing improvement for the direct dialog between the middle management and the nuclear power management level, and the activation of the meeting body (The Nuclear Power Generation Security Safety Committee, the Nuclear Power Risk Management Meeting, etc.), which holds discussions regarding the safety.
- On March 7, we reported the contents which we observed and evaluated for the past half a year to the board of directors meeting from the Nuclear Safety Oversight Office General Manager. The main contents are as follows.

  At present, "Germination" of improvement in many fields is going to be seen, but there is still alienation available with the world top class nuclear power safety, there are lots to be done continuously.

  a. The framework to manage the safety in the Fukushima Daiichi has not yet defined, and the prioritizing of the work regarding the safety hazard and the approval process have not yet clarified.
  b. The risks (In particular, exposure dose) regarding the safety have not assessed about the Fukushima Daiichi's decommissioning reactor road map, and when we try to curb the exposure dose, there can be the risks which delay the road map achievement.
  c. The clear procedure regarding the change management (Change management) has not been applied, and the structural reorganization presently undergoing is not also applied. As a result, the evaluation method of the achievement status for the purpose of setting up the Fukushima Daiichi decommissioning promotion company, the risks and its measures going with the structural reorganization have not determined.
  d. The action plan to improve the nuclear power safety culture and performance should continue to be built up and be led by the senior management (Nuclear power leaders).
- The Nuclear Safety Oversight Office implemented the oversight activities about the following items mainly in the 4th Quarter in FY 2013.

  a. Efforts to stabilization of the Fukushima Daiichi Units 1 – 4 (Measures against contaminated water for seawater piping trenches, the protection from radiation, the measures for natural disaster)
  b. Efforts to improvement for the safety of Kashiwazaki Kariwa (The effectiveness of the serious accident measures, the individual measures application status, the system of the operation division)
  c. Efforts to the prioritization for the nuclear power safety in the nuclear power division (The effective promotion (Safety culture penetration degree, Process utilizing the safety information) of "Nuclear Power Safety Reform Plan"), Management and Governance regarding the nuclear power safety (Follow-up activity of the third party evaluation by the international special organization))

A scene of the interview to Fukushima Daiichi staff

A scene of the observation of the emergency training in Kashiwazaki Kariwa by the Nuclear Safety Oversight Office

(2) Self-evaluation in fiscal year 2013

We set up the Nuclear Safety Oversight Office (General manager: John Crofts) and piled up the education training of the oversight office personnel and the implementation, the point-out, and the proposal of the oversight activities were started by the said office.
The nuclear power division implemented the improvement proposal matters regarding the safety culture and the organization management from the said office, but the difference with the organization which has achieved the nuclear power safety of the world top class is large, and we have received the evaluation that there are lots of things to be done continuously.

3.3 Countermeasure 3: Reinforcement for the defense in depth proposal force

(1) Implementation in the 4th Quarter

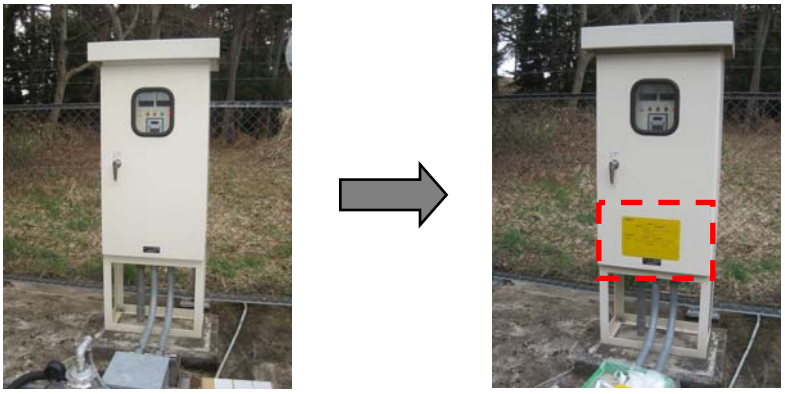
- Competition for the safety improvement

  Efforts toward the realization of the excellent proposals (12 cases) were started sequentially. The excellent proposal realized so far is one case of the Fukushima Daini explaining the following.

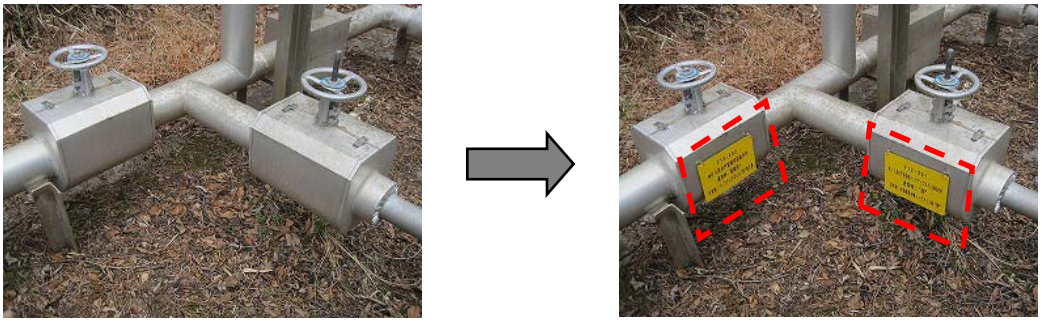
  - In case the facilities taking in water for cooling water (Fresh water) necessary for the reactor cooling, etc. from rivers are lost in the accident, the display tags were set up for pumps/valves of the underground take-in water facility so that the underground water can be exactly taken in.

  Also, the name of this activity was changed to “Competition of reinforcing the safety improvement proposal force” so as to be commensurate with the technological capability reinforcement of the purpose of the activity. Further, we see the awareness itself to the desirable matters for improvement at the site is important in reinforcing the technological capabilities, and we additionally introduced tentatively the mechanism (Invitation for needs) to accept matters (Needs) to be considered that the improvement leads to progress the nuclear power safety. The first application in fiscal year 2014 was started (March).

Before improvement **After improvement**



Pasting the system outline diagram on the deep well No.1 pump control panel



Installing the deep well backup line valve nameplate

Set-up the display nameplate onto the underground take-in water facility (Fukushima Daini)

- Operation Experience (OE) information of both home and abroad

Of the information in fiscal year 2013 portion, we completed the analysis about 505 cases (The 1st Quarter: 108 cases, the 2nd Quarter: 69 cases, the 3rd Quarter: 157 cases, the 4th Quarter: 171 cases) until the 4th Quarter. Of 12 cases judged to be necessary by the impact assessment, we completed impact assessment for seven cases, and instructed the measures to the power station (Example: On January 30, 2012, the first-phase open failure of three-phase AC power generation in Byron Unit 2 in the U.S. Since they could not detect this failure, the imbalance of each phase of backup power continued, and the safety system equipment stopped. In our company, the relay detecting the relevant failure has been set up, but we already instructed the additional operation procedure in ready for the case we cannot detect it).

Also, as to the operation experience information before the fiscal year 2012, all 283 cases have completed the analysis. As for 17 cases out of 21 cases which the impact assessment was judged to be necessary, we completed the impact assessment and instructed the measures to the power station (Example: On March 11, 2011, the pendant circuit breaker was damaged due to swings by the earthquake and the fire having occurred due to the arc discharge by the short circuit/ground fault in Onagawa Unit 1. We instructed to implement either steps of the setup of the frame for swing stopping, of changes to the horizontal type vacuum circuit breaker and of the impossible use of the relevant circuit breaker against our company's same type of the circuit breaker).

- Hazard Analysis

We sequentially analyzed the inflence, etc. to the nuclear power generation facility in the event the hazard exceeding the design criteria occurs about approximately 30

cases events extracted as the analysis subject based on the analysis plan made in the 2nd Quarter, and completed the analysis of 2 cases (Cumulative total 13 cases) anew of toxic gases and sabotage. The examination status of its analysis and measures are as follows.

- As to toxic gases, the case like the disabled chemical tanker approaching to the power station can be considered, but we assumed that this case is difficult to become cliff edge.[7] However, the toxic gas measures (Detection methods, safeguard equipment, etc.) continue to be discussed.
- On the other hand, as to the sabotage, it has not influenced to the power station in the design criteria's level, but in the event the attack of strengh exceeding the desing criteria occurs, we assumed it could become the cliff edge. As to the measures against sabotage, we will continue to discuss.

➢ Safety Review

We implemented the safety review 11 times from January for the subject of the plant walkdown, the operation experience information utilization, the procedure establishment for the response in the accident, the emergency training and the like in Kashiwazaki Kariwa. The organizational weak points of the power station were not confirmed, but the points to be improved in order to continuously implement the plant walkdown and the points to improve referenced for the overseas guides against the check items to be used in creating a plan for the procedure were extracted.

➢ Reduction of the operation burden attributed to placing too much value on the evidence[8]

We discussed the review about the operation process of the design control and the procurement control of the maintenance operation which the operation burden reduction effects are considered to be large. As for the design control, we implemented the improvement such cases as preparing the example collection regarding the operation such that the excessive operations more than the manual demanding will not be carried out. As for the procurement control, there is nothing to be considered to be the excessive operations, and we judged that there are no revised points on the manual.

➢ Introduction of IT into the maintenance operation process

Introducing the MAXIMO[9] (Phase 1) for the purpose of the upgrading the data base to become the basics of the maintenance operation, the rationalization of nonconformance control and work control process has been completed during the fiscal year 2013. Further, we initiated the discussion in order to realize the introduction of MAXIMO (Phase 2) for the purpose of the rationalization (Introduction of IT into a series of operations of planning the inspection plan, the procurement, the inspection/receiving inspection, etc.) of the whole maintenance processes until the first half of fiscal year 2016.

(2) Self-evaluation in fiscal year 2013

In order to reinforce the defense in depth proposal force, we implemented the "Safety improvement completion," the review of the operation experiences at home and abroad and the review of the review process and thorough natural hazard analysis as the various measures.

---

[7] When the load more than certain magnitude was added like tsunami largely exceeding the assumption on the design, the wider loss of the safety function occurs at a time by the common factors.

[8] It means that we heavily focus on securing the operation implementation process and its result's evidence.

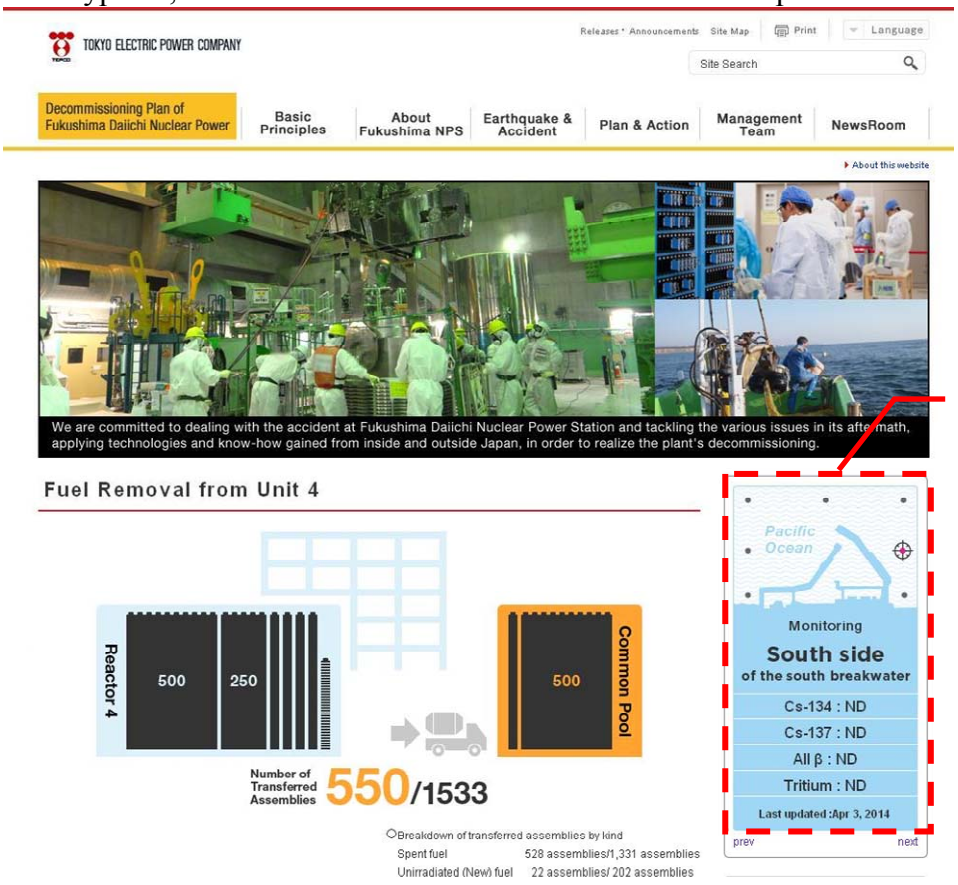
[9] IT solution realizing the strategic asset management

However, the summary places of these various measures are apt to be the main points of countermeasures implementation, and this does not comprise the whole organization efforts.

3.4 Countermeasure 4: Enrichment of the risk communication activities

(1) Implementation in the 4th Quarter

- We collected the risk information of the nuclear power division, and continued to implement the proposal for the response methods against the management level and the nuclear power division.
- The social communication office carried out the training on a plan basis against the risk communicators, and together with an attempt to level-up, the risk communicators in each power station organized the training regarding the prompt information transmission to the staff and the risk communication such as the societal viewpoints as the lecturer, and practiced as the enlightenment activities.
- Followed by the 3rd Quarter, we implemented the following as the efforts of easy to understand information transmission.
  - With respect to the improvement of the home page, we implemented continuously. In the 4th Quarter, we implemented the renewal of the home page for overseas users. As a countermeasure for rumor damage, we visualized the radioactivity measurement of the ocean having highly interested from overseas in particular, and listed up with such as graphics for easier understanding. We divided the enterprise website from the special-purpose decommissioning website, so that you can access simply to the necessary information.
  - We prepared for the easy to understand data sequentially such as the moving image having utilized the CG, and we transmitted by the home page, etc. In the 4th Quarter, we prepared and made public about the "Underground water bypass", one of the efforts into the contaminated water problems.



