V. Response to the nuclear emergency

1. Emergency response after the accident occurred

(1) Establishment of organizations and instruction for evacuation etc.

1) Initial response etc. pursuant to the Act on Special Measures Concerning Nuclear Emergency Preparedness

At 15:42 on March 11, the Ministry of Economy, Trade and Industry (METI) in charge of safety regulation of nuclear power plants received a report from a nuclear operator pursuant to the Act on Special Measures Concerning Nuclear Emergency Preparedness (Total loss of AC power during operation) and established the Nuclear Emergency Preparedness Headquarters and the On-site Headquarters.

At 16:00 on the same day, the Nuclear Safety Commission of Japan (NSC Japan) held an extraordinary meeting and decided to organize an Emergency Technical Advisory Body.

At 16:36 on the same day, in response to the report as of 15:42 pursuant to the provisions of Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness, the Deputy Chief Cabinet Secretary for Crisis Management established Emergency Response Office for the nuclear accident at Prime Minister's Office.

At 19:03 on the same day, the Prime Minister declared the nuclear emergency and established the Nuclear Emergency Response Headquarters and the Local Nuclear Emergency Response Headquarters.

In parallel, other ministries and agencies established organizations to respond to the emergency.

2) Identifying current status of the emergency incidents

The Emergency Response Support System (ERSS), which monitors status of reactors and forecasts progress of the accident in a nuclear emergency, got errors in the data transmission function of the system right after the occurrence of the accident. Therefore, necessary information from the plant could not be obtained and the intended functions of the system

could not be utilized.

Regarding the System for Prediction of Environmental Emergency Dose Information (SPEEDI), which quickly predicts atmospheric concentration of radioactive materials and radiation dose in the surrounding area in an emergency situation when a large amount of radioactive materials is or might be released from reactor facilities, Ministry of Education, Culture, Sports, Science and Technology (MEXT) instructed the Nuclear Safety Technology Center at 16:40 on March 11, to shift SPEEDI to emergency mode as specified in the Basic Disaster Prevention Plan. The SPEEDI forecasted distribution of gamma radiation dose rate (absorbed dose in the air) from radioactive noble gas on the ground and temporal variation of concentration distribution of radioactive iodine in the air under the assumption of the release of 1 becquerel (Bq) of radioactive noble gas or iodine per hour continues. SPEEDI normally calculates forecast data by inputting the release source information comprised of radiation monitoring data transmitted from reactor facilities, meteorological conditions provided by the Meteorological Agency and topographical data. However, it could not conduct its primary functions to quantitatively forecast atmospheric concentration of radioactive materials and air dose rate because source term information through ERSS could not be obtained in this accident.

Operational procedure of SPEEDI has been partially reviewed as the initial response to this accident as follows.

The terminals of SPEEDI operated by MEXT are located in MEXT, NISA, NSC Japan, Local Nuclear Emergency Response Headquarters (hereinafter referred to as “Local Headquarters”) and Fukushima prefecture. Also, staff of Nuclear Safety Technology Center who operates the system was assigned to NISA and MEXT. On the other hand, staff of Nuclear Safety Technology Center was not assigned to NSC Japan because it was to request calculation by SPEEDI to the Nuclear Safety Technology Center through MEXT when NSC Japan needed such calculation.

On March 16, after roles and responsibilities of each ministry were realigned, MEXT became responsible for controlling the implementation of environment monitoring and publicizing the results. NSC Japan became responsible for evaluating monitoring information etc. MEXT also instructed the Nuclear Safety Technology Center to facilitate SPEEDI analysis by NSC Japan and dispatched the staff of the Nuclear Safety Technology Center to the Secretariat of NSC Japan. This enabled NSC Japan to directly request the staff

of the Nuclear Safety Technology Center for estimation.

3) Establishment of the Local Headquarters and relocation of the headquarters to Fukushima prefectural office

On March 11, the staff of Fukushima Dai-ichi Nuclear Safety Inspector's Office in charge of Fukushima Dai-ichi NPS were on duty for operational safety inspection, excluding a part-time clerk working at the office. After the quake occurred, three office staff including the Office Manager returned to the Off-site Center, around 5 km west of the NPS, and the remaining 5 nuclear safety inspectors stayed at the NPS to collect information.

At 15:42 on March 11, the Local Nuclear Emergency Preparedness Headquarters was established at the Off-site Center immediately after receiving a notification pursuant to the provisions of Article 10 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. Local Nuclear Emergency Response Headquarters (Local Headquarters) was also established at 19:03 on the same day after the occurrence of emergency incidents pursuant to the provisions of Article 15 of the same Act. The head of the Nuclear Safety Inspector's Office temporarily acted as the head of the headquarters until the Vice Minister of METI arrived pursuant to the provisions of Nuclear Emergency Response Manual.

However, in addition to blackout due to the earthquake, all power sources were lost due to malfunctions of emergency power source and no communication tools were available at the Off-site Center. Therefore, the head and other staff had to move temporarily to the neighboring Environmental Radioactivity Monitoring Center of Fukushima, where they used the satellite phone installed in the Center to secure external communication.

The Vice Minister of METI, Director-General of the Local Headquarters, immediately departed for the Off-site Center with NISA staff and Secretariat of NSC Japan from the Ministry of Defense (MOD) by helicopter of SDF etc. at 17:00 on March 11 following the occurrence of emergency situation prescribed in Article 15 of the Act on Special Measures Concerning Nuclear Emergency Preparedness. They arrived at the Environmental Radioactivity Monitoring Center of Fukushima at 0:00 on March 12. Around the same time, the staff of the MEXT also arrived separately. In and after the night of March 11 to the next day, officials and staff of SDF, Fukushima Prefecture including Vice Governor, Japan Atomic Energy Agency (JAEA) and National Institute of Radiological Sciences and others arrived. However, the initial mobilization of staff and specialists of relevant ministries and

agencies originally expected as members of the local headquarters was generally slow. In addition, the responsible NSC commissioner and the members of the Emergency Response Investigation Committee were not dispatched immediately to the site, as specified in the Basic Disaster Prevention Plan. The earthquake occurred earlier seems to have affected the mobilization.

