X. Future Efforts to Settle the Situation regarding the Accident

1. The current status of reactors etc. of Fukushima Dai-ichi NPS

In reactors of Fukushima Dai-ichi NPS in Units 1, 2 and 3, fresh water has been supplied to RPV through a feed-water system and have been continuously cooled the fuel in RPV. This helped the temperature around the RPV stay at 100 to 120 degrees Celsius at the lower part of the RPV. Due to the concern over the increase of the accumulated water, review and preparation for circulation cooling system including the process of draining accumulated water has been underway. Although the RPV and the PCV of Unit 1 has been pressurized to some extent, steam found in some units such as Units 2 and 3 seems to be caused by leakage from the RPV and the PCV, which is condensed to accumulations of water found in many places including reactor buildings and some steam has been released to the atmosphere. To respond to this issue, the status has been checked by dust sampling etc. in the upper part of the reactor buildings and discussion and preparation for covering the reactor buildings has been underway.

Cold shutdown of Units 5 and 6 has been maintained using residual heat removal systems with temporary seawater pumps and their reactor pressure has been stable in between 0.01 ~ 0.02 MPa.

Status of Each Unit of Fukushima Dai-ichi NPS(As of May 31st)

Unit No.	Unit 1	Unit 2	Unit 3	Unit 5	Unit 6
Situation of water injection to reactor	Injecting fresh water via the Water Supply Line. Flow rate of injected water : 6.0 m^3/h	Injecting fresh water via the Fire Extinguish and Water Supply Line. Flow rate of injected water: 7.0m^3/h(via the Fire Protection Line), 5.0m^3/h(via the Feedwater Line)	Injecting fresh water via the Water Supply Line. Flow rate of injected water : 13.5 m^3/h	Water injection is unnecessary as cooling function of the reactor cores are in normal operation.	
Reactor water level	Fuel range A : Off scale Fuel range B : -1,600mm	Fuel range A : -1,500mm Fuel range B : -2,150mm	Fuel range A:-1,850mm Fuel range B:-1,950mm	Shutdown range measurement 2,164mm	Shutdown range measurement 1,904mm
Reactor pressure	0.555MPag (A) 1.508MPa g(B)	-0.011MPa g (A) -0.016MPa g (B)	-0.132MPag (A) -0.108MPag (B)	0.023 MPag	0.010 MPag
Unit No.	Unit 1	Unit 2	Unit 3	Unit 5	Unit 6
Reactor water temperat-ure	(Collection impossible due to low system flow rate)			83.0°C	24.6 °C
Tempera-ture related to Reactor Pressure Vessel (RPV)	Feedwater nozzle temperature: 114.1 °C Temperature at the bottom head of RPV: 96.8 °C	Feedwater nozzle temperature: 111.5 °C Temperature at the bottom head of RPV: 110.6 °C	Feedwater nozzle temperature: 120.9 °C Temperature at the bottom head of RPV: 123.2 °C	(Monitoring water temperature in the reactor.)	
D/W Pressure, S/C Pressur	D/W: 0.1317 MPa abs S/C: 0.100 MPa abs	D/W: 0.030 MPa abs S/C: Off scale	D/W: 0.0999 MPa abs S/C: 0.1855 MPa abs	-	
Status	We are working on ensuring the reliability of cooling function by installing temporary emergency diesel generators and sea water pumps as well as receiving electricity from the external power supplies in each plant.				

2. Response to the "Roadmap towards restoration from the accident by the nuclear operator"

(1) Announcement of "Roadmap towards restoration from the accident" (April 17, 2011)

An accident releasing radioactive materials outside the plant occurred at Fukushima Dai-ichi Nuclear Power Station (NPS) as a result of the Great East Japan Earthquake which occurred off the Pacific coast of the Tohoku region of Japan on March 11.

Since then, Fukushima Dai-ichi NPS has made every effort to cool each plant from Unit 1 to Unit 4, to achieve the cold shutdown and to swiftly mitigate the release of radioactive materials from the plant to the surrounding environment.

The residents in the municipality where the NPS is located and those in the surrounding municipalities, were forced to evacuate or stay indoors, etc., due to the release of radioactive materials.

The issue with the highest priority under this condition was to achieve cold shutdown quickly and to enable evacuees to return to their homes. Although TEPCO announced the status of the plants at each occasion from the occurrence of the accident on March 11, the company considered that there was a need to make public what are the challenges to be tackled, targets to be achieved and measures to be taken in the future.

Furthermore, Prime Minister Kan instructed TEPCO on April 12 to present a future plan for restoration from the accident.

In response to the instruction, TEPCO announced on April 17 the "Roadmap towards restoration from the accident," which was drafted by the government and TEPCO under the Response Headquarters for the Accident in Fukushima NPS.

