Nuclear Safety Reform Plan
Progress Report
(FY2013 3rd Quarter)

February 3rd, 2014

Tokyo Electric Power Company, Inc.

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Introduction

Again, we would like to present our heartfelt apologies for the tremendous distress, torment, and hardship that the Fukushima Nuclear Accident and recent problems with contaminated water have inflicted upon the residents of communities around the power station and on society at large. TEPCO is united as we continue to work together to maintain the stable state of Fukushima Daiichi Nuclear Power Station, and we will strive in our efforts as we work to "provide damage compensation," "decommission and decontaminate" and "restore Fukushima" so that those who evacuated are able to return home and all Japanese citizens can live with peace of mind.

On March 29, 2013[1], TEPCO compiled the "Fukushima Nuclear Accident Summary and Nuclear Safety Reform Plan", and we are currently implementing the Nuclear Safety Reform Plan. Progress made is verified quarterly and notification is provided of the results. Here, we give an account of the progress made during the third quarter (October ~ December 2013) of the fiscal year.

In the third quarter, although results to a certain extent have been found in measures aimed at reform, both internal and external monitoring and assessment organizations have stringently pointed out that the nuclear safety reform plan is still insufficiently imbued and established within our organization.

For this reason, with the aim of raising safety awareness, bolstering field capabilities and strengthening communication abilities, managers and nuclear leaders at the Head Office and power stations will exercise stronger leadership and work to improve management practices so as to make the safety culture more widespread as well as to implement and instill reforms.

The principal points highlighted in this report are:

◎Progress of safety measures concerning facilities and operation at each power station

①Fukushima Daiichi Nuclear Power Station (NPS)

We have advanced emergency countermeasures and comprehensive measures in a preventive and multi-tiered fashion based on the three principles of "eliminating the source of contamination," "keeping ground water away from contamination sources," and "preventing contaminated water leakage."

- To accelerate and improve the reliability of measures addressing issues associated with contaminated water and tanks as well as reactor decommissioning work, we formulated emergency safety measures and have promoted comprehensive measures company-wide.
- At Unit 4, we started to remove fuel from the spent fuel pool approximately one month

[1] Hereinafter, dates displayed without a year are understood as the year 2013.

earlier than initially planned. This marks the transition to Phase 2 of the Mid-and-Long Term Roadmap towards Decommissioning.

- TEPCO decided to establish an independent division for the organizations involved in reactor decommissioning and contaminated water countermeasures as of April 1, 2014 in order to clarify and centralize the framework for responsibility related to reactor decommissioning and contaminated water countermeasures.

②Fukushima Daini Nuclear Power Station (NPS)

- The transfer of fuel from inside the Unit 2 reactor to a spent fuel pool began in September, and we completed the transfer of all fuel in October.
- A visual inspection of the Unit 2 reactor core internals was conducted from November to December, and no abnormalities were confirmed in any of the equipment inspected.

③Kashiwazaki-Kariwa Nuclear Power Station (NPS)

- Work is underway on the installation of filtered venting equipment.
- An application was presented to verify compatibility with new regulatory standards, and TEPCO is currently responding to the review.

◎Progress on Nuclear Safety Reform Plan (Management)

①Reform from Management

As a result of repeated workshops and forums, discussions about nuclear safety among management and nuclear leaders[2] have become more lively.

②Enhancement of Oversight and Support for Management

Based on the results of monitoring activities of the Nuclear Safety Oversight Office, suggestions for improvement of safety culture and organizational management have been accepted.

③Enhancement of Ability to Propose Defense in Depth

Various measures to enhance capability for proposing defense in depth have been implemented. We are conducting the Safety Improvement Campaign, reviews of operational experiences from both Japan and other countries and performing hazard analyses.

④Enhancement of Risk Communication Activities

Press releases and the website have been improved. Information transmission has been

[2] Executives and corporate officers responsible for nuclear power, director of the Fukushima Daiichi Stabilization Center, power station directors and construction directors, Head Office nuclear power-related general managers and anyone equal to or above these ranks.

enhanced by using videos, computer graphics, and English-language releases in order to deal with the issues of contaminated water and Unit 4 fuel removal.
In addition, we have worked to rectify the approach that "decisions to announce risks should be deferred until data and facts constituting the ultimate basis are available"

⑤Reform of Power Station and Head Office Emergency Response Organizations
Emergency structure based on the ICS[3] has been organized and gone operational.

⑥ Reassessment of Non-Emergency Power Station Organization and Enhancement of Engineering Capability for Direct Management
Through the deployment of system engineers according to the status of each power station and directly managed work, technical capabilities of individuals and organizational capabilities of teams will be improved

On December 13th, "Progress Report No. 1" was released, which chronicles the status of review of these unidentified and unexplained matters about the Fukushima Nuclear Accident. Our efforts to clarify what happened, such as by understanding how the reactors behaved during the accident and other areas through systematic field investigations and simulated analyses, will improve safety, which is our duty as a nuclear operator. The information will also aid in the process of reactor decommissioning, and reform the safety of nuclear power.

[3] Incident Command System (system for issuing field command during a disaster, which has been adopted as the standard in the U.S. and elsewhere)

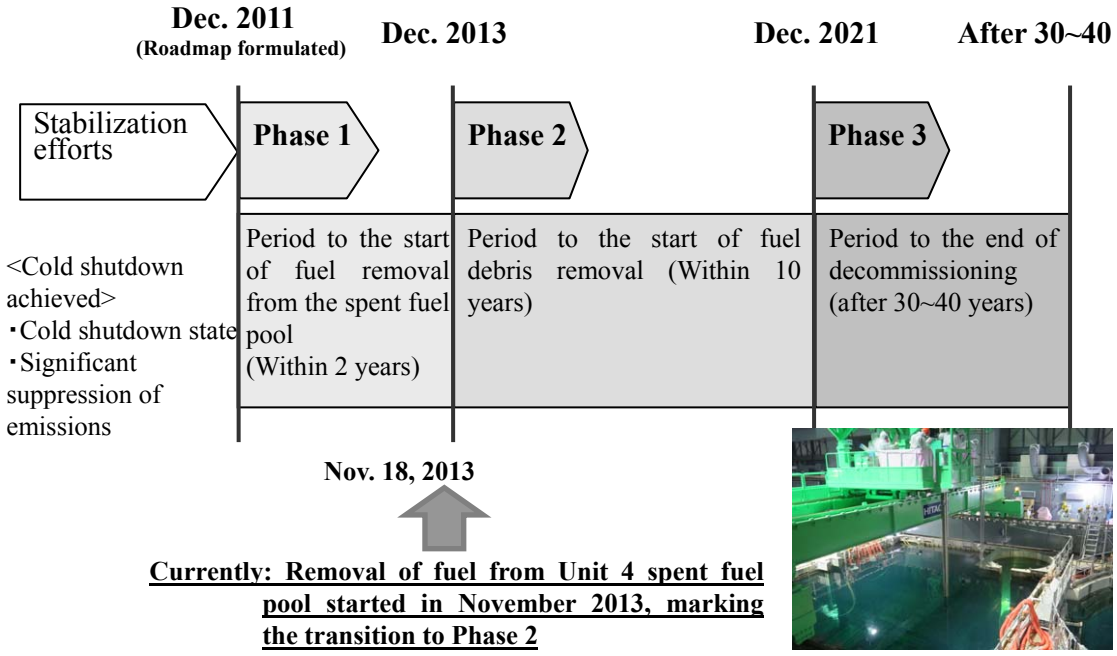
1. Progress of safety measures concerning facilities and operation at each power station

1.1. Fukushima Daiichi Nuclear Power Station (NPS)

(1) Removal of Spent Fuel from Unit 4

At Fukushima Daiichi NPS Unit 4, the removal of fuel stored in the spent fuel pool, which is next to the reactor, began on November 18th of last year. The fuel removed is taken to a common pool, which is a facility in a separate building on site, and will be centrally stored. Of the 202 fresh fuel and 1,331 spent fuel which had been stored in the spent fuel pool, the removal of 22 fresh fuel and 110 spent fuel was completed as of December 31st. Our aim is to complete the fuel removal work by the end of 2014.

The removal of fuel from the spent fuel pool is a significant milestone in moving the decommissioning work forward. We were able to commence this work one month earlier than initially planned thanks to the cooperation of everyone involved, and we believe that having made the transition to Phase 2 of the Mid-and-Long Term Roadmap towards Decommissioning was a major breakthrough.



This removal work has to be performed in the post-accident work environment which differs from ordinary circumstances, so work procedures were formulated after potential risks were deduced based on differences in the work environment and include equipment to prevent contamination due to radioactive material and any impact from debris which had fallen into the pool when the explosion occurred at the building. We also had a third-party international expert group, the International Research Institute for Nuclear Decommissioning ("IRID"), conduct a review of our preparations.

Furthermore, workers have been provided with classroom study and training, including training in operating the actual equipment so that they may acquire the skills necessary for fuel handling. Workers, whose skills have been certified, are performing the work in a safe and deliberate manner.

(2) Status of Efforts Concerning Measures to Address Contaminated Water

Amid the severe work environment and constraints due to limited time since the accident, we were not able to extricate ourselves from assembling and operating stopgap facilities. We are taking seriously what has regretfully resulted from weak quality controls and management as well as insufficient communication, and will fundamentally improve these areas.

To address the problems of an outflow of contaminated water into the power station port and leakage of contaminated water from tanks, we reinforced the framework with the establishment of the Contaminated Water and Tank Countermeasures Headquarters, under the direct control of the president, on August 26 to fundamentally remedy the situation.

The Contaminated Water and Tank Countermeasures Headquarters is comprised of 15 teams promoting, among other things, the urgent and fundamental reinforcement of tank management, intensified analysis and risk management, acceleration of mid-to-long term measures, and incorporation of knowledge from experts invited from inside and outside Japan. While being advised and guided by project management leaders, each of the respective teams has implemented project management that clearly defines the objectives, goals, scope, schedule and other designs, and produced specific results. The construction of this system forms the foundation for improving the current situation “while thinking outside the box.”

Personnel involved with contaminated water and tank measures will be reinforced not only with staff from the Nuclear Power Division, but also from other divisions as well as outside personnel possessing knowledge and experience so that ultimately the force will be augmented with 220 people. This organizational strength will be exerted to shed light on overall risks concerning the issue of contaminated water as well as to steadily implement preventive and multilayered countermeasures.