Website dedicated to decommissioning reactor for overseas users

- In terms of the contaminated water problems, we reinforced the information transmission to overseas not only inland Japan in order to response to the surge of international interests. We continued to implement the explanation to the embassies based in Japan by the risk communicators about the status of Fukushima Daiichi including the contaminated water problems from the 2nd Quarter. In the 4th Quarter anew, we implemented the explanation to the embassies based in Japan about the investigation/discussion status (Made public on December 13, 2013) on the non-confirmed/unsolved matters regarding the Fukushima nuclear power plant accident.
- To preserve the memory and records of the Fukushima nuclear power plant accident and to hand down within and across corporations and to turn the process of the decommissioning reactor business over vast and long time periods into the database systematically are our company's one of responsibilities to pull our weight. Since this is important to continue to bring together the intelligence and our efforts, we started to discuss toward the setup of "The Fukushima nuclear power accident/decommissioning reactor data library (Temporary name) "which bears this role.
- When we welcome the March 11th of the third year after the Fukushima nuclear power plant accident, we prepared the picture panels and the videos showing the state of our company's 100,000 people temporary workers project (Efforts such as all returnee's house cleaning, removal of weeds and the dosimetry). We put up these to each business site in order to further strengthen awareness /togetherness of all employees living out their responsibility to Fukushima.

(2) Self-evaluation in fiscal year 2013

We set up the social communication office (General Manager: Ms. Chisa Enomoto), and we appointed/placed the risk communicators, and started the activities. We gather/analyze the risk information in a unified way from the wider whole company (Nuclear power division in particular), and offer necessary instructions/advice together with becoming the organizational consultation contact. Through such activities, the provision of the proactive risk information to the social communication office from the nuclear power division and other divisions has come to be implementing.

However, in "Issue related to announcement of contaminated water discharge into nuclear plant harbor (Announced on July 26, 2013)", there was not enough of advice on the sense of apprehension and the pursuit of corrections about the contents when made public for the high-concentrated tritium detection from underground water on the east side of the Unit 1 and Unit 2 turbine buildings on June 19, 2013 and for thereafter publication attitudes (Retained the judgment for approximately one month about the drainage into the harbor).

Looking back on it, we thoroughly build up the trust-based relationships with the community and society by implementing the organizational and individual enlightenment and the risk communication to the established purpose of the social communication office and the risk communicators anew.

In addition, in order to ensure the prompt information disclosure, in the Fukushima Daiichi nuclear power plant, we lay down a plan for the report criteria and the public announcement anew (Made public on September 13, 2013) and after confirming the occurrence of the accident troubles, we are operating to go public as a guide within roughly one hour. In other areas, the first step of the risk communicators is the easy to understand information transmission, we initiated improvements such as the press release and the homepage by transmitting information adding the meanings/interpretation to the messages

and the data announced as a corporation. In particular, we utilized the videos and CG, etc. about the interpretation of the contaminated water problem and Unit 4 fuel removal, and we reinforced the information transmission by English.

3.5 Countermeasure 5: Reform of Power Station and Headquarters Emergency Response Organizations

(1) Items implemented in the fourth quarter

- Emergency response organization is being operated based on the ICS[10] framework since last January at Kashiwazaki Kariwa and since last October at Fukushima Daiichi and Fukushima Daini.
- At the Kashiwazaki Kariwa integrated training which was held on March 18th this year (Headquarters also participated), coordination with an external organization of Nuclear Emergency Support Organization was confirmed and verified, and a manipulation training utilizing a robot transported from the organization was performed. As a result of the training, the coordination with the Nuclear Emergency Support Organization was confirmed function. Besides, personnel were sent for the first time to other than power stations such as administrative organizations （Kashiwazaki City, Kariwa Village) and actual off site centers and confirmed the effectiveness of information share procedures with the Emergency Response Center.

Situation inside the Emergency Response Center

The joint injured transfer training with Kashiwazaki City Fire

Remotely operated robot manipulation training

Kashiwazaki Kariwa Nuclear Power Station training scene (March 18, 2014)

[10] Incident Command System (On site Command system for disaster which is normally adopted in the U.S.A. and other countries)

- At Fukushima Daiichi NPS, a comprehensive joint training was held on March 13 this year for the first time since the introduction of the ICS based framework. About 160 personnel and 50 workers of contractors participated in the training. Assuming an attack of large tornado resulting in the multi simultaneous facility damages, actual evacuation training of site operation workers and actual training of coping with leakage of contaminated water tank and restoration of Reactor coolant injection facilities were performed and validated the response capability. According to the result of the training session several improvement points for training methods under current emergency response condition, and basic action of the emergency response personnel (utterance and response) were extracted.

Response training of contaminated water tank leakage

Situation of Emergency Response Center

Training scene at Fukushima Daiichi NPS (March 13, 2014)

- At Fukushima Daini, individual training sessions such as power supply training by power supply cars and heavy machinery manipulate training were continuously carried out, and emergency response capability was improved. About 90 individual training sessions were carried out and total of about 280 personnel participated.
- Emergency response organization of the Headquarters has been operated under the ICS based framework since last March. At the start of introduction of ICS framework to the Headquarters, there were several problems regarding external correspondence such as communications with local governments and public information framework, but the performance has been being improved by the practical framework reassessments and repeated training sessions.

Headquarters training scene (March 18, 2014)

- ICS training program which is organized in the USA was researched. Creating a Japanese version of documentation is scheduled and specific utilization methods are under consideration.

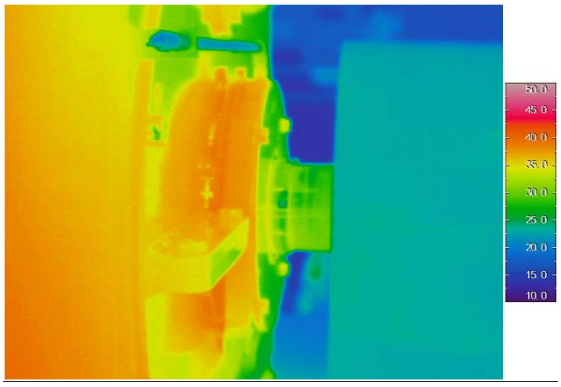
(2) Self assessment of FY2013

We have constructed emergency response framework based on ICS, repeated training sessions while getting advises from external experts, and discovered problems and improved them.
At Kashiwazaki Kariwa, some improvements were seen for the emergency response operation capability, compared to previous training sessions, because of the clarification of instruction and command structure, prompt information sharing including municipals of local community, as well as organizing the concept of decision making.
On the other hand, situation of Headquarters, Fukushima Daiichi NPS and Fukushima Daini NPS is that learning of ICS is yet insufficient and personal and group unit training is lacked, so the improvement of emergency response capability is in a difficult situation.
In addition, it is necessary to confirm the coordination capability with external organizations assuming actual incident situations.

3.6 Countermeasure 6: Reassessment of Non-Emergency Power Station Organization and Enhancement of Technological Capability for Direct Management

(1) Items implemented in the fourth quarter

- Availability evaluation was conducted to the organizations of Fukushima Daini and Kashiwazaki Kariwa (non-emergency organization), which were reorganized on September 1 last year. Reorganization effect was confirmed for Radiation Safety Dept etc., to which radiation measurement and radiation safety related organizations had been integrated. Subjects hereafter are developments of human resources who have business skills to fit the objective of reorganization, redistribution of human resources according to the actual organization situations, and rationalization of operations.
- A scale of 20 personnel system engineering group (including 4 specialized staffs as system engineer) was established in Kashiwazaki Kariwa on September 1 last year. The group made an action plan/training plan for the time being and deployed the activity. Furthermore, the group is preparing to start the system level plant monitoring action as system engineers in the future. Note that about 35 specialized staff members are planned to be fostered within 3 years.
- System engineers monitor as a plant monitoring activity that performance of main systems including important systems for safety are showing expected function/performance not only from equipment unit point of view but also from wider point of view as a system unit. The full-fledged operation is planned to start at January 2015.
- Kashiwazaki Kariwa operators have been joining the power supply cars connecting training from last July conducted by the emergency response organizations (as of the end of March, 11 members attended the training with Units 6 and 7 compared to 35 target deploy personnel). Fire engine connecting training also stared from last October (as of the end of March, 41 members attended the training with Units 6 and 7 compared to 35 target deploy personnel). Furthermore, facility diagnosis by operators has being been sequentially conducted for Units 6 and 7 rotating equipment from last November under the support of the system engineering group.



Equipment diagnosis by operators (Example: Infrared thermography diagnosis)

- For maintenance personnel, enhancement of basic technologies (annealed wire/rope handling training etc.) 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 connection training, exchange of electric motor, pump bearing disassembly/assembly, ground leveling by heavy machinery and so on) has been performed from last July at each power station (as of the end of March, total of 2,629 members at 3 power stations have attended the training: 73 at Fukushima Daiichi, 1,564 at Fukushima Daini, 992 at Kashiwazaki Kariwa).
- At Kashiwazaki Kariwa, direct management of work training of disassembly/assembly of pump/motors and instrument calibration by utilizing a skill training facility and under the guidance of cooperating companies.

Training target equipment

Disassembly of pumps and parts maintenance

Motor disassembly

Instrument calibration

Situation of pump/motor disassembly/assembly training utilizing the skill training facility (Kashiwazaki Kariwa)

(2) Self assessment of FY2013

In September last year, reassessment of non-emergency power station organization was conducted including the strengthening of responsible section of human resource development, integration of safety related sections to the nuclear energy safety center, and set up of a new organization for the enforcement of system engineering capability and direct management engineering.
In addition, by the education of system engineers and direct management training corresponding to each power station, each personnel engineering capability and team organization capability were enhanced. This activity is focused on the enforcement of emergency response capability through direct management operation, based on the lessons learned from the Fukushima Nuclear Accident. But the original purpose is to be able to stack improvements to enhance the nuclear safety. Therefore, a wide range of engineering capability should be enhanced, as well as the direct management operation.

3.7 Evaluation by outsiders on reformation

Our effort for Nuclear Safety Reform has been evaluated from the view of third-party by Nuclear Reform Monitoring Committee, Nuclear Safety Oversight Office, and International special organizations, having received the following findings and proposals so far:

[Nuclear Reform Monitoring Committee]

- Monitoring results or comments have been provided 5 times by the chairman and vice-chairman of the committee, and the latest (February 3, 2014)[11] consists of the following four points.
  - a： It is in a slower pace than expected, however, the Nuclear Reform by TEPCO has been achieving steady progress. The Nuclear Safety Reform is a long journey; hence it is difficult to conduct in a short time. Monitoring activity by the Nuclear Safety Oversight Office has been getting on the right track; TEPCO deserves an appreciation since its actions have been started by sincerely accepting the reformation proposals from the Oversight Office.
  - b： TEPCO has started removal of spent fuel at Unit 4, which became a big milestone of the Nuclear reactor decommissioning project which will take a long time. We should continue this work carefully and sincerely prioritize the safety the most, as well as send transparent information regarding progress to inside and outside Japan. Regarding the issues of contaminated water, it deserves an appreciation deciding transition of nuclear reactor decommissioning to other company on the purpose to clarify the allocation of responsibilities pertaining to decommissioning and countermeasures against contaminated water in addition to sequential operation of preventive and multilayered countermeasures. Note, however, for fundamental resolution of the issues of contaminated water, integrative management plan must be established in combination with the Japanese government and the siting community with accurate understanding of the overall situations of contaminated water and groundwater.
  - c： TEPCO recently tends to show the meaning of data officially announced as messages. It deserves appreciation for making an effort toward better

[11] As for the others, please refer to the Web page of Nuclear Reform Monitoring Committee.

communication for easy understanding by utilizing video contents and CGs. For ever, TEPCO shall exercise cautions for transparency of the information so that TEPCO will not remain above suspicion of hiding something.

d： Continuous improvement of effectiveness of the Nuclear Reform is required for TEPCO. In order to realize this, quantitative target management is required to measure the progress by individual items of the Reform.

[Nuclear Safety Oversight Office]

- In order for steady progress of "Nuclear Safety Reform Plan," it is urgently required to construct the process for innovation management (including a system to monitor and analyze current situation, execution plans practical at the sites, comprehension permeation plans) as well as effective driving of these projects (Progress report in the third quarter).

[International Special Organizations]

- The leaderships starting from the management to the nuclear power leaders of the headquarter and the Nuclear Power Station as well as the permeating of safety culture, execution/permeating of Nuclear Safety Reform, and monitoring/overseeing of the performance of the headquarter and the Nuclear Power Station are insufficient (Progress report in the third quarter).

Based on the above evaluations and proposals, TEPCO will accelerate and implement the Action plans for the Nuclear Safety Reform adding required reviews.