1) Basic policy

By bringing the reactors and spent fuel pools to a stable cooling condition and mitigating the release of radioactive materials, we will make every effort to enable evacuees to return to their homes and for all citizens to be able to secure a sound life.

2) Targets

Based on the basic policy, the following two steps have been set as targets:

Step 1: "Radiation dose in steady decilne"

Step 2: Release of radioactive materials is under control and radiation does is being significantly exposure.

Note: Issues after Step 2 will be categorized as "Mid-term issues".

Areas	Issues	Targets and Countermeasures	
		Step 1	Step 2
Ⅰ. Cooling	(1) Cooling the Reactors	① Maintain stable cooling ・Nitrogen gas injection ・Flooding up to top of active fuel. ・Examination and implementation of heat exchange function. ② (Unit 2) Cool the reactor while controlling the increase of accumulated water until the PCV is sealed	③ Achieve cold shutdown condition (sufficient cooling is achieved depending on the status of each unit.) ・Maintain and reinforce various countermeasures in Step 1.
	(2) Cooling the Spent Fuel Pools	④ Maintain stable cooling ・Enhance reliability of water injection. ・Restore coolant circulation system. ・(Unit 4) Install supporting structure.	⑤ Maintain more stable cooling function by keeping a certain level of water ・Remote control of coolant injection. ・Examination and implementation of heat exchange function.
Ⅱx Mitigation	(3) Containment, Storage, Processing, and Reuse of Wafer Contaminated by Radioactive Materials (Accumulated Water)	⑥ Secure sufficient storage place to prevent water with high radiation level from being released out of the site boundary ・Installation of storage/ processing facilities. ⑦ Store and process wafer with low radiation level ・Installation of storage facilities/ decontamination processing.	⑧ Decrease the total amount of contaminated wafer ・Expansion of storage/processing facilities. ・Decontamination/ Desalt processing(reuse), etc.

<table>
<tr><td></td><td>(4) Mitigation of Release of Radioactive Materials to Atmosphere and from Soil</td><td colspan="2">⑨ Prevent scattering of radioactive materials on buildings and ground
⑩ Cover the entire buildings (as temporary measure)
• Dispersion of inhibitor
• Removal of debris
• Installing reactor building cover</td></tr>
<tr><td rowspan="2">Ⅲn Monitoring/Decontamination</td><td rowspan="2">(5) Measurement, Reduction and Announcement of Radiation Dose in Evacuation Order/ Planned Evacuation/ Emergency Evacuation Preparation Areas</td><td>⑪ Expand/enhance monitoring and inform of results fast and accurately
・Examination and implementation of monitoring methods.</td><td>⑫ Sufficiently reduce radiation dose in evacuation order/ planned evacuation/ emergency evacuation preparation areas
・Decontamination/ monitoring of homecoming residences.</td></tr>
<tr><td colspan="2">(Note) With regard to radiation dose monitoring and reduction measures in evacuation order/ planned evacuation/ emergency evacuation preparation areas, we will take every measure through thorough coordination with the national government and by consultation with the prefectural and municipal governments.</td></tr>
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Table X2-1 Immediate Actions for the Roadmap

Timeline for achieving targets is set, in spite of various uncertainties and risks, as follows:

Step 1: Approximately 3 months

Step 2: Approximately 3 to 6 months (after completing Step 1)

Note: As soon as each step is achieved and quantitative forecasts are made, they will be publicized. When the original targets and their timeline for achievement must be revised, they will also be announced in due course.

3) Immediate Actions

In order to achieve the above targets, immediate actions were divided into three groups, namely, “I. Cooling”, “II. Mitigation”, “III. Monitoring and Decontamination.” Furthermore, targets were set for each of the following five issues and various measures will be implemented simultaneously— “Cooling the Reactors,” “Cooling the Spent Fuel Pools,” “Containment, Storage, Processing, and Reuse of Water Contaminated by Radioactive Materials (Accumulated Water) ”, “Mitigation of Release of Radioactive Materials to Atmosphere and from Soil,” and “Measurement, Reduction and Announcement of Radiation Doses in Evacuation Order/Planned Evacuation/ Emergency Evacuation Preparation Areas.” (Please refer to the chart)

(2) Announcement of the status of progress regarding “Roadmap towards restoration from the accident” (May 17), on May 17, one month after the announcement of the “Roadmap towards restoration from the accident”, TEPCO announced its progress status.

1) Basic policy and targets

No change from the previous announcement.