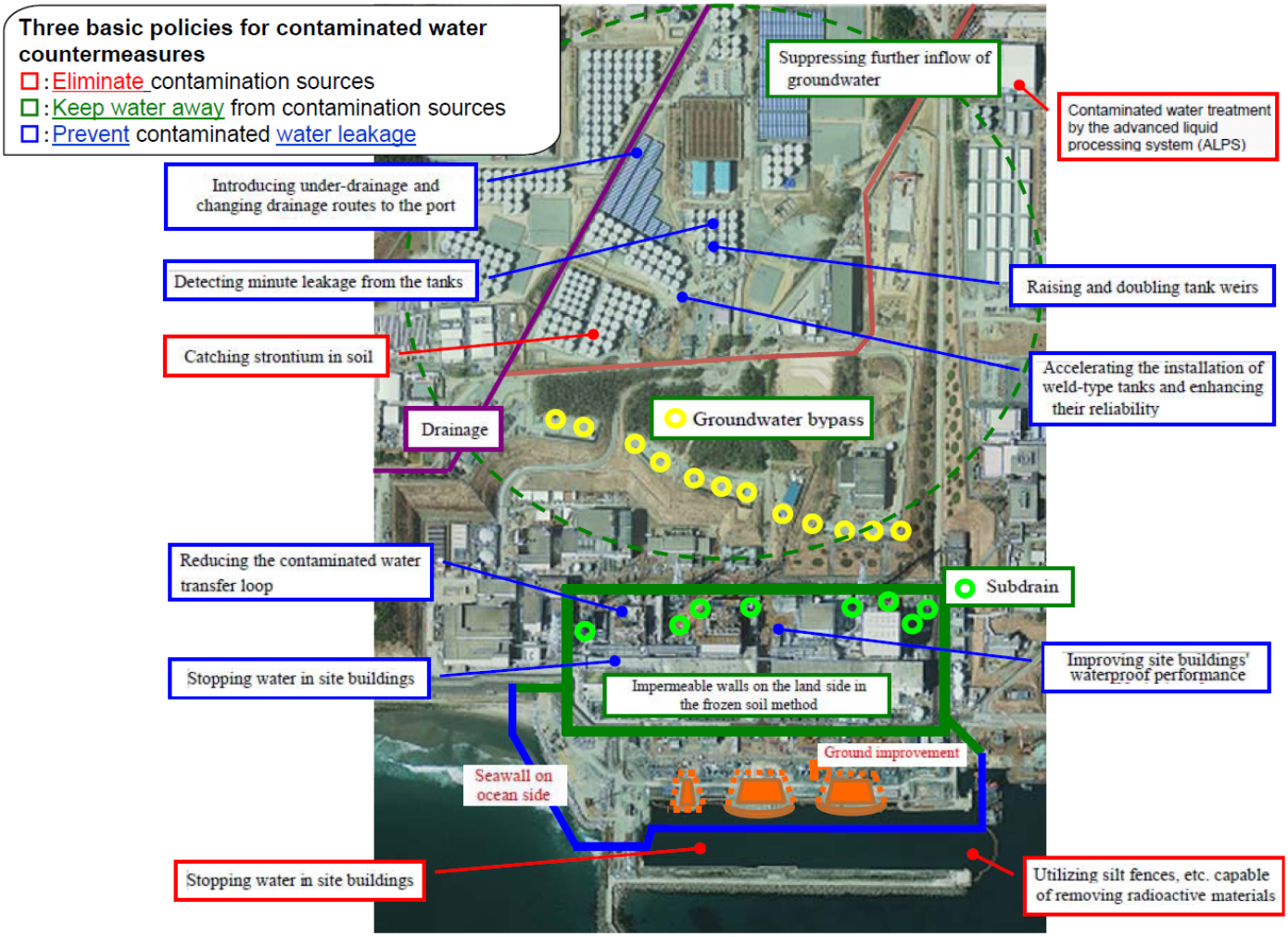
At the same time, we will plan and move to successively implement measures in accordance with the three basic policies of ①“eliminating the source of contamination,” ②“keeping ground water away from contamination sources” and ③“preventing contaminated water leakage.” ＜Reference 1＞

Furthermore, in November, we formulated and set about implementing emergency safety measures for revamping the work environment aimed at accelerating and improving the reliability of field work, augmenting management and the framework for ensuring safety and

quality, and creating permanent facilities for steadily advancing long-term decommissioning work. ＜Reference 2＞

＜Reference 1＞　Contaminated Water Countermeasures and Field Progress

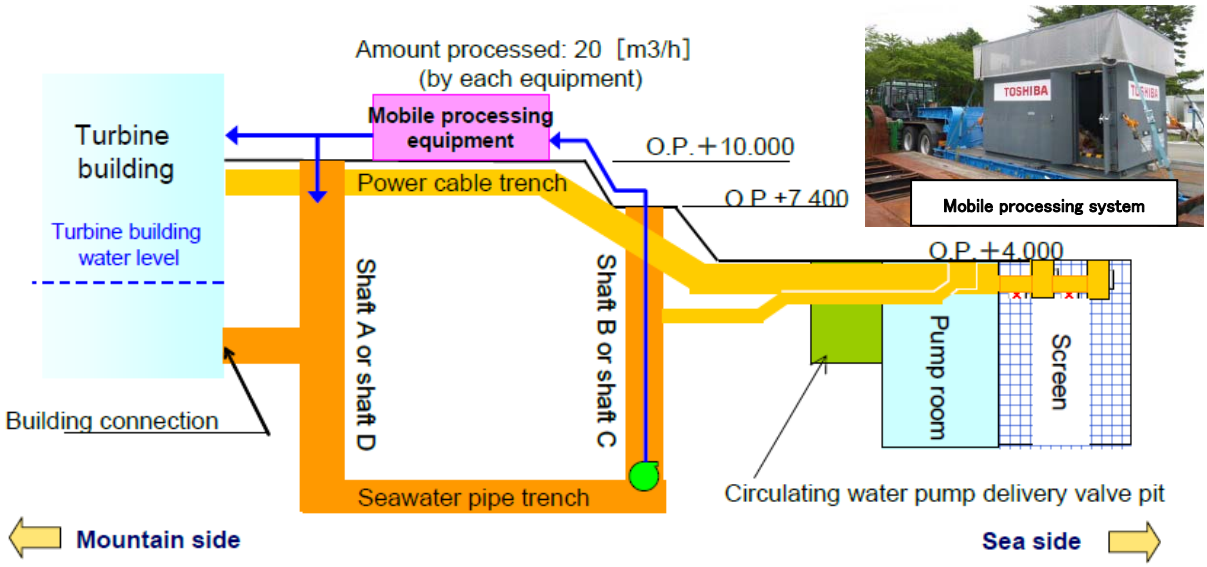
(1) Eliminate contamination sources	(2) Keep water away from contamination sources	(3) Prevent contaminated water leakage
Measures taken to date: • Drawing up and blocking contaminated water from the trench • Contaminated water treatment by the advanced liquid processing system (ALPS) • Higher performance ALPS at national expense etc.	Measures taken to date: • Groundwater bypass • Drawing up water from the well (sub drain) near the reactor building • Land-side impervious wall by soil freezing method at national expense • Paving of the building on the sea side etc.	Measures taken to date: • Ground improvement by water glass • Sea-side impervious wall • Additional installation of tanks (replacement of bolt-tightened tanks to welded tanks) etc.
Major additional measures: ✓ Increase of ALPS ✓ Tank water leakage countermeasure (collection of strontium contained in the soil) ✓ Treatment of seawater in the port etc.	**Major additional measures:** ✓ "Wide-area paving (surface lining)" or "additional lining and inner paving" * In consideration of radiation dose reduction by ground surface decontamination, etc. ✓ Installation of an eaves through to the tank top	**Major additional measures:** ✓ Acceleration of the installation of welded tanks ✓ Large-scale tsunami countermeasures (watertight doors to reactor buildings, etc.) ✓ Prevention of contaminated water leakage from the reactor building ✓ Reduction of the contaminated water transfer loop, etc.



①Measures to Eliminate Major Sources of Contamination

・Pumping out contaminated water and sealing trenches [Emergency Measures Team]

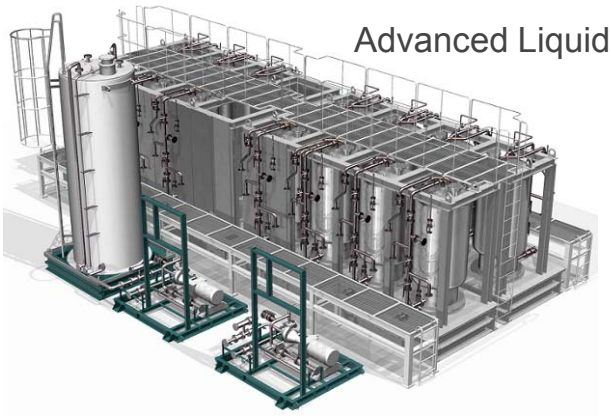
Work to seal seaside power cable trenches, which are one type of trench highly suspected of being a source of contaminated water leakage, has been underway since August 2013. Filtering of contaminated water in trenches began in November and has been underway since with the aim of cutting off, draining and sealing the main seawater pipe trenches.



Install an underwater pump in the shaft on the sea side of the Units 2 and 3 main trench (seawater pipe trench) to pump up accumulated water and transfer water purified with the mobile processing equipment to the shaft on the mountain side.

・Filtering contaminated water using the Advanced Liquid Processing System [Contaminated Water Treatment Enhancement Team]

Preparatory work began in November to start operation of the high-performance Advanced Liquid Processing System in mid-FY2014 and to augment the system in early in FY2014, and these operations are continuing.

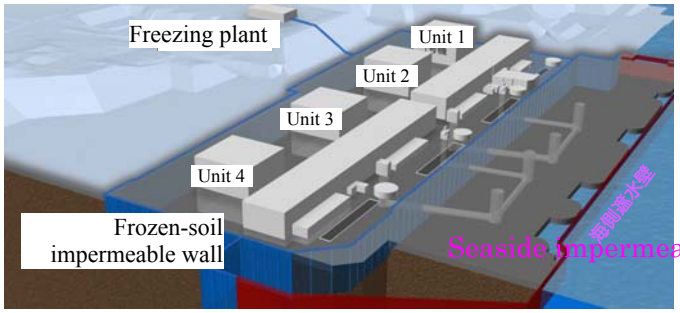

Advanced Liquid Processing System

②Measures to Keep Groundwater Away from Contamination Sources

・Frozen soil-type land side impermeable wall [Contaminated Water Countermeasures Review Team]

Preliminary work began in November. Currently, verification testing is being conducted on site.