After the emergency power supply for the Off-site Center was recovered and satellite communication system became available, operation of the Local Headquarters resumed at the Off-site Center again at 3:20 on March 12.

Meanwhile the head of the Local Headquarters directed the heads of relevant local governments to confirm the evacuation status, give publicity to local residents, prepare for potassium iodide and conduct emergency monitoring, screening and decontamination etc. as the activities at the Off-site Center.

Plant information, ERSS, SPEEDI and others were still unavailable at the Off-site Center for some period of time. Subsequently, with high radiation dose due to the progress of nuclear emergency and lack of fuel, food and other necessities due to congested transportation around the site, it became difficult for the Local Headquarters to continue effective operation at the Off-site Center.

Alternative facilities are required to be prepared for such a case pursuant to the provisions of the Act on Special Measures Concerning Nuclear Emergency Preparedness. Minami-soma City Hall originally selected as an alternative location for the Off-site Center was already used as a place for responding to the earthquake and tsunami disaster.

After rearranging an alternative facility for the Off-site Center, the Local Headquarters was moved to Fukushima Prefectural Building on March 15.

4) Initial operations of environment monitoring

The Basic Disaster Prevention Plan provides that in light of evaluating the effect to the surrounding area of released radioactive materials or radiation from nuclear facilities in the event of an emergency and based on the guideline established by the Nuclear Safety Commission, local governments are required to maintain their emergency monitoring system including developing emergency monitoring plan, installing and maintaining

monitoring posts and securing monitoring personnel…" and "…after the state of nuclear emergency is declared, local governments are required to gather emergency monitoring results including information from relevant organizations and communicate with the staff dispatched to the emergency response facilities." Thus, local governments are responsible for implementing and managing emergency monitoring.

The idea that the local governments are responsible for environment monitoring is based on the fact that since the local governments have more information about residents' situation and geography of each municipality, they would be more suitable to implement evacuation and to escort the residents than the national government.

In Fukushima Prefecture, the prefectural government personnel got together during this accident and started conducting emergency monitoring activities together with relevant authorities. However, it was quite difficult for Fukushima Prefecture to implement sufficient environment monitoring activities because unexpected events occurred. For example, equipment and facilities of Fukushima Prefecture were damaged by the earthquake and tsunami and affected by blackout; the local government itself had to take disaster response to widely-spread damage by the earthquake and tsunami; and the Local Nuclear Emergency Response Headquarters was relocated from the Off-site Center to Fukushima Prefectural office, as mentioned before.

MEXT dispatched monitoring cars from a major nuclear emergency prevention facility in Ibaraki prefecture, bordering Fukushima prefecture, to the Off-site Center near the NPS as the first dispatch (two owned by MEXT and one by JAEA) and to Fukushima City, where Fukushima prefectural office is located, as the second dispatch (two owned by MEXT and two by JAEA).

The initial response to environment monitoring on the requests just after the earthquake was limited because relevant ministries and agencies which are responsible for implementing and supporting monitoring upon request as provided in the Basic Disaster Prevention Plan, were engaged in other disaster response measures such as searching for missing many people in the wide disaster area.

The information of the first environmental radiation monitoring conducted on March 13 was made public by NISA at 7:30 on March 14. This monitoring observed radiation dose rate higher than 30 μSv/h in some area.

Environment monitoring conducted from 20:40 to 20:50 on March 15 at 3 locations by a monitoring car travelling around Namie Town, 20 km northwest of Fukushima Dai-ichi NPS observed 330 μSv/h at maximum outside of the car. This data was made public by MEXT at 1:05, March 16.

High level of radioactive iodine and radioactive cesium were detected on March 15, from sampled topsoil and plants. As the plume path areas would presumably continue to have high radiation dose rate and high concentration of radioactive materials, NSC Japan proposed to conduct early monitoring of milk, drink water and agricultural products at a conference with emergently called up team at Prime Minister's office.

During this time, although MEXT dispatched monitoring cars, due to the impact of the earthquake on roads and the progress of the disaster event in the reactor facilities, the Local Nuclear Emergency Response Headquarters was unable to conduct sufficient monitoring activities.

Under these circumstances, roles and responsibilities within the government were realized and MEXT became responsible for managing implementation of environment monitoring and publicizing the results. Since 1:05 on March 16, environment monitoring results have been announced daily by MEXT. NSC Japan also requested MEXT through the Nuclear Emergency Response Headquarters to install cumulative dosage meters at a certain location (Point 32) or increase frequency of measurement there etc., because values higher than 100 μSv/h had been detected for 2 consecutive days since March 17, as publicized in "Monitoring results beyond 20 km from Fukushima Dai-ichi NPS" by MEXT. (March 18)

5) How evacuation area and "stay in-house" area were established

a. Instruction regarding Fukushima Dai-ichi NPS

At 20:50 on March 11, the Governor of Fukushima Prefecture instructed Okuma Town and Futaba Town to evacuate their residents and others within 2 km radius from Fukushima Dai-ichi NPS .

At 21:23 on the same day the Director-General of the Nuclear Emergency Response Headquarters (Prime Minister) issued instruction to the heads of Fukushima Prefecture,

Okuma Town, Futaba Town, Tomioka Town and Namie Town pursuant to the provisions of the Act on Special Measures Concerning Nuclear Emergency Preparedness. This instruction was to evacuate the residents and others within 3 km radius from Fukushima Dai-ichi NPS and order the residents and others within 10 km radius from the NPS stay in-house. Responding to the situation that the reactor unit 1 has not been cooled, these evacuation instructions were provided to prepare just in case for such situation to continue.

At 5:44 on March 12, the Director-General of the Nuclear Emergency Response Headquarters instructed residents within 10 km from the NPS who were originally instructed to stay in-house to evacuate to outside of the evacuation area. This instruction was issued because the pressure in the Primary Containment Vessel could possibly be increasing.