4. Policies of improvement for fiscal year 2014

During the last year, TEPCO had focused on consistent proceeding of the countermeasures 1 to 6 of the Nuclear Safety Reform Plan, and had made concrete and specific progress in the field rather simple and obvious such as improvements in announcement for the press and reform of its Web pages, improvements of emergency handling and improvement of technical capabilities by direct management.
However, specific progress has not been made yet in permeating of leadership and safety culture, and it is pointed out in the evaluation by outsiders that leadership, safety culture, and target management are inadequate.
In addition, regarding the degree of satisfaction of understanding of "Nuclear Safety Reform Plan" in all personnel of Nuclear Power and Plant Siting Division, according to the survey of the end of the last year, it had come out that around 30 to 40 percent of the personnel had not finish reading of the "Nuclear Safety Reform Plan," and it could not be said that was enough situation (in the end of this March, it was assured that all personnel had read it).
The causes of this situation were lack of effort to penetrate the contents of the "Nuclear Safety Reform Plan" among the all personnel as well as inadequate monitoring of progress of the reform. The Nuclear Management and Secretariat of the Nuclear Reform Special Task Force (hereinafter referred to as [TF Secretariat]) cannot be said that they played the role as the reform promoter and their responsibility is large.
As the reconstruction action, repetition of promotions for understanding and monitoring of the situation by the Nuclear Management is required to strengthen the system for thorough understanding.

In addition, at Fukushima Daiichi, accidental troubles continue due to weak background in lack of "safety awareness," "technological capabilities," and "ability to promote dialogue." Especially in strengthening of technological capabilities, some counteractions shall be taken relating to strengthening capabilities at the site of all personnel of the organization.

For review of specific action plans for countermeasures 1 to 6 from the fiscal year 2014, see the attached document 4.

4.1 Countermeasure 1: Reform from top Management

For the future improvement of safety awareness, enhancement of technological capabilities and ability of communication, required amelioration of management for staring from the Management to nuclear power leaders[12] of the headquarter and the Nuclear Power Station is the definition of expectations of the leaders, strengthening of monitoring and reform promotion system, promotion of internal communication, and so on.

[12] Nuclear Power executive officers in charge/corporate officers, President and CDO of Fukushima Daiichi D&D Engineering Company, Site Superintendent of Fukushima Daiichi Stabilization Center (until March 31, 2014), Superintendents of Nuclear Power Stations and Nuclear Power Plant Construction Offices, and General Managers or the above positions of nuclear relevant management in the Headquarter (Corporate) and Fukushima Daiichi D&D Engineering Company (fellows are not included).

Issues requiring special focus are the followings:

- For the Management
  - Recognize the special risk pertaining to Nuclear Power strongly as well as the responsibilities for Nuclear Power on the basis of thorough "safety first" awareness. For this, reinforce the self safety conscious by behaving in accordance with the 7 rules of nuclear safety culture[13] to cultivate safety awareness among the organization.
  - As 8th rule of safety culture, the Management shall continue checking the situation of nuclear safety culture in the organization themselves to realize required improvement quickly by aggressively utilizing pier reviews among nuclear operators and benchmarks among other organizations.
  - To create an organization capable of improving nuclear safety itself continuously, work for cultivating human resources having high safety awareness, technological capabilities, and ability of communication.
  - To incorporate the human resource cultivation plan in the business plan, create a human resource cultivation plan aligning with the headquarters, power stations, group of companies, and contractors, hence allocate the resources required for skill improvement adequately.
  - Define the expected items (see the attached document 5) and the roles of the Management for middle management and the front line at the sites.
  - Continue and repeat direct dialogs with the personnel in the front line of the Site.
  - Pursue the situations of implementation of the "Nuclear Safety Reform Plan" to strengthen the monitoring regarding the stabilization of the safety culture, strengthening of the engineering capabilities and the ability of communication.
  - Utilize the WANO performance aim and criteria to evaluate TEPCO's actions. The following must be taken into account in the later actions: Does it conform to the standards? What shall be reformed?
  - Contractors are the important partners for TEPCO, thus it is required to construct more deep reliabilities to share the same values in safety actions and safety culture according to the all safety rules.

- Nuclear power leaders

  The nuclear power leaders have to conduct themselves in accordance with the following five action indexes in addition to the action items the management has to take.
  - To place priority on the continual improvement of the safety as the most important task of management.
  - To encourage the preparation for the defense in depth on the assumption that the

[13] the 7 rules of nuclear safety culture: Safety culture means behaviors and characteristics of the organization/individual person exercising cautions required for the importance of the priority for the issues of safeties of the nuclear power station other than anything;

Rule 1: All personnel must be aware that we are involved in the nuclear safety.
Rule 2: Leaders shall take initiative of behaving the rules of safety culture.
Rule 3: Develop mutual reliance among the interested persons inside and outside the company.
Rule 4: Make decisions on the basis the nuclear safety is the most prioritized.
Rule 5: We must understand the risks pertaining to the nuclear power generation.
Rule 6: Questioning ourselves all the time is the best figure for nuclear safety.
Rule 7: Learn everyday in an organized way.

design cannot function as it is expected.

- To address potential risks caused by natural phenomena humbly, and do not underestimate the risks.
- To foster challenges to cultivate technological capability to enhance safety, and respect the challenges even if they are not successful.
- To honestly inform the society of risks that nuclear power cannot be fully removed and do no not impose a sense of security for nothing on the society.

➢ Middle management (General Managers/Managers)

- To fully realize their duties for the safety, and, in corporation with the nuclear power leaders, master the ability to get their duties fulfilled.
- Do not confine their roles within the specified scope of their duties/responsibilities of their work but have to proactively offer their opinions for improvements/innovations crossing organization borders.
- To keep in mind to have the following mindsets in addition to the seven nuclear safety culture rules + 1 and five action indexes of nuclear power leaders:
  (1)High sensitivity: To keep having awareness of the issues involved and be highly sensitive to related information around the world.
  (2)Positive attitude: To understand roles of entire organizations involved as well as roles of process preceding and following their process in order to help enhancing the accomplishment of their organization.
  (3)Diligent devotion to self-study: To have and keep the sound expertise/experiences and to keep diligently studying by themselves such the daily progress and improvement in the expertise/experiences can be realized.
  (4)Communications: To positively send messages internally and externally about nuclear safety so that they can always be stimulated by others and can have a lot of chances to enhance their safety awareness and technological capability.

➢ All the members in Nuclear Power and Plant Siting Division and Fukushima Daiichi D & D Engineering Company

Every one of the members shall bear in his (her) mind that he (she) is deeply engaged in the nuclear safety and shall endeavor to enhance his (her) safety awareness on the nuclear safety.

4.2 Countermeasure 2: Enhancement of Oversight and Support for Management

Nuclear Safety Oversight Office shall continue oversight of the following efforts as before: Efforts in stabilizing Fukushima Daiichi Nuclear Power Station, efforts in enhancing the safety at Kashiwazaki Kariwa Nuclear Power Station, and efforts in placing the top priority in nuclear safety at Nuclear Power Division.

Management and Nuclear power leaders shall positively ask for assessment and advice from the "Nuclear Safety Oversight Office," enhance their self-awareness for the nuclear safety, and endeavor to enhance the entire organization’s safety awareness on the nuclear safety.

4.3 Countermeasure 3: Enhancement of Ability to Propose Defense in Depth

Such activities as the "Safety Enhancement Competition" and "Review and Hazard Analysis of Nuclear Power Station Operations both at Home and Abroad" have been

carried out to enhance the ability to propose the defense in depth. In the future, it is necessary for all the members in Nuclear Power and Plant Siting Division and Fukushima Daiichi D & D Engineering Company to share the results and findings obtained in these activities and for those who are at the forefront of the field operations to actively challenge a variety of actions to improve the safety.
In particular, the following items have to be focused:

- All staff shall precisely understand what is meant by the term "defense in depth" which is the fundamentals of the nuclear safety, and try to enhance the technological capability that can materialize the safety measures featuring diversity and good cost effectiveness.
- Recommend them to make the inter-organizational proposal for the enhancement of the defense in depth; to try to make formulating the safety measures and implementing these safety measures to take root in the routine activities; to always adopt the excellent "Kaizen" proposal. These processes have to be the standard practice of the organization.
- Actively collect the domestic and foreign information about operational experiences, new academic findings, and information about technology development in other industries, and keep the mind‐set to penetrate into the true nature of the problem and to acquire the lessons learned.
- Retain good balance between the quality-oriented countermeasures and countermeasures valuing the diversity and speedy application. Do not leave the risks as they are for long period of time.
- The excellent proposal (11 proposals) selected in the competition for enhancing the safety improvement proposal ability in 2013 (FY) shall be put into actions within about 6 months one by one. The first proposals in 2014 (FY) have to be summarized in the first quarter.
- As a result of the safety review in Kashiwazaki Kariwa Nuclear Power Station, we shall conduct the feedback and follow-up of the extracted action items to see if they are properly applied to the proper locations. The organization and implementation of the safety review in Fukushima Daiichi D & D Engineering Company and Fukushima Daini NPS shall be planned based on the experiences obtained in Kashiwazaki Kariwa Nuclear Power Station.
- Revise the manuals for Headquarters to include only the original and essential requirements, and those for power stations to include the expertise and procedures so that the latter can be easy to update and be enacted in response to needs at the forefront of the field operations.
- Proceed to the work relevance/suitability review in order to streamline the entire maintenance process to reduce workload and to resolve the shortage of the resources. This review should be carried out in preparation for introducing the MAXIMO (Phase 2).

4.4 Countermeasure 4: Enhancement of Risk Communication Activities

It is necessary to change the way of thinking such like “Disclosure of risks should be withheld until the final data or facts that serve as evidence are obtained.” It is imperative instead to take action based on the basic policy that “even if we cannot indicate any proven evidence for an evaluation result, we speak out promptly and straightforward the potential risks associated with the result without afraid of the response in audience.”
In particular, the following items have to be focused:

- The purposes of the risk communication are to make the risk(s) public; to explain/exchange comments about how to enhance/improve the safety enhancement countermeasures for the nuclear power station against the said risk(s); to obtain a certain level of understanding about the contents of the countermeasure; and to build up the relationship of mutual trust between siting communities, society at large and us through these process of the risk communication.
- The management and nuclear power leaders shall, under the conception that no one can say that "Nuclear (power station) is 100% safe", face questions/anxieties of the people in the siting communities and society at large, disclose the risk information quickly, sincerely and actively, and promote the risk communication with the people in the siting communities and society at large.
- In conducting the risk communication, keep checking if the attitude and decision criteria of the entire company are deviating from those of the society at large or not. If there are any deviations, make the necessary corrections and inspire the awareness and consciousness of our staff.
- Support and cooperate the Social Communication Office and risk communicators in their collection, analysis, and quick/appropriate disclosure of risk information. They will make these activities as if they are people outside of the company.
- As for Fukushima Daiichi NPS, conduct the risk communication so that we can respond the anxieties of the stakeholder in advance. For this risk communication, increase the number of the risk communicators when organizing the Fukushima Daiichi D & D Engineering Company in order to enhance the information communication function in case of accident or trouble and risk detection function.
- As for Kashiwazaki Kariwa Nuclear Power Station, conduct the risk communication about the local personnel evacuation which could not be fully explained so far, in addition to the explanation of the safety measures based on the defense in depth.
- In making the data public, re-confirm the following basic attitude:
  (1) Disclose the data without delay.
  (2) Explain the meaning of the data and add the interpretation of the data.
  (3) When it will take time to investigate the meaning and interpretation of the data, disclose the data together with the reasons why it will take time and with the expected risk. Do not hesitate to disclose, wasting the time.

4.5 Countermeasure 5: Reorganization of Emergency Response Teams in the Power Station and the Head Office

For the Head Office, Fukushima Daiichi and Daini, ICS hasn't been learned satisfactorily. Especially each staff and team needs more practice about it. It is, therefore, difficult to raise the skills for emergency response measures.
As such, in the future, the Head Office, Fukushima Daiichi and Fukushima Daini will raise their emergency response skills, including communication and cooperation competency within the premises and with outside entities through practicing regular learning and repetitive training on ICS for each individual staff and as teams, in addition to comprehensive training sessions done quarterly.
The followings are lists of items particularly to be focused on.

- Based on lessons learned from the broad area accidents related to natural disaster at Fukushima Daiichi and Daini, to set up and strengthen the skills of an organization for 72 hours after occurrence of an accident to do some emergency response measures by power station workers of TEPCO;
- To give training sessions to operators and overnight workers regularly on restarting water injections to nuclear reactors and restoration of power supply and final heat sink

that should be completed within an hour after the occurrence of an accident, till they master their respective works;

- To give education on basic concept of ICS through repeated training sessions and drills and to find out issues to be solved to enhance organizational and people's competency handling emergency situations. In doing so, efficient information sharing will be sought with local administrative bodies including setting of supervisory limit, possibility of extension depending on the size of a disaster and clarification of reporting and command lines;
- To improve and upgrading organizations and overnight working system in order to raise the skill of how to respond to an accident when occurred at night and on holidays;
- To nourish staff members who are capable of anticipating the development of an accident and of mapping out countermeasures promptly;
- To significantly increase staff members who can measure radiation dose, control irradiations and do decontamination activities, in preparation for massive volume of radioactive substances have been released outside of the system;
- To add skills to the Head Office emergency response organization to understand what the affected site wants promptly and to procure the number and types of staff members and materials to be delivered to the affected site, in preparation for a case that existing number of people and materials are insufficient to cope with it;
- To collect information on preparedness and training for emergencies at other power plants in and out of Japan (including nuclear and other types of power plants), to absorb their strength;
- To investigate disaster prevention plans of areas where a nuclear power plant is located in and out of Japan to devise some means for smooth and efficient reporting and communication and to provide technical assistance that can contribute to local evacuation plans;
- Based on the proposal made by Nuclear Reform Monitoring Committee, to plan and carry out a joint drill with relevant authorities of the broader areas.

4.6 Countermeasure 6: Revising Power Plant Organizations at Normal Times and Strengthening Technological Competency to Directly Manage Power Station

For Measure 6, the scope of trainees will be continuously expanded, providing them a chance of practicing their skills at site to enhance their competency.

Further, by reflecting the accidents and troubles in FY2013, we will add countermeasures to reinforce the on-site capabilities based on observation of actual place, actual object and actual fact (See Attachment 4).