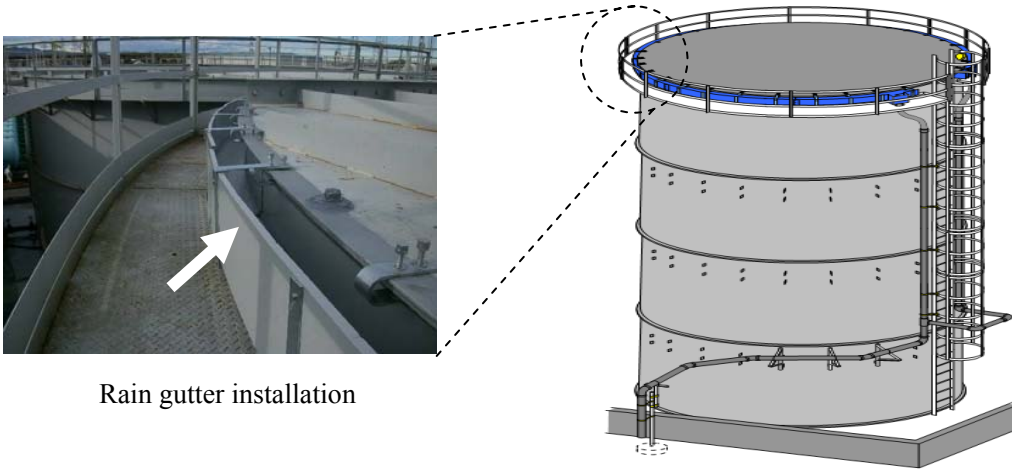
Construction of the main unit will begin in June of this year with the formation of frozen soil scheduled to start in March 2015.



③Measures to Prevent Contaminated Water Leakage

・Tank Reliability Enhancement Measures [Tank Reliability Enhancement Team]

The installation of water gauges on flange tanks was completed at the end of November. Water gauges are being installed on each of the existing welded tanks. Work to install rain gutters on tanks began in late November and is currently underway (completion scheduled for the end of March 2014).



Rain gutter installation

・Tank Enlargement [Tank Construction Management Team]

Orders were placed for finished welded tanks (approx. 70,000t) over the period from November to December 2013 so as to secure 800,000 tons of storage capacity, and preparations are being made to continue placing orders for welded tanks, those which can be welded on site. In addition, a plan is being drafted to replace flange tanks with welded tanks.

Replace

Circular steel tank
(Flange joints)

Circular steel tank
(Welded)

＜Reference 2＞　Emergency Safety Measures(November 8 publication)

＜Emergency Safety Measures＞

i) Fundamentally improve the working environment, and increase the reliability and pace of work in the field

- Site decontamination (reduce exposure dose, expand area where full-face masks are omissible)
- Establish new office building and large break areas
- Increase amount set aside in design for bonuses in worker labor expenses etc.

ii) Ensure safety and quality through improved management and reinforced framework

- Establish “safety & quality officer” to coordinate safety and quality management departments under the general manager of the Nuclear Power & Plant Siting Division
- Augment countermeasure personnel (increase of 220) by mobilizing all internal and external resources etc.

iii) Improve facility reliability with measures to construct permanent facilities

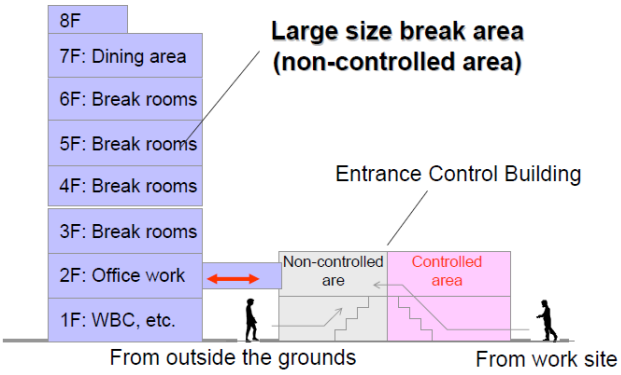
- Establish new central monitoring room, replace power equipment, improve site infrastructure etc.

iv) Appropriately manage contaminated water

- Preferential facility measures away from same type of tank, taking into account contaminated water leak source, and continue to augment patrols
- Implement measures to address rainwater, including preventing overflows from tank weirs and curbing inflow of rainwater into weirs
- Reliably implementing countermeasures, including expanding storage capacity with larger tanks, replacing old tanks with highly-reliable welded tanks, and augmenting the Advanced Liquid Processing System (ALPS), etc.

Illustration of building interior

(conceptual image)



Lateral view of building

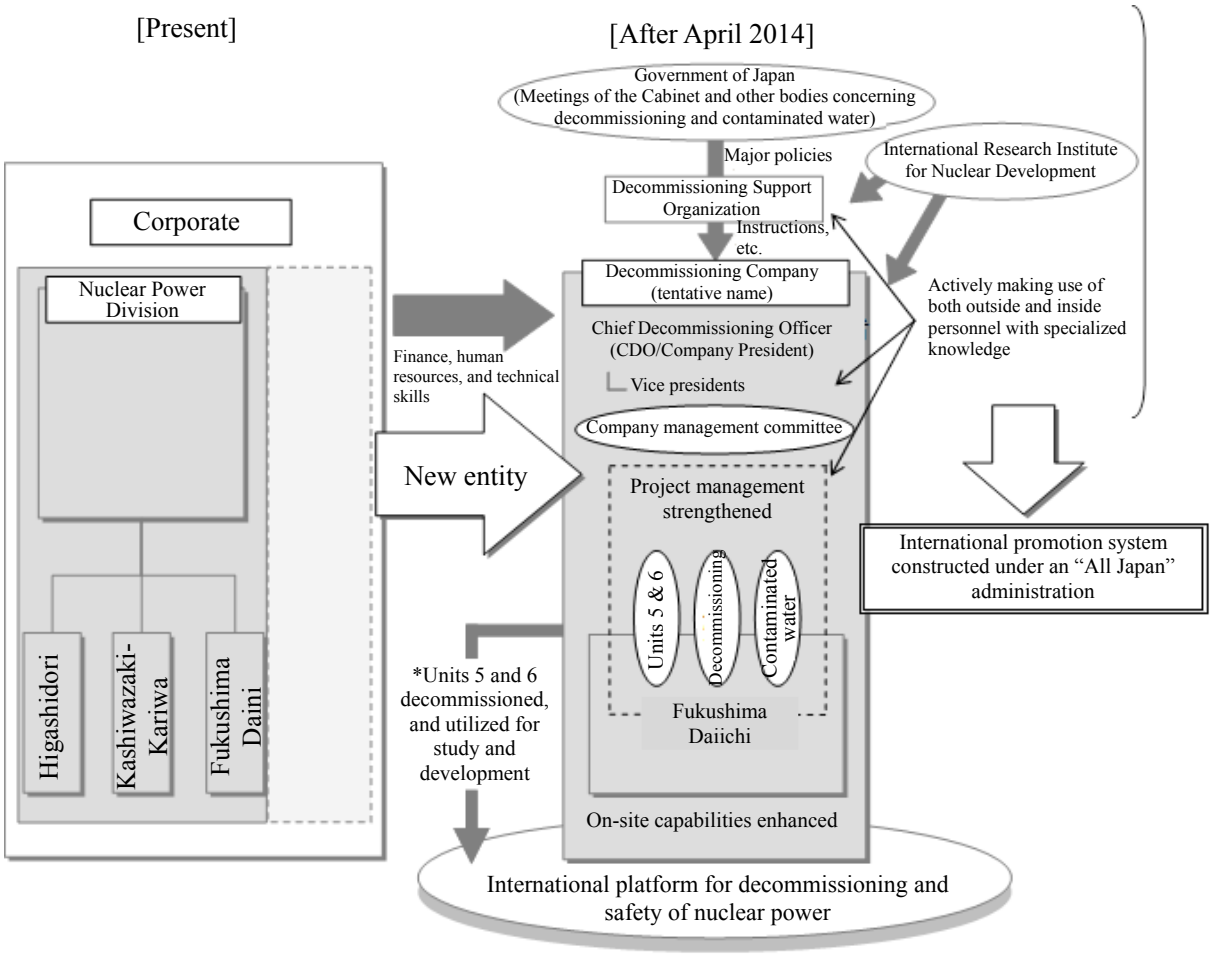
Tank patrol

(Geiger counter is used to check for minute leaks from flanges)

(3) Clarification of Responsibility: Establishment of Decommissioning Company (Tentative Name)

Based on a proposal put forth by the Nuclear Reform Monitoring Committee regarding reactor decommissioning and contaminated water countermeasures that “responses should be meted out with prompt and dynamic reassessments of the organization needed and commitment of personnel resources,” TEPCO decided to establish the Decommissioning Company (tentative name), an independent division for the organizations involved in reactor decommissioning and contaminated water countermeasures, with target date of April 1, 2014 in order to clarify and centralize the framework for responsibility.

This will fundamentally revamp the previous chain of command and decision-making process pertaining to measures for countering contaminated water leaks from tanks and responding to flows of contaminated water into the port as well as other countermeasures, and will provide a framework capable of actively utilizing both internal and external human resources possessing specialized knowledge in order to reliably perform the decommissioning work.



The president of the Decommissioning Company will be given the rank of Chief Decommissioning Officer (CDO[4]) as concerns reactor decommissioning and contaminated water countermeasures so that the various issues arising in the field can be flexibly and promptly addressed. Persons equivalent in rank to chief reactor officers will be invited from manufacturers and other outside companies as well as from inside TEPCO. In addition, within the Decommissioning Company, a company management committee will be set up to serve as the body for making decisions on committing any human and financial resources needed. The project management framework will be augmented and technological capabilities improved and enhanced in the field.

Moreover, the company will actively utilize outside personnel having expert knowledge and liaison with the International Research Institute for Nuclear Decommissioning to successfully execute reactor decommissioning and contaminated water countermeasures over the long-term within a framework that marshals the capabilities of parties concerned both inside and outside Japan as a national project. We will continue to fulfill our responsibilities in regard to the Fukushima Nuclear Accident as a united Tokyo Electric Power Company group.

[4] Chief Decommissioning Officer

On December 18th, we decided to decommission Units 5 & 6 as of January 31, 2014. With the continuing cooperation provided by the International Research Institute for Nuclear Decommissioning and other research institutes, we will examine utilizing these units in full-scale mock-up tests of devices for removing fuel debris, surveying the interior of the primary containment vessel and remote decontamination of the inside of the reactor building so that we may proceed steadily with the work of decommissioning Units 1~4 which involve advanced engineering challenges.

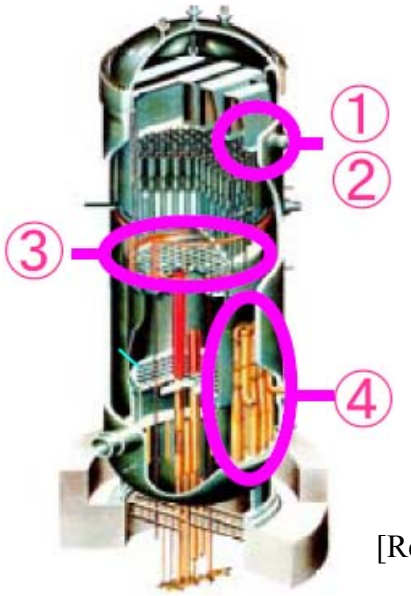
1.2. Fukushima Daini Nuclear Power Station (NPS)

Fukushima Daini Nuclear Power Station still maintains its stable cold shutdown status. Following Unit 4, reactor inspections for Unit 2 ended in December last year.

