Overview of Nuclear Safety Reform Plan Progress Report (1st Quarter FY2016)

- To keep our resolution of becoming a "**nuclear operator that continuously improves safety to unparalleled levels by making each day safer than the last while never forgetting the Fukushima Nuclear Accident**," TEPCO has been promoting the Nuclear Safety Reform Plan since April 2013 as we aim to achieve the world's highest level of safety for nuclear power stations.
- Based on the results of the investigation conducted by the Third-Party Investigation Committee into the problems with the notification and reporting of "meltdowns" at Fukushima Daiichi NPS Units 1~3 as well as incorrect explanations given to the Technical Committee for the Government of Niigata Prefecture, we released a statement entitled "TEPCO's Introspection and Pledge" and announced measures to prevent other accidents and are enhancing our efforts under the Nuclear Safety Reform Plan.

1. Efforts in response to the Third Party Investigation Committee Report on Notification and Reporting during the Fukushima Nuclear Accident

- We consider it our responsibility to address the issues identified by the Third Party Report such as ① lack of capacity and mechanisms for communicating facts in an easy-to-understand manner, ② insufficient knowledge and understanding of internal manuals, and ③ weak mechanisms for sharing and locating information internally.
- We clearly state the following two points in TEPCO's Intropsection and Pledge.
  - ・The president has declared that the TEPCO shall proactively disclose information and is following through with this declaration
  - ・The General Manager of the Nuclear Power and Plant Siting Division shall decide what terms are used during external communication in an emergency situation.

In addition, we are also engaging in new efforts such as 'enhancing drill scenarios and conducting drills that consider external pressures', 'revising education for emergency response personnel and how emergency response skills are managed', and 'establishing contacts to gather information on the announcements, notifications and reports given during the Fukushima Accident'. This message from the president on TEPCO's position on proactively disclosing information has already been conveyed and contacts to gather information have been established.

＜TEPCO's Introspection and Pledge＞
We pledge to keep the safety of the siting community and society as a whole the utmost priority no matter what situation occurs and to remain resolute in regards to telling the truth.

2. Progress on Safety Measures at Nuclear Power Stations

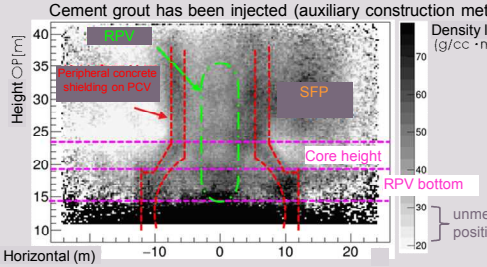
- At the Fukushima Daiichi NPS, progress has been made on freezing the land-side impermeable wall, and the surveys of fuel debris at Unit 2 have begun following those conducted at Unit 1 using the muon penetration method as we prepare to remove debris.
- At the Fukushima Daini NPS, the appropriateness of the recovery report in the wake of the Great East Japan Earthquake has been confirmed. At the Kashiwazaki-Kariwa NPS, safety measures for all types of hazards are being implemented.

Fukushima Daiichi Nuclear Power Station

The land-side impermeable wall (frozen soil wall) built to prevent an increase of contaminated water has effect. At points where the temperature has been slow to decline, auxiliary construction methods have b freezing

- Because differences were verified in water levels and water heads along the inside and outside of the land-side impermeable wall (sea-side), a transition was made to Phase 2 and freezing began on the side facing the mountains (June 6)
- The high groundwater flow velocity is thought to impact areas where the temperature has been slow to decline. Cement grout has been injected (auxiliary construction method) to decrease flow velocity and promote freezing

Commencement of Phase 2 freezing



Assessment of material distribution based on Muon penetration method measurement results of Unit 2

Measurements using the muon penetration method※ at Unit 2 confirm the presence of something that appears to be debris at the bottom of the reactor pressure vessel

- Measurements will continue to be taken to amass data, which will be verified and consolidated

※Method whereby properties of muons, which are subatomic particles, are used to look into an inner area, much like an x-ray

Fukushima Daini Nuclear Power Station

The government confirmed the appropriateness of the recovery report based on the plan for disaster preparedness

- The national government confirmed the appropriateness of the recovery report for facilities for maintaining a cold shutdown (June 13), and the power station maintains a state of nuclear emergency to make sure that safety is assured

Nighttime drill in operating heavy equipment

Drills continue to be conducted while assuming severe environments in order to ensure stable cold shutdown

- Drills have been conducted at night, with workers using full-face masks and amongst other conditions of higher degrees of difficulty in order to further improve technical self-sufficiency

Kashiwazaki-Kariwa Nuclear Power Station

As part of the lessons learned from the Fukushima Accident, we are implementing a broad range of safety measures to address not only earthquakes and tsunamis, but also other hazards that may trigger a severe accident

- In addition to safety measures for complying with new regulatory requirements, we have implemented safety measures that take into account the experience and lessons learned from the Fukushima Accident
  - A corium shield, which uses a high heat-resistant material (zirconia refractory material: heat resistant up to approximately 2,700℃), was installed to prevent molten fuel and the liner of the reactor containment vessel floor from coming into contact during a severe accident (Unit 7)
- In preparation for tornados, outdoor light oil tanks were replaced with tanks with thick steel plates to make them shock-resistant against flying debris and objects that may be thrown into the air, such as manhole covers, were fastened down using metal bars (Unit 6&7)

Corium shield installed to prevent molten fuel and the reactor containment vessel from coming into contact with each other when a severe accident occurs [Unit 7]

Light oil tanks for Unit 7 after replacement (Thickness of the steel plating of the tanks is approximately four times what it was)

Manhole covers fastened down using metal bars (Unit 6&7)

3. Nuclear Safety Reform Plan Progress (Management)

- We have transitioned from the previous system dedicated to non-conformance management to a system managing improvement activities as a whole, and have accelerated these activities
- This summer, the preparatory organization for the Nuclear Human Resources Development Center (provisional) was established and preparations begun for education and training programs across a wide range of fields from the basics of nuclear safety to management skills

Safety Consciousness

Measure 1: Reform from Top Management

- In order to promote nuclear safety reforms, the General Manager of the Nuclear Power and Plant Siting Division has strengthened activities to enhance understanding about expectations and the reasons behind them.