The "on-site capabilities" are described as below in "Action Guideline 4: Reinforcement of individual capabilities" (Attachment 5).

Based on observation of actual place, actual object and actual fact, following abilities should be established:

(1) Ability to thoroughly understand, analyze and evaluate the site condition

(2) Ability to develop plans and countermeasures and to thoroughly implement them

(3) Ability to continue improvement and innovation even after implementing the countermeasure for further enhancement of the safety / quality

These on-site capabilities are a part of basic skills that serve as a foundation of entire technological abilities including the nuclear safety technology such as defense in depth and Probabilistic Risk Analysis (PRA). Besides, this reinforcement of the on-site capabilities should be promoted by organizational approaches in addition to personal efforts of individual workers.

In light of the above, items to be specially focused on in Countermeasure 6 shall be as follows.

- To nourish skills for focused analysis and evaluation of latent risks and hidden issues, for developing and carrying out prompt solutions and for continuous improvement with using creative and flexible thinking, based on the principle of *go to the site, see actual items and understand the reality*;
  <Deployment method>
  - Definition of on-site capabilities necessary for individual people and job
  - Improvement of individual ability by Off-JT and OJT
    (Widely utilize knowledge and experience of inside/outside the company, and repeat practice, confirmation and improvement)
  - Supports by organizational approaches and benchmarking of domestic and international best practice

- To train system engineers familiar with overall affairs of a nuclear power plant, in order to strengthen the ability of the plant to have a birds' eye view on overall nuclear safety and to acquire skills to cope with an accident of unforeseeable size. In order to do so, the number of skilled operators will be increased, placing them as cores of the system engineer to assign them to maintenance and other department to uplift the skill to make a proposal on facility improvement;
- To learn how to diagnose facilities so that any facility abnormalities can be detected at its early stage and at the same time to promote rationalization of maintenance works.
- To develop human resources, to examine the framework for redistribution of resources and mid-to-long term HR rotation and to implement the framework.
- So far the engineering work for facility maintenance in nuclear power stations was assigned to plant makers and supporting companies. A part of them will be done directly by TEPCO. Some staff members will be dispatched to some supporting companies from TEPCO to nourish and learn their maintenance skills.

4.7 Setting the States of Organizations and Individuals to be Realized for Setting Up and Achieving Overall Objectives

It was analyzed and determined that the nuclear accident was occurred in Fukushima partly

because the plant believed without due reasons that ‘Safety is already established in us.’ So in this ‘Nuclear Safety Reform Plan,’ in order to prevent such false ideas of workers that ‘A safety has a certain goal,’ we thought it would be better to continue uplifting nuclear safety without setting any particular goals for it. For the action plans, they are picked up as detailed examples for raising ‘safety awareness,’ ‘technological competency,’ and ‘ability to promote dialogue,’ and they expect that each worker will enhance and develop the plan. What actually occurred, however, was that action plans shown as examples had only been implemented. In the future, each layer will be required to set an innovation target to each of ‘safety consciousness,’ ‘technological competency,’ and ‘ability to promote dialogue,’ (see attachment 6) and PDCA will be turned while monitoring the progress and issues for each measure. This idea coincides completely with that shown in ‘the new comprehensive special business plan’ and ‘TEPCO Group Action Plan for FY2014.’
As the starting point of the idea, the management will clarify their expectation for the organization on nuclear safety, which will be shared among nuclear power leaders and to develop it into the middle management layers.

4.8 Evaluation of the Degree of Achievement and Progress

To the comment that implementation and dissemination of our nuclear safety reform activity is unsatisfactory, a report on the progress of this year will be made at the end of the current business year, by organizing the evaluation structure and confirming the initial state at the beginning of this business year, both based on the recommendation of Nuclear Reform Monitoring Committee on target management of the reform plan.
In addition, KPI (key performance indicator) for continuous safety evaluations will be developed. As a common tool, KPIs will be handled as inputs for meetings of the top management, nuclear power leaders and middle management, the Head Office, power stations and construction offices. It is also used for monitoring the progress of nuclear safety and confirming challenges and points to be improved.

For checking effectiveness of each measure, three modes of measurements will be used for quantitative evaluation as much as possible.

(1) Self-evaluation using questionnaires
(2) Evaluation by result indicator
(3) Third party evaluation by Nuclear Safety Oversight Office, Nuclear Reform Monitoring Committee and other internationally recognized expertise organizations.

Any targets and goals achieved this year must basically be better than those done last year. Without just determining this is better and that is worse, the following viewpoints are important with the evaluation results as inputs, and multi-layered discussion for each layer will be continued.

- Why do the results of my self-evaluation in the questionnaire differ from the evaluation on me by my staff?
- I evaluated my performance positively, but the result indicator isn’t so positive. Why?
- I got some negative comments in the third party evaluation. Why?

4.9 Strengthening a System for Promoting and Following up Nuclear Safety Reform

Nuclear safety reform will be promoted jointly by the TF Secretariat and nuclear division. So far the weight was put to the nuclear division side which is actually in responsible for

doing actions, but now the TF Secretariat will be positioned as the reform promoter, based on evaluations done by ourselves and by the third parties, and the following two items will be reinforced.

- The TF Secretariat members have been in nuclear division and have worked for reform and since July last year, certain jobs have been added to each member one after another. From now onward, several members will be selected solely for the TF Secretariat works to establish a project. The dedicated staff will act as reform promoters while discussion with other members who has double assignments.
- On the other hand, for not to make the nuclear safety reform as a responsibility of the TF Secretariat only, functions in charge of proposing and planning for Nuclear division (including the Head Office and power stations) and core people who can shoulder the burden of nuclear safety reform will be assigned newly to the TF Secretariat as the innovation promoter so that they can function as broad as possible.

In addition to strengthening the organization, in planning jobs for Nuclear, Action Plan 1 to 6 will be incorporated in it. While understanding the progress and challenges of each Action Plan, a PDCA cycle will be turned. The job plan incorporating the Action Plan 1 to 6 will be made under the support of the TF Secretariat.

In addition to the system reinforcement, the top management of nuclear power and the TF Secretariat will enrich communications within and between nuclear power leaders, middle managements and members to thoroughly disseminate the aim and goal of the nuclear safety reform activities. From February this year, opinion exchange meetings by the top management with middle management (power plants and the Head Office) have been held step by step so that the top management can understand what the middle management may think and can show their expectations and give guidance to them.

Concluding Statement

The progress report this time includes progress that have been made in the fourth quarter of FY2013 (Jan. – Mar. 2014), review for the entire FY2013 and improvements for FY2014.

Each nuclear power plant showed a certain progress in safety, in terms of their facility and operation. Each action plan in the Nuclear Safety Reform Plan is in progress based on the Action Plan. However, the speed of the improvement upgrading

(1) safety awareness and safety culture
(2) technological capability (site competency)
(3) ability to promote dialogue

to make 'itself prepared utilizing every wisdom,' or the original goal of the nuclear safety reform come true is not satisfactory and it is essential for the management, the Head Office and nuclear power leaders in each nuclear power plant to take an initiative to facilitate the reform again.

The background of 'insufficient control,' a common cause for the Fukushima Daiichi accident lies on the issues related to these (i) safety consciousness and safety culture; (ii) technical skill (site competency) and (iii) communication skill. We consider these insufficiencies as challenges not only for Fukushima Daiichi NPS but also for the entire Nuclear Power Division. We are committed to be engaged in this initiative as a whole Nuclear Power Division, starting from the reinforcement of on-site capabilities that serve as foundation of engineering power based on "three actuals" policy (actual place, actual object and actual fact).

This report showed a proposal on the reform policy that is essential toward FY2014. For critical points, especially, we will understand how each action plan is implemented against targets set, monitor progresses and problems and turn the PDCA cycle.

We, as a nuclear power plant operator, are determined to commit ourselves to return trust of the society and people in Fukushima Prefecture. Under the strong determination of 'Keep the Fukushima Nuclear Accident firmly in mind; Today should be safer than yesterday and tomorrow than today; Be a nuclear power plant operator that keeps creating incomparable 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

Attachments

Attachment 1

Accidents and Troubles in Fukushima Daiichi Nuclear Power Station in FY2013

Safety awareness	Technological capability	Ability to promote dialogue
A: A rodent slipped into one of the temporary power sources which were updated in a sequenced manner, causing a short circuit. This further caused stoppage of cooling SFPs. As there were about 4 days before the temperature in the SFPs reaching to the limit, full scale restoration works started from the subsequent morning.		
The single short circuit event developed into an extended-hours blackout for broader areas was partly because of the lack of safety awareness to restore SPF cooling promptly based on the defense in depth, including preparing emergency power supply.	It had a lack of the environment and/or the system to identify any power system failure to promptly restore it.	It was a technical judgment to think there was certain time before a cooling failure occurs after the occurrence of a blackout. However, people in the power station didn't realize the anxiety of local people on loss of facility power supply for a long time, and due to that, no sufficient explanations on latent risks and the situation when the accident occurred.
B: A metal net fence was installed to prevent rodents from entering into the facility, as a recurrence prevention measure of Accident A above. However the work was done without shutting down the power supply and a ground fault occurred by a wire connecting the metal net in place got contacted to the terminal board.		
The department in charge of the work wasn't specialized with electricity, the workers didn't have sufficient recognition on safety of workers and property in doing electrical works. However, knowledge on electrical safety should be understood by all workers as the basic common sense.	The workers lack of technical knowledge on safety measures when doing works on power boards while recharging batteries.	There was no communication in the organization with people having knowledge on electric works to obtain appropriate advice and support.
C: Some tanks were installed under the ground to store water after being purified by ALPS. Construction of the ALPS made a delay. The capacity of tanks currently used for storing contaminated water was reaching to the full. It was inevitable to store contaminated water to the underground tanks. The underground tanks had double water shielding sheets and telltale holes as well as water level meter, but eventually contaminated water was leaked out of the tank. The telltale holes made a delay in detecting it.		
All contaminated water should originally been under strict control within controlled area, for a normal nuclear power facility. However, the emergency measure taken after the accident to store contaminated water in underground tanks continued. Though there was a lack of storage facility then, it should have been done to accelerate installation of more steel tanks and other risk mitigation measures in preparation for possible leakage of contaminated water, so that the water can be transferred into the steel tanks, standing on the viewpoint of defense in depth and based on the high safety awareness.	Based on the circumstances that unexpected volume of contaminated water was stored then, and early detection of leakage had become difficult, more efforts should have been taken to improve and to realize a new way of leakage monitoring and to develop a technology to minimize adverse impacts caused by the leakage.	In the original plan, water purified by ALPS was to be stored in the tank. So, when examining pros and cons of storing highly contaminated water in the tanks, communications between design and construction function and the department in charge of controlling contaminated water should have been made thoroughly till they had a common recognition on specifications and performance of such underground tanks. It should have been done to explain in depth on the policies for minimizing overall risks to share the idea with the regulatory authorities and people in Fukushima Prefecture, to prioritize works that should be done in a reasonable manner and to promote operation of the facilities and improvement activities.

Safety awareness	Technological capability	Ability to promote dialogue
D: While recognizing stagnation of highly contaminated water in the trenches on the east of the Units 1 and 2 turbine buildings, no concrete countermeasures were prepared.		
The highly contaminated water in the trenches was seen as a risk factor for leaking into the sea, it should have been done to address the issue by prioritizing building competency to make early detection of leakages and early establishment of the method to remove contaminated water, etc.	As to the leakage prevention measure, installation of impermeable walls on the sea side was considered as a permanent measure. However, we shouldn't have relied on one single measure, but have had more flexible thinking by preparing more diversified measures, though the effect of which may be limited, in preparation for the one single measure turned out to be not effective or didn't show expected results.	For issues that are difficult to be solved such as highly contaminated water stagnant in trenches, existing of such risks should have been shared with the relevant regulatory authorities and local autonomous bodies, etc., in a way that communication can be made to collect wisdoms of those people for solving such problems.
E: On June 19, 2013, we announced that high concentration of tritium was detected from groundwater sampled on the east side of the Units 1 and 2 turbine buildings. However, as to the leakage of it into the bay, we just insisted 'we are collecting data for evaluation,' and it was only July 22 of the same year that we started to mention the leakage.		
—	—	We were obsessed by the idea that we should not disclose any uncertain idea about the leakage into the sea unless we got data and facts that ultimately supported the idea.'
F: Contaminated water leaked out of the connections at the bottom of a flange-type tank. A weir was already in place in preparation for a leakage, but its drain valve was open to discharge precipitation out of the weir. This allowed leaked contaminated water flown out of the weir as well.		
In order to discharge rainwater within the weir, the drain valve was always set in open position. This was based on the idea that keeping it open could detect leakages earlier. However, the actual fact was there were a lot of area in the weir that was always wet by rain water, and we couldn't determine if a leakage occurred or not, till a massive leakage actually occurred. We should have made an alternative idea that allows closure of the valve, if the premises for a method of control weren't established. However, no improvements were made till a massive leakage occurred.	We were unable to find an effective method that allowed prevention of rainwater stagnant in the weir and that could be implemented as early as possible. We should have thought combination of other measures that could be implemented swiftly in place easily, even if their effectiveness might be limited, not just relying on one single measure.	Tank patrol staff should have called strongly for improving the situation by reporting that water pools made them difficult to leakage due to rainwater at an early stage, to the tank controller.