Installation of necessary facilities to maintain cold shutdown ended in February last year for Unit 2. Work to transfer fuel inside the reactor (all 764 units) to the spent fuel pool began in September of the same year, and transfer of all fuel to the pool ended on October 16.

Later, visual inspection of core internals with the purpose of spreading knowledge of the impact of the Tohoku-Chihou-Taiheiyo-Oki Earthquake began on November 21st, and inspection of all equipment subject to inspection ended on December 18th. Results of the inspection showed that there were no abnormalities in the core internals.

An underwater camera was extended down from the work trolley above the reactor to the object to be inspected inside the reactor, and skilled workers visually observed the footage of core internals shown on the monitor.



① Steam dryer aseismic blocks (4 locations)
An upside down concave shape is welded to the center on the side of the steam dryer and embedded on dryer support brackets in order to support it

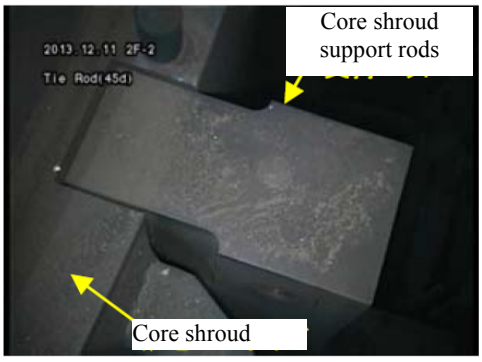
② Steam dryer support brackets (4 locations)
Steam dryer is supported by embedding steam dryer aseismic blocks on cylindrical panels welded on the inside wall of the reactor pressure vessel

③ Upper lattice grid plate (4 locations)
Sheets are combined in a lattice, and bolted to the top of the core shroud to support fuel assemblies laterally

④ Core shroud support rods (4 locations)
To counter stress corrosion cracking (SCC), struts are fastened by inserting the core shroud vertically on equipment installed at Units 2 and 3

[Reactor pressure vessel]

Inspection work on wheeled work platform (photographed on Dec. 13)



Core shroud support rods (photographed on Dec. 11)

1.3. Kashiwazaki-Kariwa Nuclear Power Station (NPS)

(1) Installation of Filtered Venting Equipment

Based on the lessons learned from the Fukushima Nuclear Accident, we have strengthened functions for removing residual heat from and injecting cooling water into reactors as well as improved the reliability of such operations. We are also moving forward with installation of filtered venting equipment so as to reduce, to the extent possible, any impact from radioactive materials even if such functions do not operate well.

① Role of Filtered Venting Equipment

Filtered venting equipment has the capability to lower the pressure of the primary containment vessel if there is an accident, reliably depressurize the reactor and institute low-pressure cooling water injection. It releases heat into the atmosphere from inside the reactor. Furthermore, even if the reactor core is damaged during a severe accident, gas inside the primary containment vessel is released to the outside through a filtered vent, thereby preventing the PCV from rupturing, and removing cesium and other elements to prevent extensive soil contamination.

② Progress of Above-Ground Filtered Venting Equipment Installation

The foundation work has been underway at Units 6 and 7, and the task begun of installing the main container unit for Unit 7 in October.

Installing above-ground filtered venting equipment

③Performance Verification Tests of Filtered Venting Equipment

At the TEPCO R&D Center, tests are being conducted to verify the performance of filtered venting equipment. Specifically, particles simulating the radioactive particles output

when internal gas is released in order to protect the PCV after core damage, and particle removal capacity is measured by supplying air, which is commingled with such particles, to the test filtered venting equipment and then measuring the number of particles on the intake and exhaust sides of the test filtered venting equipment. The results have verified that over 99.9% of particulate radioactive material is able to be removed. Currently, tests are being conducted by varying the flow rate, particle size, and other factors, and we are continuing to further enlarge our data.

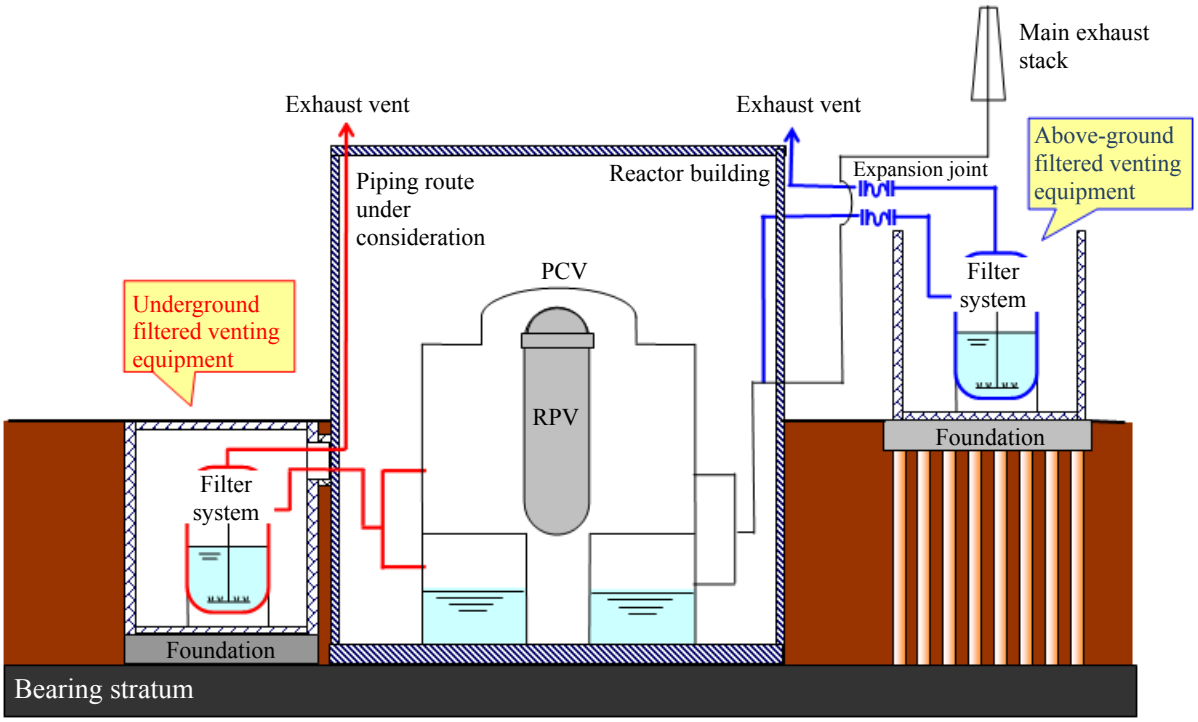
④ Underground Filtered Venting Equipment

In addition to above-ground filtered venting equipment, we are considering the installation of underground filtered venting equipment, which allows for diversity and serves to further improving safety. The particle removal capacity of underground filtered venting equipment is the same as the above-ground type, and each has its own characteristics.

	Underground	**Above-ground**
Characteristics	・More advantageous from the standpoint of an aircraft impact than above-ground type ・Less displacement with reactor building during an earthquake than above-ground type ・ Shielding design is alleviated in comparison to above-ground type	・Ventilation is not required for releasing heat from radioactive materials, which are trapped in the filter, to outside the shielding wall. (Because heat dissipates into the atmosphere through natural circulation) ・ Processing of scrubber water, containing radioactive materials, is easier to perform after filter use than for the above-ground type

From an assessment of exposure levels and release rates, the following results have been obtained for both the underground and above-ground types.

	Results	Review guideline threshold level
When venting to prevent reactor core damage Radiation level at site boundary	Approx. 4.2×10^{-2}mSv	Not exceeding 5mSv
When venting to prevent PCV damage (after core damage) Cesium-137 emissions	Approx. 2.5×10^{-3}TBq (TBq = 10^{12}Bq)	Not exceeding 100TBq



Schematic diagram of above-ground and underground venting equipment

(2) Status of Response for Confirming Compliance with New Regulatory Requirements and Points Noted for Compliance

In preparation for the review on Units 6 and 7 for confirming their compliance with the New Regulatory Requirements, TEPCO filed applications with the Nuclear Regulation Authority on September 27th for approval on the modification of the reactor installation, approval on the engineering work plan and approval on the modification of the Technical Specifications for Nuclear Reactor Facility. On November 21st, the matter has been submitted to the Nuclear Regulation Authority's review meeting and a full-scale review initiated. We will continue to address the Nuclear Regulation Authority's review and undergo its assessment.

● Review Meetings convened by the Nuclear Regulation Authority (as of the end of December)

・November 21: First review meeting (main item on the agenda: Overview of the application for approval on the modification of reactor installation)

・November 28: Second review meeting (main item on the agenda: Main discussion points of the application)

The principal points of safety measures for compliance with new regulatory standards are as follows.

①Natural phenomena (earthquakes, tsunami and other natural phenomena) and accidental external man-induced events

- In regard to earthquakes and tsunami, past survey data on geological features and geological structures has been compiled, and additional geological surveys conducted.
- In regard to other natural phenomena, wind (typhoon), tornado, snow, low temperature, volcano and lightning were selected as events to be considered for design from the approximately 40 events extracted with reference to the IAEA and ASME[5] documents according to the characteristics of the siting point of the Kashiwazaki-Kariwa Nuclear Power Station. Design standards for such events are being set and impact evaluation has been completed.
- In regard to accidental external man-induced events, in addition to the fall of aircrafts and collapse of dams whose impact on reactor facilities have been confirmed, impact of the leakage of toxic gas stored and managed on-site, and external fires (forest fire, fire at nearby plants, fire from the fall of aircrafts) prepared for a new regulatory review guide have been selected as events to be considered for design, and evaluation of their impact has been completed.

②Protective measures against interior flooding[6]

- Equipment to be protected from interior flooding has been selected, and measures to counter flooding, such as the installation of watertight doors, have been implemented. Flooding impact assessments, which take such measures into account (from where and how much flooding occurs, how it spreads inside buildings, and what impact it has on equipment), have been conducted, and the necessary measures taken.

③Protective measures against internal fires

- The policy is to provide for defense in depth by implementing measures to "prevent fires from occuring," "detect and extinguish fires," and "mitigate any impact," as well as measures to counter internal fires have been implemented
- As an "occurrence prevention" measure, flame resistance of cables are being checked through verification tests. As a "detection and fire extinguishing" measure, fire detectors and fixed fire extinguishing equipment are being additionally installed. As a "mitigation of impact" measure, systems are being separated with fireproof walls so that the safety function of the reactor is not lost due to a single fire.