General Manager of Nuclear Power and Plant Siting Division addressing at a training session for new employees

Group discussion of the Nuclear Safety Information & Notification Council

- As part of activities to make nuclear safety culture more widespread, the officers in charge of safety at contractor head offices gather for nuclear safety information meetings
  - Through group discussions and other interactive communication, information is shared about the Fukushima Accident, the starting point for TEPCO's safety culture, as well as thoughts about Nuclear Safety Reforms and TEPCO's expectations to contractors regarding safety

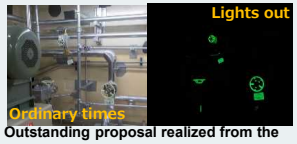
Measure 2: Enhancement of Oversight and Support for Management

- The Nuclear Safety Oversight Office (NSOO) has confirmed the progress on several good practices as well as the issues needed to further the commitment of management from the aspects of behavior toward nuclear safety, and encourage improvement of these issues by nuclear leaders
- The pace at which the NSOO is setting new recommendations and the pace at which these recommendations are being completed are almost in line. There are still issues including the deficiency of communication between power station and the head office whose improvement needs to be accelerated and followed, and activities focusing on improvements need to be implemented

Technical Capacity

Measure3: Enhancement of Ability to Propose Defense-in-Depth

- The Second Safety Improvement Proposal Competition of 2015 has selected 11 outstanding proposals out of 220 entries
- CAP (Corrective Action Program) activities have been initiated to good practices, third-party review results and other information besides non-conformance data incorporated to progressively make improvements
  - Nuclear operators in the United States who proactively undertake CAP are benchmarked and referenced for activities such as the strong commitment of nuclear leaders



Outstanding proposal realized from the Safety Improvement Proposal Campaign (adoption of high-luminous phosphorescent material for important facilities)

Overseas benchmarking concerning CAP (improvement activity programs) (Brunswick Nuclear Generating Station)

Measures 5: Enhancement of Emergency Response Capabilities of Power Stations and the Head Office

- Comprehensive and individual drills continue to be conducted to maintain and improve emergency response capabilities
- In the wake of issues related to the reporting of core meltdowns, drills are conducted on responding to more rigorous scenarios as well as requests from external entities

Individual drill (Head Office)

Comprehensive drill (Fukushima Daiichi NPS)

Comprehensive drill (Kashiwazaki-Kariwa NPS)

Measure 6: Development of Human Resources to enhance Nuclear Safety

- A Nuclear Human Resources Development Center (provisional), which will oversee the training of Nuclear Power Division personnel, will be established at Fukushima Daini NPS, and a preparatory organization was formed on July 1 (total staff of approximately 70 personnel)
- Education and training programs have been reorganized so that systematic education and training are to be provided
  - Education and training programs have been restructured, and improved training is scheduled to commence within the fiscal year, particularly for operations and maintenance personnel

Staff of the preparatory organization for the Nuclear Human Resources Development Center

Ability to Promote Dialogue

Measure 4: Enhancement of Risk Communication

- Together with Sellafield Ltd., meetings of the Fukushima-West Cumbria Study have been held monthly (since May) to learn about each other's experiences
- In response to the request by educators in Fukushima Prefecture, Mr. Ishizaki, Representative of Fukushima Revitalization Headquarters and Mr. Masuda, President of Fukushima Daiichi D&D Engineering Company gave a briefing and exchanged views with students on the progress of decommissioning at Fukushima Daiichi, compensation, decontamination and support for recovery, at a high school in Fukushima Prefecture (May).

Fukushima-West Cumbria Study (meeting held via teleconference)

Exchange views with students at a high school in Fukushima Prefecture

KPI pertaining to the behavior of leaders for improving safety consciousness (New) 【Target : Upward trend※】	46.7 points Although many Nuclear Power Division personnel are reading the messages communicated by nuclear leaders, the degree to which they feel the messages "helpful" needs to be increased.
KPI pertaining to the level of improvement in safety consciousness throughout the entire Nuclear Power Division (New) 【Target : Upward trend※】	60.9 points Retrospective activities related to nuclear safety have taken hold. Managers are encouraged to emphasize on-site observations (management observations).
KPI pertaining to non-emergency technical capacity (New) 【Target : Over 100 points by the end of 2016】	77.2 points In order to systematically develop human resources to enhance nuclear safety, the activities of the Nuclear Human Resources Development Center will be strongly promoted.
KPI pertaining to emergency technical capacity (New) 【Target : 120 points by the end of 2016】	112 points Personnel have been secured who possess the skills needed during emergencies.
KPI pertaining to dialogue ability (external) 【Target : Positive in comparison to the previous year】	＜FY2015 achievements (compared to FY2014)＞ +0.9 points（quality & quantity of information communicated） +1.0 points（Awareness & stance toward public relations and hearings） This KPI is assessed to have "improved" compared to the previous fiscal year.
KPI pertaining to dialogue ability (internal) 【Target : Upward trend】	Nuclear Power Division overall：78.5 points （+0.2 over previous fiscal year） Nuclear leaders：86.1 points （+1.5 over previous fiscal year） Continue to work to realize good internal communication.

※Achievement will be assessed after 2nd quarter