At 18:25 on the same day, responding to an explosion at Unit 1 of Fukushima Dai-ichi NPS and the related emergency measures etc., the Director-General of the Nuclear Emergency Response Headquarters issued a new instruction to the heads of relevant municipalities, which included Fukushima Prefecture, Okuma Town, Futaba Town, Tomioka Town, Namie Town, Kawauchi Town, Naraha Town, Minamisoma city, Tamura city and Katsurao Village. This instruction is to evacuate the residents within 20 km radius. It was issued to prepare for any possible risks which would occur simultaneously at multiple reactors including the Units other than Unit 1.

From March 12 onward, various incidents at multiple units occurred including explosions which appeared to have been caused by hydrogen at Units 1 and 3 on March 12 and 14 respectively, an explosion incident and smoke at Unit 2 and an explosion and a fire at Unit 4 on March 15. At 11:00 on March 15, the Director-General of the Nuclear Emergency Response Headquarters issued a new instruction to the heads of relevant local governments including Fukushima Prefecture, Okuma Town, Futaba Town, Tomioka Town, Namie Town, Kawauchi Town, Naraha Town, Minamisoma City, Tamura City, Katsurao Village, Hirono Town, Iwaki City and Iitate Village. The instruction is to order residents within radius between 20 km and 30 km from Fukushima Dai-ichi NPS to “stay in-house.” (Lifting the instruction to “stay in-house” will be mentioned below.)

b. Instructions to Fukushima Dai-ni NPS

At 5:22 on March 12 and onward, a nuclear emergency of losing pressure-control function

in multiple units of Fukushima Dai-ni NPS occurred. The Prime Minister declared the state of nuclear emergency pursuant to the provision of the Act on Special Measures Concerning Nuclear Emergency Preparedness at 7:45. (Note: Simultaneously with the declaration of the state of nuclear emergency, the Nuclear Emergency Response Headquarters and the Local Headquarters for Fukushima Dai-ni NPS were established, and then they were integrated into those of Fukushima Dai-ichi NPS. As a result, the Prime Minister became the Director-General of the Nuclear Emergency Responses Headquarters for both Fukushima Da-ichi and Dai-ni NPSs.)

At the same time, the Director-General of the Nuclear Emergency Response Headquarters also instructed the residents and others within 3 km radius from Fukushima Dai-ni NPS to evacuate, and ordered the residents and others within 10 km radius from Fukushima Dai-ni NPS to stay in-house. The relevant local governments include Fukushima Prefecture, Hirono Town, Naraha Town, Tomioka Town and Okuma Town.

At 17:39 on the same day, responding to the explosion at Unit 1 of Fukukshima Dai-ichi NPS, the Director-General of the Nuclear Emergency Response Headquarters instructed the residents and others within 10 km radius from Fukushima Dai-ni NPS to evacuate. Those who were instructed to evacuate was originally instructed to stay in-house.

Regarding this instruction of evacuation, on April 21, the Director-General of the Nuclear Emergency Response Headquarters issued an instruction to the heads of local governments to change the evacuation area to within 8 km radius from Fukushima Dai-ni NPS. The relevant local governments include Fukushima Prefecture, Hirono Town, Naraha Town, Tomioka Town and Okuma Town. This instruction change was issued based on the judgment that risks of serious accidents have been considerably reduced from the time when the state of nuclear emergency was declared at 7:45 on March 12 and certain safety measures have been taken since then.

The Director-General of the Nuclear Emergency Response headquarters changed the instruction on the instruction on the evacuation area after hearing the opinions of the Nuclear Safety Commission pursuant to the provisions of Article 20 (5) of the Act on Special Measures Concerning Nuclear Emergency Preparedness. (Refer to Appendix V-1 for “evacuation instruction by the Director-General of the Nuclear Emergency Response HQs” etc.)

c. Communication channels and status of evacuation instruction

In the initial stage of the accident, the Director-General of the Nuclear Emergency Headquarters determined the evacuation area and instructed evacuation in order to ensure the safety of the residents and others as soon as possible. After such instructions were issued, the Administration of the Nuclear Emergency Response Headquarters called the On-site Headquarters and Fukushima Prefecture to deliver evacuation instructions and "stay in-house" instructions, and relevant municipalities received calls on such instructions through the On-site Headquarters and Fukushima Prefecture. Additionally, the Nuclear Emergency Response Headquarters directly called those local governments. However, because communication services including telephone lines were heavily damaged by the great earthquake, not all the direct calls reached the relevant local governments. Advance notice to local governments was not satisfactorily delivered. On the other hand, the police communicated the evacuation instruction to the local governments using police radio. Furthermore, in order to swiftly convey the evacuation instruction to residents, they used police vehicles such as patrol cars to inform the public and guided the residents in the evacuation process. In order to promptly communicate the evacuation instructions, the Chief Cabinet Secretary held press conferences to announce the instructions immediately after they were issued and mass media such as television and radio were fully utilized. Actual evacuation was promptly conducted with the cooperation of the relevant local governments, the police and the local residents, etc.

6) Responses of national and local governments after evacuation and "stay in-house" instructions

a. Overview of evacuation area etc.

The population of the evacuation area (within 20 km radius from Fukushima Dai-ichi NPS and 10 km radius from Fukushima Dai-ni NPS), where instructions was issued by March 15, was approximately 78,200 and that of "stay in-house" area (between 20 km and 30 km radius from Fukushima Dai-ichi NPS) was approximately 62,400. (Source: Flash report of National Census of 2010)

At 23:30 on March 15, NISA announced that evacuation of the residents out of 20 km radius from Fukushima Dai-ichi NPS and 10 km radius out of Fukushima Dai-ni NPS had already been implemented as of 19:00 on March 15.

b. Responses of national and local governments after instructions are issued

In addition to residents who follow evacuation and "stay in-house" instructions issued by the local governments, some residents who were instructed to stay in-house voluntarily evacuated from their home. The situation of the "stay-in-house area" was as follows: The number of residents who wish to voluntarily evacuate was increasing, it became more difficult to maintain social life due to stagnant business and distribution etc. and evacuation instruction could also be issued in such zones with increased radiation dose depending on the future progress of the plant situation. Based on the situation, the Government recognized the necessity of actively providing life support with goods like gas, food and medicines and encouraging voluntary evacuation for residents in "stay in-house" area as well as accelerating preparation for the future issuance of evacuation instruction in such area. On March 25 at the press conference, the Chief Cabinet Secretary encouraged the relevant local governments to voluntarily evacuate residents and be ready for taking appropriate measures promptly when evacuation instruction is issued.