④Probabilistic risk assessment (PRA)

- Probabilistic risk assessment (PRA), which evaluates risks of a nuclear power station

[5] American Society for Mechanical Engineers

[6] Interior flooding is when pipes break and water flows into the reactor building. When interior flooding occurs, equipment important for safety comes in contact with water and stops operating, which causes a great impact on the safety of the nuclear power station.

using the probability of a certain event and the probability of equipment failure, is being implemented.

・PRA has been implemented for risks that lead to core damage due to accidental equipment failure during operation, risks that lead to containment vessel damage, risks that lead to core damage when the reactor is shut down such as during outage, and risks that lead to core damage due to earthquakes and tsunami.

・Safety measures are being implemented based on such PRA results, and their effectiveness is being checked.

⑤Assessments of effectiveness during severe accident

New regulatory standards have the following stipulations concerning assessments of the effectiveness of equipment for the various safety measures so far added, which are to be employed during a major accident such as one involving core damage.

－Confirmation of the effectiveness of core damage prevention measures

Core damage can be avoided with alternate water injection using a low-pressure alternate water injection pump and securing emergency power with the emergency gas turbine generator, when assuming that equipment necessary for safety such as the emergency core standby cooling system and emergency diesel generator cannot be used.

－Confirmation of the effectiveness of measures to prevent containment vessel damage

A damaged core can continue to be cooled with a low-pressure alternate water injection pump when the core is damaged, and damage of the containment vessel can be avoided by controlling the spread of radioactive materials outside with the alternate containment spray system and containment pressure relief unit.

－Confirmation of the effectiveness of fuel damage prevention measures for spent fuel pools

Cooling of fuel is possible using alternate water injection with fire trucks even when loss of residual heat removal function of the spent fuel pool or outflow of stored water occurs.

－Confirmation of the effectiveness of fuel damage prevention measures for reactors in shutdown

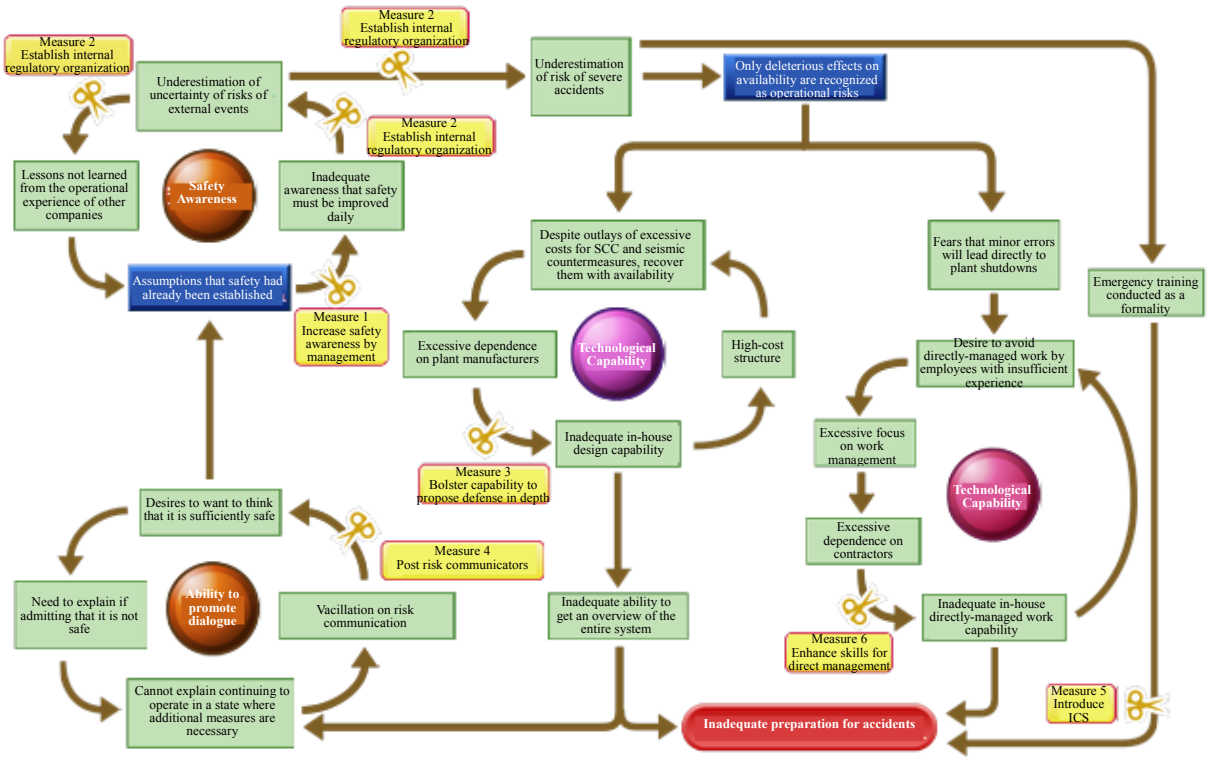
A core can by cooled with alternate water injection using a low-pressure alternate water injection pump and by securing emergency power with the emergency gas turbine generator, even should station black out or outflow of coolants occur during plant shutdown.

We will provide explanations concerning the aforementioned items in future Nuclear Regulation Authority reviews and have their appropriateness evaluated.

2. Progress on Nuclear Safety Reform Plan (Management)

Turning to progress on the Nuclear Safety Reform Plan (management), this report provides explanations in two areas, "items implemented" and "future plans," for each of the six measures to sever the so-called “negative spiral” which contributed to structural issues which nuclear power departments have faced.

Severing the negative spiral of insufficient accident preparation



2.1 Countermeasure 1: Reform from Management

As a result of workshops and forums which have been repeatedly held since April, discussions about nuclear safety among management and nuclear leaders have been lively, but it has been pointed out by internal and external monitoring and assessment organizations that leadership has been insufficiently exercised in spreading a safety culture as well as implementing and extending reforms. In the future, with the aim of raising safety awareness, bolstering field capabilities and strengthening communication abilities, managers and nuclear leaders at the Head Office and power stations will work to improve management practices so as to clearly define what is expected of them, reinforced the framework for monitoring and reform promotion, and promote internal communication.

＜Items implemented＞

- "360-degree assessments of behavioral indicators" were conducted in October for nuclear power leaders (assessment period: July 1~September 30). The results of observations of the leaders' behavior by their superiors, co-workers and subordinates were compiled and feedback given to each nuclear power leader so that the person would be aware of any gaps between the behavioral indicators and the person's own perceptions.
- The IAEA held a safety culture self-assessment workshop for corporate officers (October 10) as well as the President and nuclear power leaders (October 11~13).

  Using an experience-based learning approach in which much of the time was devoted to "dialoguing" to raise participants' awareness as they exchanged opinions, attendees became aware of among other things that culture is something orienting daily behavior, that what cannot be seen is more important that what can, and that, therefore, it is important to share feelings through dialogue and empathy.
- On November 17th, nuclear power leaders held group discussions on the topic of "internal communication." Over the period from December to January, group discussions have been held consecutively by management and each group based on the results of the nuclear power leaders' discussion. The results of discussions at each level will be set as the topics for the next nuclear power leaders' group discussion (scheduled to be held in the fourth quarter).
- Training in risk communication was held for executive officers and nuclear power leaders (November 25th). Participants recognized, among other things, the importance of sharing values, which is a prerequisite for communication.
- Training to provide greater knowledge about safety, which is necessary for nuclear power leaders, started in December with programs instituted for candidates to be conducted prior to their appointment.

IAEA safety-culture self-assessment workshop

Nuclear power leaders in group discussion

Third-party evaluations by international expert agencies have indicated regarding such efforts that “Leadership by management as well as nuclear leaders at power stations and the Head Office, the imbuement of a safety culture, the implementation and extension of nuclear safety reforms, and the monitoring and supervision of performance at the Head Office and power stations have all been insufficient.”

＜Future plans＞

- Forums on safety culture will be held according to occupational level (nuclear power leaders, management, staff) (February~March) to accelerate reforms.
- In regard to Fukushima Daiichi Nuclear Power Station, an important time has come for transforming the power station from being the “scene of a fire and field hospital” and leadership will be exercised with the aim of realizing specific countermeasures, including changing awareness, enhancing quality controls and risk management, improving reliability and creating permanent facilities in collaboration with the “Reactor Decommissioning Company (tentative name)” to be established in the future.
- In response to the matters indicated by international expert organizations, we will implement the following improvement measures to raise safety awareness, bolster field capabilities and strengthen communication ability.

  ・Clarify expectations

  We will clearly define the expectations of management as well as nuclear leaders at the Head Office and power stations and the roles that they should play

  ・Strengthen framework for reform promotion and monitoring

  We will follow implementation of the Nuclear Safety Reform Plan and enhance our monitoring of the status of establishment of a safety culture, augmentation of field capabilities and fortification of communication abilities. In addition, we will also maintain and strengthen frameworks for carrying out such efforts. Management and nuclear leaders at power stations and the Head Office will themselves also ascertain conditions in the field.

  ・Promote communication

  Management and nuclear leaders at power stations and the Head Office repeatedly communicate so that expectations are soundly conveyed, and they will stimulate communication on their own through direct conversations with employees on the frontlines.

  Particularly, in response to the comment that the implementation and extension of nuclear safety reforms has been insufficient, we will carry out the following in accord with suggestions on managing the reform plan by objective, which were put forward by the Nuclear Reform Monitoring Committee.

  ・After clarifying goals and creating target management tables, we will conduct assessments that look back over the achievements during the year and announce the

results in an annual report.

・Each plan will be sure to be incorporated into 2014 and later operational plans and systematically developed through continuing assessments to steadily implement the Nuclear Safety Reform Plan and have it imbued in every single person in the field.

- Achieve benchmarks for management to improve its practices
  - ・We will learn advanced case studies from other companies both inside and outside Japan about management practices for stimulating internal communication and making the safety culture more widespread, and make improvements, referencing outstanding points.

2.2 Countermeasure 2: Enhancement of Oversight and Support for Management

Based on the results of monitoring activities of the Nuclear Safety Oversight Office, suggestions for improvement of safety culture and organizational management have been accepted. Specific measures to respond to suggestions and indications from third-party evaluations of the Nuclear Safety Oversight Office, Nuclear Reform Monitoring Committee and international expert organizations are being examined and implemented.