Safety awareness	Technological capability	Ability to promote dialogue
G: Even though the space available in tanks was becoming smaller, those tanks accepted rain water stagnant in the weir up to the tank edge to prevent rain water from leaking out of weirs due to typhoons. 5 tanks were interconnected for use. The area where those tanks were located was moderately inclined, but as the water level monitored was at the upper tank, rainwater leaked out from the top plate of downstream tank.		
The tanks in Area B didn't originally intend to store contaminated water. However, due to the shortage in space of rainwater tanks, it was decided to store rainwater in the tanks in Area B. In determining this, no thorough examination was made about those tanks located on the downhill side.	The water level was measured at the tank which water level is expected to be the lowest, it was difficult to foresee the water flown out of the top of the tank by just monitoring the data. Due to the inclination of the tank, it was unable to foresee that contaminated water flow out from the top of the tank could go out of the weir.	Workers of a supporting company reported of the leakage twice, but for both, TEPCO workers couldn't identify it. The volume of leakage could have been much smaller, if relevant information were communicated appropriately among the supporting company and TEPCO, on the source and conditions of the leakage.
H: When an RO-3 pressure hose of a water purification device of a contaminated water treatment facility (reverse osmosis membrane facility) was replaced with a PE pipe, wrong part of the pressure hose was disconnected making contaminated water leaked out. The workers, without putting on appropriate clothes, did water stopping works.		
Meticulous care should have been paid to the works, because the work involved gave a threat to workers directly contacting to contaminated water.	No risks of erroneously selecting objects without identification display were considered on a device set up as an emergency, Emergency stop (safety treatment) wasn't sufficient for preparing for the risks.	No sufficient communication have been secured and made between supporting companies and TEPCO, on prevention of exposure to radiation, prevention of spreading out of contaminants, checking items to work, risks accompanied by the work and communication when an accident occurred.
I: The result of total beta measurement of a part of seawater samples was disclosed erroneously as that of strontium 90 measurement (caused by underestimation of detection efficiency and counting error). The fact wasn't announced for 6 months.		
—	At Fukushima Daiichi, radiation was measured of the level that wouldn't be seen in other power plant. As such, it is essential that measurement staff acquire more advanced skills for radiation measurement, such as detection efficiency of devices used, and appropriate dilution level when measuring high concentration of beta ray source.	Even when measurement results involve a certain inconsistency and hence should be judged as abnormal, if the causal analysis takes time, the announcement should have been made earlier even with a comment that the results needed to be clarified further.
J: When the thermometer was subject to an insulation resistance measurement, 250V was imposed to the thermometer and not 100V. This damaged the thermometer.		
New equipment must be handled with extreme care. If its specification is unknown, it is careless to just assume its rated voltage. In this case study, the damaged was just the thermometer but this type of carelessness could produce a significant risk.	—	The tester should have contacted either the staff in charge of installing the equipment, installing company, or its manufacturer to gain the specification of the thermometer.

Safety awareness	Technological capability	Ability to promote dialogue
K: Contaminated water was transferred to the tanks in Area E. However, the worker didn't recognize that the water level of the tank wasn't increased. Moreover, the water level alarm of a tank in Area H6 was triggered, but he determined it as an error.		
Transfer and storage of water contaminated with strong radiation requires careful control not to allow leaking out of it. Drawings of facilities installed at the time of turmoil just after the accident should have been organized at early date in order to understand the status. In the case of a water level alarm, the worker should have confirmed it by his own eyes if the water level was actually exceeding the upper limit, without just carelessly determining it as an error.	In order to monitor transfer of contaminated water without showing any problem, it is necessary to zoom up the water level trend of a tank. However, the service providing company didn't have any training for enlarging the monitoring screen or any handling manuals to refer to.	TEPCO should have taken efforts to frequently try to understand if the service providing company's way of working was acceptable or not in order to require them for improvement if necessary.
L: The excavation work started without collecting sufficient information beforehand. The trial excavation was done, but within the range of soil added after the earthquake. During a full scale excavation, an object was found under the ground, but the excavation continued without interruption at different areas. As a result, electric cable was damaged interrupting the power supply to Unit 4 and cooling of its SPFs stopped.		
It is likely that there are certain unidentified objects within the underground of the premises of Fukushima Daiichi. Meticulous preliminary surveys should have been done not to damage the underground object.	No trial digging was done before the excavation. Similar incidents occurred in the past but it wasn't shared by the entire organization.	—
M: Measurement of the radiation concentration of water discharged from System (B) of the ALPS showed abnormality. The measurement and transfer of water continued in parallel with each other, making 9 water treatment tanks in Area J1 contaminated.		
Appropriate facility design and operation control should have been made to avoid such a wide area contamination.	Design, construction and operation of a water treatment facility like ALPS are a technology of unknown domains. We should have acquired technical competency so that we can request for necessary functions required for identifying the affected range caused by malfunctioning of the facility.	—

Details on Accidents/Incidents at Fukushima Daiichi Nuclear Power Stations for the 4th Quarter

1. Delay in Disclosing the Results of Strontium 90 Analysis and Counting Omissions of total β Analysis

<Outline>

A total β radioactivity measurement, or measurement of all β nuclear species including strontium 90, and measurement of strontium 90 only should necessarily show the former larger than the latter.

In the seawater measurement at the bay last summer, the result was that the latter was larger than the former.

In order to identify the cause of this, for the samples taken during June to September, the result of the measurement for strontium 90 was left unfixed. The information, however, wasn't shared among the company. The variance wasn't disclosed to the public for almost half a year.

Last September, measurement of strontium 90 was resumed, this time using a new measuring instrument (β nuclear species analysis equipment). We thought the measurement data was trustable, but the results weren't disclosed to the public till the cause of the aforesaid reversal was identified.

When specimen having high radioactivity density was measured in last July, measurement result of strontium 90 was larger than that of all β nuclear species in some specimens.

This result was carelessly disclosed without any sufficient supporting explanation, on the next day that the seawater specimen data were disclosed, because we thought the cause wasn't the same.

◎ Technological Capability

The direct reason for the seawater specimen case was that the detection efficiency of the radiation measurement system[14] used for strontium 90 measurement, installed at the hot laboratory for the Units 5 and 6 was underestimated. Due to this the measurement data of strontium 90 was compensated too large.

Why was the detection efficiency underestimated that much?

- When the system was first introduced (in 2003), four confirmation tests on detection efficiency was done. The results had variance of 50 to 70% in terms of efficiency.
- The third and fourth results were almost the same, so the results of the fourth test were taken.
- As a result, the efficiency of the system became smaller than that of the previous system, but we failed to pursue the results in depth, just thought as the characteristics peculiar to the device.

[14] Ratio of radioactivity strength of standard radiation source to radiation strength obtained by the measurement result, using a standard radiation source whose radioactivity strength is known. (Suppose the radiation strength of a standard radiation source be 100 and the radiation strength obtained from the measurement result be 70, and then the detection rate becomes 0.7. Dividing back the measurement result with 0.7 obtains the true value.)

- Thereafter, no efficiency confirmation tests were added and the underestimated detection efficiency was kept in place.

Generally speaking, a calibration work is significant in that it determines the measurement accuracy of each device and, hence, should be done carefully. In the case of variances in results, or in the event of any change compared with the previous data, additional carefulness will be required to identify the cause of them.
When the device was first introduced to the power station in 2003, it is likely that the device was treated as a tool to just confirm the measurement data was below the detection limit and hence no due care was taken to the device in terms of its measurement accuracy.
On the other hand, the case of the specimen having high radioactivity density, the cause was omission in counting the analysis of total β.[15]
It is the principle that a specimen having high radioactivity density should be measured after diluting it, or using compensation. Before diluted measurement of a specimen of 1,000 cpm or above became a written rule in October, we had no clear criteria for high radioactivity density and no appropriate measurement had been made till then.

Currently, Fukushima Daiichi conducts measurement of high level radiation that no other power plants do. In the future, all measurement will be done after confirming the basic matters related with measurement on efficiency and procedure for measuring substances of high radioactive density not just following the extension line of the conventional methods and criteria.
By doing so, it can be expected that the entire organization can gain high level of measuring technologies for the entire measurement of radioactive substances.

◎ Ability to promote dialogue

Even when measurement results involves a certain inconsistency and hence should be judged as abnormal, if the causal analysis takes time, the announcement should have been made earlier even with a comment that the results needed to be clarified further.
When a problem is arisen, the technicians in TEPCO tend to want to explain the cause and countermeasures at the same time. The recipients of the report also tend to want to get them simultaneously.
Due to this, sharing of information in the company makes a delay, pushing us to the dead end where we are forced to make an announcement on the cause and the countermeasures simultaneously, making a further delay in disclosing information.
Speaking of ability to promote dialogue, we tend to understand it as related to the one done between local residents and TEPCO. Communication deficiency was also found in us.

[15] When radiation enters into a detection device, for a certain period subsequently, the device becomes unable to measure radiation even if new radiation enters into it, making the measurement result smaller.

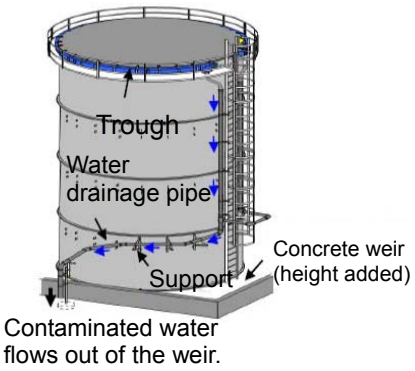
It is necessary for a sender of information to try to share information on cause and actions, even if it is of an interim nature, while for a recipient, to try to accept a flash report containing incomplete information.
The recipient, not just waiting for arrival of information, should try to get it by referring to the status to the sender regularly keeping it in mind that delay in arrival of information may be due to a problem on the part of the sender.

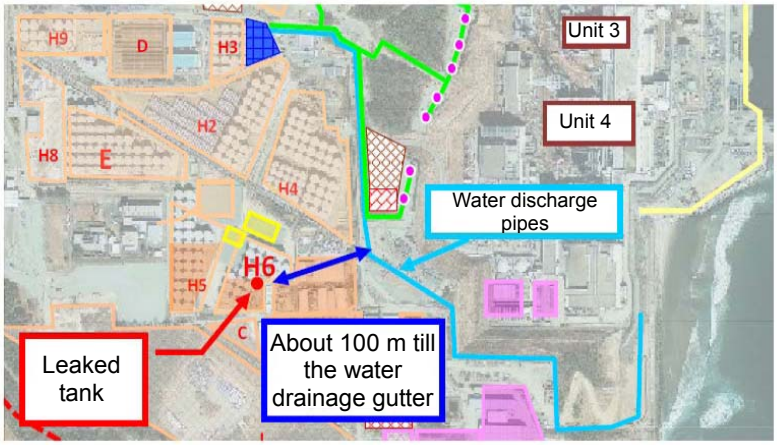
As to the counting omission, it is natural for local residents, regardless of the cause, to suspect any data whose result is unreasonable. We should have kept this in mind to have given thorough explanations to avoid it.
The data disclosed this time was 7 month old, but the record high values. We failed to emphasize on it, which was lack of consideration on our part.
We are determined to try to implement careful information disclosure standing on the eye line of the society in the future to come.

2. Leaking Out of about 100 tons of Contaminated Water from the Top of the Tank in the Area H6

<Outline>

Contaminated water was transferred to tanks in Area E. However, the worker didn't recognize that the water level of the tank wasn't increased, which resulted in the leakage of contaminated water out of weir. Moreover, the water level alarm of a tank in Area H6 was triggered, but he determined it as an error. Whether a transfer to a tank in the Area E was smoothly going on or not could be confirmed by checking the water level of the recipient tank. However, the monitoring was insufficient and the abnormality failed to be detected at its early stage. As to the operation of the valve in relation to the transfer, the investigation is still going on.





◎ Safety Awareness

Normally, a nuclear power station has multiple layers of facilities to contain radioactive substances within the plant. In the case of Fukushima Daiichi, as a result of the stopgap measures in forming facilities, there is only one wall existing between radioactive substances in the plant and outside environment.

Strongly keeping it in mind, it is necessary that contaminated water be transferred and stored with the care over and above that paid during the normal operation of the plant.

Currently, facility improvement is going on to remove such a weakness, but it will take additional time till existing facilities to be replaced by highly reliable ones. Till then, all employees of TEPCO and supporting companies should have high standard of safety awareness to address human management not to cause any leakage.
For the facilities established under the turmoil after the accident, their drawings should be prepared as soon as possible to understand the current status.
When a water level alarm is discharged, we must not determine it as an error carelessly without checking what is happening.

◎ Technological Capability

The contaminated water was originally meant to be transferred toward tanks in Area E. In order to confirm the water level of the tank increased in proportion to the transfer of contaminated water, it was necessary to zoom up the trend screen of the monitoring system appropriately. However, the service providing company didn't expertise to zoom it up, resulting in failure of detecting the abnormality at its early stage.
The cause was we were too busy in forming facility as soon as possible to give training to workers on how to enlarge the monitoring screen and other operations and to prepare detailed instruction manuals in addition to insufficient efforts for raising the operation skills.
When a water level alarm in the tanks of Area H6 is ON, actual water level of the tank should be visually checked. In no cases this should have been considered carelessly as an error of measuring devices.
In the future, it is necessary to prepare procedures and drawings in order to gain better understanding on the facilities and to enhance and confirm operator skills through training, etc.