Regarding evacuation of people who need care in emergency, for those who were hospitalized and lived in nursing homes within 20 km radius from the NPS, was completed after evacuation instruction without delay. 700 residents who were hospitalized between 20 km and 30 km from the NPS were transferred to 6 hospitals by March 21 after Fukushima Prefecture and other prefectures cooperated with the collaboratioon of relevant ministeries and agencies. 18 facilities with capacity of approximately 980 residents who lived in nursing homes between 20 km and 30 km from the NPS were transferred to appropriate facilities by March 22.

The "stay in-house" instruction to residents between 20 km and 30 km radius from Fukushima Dai-ichi NPS was lifted simultaneously with specifying Deliberate Evacuation Area and Emergency Evacuation-Prepared Area. (Refer to 4. for details of the establishment of Deliberate Evacuation Area and Emergency Evacuation-Prepared Area.)

7) Establishment of Restricted Area and temporary access to the area

a. Background of the temporary access

With the prolonged evacuation and "stay in-house," some residents entered the evacuation

area for such reason as bringing out daily commodities from home and other reason. Around the end of March, the Local Headquarters and the Fukushima Prefectural Emergency Response Headquarters requested the relevant local governments to prohibit any access to the evacuation area within 20 km radius from Fukushima Dai-ichi NPS because of residents' safety risks. The Chief Cabinet Secretary also announced that off limits to evacuation area will be strictly enforced and a possibility of temporary access is under review in response to the requests by the residents from the Restricted Area.

b. Establishment of Restricted Area

Even though off-limits to the Restricted Area was communicated, considerable residents' safety risks were a matter of concern because the authority continuously recognized that some residents actually entered such area. On the other hand, as for making a shift from the evacuation area to legally enforceable Restricted Area, the need of such change and the limited rights of the residents had to be carefully weighed and whether effectiveness of such enforcement can be assured had to be considered fully. The Nuclear Emergency Response Headquarters coordinated with relevant local governments which were authorized to establish such Restricted Area.

On April 21, based on opinions of the Nuclear Safety Commission, the Director-General of the Nuclear Emergency Response Headquarters issued an instruction to the heads of relevant local governments pursuant to the Act on Special Measures Concerning Nuclear Emergency Preparedness. This instruction was intended to establish the Restricted Area in the area originally specified as the evacuation area within 20 km radius from the NPS pursuant to the provisions of Disaster Countermeasure Basic Act 223 (enacted 1961) replaced with the Act on Special Measures Concerning Nuclear Emergency Preparedness. In response to this instruction, the heads of relevant local governments established the Restricted Area on April 22. Establishment of the Restricted Area is intended to limit access to the area in order to prevent risks of residents and others entering the evacuation area, other than those engaged in emergency response measures (Emergency response to prevent expansion of the nuclear accidents) and the cases approved by the heads of local governments. After the establishment of Restricted Area, legal penalties are to be imposed on a person who enters the Restricted Area, and any access to such area is to be physically limited in principle.

c. Overview of temporary access

On April 21, the Nuclear Emergency Response Headquarters announced the basic viewpoints of temporary access concurrently with establishment of the Restricted Area. Temporary access is allowed within 20 km radius from Fukushima Dai-ichi NPS excluding 3 km radius from the NPS and high risk area. The residents are allowed to enter the area temporarily for a few hours and carry the minimum necessary goods out from there while ensuring safety. Also, corporate bodies, etc., whose inability to access the area is expected to cause serious loss of public interest shall be permitted access by the heads of relevant local governments after consultations with the head of the Local Nuclear Emergency Response Headquarters. On April 23, the Director-General of the Headquarters announced the Permission Criteria for temporary access to Restricted Area (Eligibility, conditions and procedures, etc.). On May 9, NSC Japan provided technical advice on "Implementation of temporary access" upon request of the Nuclear Emergency Response Headquarters. The temporary access of residents was sequentially implemented pursuant to the permission criteria from May 10 onward, after coordination of relevant local governments, Fukushima prefecture and others. One of the 9 eligible local governments, Kawauchi Village, was allowed temporary access on May 10 and May 12. Later, temporary access was implemented for Katsurao Village on May 12, Tamura City on May 22, Minamisoma City on May 25 and 27, Tomioka Town on May 25, Futaba Town on May 26 and 27, and Namie Town on May 26 and 27.

(2) Efforts on nuclear emergency preparedness

1) Ensuring the safety and security of the residents and others

Based on the "Roadmap for Immediate Actions for the Assistance of Nuclear Sufferers" (May 17, refer to Appendix X-1), various actions are being taken under the lead of the Nuclear Sufferers Life Support Team to provide life support to nuclear sufferers. As a part of these actions, the following efforts are taken to ensure safety and security of residents and others concurrently with emergency measures.

・General information on nuclear emergency is provided at the press conferences and by press releases as well as on websites from the Nuclear Emergency Response Headquarters (NISA, Prime Minister's Office, etc.), the Local Headquarters, NSC Japan, and Tokyo Electric Power Co., Inc. (hereinafter referred to as TEPCO) accordingly.

・ Regarding health information related with radiation, MEXT has provided the Health Counseling Hotline and the National Institute of Radiological Sciences (NIRS) has opened a health counseling contact to respond to the requests for consultation from the public. Information on the safety of food and tap water is available on the website of Ministry of Health, Labor and Welfare (MHLW). In addition, in response to requests from the local governments, specialists, etc. from universities nationwide and the National Institute of Radiological Sciences have conducted explanatory meetings to residents regarding the health effect of radiation, etc.

・ As for the mental healthcare, MEXT opened the "portal site for mental care" on its website to provide information on contacts that provide counseling services for anxiety and distress of the residents of the disaster affected area as well as on children's mental care.