<Items implemented>

- The Nuclear Safety Oversight Office conducted monitoring activities principally concerning the following items, and provided a report to the Board of Directors.
  (1) Efforts to stabilize Units 1~4 at Fukushima Daiichi NPS (management of criticality and cooling)
  (2) Efforts to improve safety at Kashiwazaki-Kariwa NPS (safety enhancement measures (planning and designing facilities and implementing their construction as well as the status of planning and implementation of operations))
  (3) Efforts for making nuclear safety the top priority in the Nuclear Power Division (effective promotion of the Nuclear Safety Reform Plan as well as management and governance of nuclear safety)
  (4) Work to remove fuel from the spent fuel pool at Fukushima Daiichi NPS Unit 4
    ・Observation of some mock-up tests of fixtures to counter galling and training using such implements
    ・Evaluation of removal operating procedures and interviews with persons involved
    ・Observation of the work for removing fresh fuel and spent fuel

- Currently, the Nuclear Power Division is making improvements in regard to the improvement proposals put forward by the Nuclear Safety Oversight Office, which are based on the results of monitoring activities.

○Leadership has been insufficient in putting a robust nuclear safety culture into practice.

－ Strong nuclear safety leadership is necessary for the creation of a robust nuclear safety culture. Top management and the Board of Directors as well as all other leaders need to clearly execute the principles of a nuclear safety culture.

○The system for managing safety is insufficient.

－ Middle management forms the core of the line organization, and the process by which various safety related activities are assessed and monitored needs to be strengthened.

－ So that high-level committees on safety in the Nuclear Power Division are effective, they should meet more frequently and improve the quality of discussions and challenges (rigorous questioning).

○Management has been insufficient for steadily advancing the administration of organizational change and programs for improvement (particularly, the Nuclear Safety Reform Plan).

－ In order to steadily advance organizational change and the Nuclear Safety Reform Plan, processes for managing reforms (including a framework for monitoring and analyzing the current situation, implementation plans adapted to actual site circumstances, as well as plans for disseminating insight and understanding) should be promptly constructed, and these projects effectively promoted.

○ Levels of safety management at Fukushima Daiichi NPS need to be restored to ordinary levels.

－ Taking into account the significant divergence from guidelines for safety culture, governance and performance at operation sites, procedures and processes, which are no longer applicable since the disaster struck, should be reconfigured or reconstructed (decision-making process concerning safety, risk assessments including human factors, radiation control based on the ALARA[7] concept, etc.).

－ Although there are problems with distance from and access to the field, middle management should be more involved in the work.

➢ For fuel removal from the spent fuel pool at Fukushima Daiichi NPS Unit 4, the Nuclear Safety Oversight Office provided a wide variety of advice from the perspectives of ensuring work safety and worker protection when there was the opportunity in advance meetings on safety assessments, on-site observations and other occasions. The improvement matters requested by the Nuclear Safety Oversight Office are being responded to appropriately by the sections responsible at power stations and the Head Office, and improvement efforts are continuing even now to reduce exposure, strengthen monitoring of radiation levels and so on.

[7] As Low As Reasonably Achievable: a basic approach stating that “all exposure should be held as low as reasonably achievable while taking into consideration social and economic factors”

Interview with power station officials

Field walk-down at Fukushima Daiichi NPS by the Nuclear Safety Oversight Office

<Future plans>

- We will continue to follow-up on matters proposed for improvement as well as conduct monitoring activities mainly of efforts to stabilize Fukushima Daiichi NPS, to improve safety at Kashiwazaki-Kariwa NPS, and to make nuclear safety the top priority of the Nuclear Power Division.

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

Various measures to enhance capability for proposing defense in depth have been implemented. We are conducting the Safety Improvement Campaign, reviews of operational experiences from both Japan and other countries and performing hazard analyses. In the future, in addition to stipulated countermeasures, every individual on the frontlines of the field needs to take up the challenge and make a new effort to improve their ability to propose defense in depth and to make those activities more widespread.

<Items implemented>

- Safety Improvement Competition

Of the 33 proposals submitted mainly by nuclear power leaders in the "Safety Improvement Competition," the final selection, which found 12 outstanding proposals, was made in October. Consideration has begun of the specific designs for realizing these outstanding proposals. Some of the outstanding proposals are:

- Deploying vehicles for advance confirmation of road conditions with the aim of having a quick response from outside the power station when a disaster occurs
- Securing communication tools in preparation for cases where operation center buildings or other structures, which serve as logistic support bases, are also affected during an accident (deploying emergency disaster response vehicles)
- Maintaining drawings which summarize plant design data, parameters and other information needed for an accident response with the aim of improving

management capability during an accident

- Information about operation experience (OE)

With regard to information about operation experience (OE) from both inside and outside Japan, 334 items (1st quarter: 108; 2nd quarter: 69; 3rd quarter: 157) were analyzed and assessed during the fiscal year through the third quarter. Out of these, 10 items were determined to necessitate impact evaluation, evaluation for 3 of those items was completed and power stations were instructed to take measures in regard to those items. Measures included additions and other revisions for operation procedures when an alarm is issued. Also, with regard to OE information through the previous fiscal year, 244 of 283 items (approx. 86%) have been analyzed and assessed, and impact assessments have been completed for 5 of the 33 determined to require such, then power stations were instructed to take measures in regard to these.

- Hazard analysis

In accordance with the hazard analysis plan formulated in the second quarter, the Head Office conducted step-by-step analyses of what the impact and other effects migh tbe from the approximately 30 events extracted for analysis on a nuclear power generation facility if a hazard should arise which exceeds design guidelines. Analyses have been completed for six items, including magnetic storms and cyberterrorism (total of 11 items). The status of the analyses and countermeasures reviewed up until now is:

- It was estimated that even if a forceful tornado, volcanic effect (volcanic ash or other material falling, etc.), electromagnetic storm or other such event occurred which exceeds design standards, it is unlikely to bring about a cliff edge[8] situation. Nevertheless, we will continued to review countermeasures for tornados and electromagnetic storms.
- Meanwhile, regarding volcanic effects (pyroclastic flow, submarine volcanos, etc.), there is no effect on the power station at the design standard level, but if a powerful event occurs exceeding design standards, it has been estimated that a cliff-edge situation may result. We will continue to review measures to counter pyroclastic flow, submarine volcanos and other such events.

- Safety reviews

Safety reviews have been conducted nine times since October of last year, focusing on nonconformity management, plant walk-downs, utilizing operation experience information and other safety activities at Kashiwazaki-Kariwa NPS. Although organizational weaknesses were not confirmed at the power station, improvements were deduced, such as the formulation of independent plans and the accumulation of

[8] Extensive failure of safety functions occurring at once due to a common factor when load of a certain magnitude is applied such as a tsunami significantly surpassing design assumptions

experience, through the plant walk-down activities.

- Alleviation of the operational burden due to a disproportionate emphasis on evidence[9]

  We have conducted a reassessment of operational processes for procurement management and design management of maintenance work, which have a significant effect on alleviating the operational burden. With regard to design management, we implemented improvements such as preparing a collection of examples related to operations so that no operations are carried out which exceed what is required by manuals. It was determined that no revisions were need in the manuals for procurement management.

- Performance evaluations

  Performance evaluations were incorporated in the policy for preparation of this year's business plan and reflected in each individual's business plan so that assessments would be conducted of nuclear safety. The results were evaluated in the performance assessment for the first half of FY2013 (such assessments will be continued).

- Computerization of maintenance work processes

  With regard to the computerization of maintenance work processes, work is underway with the aim of introducing MAXIMO[10] (Phase 1) within the fiscal year with the aim of streamlining database preparation, which is the foundation for maintenance operations, non-conformity management and work management processes. Furthermore, a review has been started for realizing the introduction of MAXIMO (Phase 2), whose aim is to realize the rationalization of the entire maintenance process, by the end of the first half of FY2016.

[9] An overemphasis on ensuring the processes in which operations are implemented and evidence from such results

[10] IT solution for realizing strategic asset management

<Future plans>

- Regarding the Safety Improvement Competition, plans will be formulated for realizing outstanding proposals. We will improve processes which lead to enhanced technological capabilities, and these will also be continued in the future.
- With regard to OE information, the Head Office is scheduled to complete its analysis and assessment of operation information until last year by the end of FY2013 (as of end of December, 39 items have not been completed).
- As for hazard analyses, we are proceeding in a successive manner to complete the analyses of approximately 30 events and address such matters so that nuclear safety is improved by the fourth quarter. Thereafter, we will take into account circumstantial changes based on calamities or other accidents that have newly arisen and new knowledge as we continue our efforts.
- In conjunction with our safety reviews, individual reviews are scheduled to be conducted of other safety activities at power stations to deduce any indicated matters or other areas of concern as well as to provide feedback and follow-up to the relevant sections. In addition, after the issues which are to be addressed in next year's safety reviews have been consolidated, the Head Office will review procedures and other guidelines for implementation as we continue carrying out our review activities.
- Because manual revisions did not have a significant effect on alleviating the burden of operations involving a great many rules and a large amount of required evidence, we will, in the future, conduct reviews by altering the focal point of the examination.

Commendation ceremony for the Safety Improvement Competition (Fukushima Daiichi NPS)

Safety review in session

2.4 Countermeasure 4: Enhancement of Risk Communication Activities

In regard to risk communication activities, press releases and the website have been improved based on the advice from the Nuclear Reform Monitoring Committee. In particular, information transmission has been enhanced by using videos, CG, and English in order to deal with the issues of contaminated water and Unit 4 fuel removal. The Social Communication Office continues to check deviations from society, such as whether the idea that "judgment should be held until data and facts that become the ultimate foothold are produced, instead of taking the stance of actively delivering risks" is still remaining, and corrective action is taken.

<Items implemented>

- We have reflected on instances where announcements of large numerical figures on tritium concentrations and other such data led to anxiety among the public and the result of our being overscrupulous about correctly conveying facts such that confusion resulted in that people did not know what we were trying to say. When communicating externally, we have been transmitting our message as a company and adding content about the data significance and its interpretation (effects on health and the environment, etc.)

[Conveying our message]
Views and interpretations by management, outside experts, outside organizations and others are actively distributed online.

[Conveying data's significance]
Explanation using a comparison of standard values for food intake

Ex. Cesium-137: 1.4Bq/L detected
Guideline for beverage water quality (WHO) = 10Bq/L

Ex. 10/10 The following comment is appended to emails sent to news outlets

The detection of this value is lower than that prescribed by WHO beverage water quality guidelines (10Bq/L for Cesium-134 and Cesium-137), and although it is believed not to have an effect on the environment, we will continue to watch any trends.