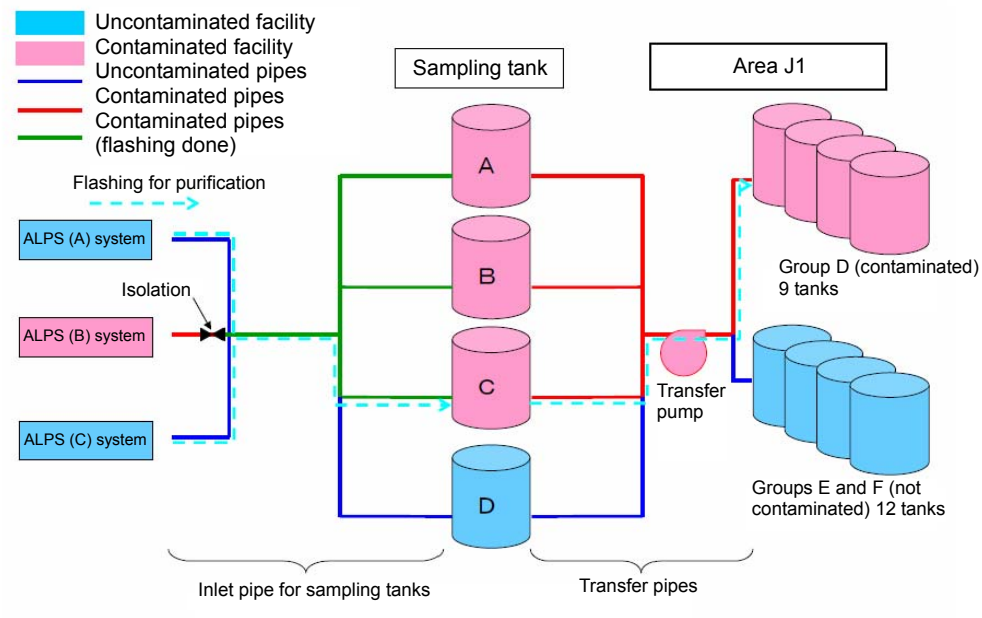
◎ Ability to promote dialogue

TEPCO should have kept more close relationship with its supporting companies by frequent exchange of opinions daily or by checking their actual works or by asking if they are in trouble or not in some way or another to improve the situation.

3. Contamination of Water Tanks in Area J1 due to Increased Radiation Density at the outlet of ALPS (B)

<Outline>

All water treated by ALPS is transferred into treated water tanks (this time in Tank J1) by way of sampling tanks.
As radioactivity density measurement of treated sampled water and transfer of the treated water to the receiving tank were done in parallel as a rule, expansion of contamination till the treated water tank couldn't be avoided when it was revealed that water in the sampling tank was contaminated.



◎ Safety Awareness

Though no flow-out of the plant occurred, spreading of contamination among the system can cause a delay in treatment of contaminated water, which is an important risk alleviation work. Appropriate monitoring system should have been established and facility design capable of early abnormality detection and prevention of spreading out should have been made in preparation for possible malfunctioning or failure in performing expected functions of the ALPS.

◎ Technological Capability

The ALPS failed to perform expectedly because carbonates including strontium 90 that should be removed in the preprocessing facility (cross flow filter) passed through the filter[16] without being caught by it effectively.

The past operation log showed a sign of the carbonates flown into the absorption tower appeared in mid-January when differential pressure indicated an upsurge. We were unable to consider it as an abnormality leading to deterioration of filtration performances.

The design, construction, and operation of water treatment facilities, including ALPS are the domains of technology we don't have sufficient experience with. If so, it is necessary to act carefully by asking for help of outside professionals who are familiar with it, in case of abnormality to the system.

In the near future, we should gain technological capability that allows identification of the cause of various abnormalities.

[16] Failure of the cross flow filter is under investigation.

In March 28, 2014, ‘an industrial disaster occurred in which a worker died while repairing foundation piles.’ In order to repair foundation piles broken in the earthquake occurred in the offshore Pacific Ocean of Tohoku region, soil was excavated to confirm the damage of piles as preparatory operation (about 1.7 m below the ground surface, as the place of disaster) in the empty container warehouse at the solid waste storage related facility. Just when leveling concrete found below the foundation was broken, the leveling concrete and soil were collapsed covering workers. We at TEPCO resolve to do our level best to prevent recurrence.

Analysis of the background factor related to this industrial disaster will be made in the next quarterly report, from the viewpoint of ‘safety awareness,’ ‘technological capability’ and ‘ability to promote dialogue.’

Attachment 3

Evaluation and Challenges of Action Plans

Current Action Plan		Evaluation and Challenges for FY2013
Measure 1	Measure 1-1 Upgrading safety awareness of the management	It is necessary to continue seminars and training sessions while deepening discussion between the top management and nuclear leaders to disseminate it among the entire organization.
	Measure 1-2 Nourishing nuclear power leaders	It is necessary to strengthen nourishing leaders through education and training sessions, seminars and the 360-degree evaluation. Especially necessary is which achievements have been made concretely in terms of safety enhancements.
	Measure 1-3 Dissemination of safety culture to the entire organization	In order to disseminate expectation of the top management and nuclear leaders to the entire organization, it is necessary to document it and issue it repeatedly. Improvements are required including appointment of a facilitator for effective communication on nuclear safety. It is necessary to continuously improve the situation while monitoring the discussion process and its results.
Measure 2	Measure 2-1 Setting up of internal regulatory organization	The Nuclear Safety Oversight Office has been established. It is necessary to continue monitoring and proposal by the Nuclear Safety Oversight Office and monitoring of the progress.
	Measure 2-2 Upgrading the roles of the middle management	We expected voluntary innovation of consciousness and behavior. Due to this, direct action to the middle management was weak and the middle management fails to perform its role as a leader for enhancing 'Safety Awareness,' 'Technological Capability' and 'Ability to promote dialogue.' It is necessary to increase communication opportunities between the middle management and the top management.
	Measure 2-3 Revising the positioning of chief engineers for nuclear reactors	Disposition is completed by giving a role of the Nuclear Safety Oversight Office simultaneously. It is necessary to confirm their safety awareness and activities as chief technician of nuclear reactors.
Measure 3	Measure 3-1 Establishing a job process that can accumulate defense in depth	As to the safety enhancement competition, a certain outcome was produced for a system of giving proposals. On the other hand, improvement should be made as it takes time in putting selected excellent proposals into practice.
	Measure 3-2 Establishing a process that utilizes safety information	Processing operator experience information is in progress as scheduled. In parallel with it, the improvement of evaluation processes is ongoing. In the future, it is necessary to share information with not a grasp of people, but with the Head Office and the plant broadly, to raise it so that people are conscious of it daily as a controlled item.
	Measure 3-3 Establishing a process improvement through hazard analysis	30+ cases extracted for analysis: In progress as planned. In the future, it is necessary to evaluate if each one has a nature of a cliff edge and to do decision making on pros and cons of implementing it.
su ca	Measure 3-4	A safety review activity started at Kashiwazaki-Kariwa. It

Current Action Plan		Evaluation and Challenges for FY2013
	Periodical improvement of safety evaluation processes	is necessary to feed back to other plants of the reflections made at the review activities and latest findings.
	Measure 3-5 Clearing of evidence-oriented business approach	No rule that could be clearly said as too much was confirmed in the manual texts. It is necessary to separate requirements that should be observed and expertise and procedures for the ease of revising the latter two. Change the action plan to reflect it.
	Measure 3-6 Centralized control of performance evaluation related to nuclear safety	Already incorporated in the job performance evaluation structure. Assured implementation of it and follow-up required.
	Measure 3-7 Enhancing competency for solving problem beyond the departmental boundaries	Computerization (IT) of the process of maintenance jobs is in progress as scheduled.
	Measure 3-8 Revising personnel transfer for deepening understanding among departments	Already incorporated in the structure of personnel transfer for deepening understanding among departments
Measure 4	Measure 4-1 Appointment of risk communicators	Planned number of risk communicators has been assigned. Future tasks include training, planned assignment, and nourishment.
	Measure 4-2 Risk communications	The way press meeting is held and webpages are improving to disseminate information. Issues of contaminated water and decommissioning works gain a lot of social attention and continued, appropriate and timely information giving will be necessary.
	Measure 4-3 Establishment of Social Communication Offices	Establishment of Social Communication Offices is completed. The SC Office is required to continuously confirm and correct any deviations of the way of thinking and judgment criteria of TEPCO from those of the society.
	Measure 4-4 Enhancing negotiating skills with regulatory authorities	As a premise of having communication with the regulatory authority, TEPCO should enhance its nuclear safety technologies before doing to.
Measure 5	Measure 5-1 Reorganization of emergency organization (Introduction of ICS)	Reorganization of emergency organization (Introduction of ICS) for the 3 power plants and the Head Office is done. It is necessary to learn ICS in detail and to clarify functions of each organization based on it.
	Measure 5-2 Strengthening operational aspect of emergency activities	It is necessary to repeat education, individual training and drills to extract challenges and improve the situation to enhance the skill to react against an emergency.
Measure 6	Measure 6-1 Revising plant organizations for normal times	The organization has been reformed in September last year and business year end evaluation ended in March this year. It is necessary to monitor activities of the revised organization to identify if improvements should be made or not, in preparation for the future reorganization. As to the system engineers, it is necessary to continuously educate them.
	Measure 6-2 Expanding the scope of emergency activities done by TEPCO employees	We are training our staff so that an accident can be handled by TEPCO employees directly. In addition to the competency in responding against an accident, the site competency should also be raised so that nuclear safety activities can be continuously uplifted.

Overall, each action plan can be evaluated as making a steady progress. It is necessary to continue

improvement based on the comments and recommendations by advisory and supervisory organizations in and out of TEPCO, which will be explained in detail henceforth.

Attachment 4

Revision of the 'Nuclear Safety Reform Plan' in and after FY2014

Nuclear Safety Reform Plan announced on March 29, 2013		Nuclear Safety Reform Plan in and after FY2014	
Measure 1 Reform from top management	Measure 1-1 Upgrading safety awareness of the top management	Measure 1 Reform from top management [AP22]	Measure 1-1 (Modified) Upgrading safety awareness of the top management and the entire organization
	Measure 1-2 Nourishing nuclear power leaders		Measure 1-2 (Unchanged) Nourishing nuclear power leaders
	Measure 1-3 Dissemination of safety culture to the entire organization		Measure 1-3 (Unchanged) Dissemination of safety culture to the entire organization
Measure 2 Enhancement of oversight and support for management	Measure 2-1 Setting up of internal regulatory organization	Measure 2 Enhancement of oversight and support for management [AP22]	Measure 2-1 (Modified) Improvement activities against comments and recommendations by Nuclear Safety Oversight Office on our monitoring activities
	Measure 2-2 Upgrading the roles of the middle management		Measure 2-2 (Unchanged) Upgrading the roles of the middle management
	Measure 2-3 Revising the positioning of chief engineers for nuclear reactors		Measure 2-3 (Unchanged) Revising the positioning of chief engineers for nuclear reactors The activities of the chief engineers of nuclear reactors will be subject to evaluation at the end of the business year
Measure 3 Enhancement of ability to propose defense in depth	Measure 3-1 Establishing a job process that can accumulate defense in depth	Measure 3 Enhancement of ability to propose defense in depth [AP23]	Measure 3-1 (Modified) Competition for enhancing skills of proposing safety enhancement methods
	Measure 3-2 Establishing a process that utilizes safety information		Measure 3-2 (Unchanged) Establishing a process that utilizes safety information
	Measure 3-3 Establishing a process improvement through hazard analysis		Measure 3-3 (Unchanged) Establishing a process improvement through hazard analysis
	Measure 3-4 Periodical improvement of safety evaluation processes		Measure 3-4 (Unchanged) Periodical improvement of safety evaluation processes
	Measure 3-5 Clearing of evidence-oriented business approach		Measure 3-5 (Modified) Revising roles of the manuals of the Head Office and of plants
	Measure 3-6 Centralized control of performance evaluation related to nuclear safety		Measure 3-6 (Unchanged) Centralized control of performance evaluation related to nuclear safety Actions subject to evaluation at the end of the business year

Nuclear Safety Reform Plan announced on March 29, 2013		Nuclear Safety Reform Plan in and after FY2014	
	Measure 3-7 Enhancing competency for solving problem beyond the departmental boundaries		Measure 3-7 (Unchanged) Enhancing competency for solving problem beyond the departmental boundaries
	Measure 3-8 Revising personnel transfer for deepening understanding among departments		Measure 3-8 (Unchanged) Revising personnel transfer for deepening understanding among departments To be evaluated at the end of business year
Measure 4 Enhancement of risk communication activities	Measure 4-1 Appointment of risk communicators	Measure 4 Enhancement of risk communication activities [AP24]	Measure 4-1 (Modified) Planned appointment and training of risk communicators
	Measure 4-2 Risk communication		Measure 4-2 (Modified) Risk communication (incl. improvement of the means for disseminating information)
	Measure 4-3 Establishment of Social Communication Offices		Measure 4-3 (Modified) Promotion and supporting risk communication activities
	Measure 4-4 Enhancing negotiating skills with regulatory authorities		Measure 4-4 (Done) First thing to do is raising technological capability (to be done by Measure 6-3, and Measure 6-4). Deleted from the controlled items (to be re-set as necessary).
Measure 5 Reorganizing emergency organizations in plants and the Head Office	Measure 5-1 Reorganization of emergency organization (Introduction of ICS)	Measure 5 Strengthening emergency response skills (organizations) at plants and the Head Office [AP23]	Measure 5-1 (Done) Done
	Measure 5-2 Strengthening operational aspect of emergency activities		Measure 5-2 (Unchanged) Strengthening operational aspect of emergency activities
Measure 6 Reassessment of non-emergency power station organization and enhancement of engineering capability for direct management	Measure 6-1 Revising plant organizations for normal times	Measure 6 Strengthening emergency response ability (individual) and site competency [AP23]	Measure 6-1 (Done) Done
	Measure 6-2 Expanding the scope of emergency activities done by TEPCO employees		Measure 6-2 (Unchanged) Expanding the scope of emergency activities done by TEPCO employees
			Measure 6-3 (Added) Strengthening site competency
			Measure 6-4 (Added) Strengthening engineering competency among site competency

[AP##] correspond with item number of 'TEPCO Group Action Plan for FY2014' (announced on March 31, 2014)

See the next page for Measure 6-3 and Measure 6-4 newly added.