・ Also, MHLW opened a special page on its website to support the affected workers and their families as well as those who support them on its mental health portal called "Koroko-no-mimi (ear of the heart)." The website also posts, "How to protect your mental health" which gives some clues to protect mental health of the affected staying at shelters and other places. Incorporated Administrative Agency National Center of Neurology and Psychiatry (NCNP) also opened a webpage to provide information for healthcare professionals and those who support the affected.

・ Furthermore, "mental care teams" comprised of healthcare personnel etc. were dispatched to 3 prefectures affected by the disaster upon request of MHLW to work with health nurses to provide mental care to the affected as well as those who support them such as the employees of the local governments. (There are 24 persons in 6 teams in Fukushima Prefecture as of May 27)

・ The affected who evacuated from the evacuation area surrounding the NPS were not able to obtain sufficient information, which placed them in a situation where it was concerned that their anxiety over radiation-related issues which are difficult to understand, could be amplified. In order to ensure the delivery of readily understandable information to the affected, Local Headquarters published newsletter to post in shelters of the suffering areas (5 editions to date) and broadcasted radio programs featuring Q&A session at two local radio stations (AM and FM) everyday since April 11. These contents are posted on METI website to allow the affected including those who evacuated out of Fukushima Prefecture to have access to them.

・ On May 7, upon request of the Nuclear Emergency Response Headquarters, NSC Japan delivered its view in light of radiation protection and safety that fishing by those engaging in fishery in the sea area beyond 30 km radius from Fukushima Dai-ichi NPS was permissible. In addition, NSC Japan advised the Nuclear Emergency Response Headquarters to continue monitoring and report to NSC Japan as appropriate and make efforts to mitigate radiation exposure. On the same day, the Ministry of Agriculture, Forestry and Fisheries (MAFF) communicated this information to those related with fishery industry.

・ Fukushima Prefecture decided to conduct extensive medical checks to estimate radiation dose to date from the accident occurrence and survey the effect on health of 2 million citizens of the prefecture, which will start from some area in the prefecture in late June. On May 27, the first meeting of "Fukushima Prefecture Health Monitoring Survey Research Committee" was held. The details of the survey will be discussed in that committee in advance.

2) Organization structure for the emergency response and other matters in this disaster (Appendix V-2)

a. Overall governmental structure for the emergency response to the earthquake and the nuclear accident

・ As, in the East Japan Great Earthquake, as a nuclear accident occurred after large-scale earthquake and tsunami, the Government of Japan established two central headquarters; Emergency Disaster Response Headquarters and Nuclear Emergency Response Headquarters, pursuant to the provisions of the Disaster Countermeasures Basic Act and the Act on Special Measures Concerning Nuclear Emergency Preparedness respectively. Local Headquarters (Government Local Liaison Disaster Response Office in Fukushima and Iwate Prefectures as well as Local Headquarters in Miyagi Prefecture, under the Disaster Countermeasures Basic Act) were established for each of those two Headquarters. Life support teams were bolstered by establishing the teams as follows: the Headquarters for Special Measures to Assist the Lives of Disaster Victims as for Emergency Disaster Response Headquarters (currently renamed as the Team in charge of Assisting the Lives of Disaster Victims) and the Team in charge of Assisting the Lives of Victims around the Nuclear Power Station as for Nuclear Emergency Response Headquarters.

The two Headquarters are jointly operating to conduct some of the activities where possible, such as joint holding of Headquarters meetings and arrangement of procurement and transportation of relief supplies for affected. The two Headquarters are also sharing information and making operational coordination, etc at meetings of Emergency Operations Team, with the participation of Director-General level and other officials from relevant ministries and agencies.

・ With regard to the identification of the actual status of emergency incidents at reactor facilities, emergency measures to be taken to control the incidents, and other matters, the Government and the nuclear operator established Integrated Headquarters for the Response to the Incident at the Fukushima Nuclear Power Stations (currently renamed as Government – TEPCO Integrated Response Office) (in operation from March 15 at Head Office of TEPCO) for the purpose of working together, sharing information, making decisions and issuing instructions on necessary responses.

・ In the above stated organizational structure, the NSC, supported by members of the Emergency Technical Advisory Body and other experts and upon request by the Nuclear Emergency Response Headquarters and Local Headquarters, has provided technical advice for prevention of expansion of the accident and reduction of public exposure and other matters pursuant to the provisions of the Act on Special Measures Concerning Nuclear Emergency Preparedness (Refer to Appendices V-3 – V-5.). NSC's basic views on radiation protection are listed in Appendix V-6.

・ Two months after the occurrence of the Great East Japan Earthquake, the Government carried out reorganization to be based on three headquarters comprising headquarters for post-disaster reconstruction in addition to the above-mentioned two Headquarters with a view to clearly defining the role of each organization, renaming the organizations and for other purposes (from May 9).

As an immediate response, based on the discussion made at the Headquarters for the Response to the Incident at the Fukushima Nuclear Power Stations (currently renamed as Government – TEPCO Integrated Response Office), the nuclear operator developed the "Roadmap towards Restoration from the Accident at Fukushima Daiichi Nuclear Power Station" (announced on April 17, revised on May 17, Refer to Chapter X.) Also, based on the efforts made by the Team in charge of Assisting the Lives of Victims around the Nuclear

Power Plant, the Nuclear Emergency Response Headquarters developed “Plan of Immediate Actions for the Assistance of Nuclear Sufferers” (May 17). The post-nuclear disaster responses are currently implemented based thereon.

b. On-site organizational structure and other matters

・ The Local Headquarters was established pursuant to the Act on Special Measures Concerning Nuclear Emergency Preparedness at Off-site Center, but it was moved to Fukushima Prefectural Office (Refer to (1) above).

・ Meetings of the Joint Council for Nuclear Emergency Response have been held pursuant to the Act on Special Measures Concerning Nuclear Emergency Preparedness at the Local Headquarters, but the relevant municipalities, members of this Council, have not participated in it. This is because it was difficult to get all the relevant members together to hold a meeting of the Joint Council after the residents in the vicinity of the NPS had evacuated to other areas. As an alternative response, staffs of the Local Headquarters have visited relevant municipalities individually. As the municipalities under the regulation of food-related restriction expanded across the prefectural borders, Nuclear Emergency Response Headquarters in Tokyo, instead of Local Headquarters, has directly provided and exchanged information with them.