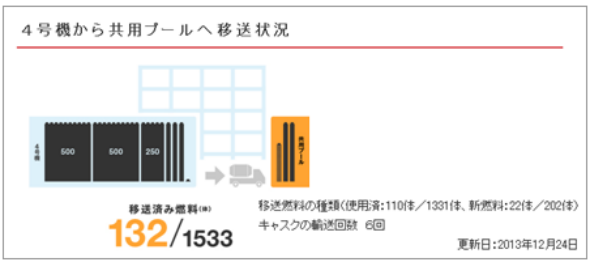
- We have also changed the monitoring data concerning contaminated on our company website so that measurement figures and measurement location correspond.
- With regard to the removal of fuel at Unit 4, we uploaded easy-to-understand material, such as video using computer graphics on our website and other platforms prior to fuel removal as an effort to address society's concerns and fears.
- Since attention toward contaminated water issue has been rising internationally, we have stepped up the transmission of information overseas as well as domestically. Since the second quarter, risk communicators have continued to hold briefings at

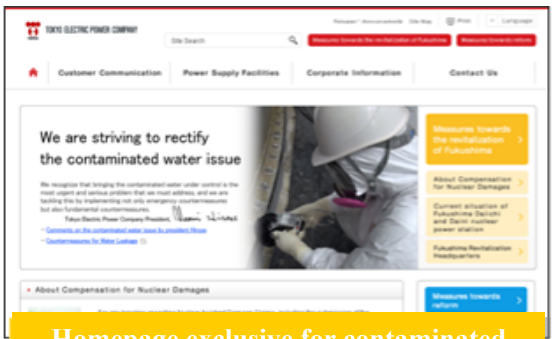
foreign embassies in Japan about the contaminated water problems and situation at Fukushima Daiichi NPS.

- Taking into account reviews of the September nuclear disaster training, we have reassessed roles clarified for risk communicators and Social Communication Office to be performed during an emergency and the appropriate assignments for each. These were verified during the December 5th integrated training at the Kashiwazaki-Kariwa NPS and Head Office. It was confirmed that the adoption of mobile mediums for risk communicators deployed to municipalities was effective in helping them to obtain timely and appropriate information.
- An outside expert was invited to serve as the director of the Social Communication Office, and, on January 1, 2014, a woman executive was appointed to that position (announced December 20th).

<Results of analysis of radioactive materials in power station vicinity>

<Postings concerning Unit 4>





Homepage exclusive for contaminated water / Timely video transmission.

Disclosure through SNS and distribution of mail magazine.

<Future plans>

- With regard to Fukushima Daiichi NPS, risk communication will be carried out by sharing with stakeholders the risks associated with treating contaminated water and reactor decommissioning work. In particular, we will practice risk communication so that we are able to respond in advance, to the extent feasible, to any misgivings held by stakeholders, which is an important step in reactor decommissioning work.
- With regard to Kashiwazaki-Kariwa NPS, in addition to explanations about safety measures based on defense in depth, we will conduct risk communication about the evacuation of local residents, which we have not been able to sufficiently practice up until now, by taking into consideration the situation of local municipalities and residents.

2.5 Countermeasure 5: Reform of Power Station and Head Office Emergency Response Organizations

Emergency structure based on the ICS has been organized and is operational at each power station and headquarters. In comparison to previous training, it was judged that improvement was made in the ability to operate the emergency organization at a power station, including the development of a clear chain of command. In the future, we will plan and implement joint training with outside organizations, in addition to improving the functions of support operations from the Head Office, based on the matters indicated by the Nuclear Reform Monitoring Committee.

<Items implemented>

- Since January, the Kashiwazaki-Kariwa NPS emergency response organization has been operating under an Incident Command System (ICS) -based structure (integrated training was conducted on December 5th, which included the Head Office emergency headquarters). Since October, the emergency response organizations at Fukushima Daiichi NPS and Fukushima Daini NPS have also been operating under an ICS-based framework similar to that of the Kashiwazaki-Kariwa NPS and the Head Office.
- Full-scale integrated emergency training was held at night on December 3rd and 4th under the ICS system at Fukushima Daini NPS. A total of 710 station personnel participated in the training over two days, in which field training exercises and other training were conducted, which assumed a state where the station had been struck by an earthquake and tsunami just as during the Great East Japan Earthquake, causing a loss of off-site power, cooling function and other such operations. The training results confirmed that command and control of the emergency organization as well as the division of roles were clear and that the organization functioned effectively. As for issues to be addressed, it was confirmed that there was room for ingenuity in methods for ascertaining the status of the deployment of emergency response equipment within headquarters as well as the status of field activities.

Emergency response headquarters

Wheel loader used to secure a route

Connecting fire hose to intake on reactor building

Pulling out cable from power supply car

Scenes from training at Fukushima Daini NPS

(December 4)

- With regard to methods for sharing information with administrative agencies, off-site centers and other parties outside the power station which has been an issue in previous training sessions at Kashiwazaki-Kariwa NPS, improvement measures were studied which employ mobile PCs along with information-sharing methods utilizing mobile terminals (smartphones, tablets). In addition, improvement measures were considered for unifying command and control over personnel deployed outside the power station under the Head Office emergency headquarters, which was then verified during the integrated training held at Kashiwazaki-Kariwa NPS on December 5th. The training results confirmed the effectiveness of aspects pertaining to information sharing.

Training at the Kashiwazaki-Kariwa NPS

(December 5)

- The Head Office emergency organization has been operating under an ICS-based structure since March of last year (integrated training was conducted on December 5th, which included the Head Office emergency headquarters). When the ICS structure was initially introduced at the Head Office, there were challenges and other issues concerning communication with siting communities, public relations systems and other external coordination, but improvements have progressed with effective reassessments of the systems and repeated training. On the other hand, with regard to liaisons with outside organizations including a logistic support organization set up between the Head Office and power station, additional proficiency is needed to be made through training and other practice in the future.
- A study was conducted of ICS training programs systematized in the U.S. The preparation of Japanese-language documents and other specific methods for effective use are being studied.

<Future plans>

- In the future, we will further improve our capability to respond during an accident by making improvements such as meticulously sharing information within headquarters while indicating the status of activities on drawings or plans, and consolidating what is said and reported during training to clarify and narrow down the necessary information to be shared.
- Training has previously been conducted in collaboration with local municipalities and other such entities. However, taking into consideration the comment by the Nuclear Safety Monitoring Committee that "training, for which more severe conditions have been set, and joint exercises with outside organizations should be addressed," we will coordinate training exercises, schedules and other arrangements to plan for joint training sessions so that the exercises are able to be conducted jointly across an even broader range of concerned organizations.
- Because it is important that an effective plan for evacuating residents be laid out in advance and sufficiently shared by TEPCO with local municipalities, a special team will be set up internally to cooperate on drafting disaster prevention plans for local municipalities.
- Integrated training for Fukushima Daiichi NPS is scheduled to be conducted in the fourth quarter.

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

Through the deployment of system engineers according to the status of each power station and directly managed work, technical capabilities of individuals and organizational capabilities of teams will be improved. The personnel covered will continue to be expanded while aiming to ensure proficiency and heighten each individual's capabilities.

<Items implemented>

- At the Head Office and power stations, methods were studied for evaluating the effectiveness of the Fukushima Daini NPS and Kashiwazaki-Kariwa NPS organizations (non-emergency organizations), which had been revised on September 1st.
- On September 1st, the System and Component Engineering Group, comprising 20 personnel, was established at the Kashiwazaki-Kariwa NPS (4 full-time system engineers assigned). The expectations of system engineers and descriptions of their future activities have been shared, and the present activity plans and training plans have been formulated and implemented.
- Operators at Kashiwazaki-Kariwa NPS participated in training for connecting power supply cars, which the emergency response organization has performed since July 2013 (as of the end of December, 6 out of the target number of 28 personnel to be assigned have undergone the training for Unit 6 and 7). In addition, training in connecting fire engines was started in October (as of the end of December, 33 out of the target number of 28 personnel to be assigned have undergone the training for Unit 6 and 7). Also, training for operators in facility diagnostics has been started since September, and operations have been gradually implemented since November.

Inserting a suction pipe

Connecting hoses

Fire engine connection training for water supply operation workers

Operators diagnosing equipment

SE meeting

- Since July at each power station, training has been conducted for maintenance personnel to enhance basic skills (training in handling annealing wire, rope, etc.) and to allow them to gain experience and knowledge through direct management of work (power supply cars, gas turbine generator vehicles, inspection of alternate heat exchanging vehicles and other such; taking out temporary hoses for emergency measures & connecting electric cables; replacing electric motors; disassembling and assembling pump bearings; ground leveling using heavy machinery, etc.) (Total of 2129 personnel have undergone training at the three power stations as of end of December: 53 at Fukushima Daiichi NPS, 1,225 at Fukushima Daini NPS, and 851 at Kashiwazaki-Kariwa NPS).
- At Fukushima Daini NPS, guidance was sought from contractors to carry out work under direct management. Activities are now underway where either the presence of supervisors is being eliminated or their degree of involvement gradually reduced so that TEPCO employees are able to perform the job of directly managing the work unassisted. On December 10th, for the first time, pump bearing work was performed by only employees without an outside supervisor present.

Disassembly (removing attached pipes)

Disassembly (removing bearing cover and case)

Component maintenance

Bearing assembly

Pump bearing work performed only by TEPCO maintenance personnel
(Fukushima Daini NPS)

<Future plans>

- Within the fiscal year, evaluations will be conducted to assess the effectiveness of revised power station organizations.
- A framework will be studied for personnel rotations (operators, maintenance personnel) over the mid-to-long term so as to develop the personnel needed for managing the organization, and such operations will begin with FY2014.
- The daily maintenance work performed by operators will be gradually expanded in keeping with the increase in personnel
- Maintenance personnel will strive to become more proficient through continued training conducted which offers experience in directly managing work and strengthening their basic skills. Such personnel will incrementally augment the content of their work, further boosting their applied skills. In addition, full-time personnel assigned to maintenance departments will efficiently and reliably promote the improvement of engineering capabilities for direct managing work by sharing the status of their activities at each power station and expanding such activities. In particular, individual names, number of personnel and other such data will be managed for each acquired technology.

3. Status of Investigations into Unidentified and Unexplained Matters in the Fukushima Nuclear Accident

As was also reported in the Nuclear Safety Reform Plan Progress Report (FY2013 2nd Quarter), we have also continued to conduct field investigations as well as additional analyses and reevaluations of existing records, data and other information in our commitment to resolving any unidentified and unexplained matters about the Fukushima Nuclear Accident.

Analyses and reassessments of existing records and other data as well as field investigations will continue to be used in an effort to clarify unidentified and unexplained matters, and we will announce these results.

3.1. Status of Review of Unidentified and Unexplained Matters

A report on the status of the review of these unidentified and unexplained matters was compiled separately in Progress Report No. 1[11] ("Report"), which was released on December 13th. In this Report, the progression of the accident at Units 1~3, which has been identified in investigations conducted up to the present, is described chronologically from the time the earthquake occurred until the end of March. Within that context, phenomena and other events which have not previously been sufficiently explained are regarded as unexplained matters. So far, 52 items have been deduced. We will continue to study these unexplained matters, and plan to announce our results as soon as the reviews are completed.

Of the items for which reviews have been completed and announced this time, the principal matters are listed below.