<Measure 6-3 Strengthening Site Competency>
In order to strengthen our emergency response competency, direct management works are being employed (Measure 6-2). It is necessary to uplift our overall and broader technologies. As a basis of doing so, each site competency will be raised. In order to do so, what is important as a starting point is to faithfully try to see the actual site (*genba*), the actual items (*genbutsu*), and the actual reality (*genjitsu*), or the facilities and the people, in a series of jobs including facility design, construction, operation and maintenance. By doing so, safety control points need to be understood and skill to identify points to be improved in facilities and work procedures should be nourished. Based on the above, skill competency is defined as the following three competencies as shown in Action Guideline 4.
Skill competency shouldn't be relied on individuals' efforts, but will be achieved as organizational efforts to establish and implement nourishment plans for individuals.

[Action Guideline 4: Strengthening Training for Individuals]

To nourish skills to solve problems by identifying the truth in it, by raising sensitivity against sites (including facilities, people and society). Put special importance on *genba* (site), *genbutsu* (actual items) and *genjitsu* (reality) always to reinforce site skills (individual competencies).

Site competency is defined as follows, based on *genba* (site), *genbutsu* (actual items) and *genjitsu* (reality),

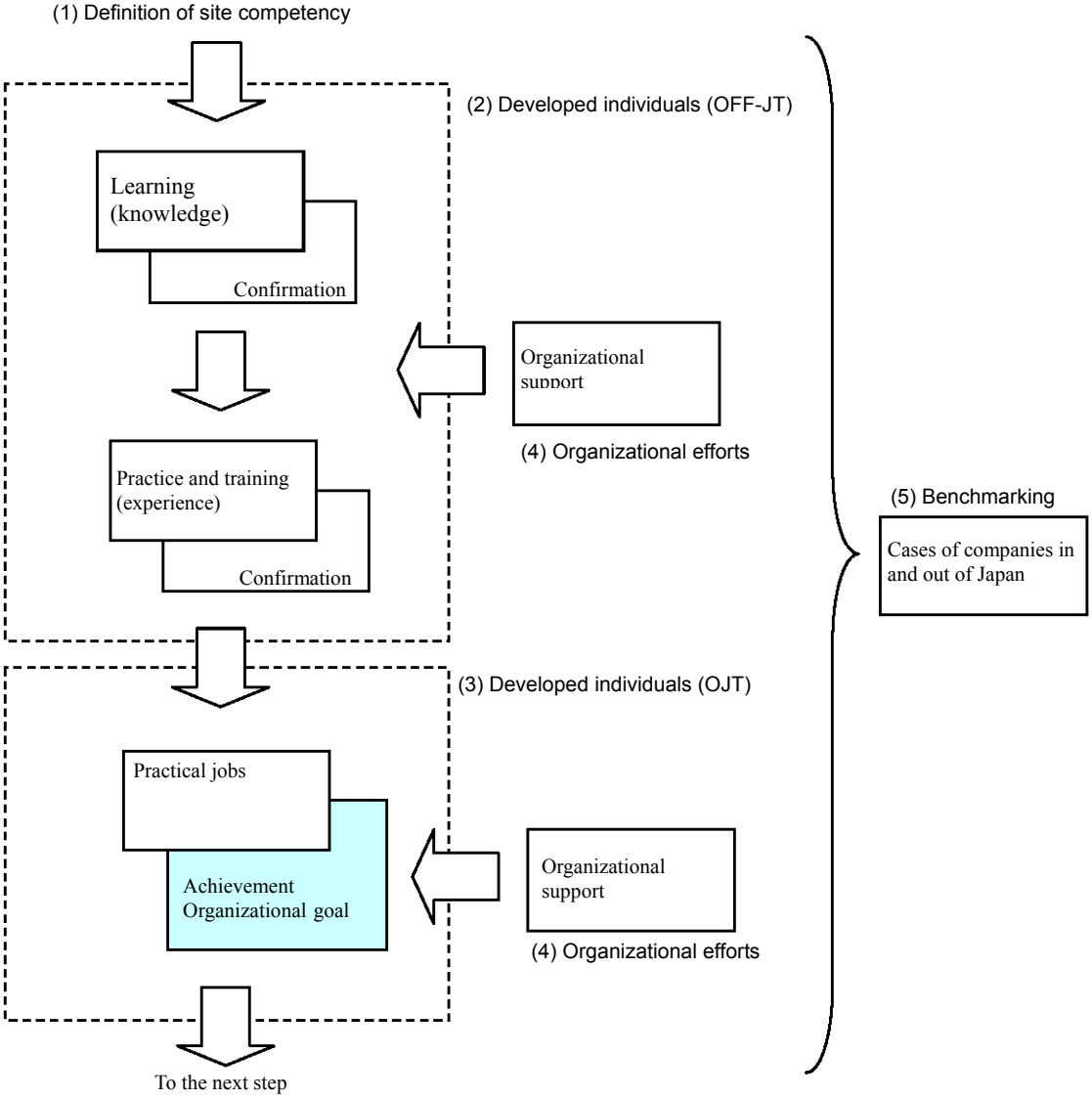
(1) Skills to understand, find out and evaluate site conditions thoroughly
(2) Skills to make and implement plans and measures
(3) Skills to continue improvements even after doing measures to raise safety and quality further

The site competency is a foundation technology for all technical competencies, namely nuclear safety technologies including defense in depth and Probability theory Risk Assessment (PRA). The site competencies will be raised not only through efforts of individuals, but also through organizational activities.

Methods for strengthening site competency will be promoted through making detailed action plans, but will be implemented following to the basic 5 processes.

(1) To define site competency for individuals and their jobs
(2) To give established knowledge and experience firmly settled through Off-JT
(3) To increase chances of practice in OJT to settle technologies in workers, and to address further improvements
(4) To clarify responsibilities and authorities for strengthening site competency, to revamp internal and external communications and to cooperate with each other for addressing it without just leaving it to others.
(5) To make cases of other companies in and out of Japan as benchmarks to introduce excellence

In addition, comprehensive programs will be formed including proactive personnel transfer for reinforcing technical competency (site competency) and HR development, taking advantage of difference in situation of plants.



Basic Process for Nourishing Site Competency

<Measure 6-4: Strengthening Engineering Competency among Site Competency>
Engineering competency is one of the site competencies that require comprehensive skills beyond the boundaries of knowledge, experience and organization, etc. Needless to say, engineering must be based on site, actual item and reality. The site competency required for engineering includes, as our own technology, the following two:-

- designing, analyzing and evaluation skills not heavily relying on plant manufacturers; and
- management competency that promotes jobs appropriately while maintaining job quality.

By enhancing designing, analyzing and evaluation skills, we will learn shortcomings of our facilities and how we operate them and raise our management competency, through which we will promote jobs appropriately, distribute resources effectively and enhance nuclear safety further.

Action Guideline for Nuclear Power Division

(General Manager of Nuclear Power and Plant Siting Division, President, Fukushima Daiichi Decommissioning Promotion Company)

Established on March 11, 2014*

[Action Guideline 1: Pursuing safety and quality without making compromise]

Aiming at achieving the world's highest safety and its supporting quality, we will do whatever we can do without making compromise, through observing regulations and rules as well as learning from past accidents and new findings and by having flexible thinking and strong mind.
Recognizing special risks peculiar to nuclear business strongly, we will enhance our safety consciousness and follow the 7 principles of the nuclear safety culture. By identifying all risks, we will strengthen continued actions for minimizing the possibility of the risks becoming reality and for alleviating aftermath of the damages. By sharing of learning, findings and experiences to the world, we will contribute to the nuclear safety in the world.

[Action Guideline 2: Establishing relationship of trust with people in the society]

In order to thoroughly protect the safety of the society, we will face seriously with questions and anxiety of people against nuclear power. Especially, based on the idea that 'nuclear power doesn't have absolute safety,' we will promote risk communication with people in the society to proactive and prompt sharing of information, to give meticulous explanation based on the situation and viewpoint of people to deepen the relationship of trust.
Especially, to inform the sense of levels and social trend from the viewpoint of the plant site area and the society, not just disclosing data and facts, and to inform our firm determination on keeping safety through plans and measures are important.

[Action Guideline 3: Improvement and innovation through originality and ingenuity]

We will decisively complete innovations and improvements through originality and ingenuity, not just sticking on conventional methods. All employees in Nuclear Power Division shall apply, develop and ensure carrying out of the 6 action plans (AP) stipulated in the Nuclear Safety Reform Plan based on the roles given to each individual. In addition, the 'Nuclear Safety Reform Plan' will be subject to a continuous revision, based on the *genba*, *genbutsu* and *genjitsu* principles to make the plan more realistic and effective.

[Action Guideline 4: Strengthening Training for Individuals and improvement of organization competency]

To nourish skills to solve problems by identifying the truth in it, by raising sensitivity against sites (including facilities, people and society). Put special importance on *genba* (site), *genbutsu* (actual items) and *genjitsu* (reality) always to reinforce site skills (individual competencies).

Site competency is defined as follows, based on *genba* (site), *genbutsu* (actual items) and *genjitsu* (reality),

(1) Skills to understand, find out and evaluate site conditions thoroughly
(2) Skills to make and implement plans and measures
(3) Skills to continue improvements even after doing measures to raise safety and quality further

The site competency is a foundation technology for all technical competencies, namely nuclear safety technologies including defense in depth and PRA. The site competencies will be raised not only through efforts of individuals, but also through organizational activities.

In addition, the following points will be reinforced in order to effectively function the organizational competency.

(1) Selection of information, enhancing information quality and prompt sharing of it
(2) Clarification of job responsibilities for each organization and responsibilities and authorities of the heads of each organization
Restricting own roles within a small range and being reluctant to cooperate with other groups and organizations are some of the shortcomings of the present Nuclear Safety Division. Heads of groups and organizations shall encourage giving support to other entities' problem solving efforts.
(3) Clarification of job responsibilities of each workers and specialist employees and utilization of project management methods in order to pursue jobs effectively for each line and to ensure achievement of divisional targets

March 31, 2014 revision
This was announced by only Nuclear Power & Plant Siting Division General manager at the time of enactment, but due to the Fukushima Daiichi Decontamination & Decommissioning Engineering Company's establishment on April 1, 2014, added the Fukushima Daiichi D&D Engineering Company President.

Targets for the Entire Organizations and State of the Organizations and Individuals that aims to become to Achieve the Targets (Words in blue color are those mentioned in the 'New Comprehensive Special Business Plan')

[Targets for the Entire Organizations]

'Keep the Fukushima Nuclear Accident firmly in mind; Today should be safer than yesterday and tomorrow than today; Be a nuclear power plant operator that keeps creating incomparable safety' (Our Determinations); and Safety of the nuclear facilities is being enhanced in terms of facility and operation (Result).

	Head Office	Power Plant	Safety awareness and safety culture	Technological competency	Ability to perform dialogue
Front line workers	Members + GM	Members + GM	[Measure 1] Try to talk about 'safety culture' in your own words or to do it by relating it to your daily life, not considering as a special thing. This makes people and organization always conscious about safety and makes them try to do some improvements.	[Measure 6] Training through direct management of TEPCO gives people some skills to respond to an emergency. It also makes them organize site competency, or the one required for people and organization to do jobs and makes them build and plan site competency development plans. This in turn upgrades nuclear safety by organization and people and possesses technological competency to put improvements into practice in a continuous manner.	[Measure 4] Strengthening technological competency makes workers recognize appropriately facility and operational risks their plant may have and makes them take and propose multiple measures. This in turn allows them to report risk information to decision makers, problems and issues are shared among them and the basis for communication competency are laid.
Middle management		General manager, deputy superintendent, U-superintendent	[Middle management] (1) Understands the plans and intentions shown by nuclear power leaders, communicates them to front line workers with their own words and incorporate them in a concrete action (business plan). (2) Encourages front line workers to do safety enhancement activities proactively, understands FACT always to make improvement activities revitalized appropriately and cancels communication gaps between front line workers and nuclear power leaders. (3) Enhances their technological competency, recognizes that human resource development is their own responsibility and upgrades site competency in terms of TEPCO's own engineering (incl. safety evaluation, anti-seismic design, facility diagnosis, IT, disaster prevention, QA/QC, and so on). (4) Implements reviews and improvements of themselves and their organizations periodically, through self assessments utilizing WANO (INFO) –PO&C and discussions on nuclear safety by layer and by organization.		
Nuclear power leaders	General manager	Superintendent	[Measure 1] In order to raise their awareness on safety, education and training sessions are given to nuclear power leaders, etc., and makes a feedback on '360 degree evaluation on action indicators.' In addition to this, implement self assessment, etc., on safety culture, leadership, and communication utilizing WAQNO (INFO)-PO&C. Through these activities, nuclear power leaders can raise their awareness on safety and as a result, safety awareness of the overall organization can be lifted up, in turn, nuclear safety is improved.	[Measure 3] Provides a chance to reinforce defense in depth skill for making proposal through 'competitions for strengthening proposal making competency for raising safety', gives instruction to the power plant for implementing necessary measures based on the analysis and evaluation of operation experience information in and out of Japan. By doing so, nuclear power leaders accumulate defense in depth in an organized, efficient and effective manner, address for enhancement of nuclear safety always and revitalize improvement activities for the entire organization aiming at enhancing nuclear safety. [Measure 5] Power plants and the Head Office have started operation of ICS, an emergency organization, and have held repeated drills on them. This makes site superintendents always confident in taking actions against emergencies promptly and appropriately.	[Measure 4] Nuclear power leaders have always more than one possible solution to any one of the problems of various kinds, and prioritize rationally things to do in order to minimize overall risks. By doing so, nuclear power leaders build a relationship of trust with local residents and people in the society. All employees always have a mind to avoid committing themselves in actions that could damage the relationship of mutual trust nor let others do such things.
	Top management		[Top management] Top management shall achieve [overall targets] through Measure 1 to 6 while emphasizing on the following three items. (1) To do concrete measures, to evaluate from various aspects of the degree of achievements, to decide the method of evaluating the effectiveness of it, to set detailed schedules and milestones, to understand (monitor) the progress while turning the PDCA cycle. (2) To owe responsibility in putting nuclear safety reform into practice and to strengthen organizations to strongly promote and follow up them. (3) To ensure responding to the comments given as third party evaluation by the Nuclear Reform Monitoring Committee, and other internationally recognized professional organizations.		