2. Implementation of environmental monitoring

(1) Environmental monitoring system

1) Environmental monitoring system

According to the Basic Disaster Prevention Plan, local governments are responsible for environmental monitoring after the occurrence of nuclear accidents and the subsequent establishment of the Nuclear Emergency Response Headquarters. The Ministry of Education, Culture, Sports, Science and Technology (MEXT), designated public institutions such as the National Institute of Radiological Sciences and Japan Atomic Energy Agency (JAEA), nuclear operators related to the accidents and nuclear operators other than the afore-said are supposed to assist local governments in their environmental monitoring activities. In addition, nuclear operators are supposed to keep measuring radioactive dose, etc. on site boundaries and notify Local Nuclear Emergency Response Headquarters of

information on the current condition and forecast of the discharge of radioactive materials, etc.

The accident at Fukushima Dai-ichi NPS occurred simultaneously with the occurrence of natural disasters of the earthquake and tsunami. Consequently, 23 out of 24 monitoring posts in Fukushima prefecture became unavailable so that communication became very difficult. In addition, since Fukushima prefectural government and others including Ministry of Defense and Japan Coast Guard providing support in response to requests had to focus also on response to seismic disasters. On March 15, staff of the Off-site Center which was the nuclear accident response center of Fukushima Prefecture came to leave there. In this circumstance, MEXT assumed the responsiblity for environmental monitoring on and after March 16 as a result of the coordination among relevant organizations within the Government regarding their respective roles.

The NSC Japan provided technical advice on monitoring to MEXT on a timely manner to improve the monitoring performed by MEXT, etc., while requesting MEXT to collect and measure dust in order to improve the accuracy of preliminary calculation by SPEEDI, the result of which was reflected in that calculation. In addition, NSC Japan evaluated monitoring results by MEXT, etc. and released the evaluation results on the web page and explained to media from March 25.

2) Operator's monitoring system

The NPS radiation control division of TEPCO, during its normal operation, monitors radioactive dose rate, radioactive material concentration and weather condition at the monitoring posts installed in surrounding monitoring areas, the discharge monitoring system for air/liquid radioactive waste, and weather observation facilities. Furthermore, TEPCO, periodically on and off the site, collects samples from the ground and the sea, and monitors radioactive material concentration in the surrounding environment (Attachment V-7 Normal monitoring system)

In case of emergency, TEPCO is supposed to have its on-site organization for nuclear emergency preparedness and response under the Nuclear Operator Emergency Action Plan to undertake activities including prediction of radiation-affected areas by measuring radioactive dose rate in and outside the NPS and concentration of radioactive materials . (Attachment V-8 Emergency monitoring system)

(2) Monitoring condition after the accidents

1) Monitoring condition in the NPS site

a. Air dose monitoring

After the earthquake, measured values of GM counters were higher than usual values in reactor facilities, while values measured at monitoring posts installed in the surrounding monitoring areas of Fukushima Dai-ichi NPS showed no anomaly. (Attachment V-9 Measured results of monitoring posts)

After the loss of external power supply on March 11, TEPCO became unable to measure at monitoring posts and, since that day, they started environmental radiation monitoring using a monitoring car . External power supply was restored on March 25 and TEPCO became able to measure at monitoring posts again. It has been continuing with measurement by installing three temporary monitoring posts on the site since March 23.

While monitoring data is usually released automatically on the operator's web page in real time, only limited contents compiled to the extent possible through manual work by personnnel were initially released because measuring at monitoring posts became impossible after the accident. The monitoring car used for radiation measurement this time can obtain data every 2 minutes. However, the nuclear operator continued to use only the values measured every 10 minutes same as before in releasing the monitoring data. The operator later checked the data and released all the measured values on May 28.

b. Discharge monitoring

Immediately after the Tohoku District - Off the Pacific Ocean Earthquake, no abnormal values were measured by the air stack monitor of each unit in Fukushima Dai-ichi NPS. (Attachment V-10 : Measured results of monitor)

However, after the loss of external power supply on March 11, the operation of the heating and ventilation system and the sampling system were suspended and therefore discharge monitoring became impossible. Although measured results of the air stack monitoring in some units were recorded until March 12, it is presumed that those results were caused by

an increase in the level of radioactivity outside measuring system, given the suspension of the operation of the sampling system.

c. Weather observation

Direction and speed of wind and atmospheric stability, etc. are monitored by common observation facilities in Fukushima Dai-ichi NPS. However, measurement in these facilities became impossible due to the loss of external power supply on March 11. TEPCO therefore started using a monitoring car for weather observation on March 11. TEPCO has still used it because it cannot perform inspection and calibration although power supply for the said system was restored on April 9.

d. Radioactivity analysis on soil

In terms of radioactivity analysis on soil of the site of Fukushima Dai-ichi NPS, soil samples were taken on March 21 and 22 at five points on the site and plutonium analysis was performed. It is presumable that, in light of the radioactive ratio of the detected plutonium isotopes, the plutonium may have been released due to the accident of this time, not due to the past atmospheric nuclear testing. Regarding detected concentration, when compared against the fallout, from the past atmospheric nuclear testing, observed in Japan (1978-2008), Pu-239 and Pu-240 were within the range of the observed values while Pu-238 was slightly above those values. Later, samples are taken on a regular basis and analyses on plutonium, gamma nuclide and strontium are being performed. (Attachment V-11: Nuclide analysis results of radioactive materials in the soil)

e. Radioactivity analysis on seawater and ocean soil

Regarding radioactivity analysis on seawater near the Water Discharge Canal of Fukushima Dai-ichi NPS, TEPCO started taking seawater samples at the Southern Water Discharge Canal and performed radioactivity analysis from March 21, as peripheral environmental monitoring. Because radioactive materials were detected as a result of the analysis, TEPCO has continued with radioactivity analysis by increasing sampling locations and its frequency since March 22. As stated below, after observing the water outflow from a pit to the sea on April 2, TEPCO takes samples from seawater in the pit and in front of bar screen near the pit to perform radioactivity analysis.