2) General overview on the progress made in the past month and further actions

Major changes from the previous announcement are indicated below:

a. Added areas and issues

The previous roadmap set three areas (“Cooling,” “Mitigation,” and “Monitoring and Decontamination”) as well as five issues (“Cooling the Reactors,” “Cooling the Spent Fuel Pools,” “Containment, Storage, Processing, and Reuse of Water Contaminated by Radioactive Materials (Accumulated Water),” “Mitigation of Release of Radioactive Materials to Atmosphere and from Soil,” and “Measurement, Reduction and Announcement of Radiation Doses in Evacuation Order/Planned Evacuation/ Emergency Evacuation Preparation Areas,”) .

Reflecting progress made in the past month, two areas (“Countermeasures against aftershocks” and “Environment improvement”) and three issues (“Groundwater ,” “Tsunami, reinforcements, etc.” and “Life/work Environment”) were newly added to the list, resulting in 5 areas and 8 issues.

Accordingly, the number of countermeasures relating to the recovery efforts has increased to 76 from 63.

b. Issue (1) Cooling of reactors: <Revision of prioritized countermeasures due to coolant leakage>

Workers entered the reactor building in Unit 1 after improving work environment, i.e. removing rubble and mitigating radiation exposure, calibrated instrumentation (reactor water level, etc.) and confirmed reactor building status.

As a result, they found that the coolant leakage from primary containment vessel (PCV) occurred in Unit 1 as well as in Unit 2, which suggests Unit 3 may have had the same risk.

Hence, flooding operations to fill PCV with water to cover the exposed fuel rods were postponed and due consideration was given to leakage sealing.

Accordingly, as a major countermeasure to achieve "cold shutdown" in Step 2, revision was made prioritize the establishment of "circulating injection cooling," where contaminated water accumulated in buildings and other places is reused to be injected into the PCV after being processed.

c. Issue (2) Cooling of spent fuel pool (SFP): <Implementation ahead of schedule>

Progress has been made in a relatively smooth manner. A measure to reduce radiation dose, remote controlled operation of concrete pump trucks called "Giraffe" and others to inject water into the fuel pools of Units 1, 3 and 4, etc were implemented ahead of schedule Installation of heat exchanger in SFP scheduled in Step 2 is expected to be implemented in Step1.

d. Issue (3). Containment, Storage, Processing, and Reuse of accumulated water

< Accumulated water increases until operation of processing facilities is commenced>

Accumulated water increased as new water was found in reactor building of Unit 1. While additional storage for accumulated water was secured as a tentative measure, starting the operation of processing facilities and the prompt establishment of "circulating injection cooling" became important in controlling accumulated water.

In parallel, countermeasures to prevent contamination spreading into the sea was reinforced. A silt fence was installed in the port, and progress was also being made on the initial construction necessary to install a circulating decontamination system in the port.

Furthermore, mitigation of groundwater contamination was set as a new issue.

New measures such as “Sub-drain management” and “shielding method of underground water were added.”

e. Issue (7) Aftershocks and Tsunami <Countermeasures are reinforced.>

Potential aftershocks and tsunami were explicitly designated issues.

“The instllation of temporary tide barriers” was set as a countermeasure for the roadmap, in addition to “adding redundancy of power source,” “transfer of emergency power source to up ground,” and “adding redundancy of water injection line.

Furthermore, in addition to SFP of Unit 4, reinforcement of each unit was under consideration.

f. Issue (8) Life/Work environment <Progress is being made step by step>

Reflecting the fact that improvement of Life/Work environment of workers in summer season has been initiated, new areas and issues were added.

Furthermore, necessary measures will be taken in addition to previously implemented “improvement of meal,” “maintenance” of accommodation,” and “installation of rest station,” which have already been implemented, progress has been made on necessary additional measures such as “installation of temporary dormitories,” and “additional installation of onsite rest facilities/restoration of current facilities.”

2. Measures taken by the Japanese Government

When “Roadmap towards restoration from the accident” by TEPCO was announced on April 17, the Japanese Government announced the statement by the Minister of METI, including the following views:.

1) The Government will request TEPCO to ensure the implementation of this roadmap steadily and as early as possible. To this end, the Nuclear and Industrial Safety Agency and other bodies will undertake regular follow-up, monitoring of the progress of the work, and necessary safety checks;

2) The Government will request TEPCO to ensure the mobilization and deployment of workers, the procurement and preparation of equipment and materials, and the arrangement of accommodation and other facilities, which are necessary to ensure the implementation of the roadmap;

3) At the end of Step 2, the release of radioactive materials is expected to be under control. At this stage, the Government will, following the advice of the Nuclear Safety Commission of Japan, review promptly the planned evacuation areas and emergency evacuation preparation areas. By the time of reviewing, criteria on which to base a judgment for those evacuation areas will be considered and decontamination will be carried out in these areas as wide as possible.
By implementing these countermeasures, the Japanese Government would like to inform the residents of some of the areas within a target of 6 to 9 months, whether they will be able to return to their homes.