[Measure 2]
The Nuclear Safety Oversight Office monitors safety activities and safety culture from the front line workers to the top management and urges improvement to the corporate functions as well as reports and recommends to the Board of Directors. This makes the Nuclear Safety Oversight Office functioning as an internal regulatory organization and due to it, nuclear safety is enhanced.

[Measure 4]
Social Communication Division and risk communicators collects, analyzes and promotes prompt and appropriate disclosure of information on latent risks.

Attachment 6

Reference

Status of Investigating Unconfirmed and Unclear Items related to the Fukushima Nuclear Plant Accident

As reported in the previous Nuclear Safety Reform Plan Progress Report (2nd Quarter for FY2013), we have been working continuously for analyzing, reevaluating, and onsite surveys for solving unconfirmed and unclear items in the Fukushima nuclear plant accident. We will continue summarizing the result and will disclose it in a stepped manner.
So that we, as the party who caused the accident, can contribute to the improvements of nuclear power engineering and nuclear power safety, we will share these investigation results widely with international audiences as common knowledge and findings. Further, we will fulfill our responsibilities by making every effort to further clarify any doubt about this accident.

(1) Status of Unconfirmed and Unclear Items

Status of the investigation and examination on unconfirmed and unclear items was first filed in a form of the 1st Progress Report[17] (hereinafter referred to as Reports on Unconfirmed Items) separately and was published on December 13 last year. Among 52 cases of unconfirmed and unclear items, 2 cases were reported as interim reports at the Atomic Energy Society of Japan in the spring of 2014 for hearing opinions.

① Enhancing Accuracy of Injecting Water into Reactors using Fire Engines

When the accident occurred, fire engines were deployed to inject water to reactors to cool them down. The fact that there was a possibility of leaking a part of the water out of the reactors has already been disclosed in a separate report. We evaluated the ratio of injected water actually reached to the reactors using the paths of the leakage and piping routes in reactor buildings and turbine buildings that were extracted in our examination. As a result, it was found that 20 to 50% of the water was actually injected to the reactor. In addition, water discharge pressure from the fire engines matters greatly to the evaluation result. It was also found that there were periods when almost no water had reached to the reactor, due to the possibility that the water discharge pressure used was lower than preconditioned fire engines.

② Cause of Stoppage of the Reactor Core Isolation Cooling System (RCIC) of Unit 3

The reactor core isolation cooling system (RCIC) of Unit 3 stopped at around 11:30 on March 12, 2011. An investigation was made to the cause of it. The result so far confirmed how the RCIC was used, how it was monitored and operated at the main control room (MCR) and that power supply was available. Thus, it was found that it is likely that a certain electrical stopping signal was inputted. However, the water level of the reactors and actual measurement data including steam pressure and flow rate, etc., of RCIC, acting as stopping signal didn't reach to the set value that a stop signal was sent. We will continue our

17 The first progress report on estimating the conditions of cores and containment vessels for units 1 to 3 in Fukushima Daiichi Nuclear Power Plant and examination on unclear issues

investigation.

(2) Field Investigation

We are working for field investigation including the containment vessels in a planned manner, using endoscope for industrial use and robots, while paying meticulous care not to cause loss of any evidences due to decommissioning works.

① Result of Investigating Water Level in the Suppression Chamber of Unit 2

An investigation was made using robots in the suppression chamber (S/C) during 3 days from January 14 to 16, 2014. Non-contact measurement was done by applying ultrasonic waves from the exterior wall of S/C to measure the water level in the chamber. The results are shown in Table 1 below. The values shown in this table shows that the water level is slightly higher than the half the height of the S/C. It is known that the pressure in a containment vessel was slightly higher than the atmospheric pressure. We think the difference in water level between the torus room and the S/C derives from the pressure difference. (See Fig. 1.)

It is known that the water level in the flask part of a containment vessel (D/W or dry well) is around the same as the height of the ventilation pipe connecting the S/C and the D/W. The fact that water won't come higher than the water level, that, for S/C, while water continuously flows into it from the D/W, the water level in the S/C is about the same as outside of the torus room, not going higher than this level, we think we have confirmed that sources of the leakage must be lower than the water level in the S/C, probably near the bottom of the S/C or somewhere around the pipe connected at the bottom of it.

Table 1: Result of Water Level measurement in the S/C of Unit 2

Date	January 14	January 15	January 16
Water level in the S/C	approx.OP3,210	approx.OP3,160	approx.OP3.150
Water level in the torus room (reference)	approx.OP3,230	approx.OP3.190	approx.OP3.160
Difference	approx.20 mm	approx.30 mm	approx.10 mm
Measuring method	Direct measurement of the underwater structures		

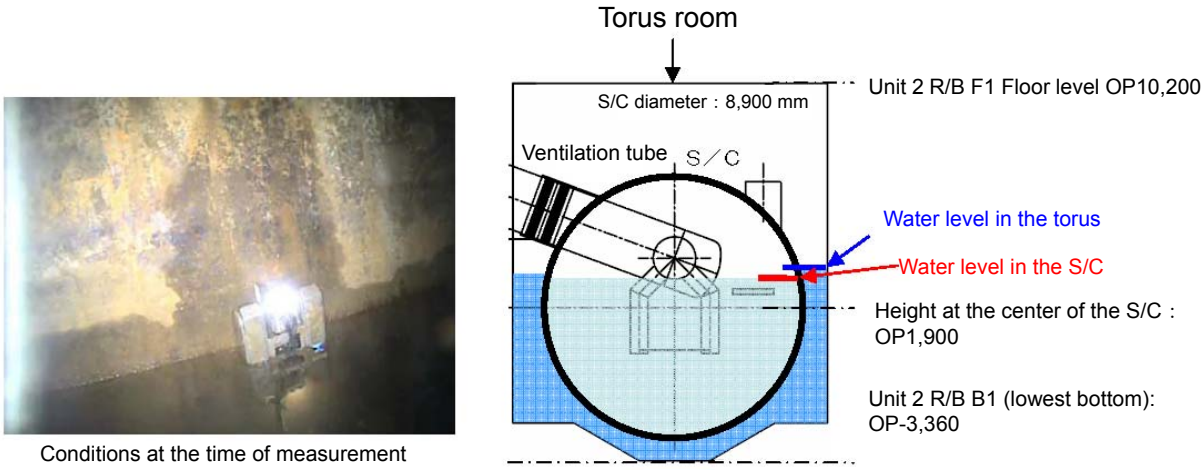
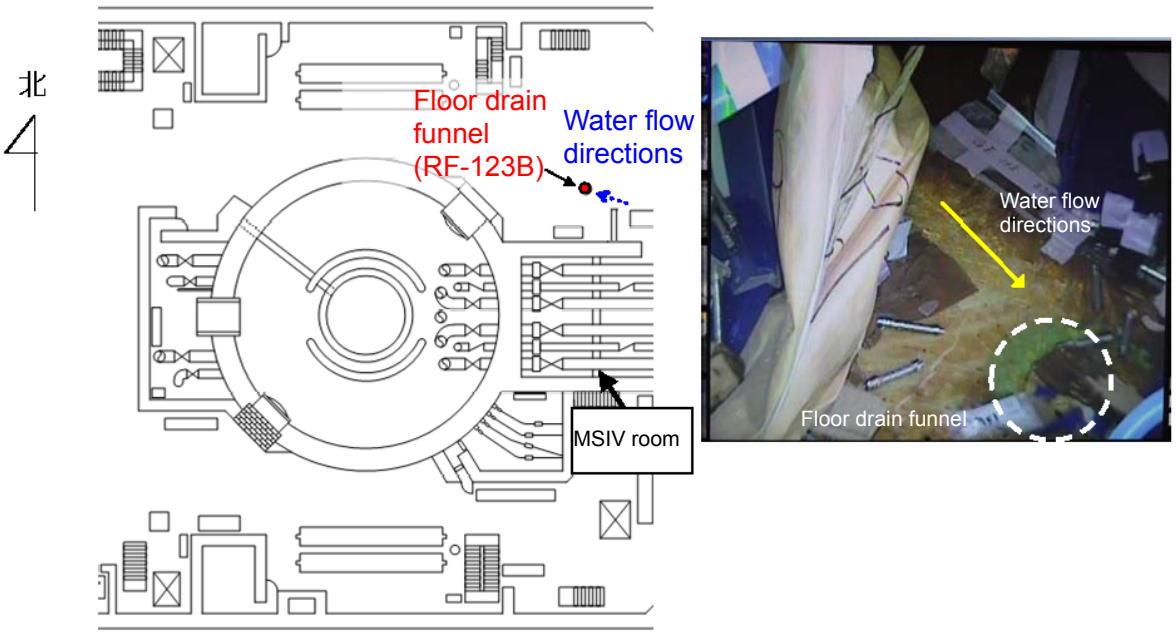


Fig.1: Water Level Check in the S/C of Unit 2

② Water Flow around the Main Steam Isolation Valve (MSIV) Room on the 1st Floor of the Reactor Building of Unit 3

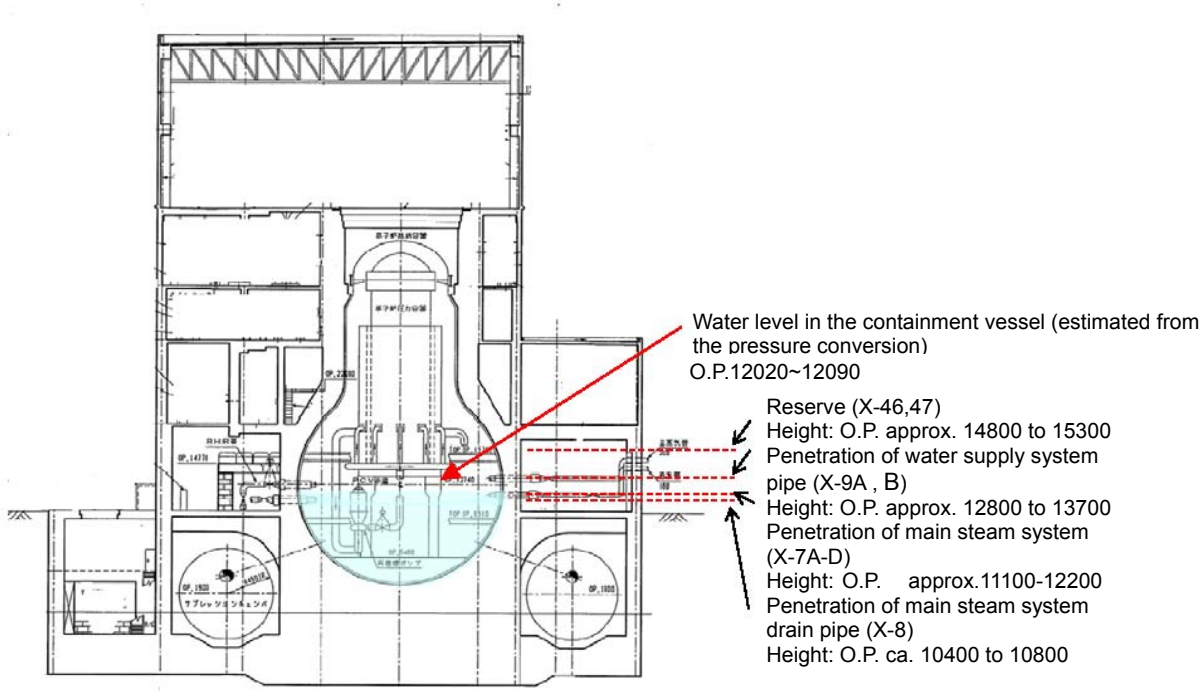
A TEPCO employee found water flown from the main steam isolation valve room on the northeast area on the 1st floor of the reactor building of Unit 3 to the floor drain funnel nearby, at around 14:40 on January 18, 2014, while he was monitoring a camera of the robot used for removing debris from the Unit 3 reactor building. (See Fig. 2.)

After radioactive analysis, we assume it was water leaked out from the containment vessel. The water level of the containment vessel of Unit 3, as indicated in Section 5.3 of 'Core Condition of Units 1 to 3 of the Fukushima Daiichi Nuclear Power Plant' published on November 30, 2011, was estimated by the differential pressure between the D/W and the S/C and we presumed that water level must be somewhere around OP12,000. Fig. 3 shows a cross-sectional view of the Unit 3 reactor building. It has main steam pipe at the height of around OP12,000. As it is likely that water was leaked out of the area where the pipe penetrates the wall of the containment vessel, we believe that it was confirmed that the water level in the containment vessel was around the same height. As such, we believe, the leaking hole wouldn't be large enough to affect significantly to the formation of water level at the lower part of the S/C and the D/W.



Schematic Plane View on the 1st Floor of Unit 3 Reactor Building

Fig. 2: Water Flow of the MSIV Room on the 1st Floor of Unit 3 Reactor Building



Cross Section of Unit 3 Reactor Building

Fig. 3: Water Level in the Unit 3 Containment Vessel estimated from the Water Flow