As of May 8, TEPCO adds sampling locations such as North Water Discharge Canal, shallow draft quay, the Intake Channels (north and south), Unit 2 screen (inside and outside of silt screen) one after another and takes seawater samples to perform radioactivity analysis. (Attachment V-12: Seawater analysis results)

In terms of radioactivity analysis on ocean soil offshore of Fukushima Dai-ichi NPS, TEPCO took samples from ocean soil at two locations (3km offshore of Kodaka ward and Iwasawa coast) on April 29 and performed radioactivity analysis and detected higher values of iodine and cesium than usual.

2) Situation of monitoring outside the NPS site

a. Overland monitoring around Fukushima Dai-ichi NPS

(a) Air dose rate beyond 20km from Fukushima Dai-ichi NPS

MEXT, with the cooperation of JAEA, has been measuring air dose rate since March 15, using up to 15 monitoring cars in liaise with Fukushima Prefecture, the National Police Agency, the Ministry of Defense and electric power companies, in order to figuring out the condition of dispersal and diffusion of radioactive materials in the overland area beyond 20km from Fukushima Dai-ichi NPS (12 points such as Kawauchi Village, Futaba Country, etc. by the National Police Agency, and four points such as army posts in Fukushima Prefecture, etc. by the Ministry of Defense). The measurement results are released by MEXT every day. In addition, MEXT estimated the cumulative dosage for one year after the occurrence of the accident based on the observed values of air dose rate, etc., and reported the contour line map to NSC Japan on April 10, which was released by the Nuclear Emergency Response Headquarters on April 11 and used as discussion data contributing to establishment of the Deliberate Evacuation Area (Attachment V-13-1).

(Measurement details)

・ MEXT has been measuring the air dose rate beyond 20km from Fukushima Dai-ichi NPS on and after March 15. The Ministry of Defense has been measuring the air dose rate at four points such as army posts in the Prefecture twice a day on and after March 27, and MEXT has been releasing its results.

・ At first, MEXT measured at various points extensively and comprehensively in order to

obtain an indication of the condition of dispersal and diffusion of radioactive materials. Based on the results and in consideration of wind direction and topographical features, MEXT selected main points in each direction and measures at the same points periodically since then.

・ MEXT released a plan to improve monitoring activities on March 21 and performs monitoring of 24 hour cumulative dose using portable type dose counters at 15 poinmts since March 23.

・ MEXT started to release the results of the air cumulative dosage measurement in Fukushima Prefecture measured by the Prefecture since April 12.

・ MEXT released the results of the investigation mesh-wise conducted by Fukushima Prefecture from April 12 to 16.

・ With regard to the travelling monitoring conducted by MEXT, JAEA and Fukushima Prefecture, MEXT released the travelling monitoring results of Minamisoma City, Iitate Village, Namie Town, Katsurao Village, Tamura City, Kawauchi Village, Hirono Town and Iwaki City on April 13. In addition, MEXT released the traveling monitoring results of Kawamata Town on April 18.

・ Following the Environmental Monitoring Enhancement Plan established by the Government Nuclear Emergency Response Headquarters on April 22, MEXT created the "dosage measurement map" with cooperation of JAEA to figure out the current distribution condition of radioactive materials and also the "cumulative dosage estimation map" to estimate the amount of the cumulative dosage for a year and both of which were released them on April 26. After that, MEXT announced the policy to release the "dosage measurement map" and the "cumulative dosage estimation map" reflecting the latest data approximately twice a month, and made the second release including the data within 20km on May 16 (Attachment V-13-2).

(Measurement method)

・ The air dose rate measurement by monitoring car has been conducted by more than one monitoring car from morning till evening every day since March 15. The GM (Gerger-Muller) counter, ionization chamber and NaI scintillation detector are used as detectors.

(Measurement results)

・ Among the points periodically measured, relatively high values (highest value: 170μSv/h at【32】on March 17) are detected at five points (【31】,【32】,【33】,【81】and【83】) located 30 km northwest from the NPS so far.

・ Moreover, the highest value 330μSv/h was observed at the point located approximately 20 km northwest from Fukushima Dai-ichi NPS from 20:40 to 20:50 on March 15.

・ As to the cumulative dosage, relatively high values (35,720μSv at【32】(cumulative value from 12:14 on March 23 to 10:24 on May 30) and (20,230μSv at【33】(cumulative value from 12:32 on March 23 to 10:08 on May 30)) were detected in the northwest direction.

(b) Air dose rate, soil radioactivity concentration, etc. within 20km from Fukushima Dai-ichi NPS

As information for discussing how to meet the requests for temporary-home-visit from residents evacuated from the evacuation zone (restricted area from April 22), MEXT measured the air dose rate and soil radioactivity concentration within 20km from Fukushima Dai-ichi NPS in cooperation with electric power companies from March 30 to April 19. In addition, the measurement has been continued in consideration of utilizing to grasp the whole picture of accident condition and lift the zones, etc. since May 6. The analysis of soil radioactivity concentration is conducted by JAEA, TEPCO and the Japan Chemical Analysis Center (hereinafter referred to as "JCAC") (Attachment V-13-3).

(Contents of measurement)

・ The air dose rate was measured from March 30 to April 2, and April 18 and 19, and MEXT released the results on April 21. The measurement results of radioactive materials in air and soil radioactivity concentration conducted on April 2 and 18 were released by the Ministry on April 25. After that, the Ministry releases the results sequentially on and after May 12.

(Measurement method)

・ The air dose rate is measured using more than one monitoring car. The GM (Geiger-Muller) counter, ionization chamber and NaI scintillation detector are used as detector. The soil radioactivity concentration is measured using germanium semiconductor

detector for 1,000 or 3,600 seconds per sample (which varies by sample).

(Measurement results)

・ As to the air dose rate within 20km from Fukushima Dai-ichi NPA, relatively high dose rate (highest value: 124μSv/h at【44】on April 2) was detected in the northwest direction.