Additionally, based on progress made for this period, on May 17, future actions to be taken by the Japanese Government were announced as follows:

(1) Support to nuclear operator and confirmation of safety

1) The government requests TEPCO to ensure the steady implementation of the roadmap as early as possible, the undertaking of regular follow-up, monitoring of the progress of the work, and necessary safety checks.

2) The government will conduct the collection of reports on the necessary measures taken by TEPCO pursuant to the provisions of Article 67 of the Act on the Regulation of Nuclear Source Materials, Nuclear Fuel Materials and Reactors, and subsequently evaluate and confirm its necessity, safety, environmental impact, etc.

(2) Support until lifting of the evacuation order

1) In order to identify precisely the needs of suffering local governments and residents, support will be provided by dispatching national government employees, and the environment which maintains communication among the relevant organizations and individuals will be improved.

2) In order to ensure the security and safety of the residents and public security in the area, the best possible efforts will be made to enforce security in the evacuation area.

(3) Support until lifting of deliberate evacuation order

1) A on-site government response office will be established to precisely identify the needs of suffered local governments and residents while the both relevant local and national governments will work closely together to smoothly provide various supports for sufferers to implement "stay in-doors" and evacuation in an emergency. Moreover, the ability to maintain communication among relevant organizations and individuals will be improved.

2) Municipal offices, prefectural and the national governments will work closely together. Moreover, the ability which maintains communication among relevant organizations and individuals will be improved.

3) Safety and security of residents will be ensured in the area by working with relevant local governments.

(4) Support until lifting of evacuation-prepared area in case of emergency

1) Both local and national governments will work closely together to implement "stay indoor" and evacuation in emergency. Moreover, the ability to maintain communication among relevant organizations and individuals will be improved.

2) Taking every possible measure to prevent crime within such areas.

(5) Ensuring safety and security of suffering residents

1) Sustainment of local community

When prefectural governments and municipalities guide the evacuees to move from primary shelters to secondary shelters and temporary housing, necessary support will be provided, while considering sustainment of the local community.

2) Ensuring healthcare, nursing and other care, and response to health concerns

a. Based upon the actual situation of each evacuation area, those who need nursing care or have disabilities or other problems will definitely be taken care of by working with relevant local governments.

b. In order to allay health concerns of the residents, screening and decontamination of the residents will definitely be implemented. A health counseling hotline was opened and on-site health counseling, and mental care is provided to ensure that residents' health is properly managed.

c. The National Institute of Radiological Science will cooperate with the relevant organizations and individuals in their efforts related to evaluating radiation exposure of the residents.

3) Educational support

a. As nursery schools, kindergartens, primary/secondary/high schools in the evacuation areas, deliberate areas, evacuation areas and evacuation prepared areas are currently closed, every measure will be taken to ensure educational opportunities for those children will be provided in and around their shelters and other places.

b. How to handle the soil and such at educational facilities in Fukushima prefecture will be promptly addressed based on the results of environmental monitoring.

4) Reinforcement of environmental monitoring (Plan for Reinforcing Environmental Monitoring)

a. Comprehensive radiation monitoring of the status of radioactive materials released from TEPCO Fukushima Dai-ichi NPS will be implemented with close cooperation with relevant organizations including Department of Energy of the United States based on "Plan for Reinforcing Environmental Monitoring."

b. Furthermore, "Radiation Exposure Distribution Maps" and such were developed and publicized, and radiation exposure is measured mainly in the deliberate evacuation areas to identify a comprehensive view of the accident status and to utilize the data for lifting of the evacuation order for the deliberate evacuation areas etc.

c. In conjunction with conducting environmental monitoring of farms and educational and other facilities, the sites for analyzing radioactive concentration of food products

mainly in Fukushima and samples of environmental monitoring will be improved.

5) How to handle rubble and sewage sludge

Regarding how to deal with rubble and sludge from sewage treatment, in addition to conducting onsite investigation, the criteria and disposal methods of the disaster waste possibly contaminated with radioactive materials will be promptly addressed based on monitoring and other results.

6) Enhancement of publicity to nuclear sufferers

a. Press conferences have been held daily in order to provide citizens accurately and promptly with information regarding the accident.

b. In order to ensure that necessary, easily understood information is communicated to evacuees, a public-service program is broadcasted through local radio stations, while newsletters have been published and posted in shelters and other places.

c. Furthermore, the Internet and nationwide radio broadcasting will be used to provide information for residents evacuated to other prefectures.