- Loss of emergency generator and other functions due to arrival of tsunami
- Inflow of water into the 4th floor of the Unit 1 reactor building
- Amount of cooling water injected from fire engines
- Operational status of the Unit 3 high pressure coolant injection (HPCI) system
- Rapid depressurization of the reactor pressure at Unit 3

In addition, of the 52 unidentified and unexplained matters elicited, work will proceed so that the following 10 top priority items will soon be clarified.

- Examination of the operation of the safety-relief valve after the core was damaged
- Status of release of radioactive materials after March 20
- Improved accuracy concerning the amount of cooling water injected into the reactor by fire engines

[11] Evaluation of the situation of cores and containment vessels of Fukushima Daiichi Nuclear Power Station Units 1 to 3 and examination into unsolved issues in the accident progression: Progress Report No. 1

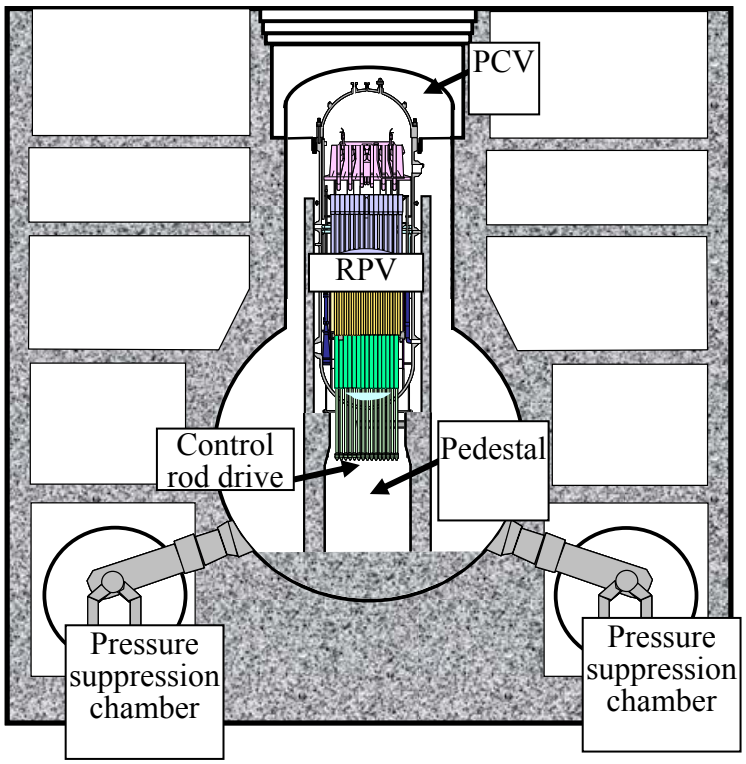
・Assessment of the operational state of the high-pressure coolant injection system (HPCI) at Unit 3 and impact on progression of the accident
・Behavior of fall of molten corium into lower plenum
・Identification of source of high level of contamination in pipes of the Unit 1 reactor cooling water system (RCW)
・Rise of reactor pressure after forced depressurization at Unit 2
・Whether or not the rupture disc operated at Unit 2
・Cause of shutdown of reactor core isolation cooling system (RCIC) at Unit 3
・Temperature stratification of pressure suppression pool at Unit 3

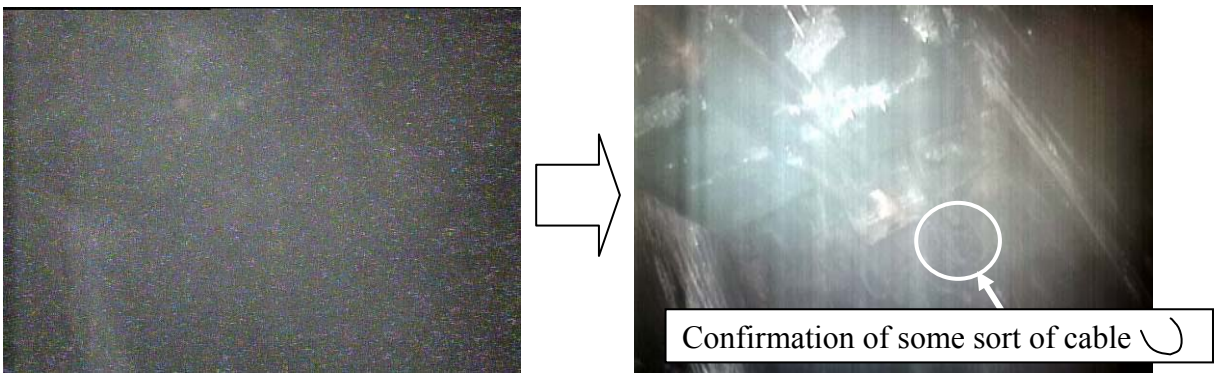
3.2. Status of Field Investigations

In the future also, field investigations will be systematically conducted, including surveying the inside of the containment vessels using robots, industrial endoscopes and other tools, while taking care so that important evidence is not lost in the decommissioning work.

① Internal investigation of the Unit 2 pedestal

An internal investigation of the Unit 2 pedestal, which was conducted on August 12th, was able to approach close to the pedestal opening, but not able to obtain any clear images. Nevertheless, image processing enabled confirmation of the pedestal's internal structure. This photograph allowed for the confirmation of a control rod drive, which had been welded to the bottom of the reactor pressure vessel, and some sort of cable.

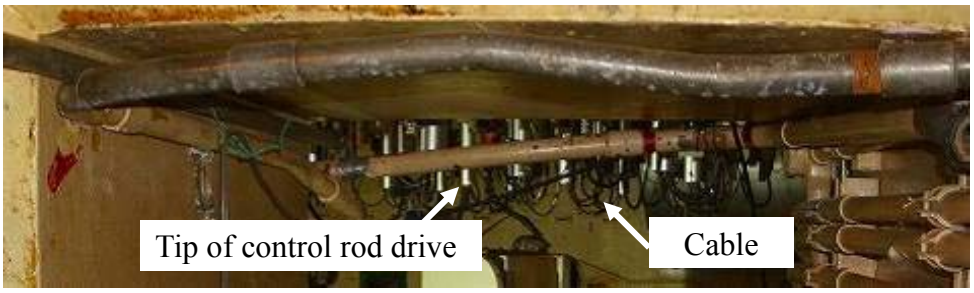




Before image processing　　After image processing

Pedestal opening at Unit 2

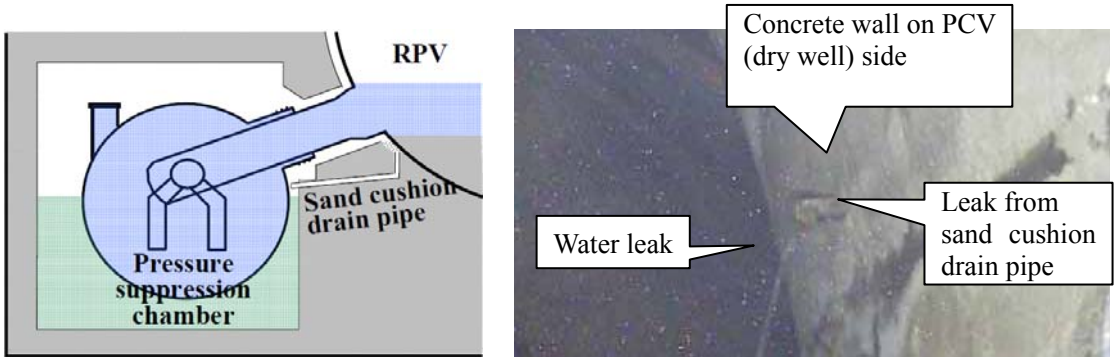
For reference, the pictures of applicable sections at Unit 5, which has almost an identical structure to Unit 2, are shown below. The tip of the control rod drive mechanism (silver tubes) and cables are also visible from the pedestal opening at Unit 5. It has been inferred that there is also damage to the bottom of the Unit 2 reactor pressure vessel, but, based on this image, it was found that the damage did not extend to the outer circumference of the reactor pressure vessel.



Pedestal opening at Unit 5

② Investigation using a boat-type robot inside the torus of Unit 1

An investigation using a boat-type robot inside the torus of Unit 1, which was conducted on November 13, 2013, confirmed a leak from a sand cushion drain pipe. It is a case where the infiltration of water into the sand cushion may be due to a leak directly from the dry well, and the position of the leak is thought to be below the water surface in the dry well



Leak from sand cushion pipe

Presently, we have not reached a definitive assessment which estimates the state of the reactor or PCV, but we will continue to examine these matters because the results of both investigations into the above two matters will be important for future reviews.

In Closing

As stated above, a certain level of progress has been seen in safety measures concerning equipment and operations at power stations, and activities have advanced in accord with the action plan for the Nuclear Safety Reform Plan.

Nevertheless, the Nuclear Safety Oversight Office and international expert organizations have pointed out that leadership by management as well as nuclear leaders at power stations and the Head Office, the imbuement of a safety culture, the implementation and extension of nuclear safety reforms, and the monitoring and supervision of performance at the Head Office and power stations have all been insufficient. We take these comments seriously and will prioritize these areas for improvement. With the aim of raising safety awareness, bolstering field capabilities and strengthening communication abilities, management and nuclear leaders at power stations and the Head Office will improve their practices to address these comments by clearly defining what is expected of leaders, strengthening the framework for reform promotion and monitoring as well as promoting internal communication. Particularly, in regard to the comment that the Nuclear Safety Reform Plan cannot be said to be sufficiently imbued throughout the organization, we will reinforce management by objective in the course of achieving the Nuclear Safety Reform Plan, and promote efforts to have it better imbued within our organization. In addition, to further raise the awareness of nuclear safety throughout the entire organization, leaders and managers will talk directly with employees on the frontlines, and exercise strong leadership by understanding the situation in the field, to the extent feasible, so as to promote reform.

We will implement the following to enhance management by objective.

- Define the ideal state to be pursued and continued for each countermeasures, and formulate and implement specific action plans
- Design methods for evaluating the effectiveness of countermeasures, set milestones, and identify the level of progress and tasks to be addressed under the PDCA cycle
- Reinforce the framework for assuming responsibility of the execution of nuclear safety reforms, promote reforms and conduct follow-up

The next fourth-quarter progress report will not only cover progress in Q4 but also serve as an annual report looking back on the past year, and announce the findings.

TEPCO will continue to receive objective assessments by the Nuclear Reform Monitoring Committee and promote reforms which take those findings into account. We welcome any opinions and comments concerning the reforms, which may be submitted via the TEPCO website or other means.

As a nuclear power operator,, TEPCO will continue to tackle nuclear safety reform based on our resolution that the “Fukushima nuclear accident will never be forgotten and we will be

a nuclear operator that continues to create unparalleled safety and increase the level of that safety to be greater today than yesterday and still greater tomorrow than today" so that we may regain the trust of everyone in society and the people of Fukushima Prefecture.

End