(c) Monitoring of the dusts in the atmosphere, environmental samples, and soils (Measurement started from samples taken from March 18)

MEXT has started measurement of radioactivity concentration in the dusts within the atmosphere, environmental samples (weeds, water in ponds), and soils taken since March 18 in order to use them to figure out distribution and accumulation status of radionuclides on and beyond 20km from Fukushima Dai-ichi NPS and for establishing the Deliberate Evacuation Area. Analysis was made by JAEA, JCAC and Fukushima Prefecture (Appendix V-13-4).

(Contents of measurement)

・ Radioactive materials (Bq/㎥) in the atmosphere as well as concentration of radioactive materials (Bq/kg) in soils and weeds 20km or more away from Fukushima Dai-ichi NPS were measured.

(Measurement method)

・Dusts in the atmosphere and environmental samples are measured with the use of Germanium semiconductor detector for 1000sec. or 3600sec. per sample (which varies by sample).

(Measurement results)

・ High level concentration of radioactive materials were detected in the soils and weeds taken in Iidate village (40km northern west from said NPS) on March 20. (soil :Iodine 131; 1.17MBq/kg Cesium 137 ; 0.163MBq/kg. weeds: Iodine 131; 2.54MBq/kg Cesium 137; 2.65MBq/kg)

・ On April 1 MEXT announced analysis results of Pu and U in the soil samples at three points 20km or more away from Fukushima Dai-ichi NPS. According to the results, Pu was not detected and U was detected at the rate equivalent to the rate in the natural world. On April 26 MEXT also announced analysis results of Pu in the soil samples at four points.

Those results show that it seems that scattering of Pu was not caused by the accidents this time. (Appendix V-14).

・ On April 12 and May 31, MEXT furher announced the analysis results of radio strontium in the land soils and plants. (Appendix V-14).

(d) Offshore area monitoring (Measurement starts from samples taken on March 23)

MEXT started measurement of concentration of radioactive materials in dusts within the atmosphere above the sea, seawater, and soils at the sea bottom, and air dose rate above the sea in the sea area off the coast of Fukushima Prefecture and Ibaraki Prefecture, etc. in concert with Fisheries Agency, Japan Coast Guard, Independent Cooperation Japan Agency for Marine-Earth Science and Technology (hereinafter referred to as JAMSTEC), JAEA, and TEPCO from March 23 in order to use them to figure out contaminated degree in the sea area and evaluate the establishment of a warning zone, etc.. (Appendix-V-5)

(Contents of measurement)

・ In order to measure radioactivity concentration in the seawater of the sea area and dusts above the sea, seawater (from March 28 adding the sampling of water in lower layer to the sampling of surface water) and dusts in the sea area off the coast of Fukushima Prefecture and Ibaraki Prefecture have been collected with the use of research vessel of JAMSTEC and analyzed in JAEA. MEXT made an announcement on May 3 in terms of radioactivity concentration in the soil at the sea bottom collected on April 29, and is making further announcements after that.

・ Responding the discharge of stagnant water etc. with low-level radioactive materials as measures in emergency conducted by TEPCO on April 4, MEXT announced to enhance the sea area monitoring on April 5.

・Responding to the “Plan to enhance environmental monitoring” developed by Government Nuclear Emergency Response Headquarters on April 22, MEXT made an announcement about enhancement of sea area monitoring on April 25. Furthermore, considering that scattering of radioactive materials in sea area is predicted and also wide ranging sea area monitoring needs to be implemented, MEXT announced on May 6 that it would widen the area for sea area monitoring with cooperation from concerned ministries and agencies.

・ Fisheries Agencies drew up “Basic Policy for Inspections on Radioactive Materials in Fishery Products” and notified relevant prefectures etc. of it on May 2.

・ MEXT made public on and after April 29 the results analyzed by TEPCO in respect of the seawater samples collected by “Meiyou”, a survey vessel of Japan Coast Guard, in the coast of Ibaraki Prefecture.

(Measurement method)

・ In terms of seawater, 0.5 litter of water has been taken once per four days at 16 points (12 points till April 21) from surface layer (nearly 1 to 2m below surface), middle layer (between surface and sea bottom) and lower layer (approximately 10m above sea bottom) with the use of CTD water sampler from March 28 to May 7. (sampling from middle layer and from lower layer started from April 25 and from March 28, respectively)

・ From March 23 to 27, the water samples were taken every two days from surface layer at eight points, and analyzed.

・ Dusts above the sea and seawater are measured in JAEA with Germanium semiconductor detector.

(Measurement results)

・ Measurement results are shown in the Appendix 16.

・ Incidentally, the sea diffusion simulation is on-going based on the results of sea area monitoring. (Refer to Chapter II (3)).

(e) Aircraft monitoring (starting with sampling on March 25)

In order to contribute to figuring out the status of the accumulation of radioactive materials on the ground surface, and evaluating the establishment of the planned evacuation zone, etc., the MEXT, in cooperation with the Ministry of Defense, TEPCO, and the U.S. Department of Energy (hereinafter referred to as “U.S. DOE”), etc. measured radioactive materials accumulated on the ground extensively and promptly.

(Contents of measurement)

・ From March 25, in order to find the situation of radioactive materials in the atmosphere from the Fukushima Dai-ichi NPS, MEXT, with assistance from the Japan Aerospace Exploration Agency, independent administrative institution (hereinafter referred to as "JAXA") and civil small aircrafts, used the aircrafts with radiation measuring instruments on board to conduct monitoring in the air above the site.

・ Along with the above, from March 24, in order to three-dimensionally find the diffusion situation of the radioactive materials in the atmosphere from the Fukushima Dai-ichi NPS, including vertical altitude, on the request of MEXT, the Ministry of Defense conducted measurement, by altitude, of nuclides and radioactive concentration of radioactive materials contained in dust in the air over Japan by aircrafts with dust measuring instruments on board.

・ Later, since the abovementioned two airborne monitorings found that air dose rates and radioactive concentrations in the air were not high, the measurement was suspended. Meanwhile, from April 6, in order to recognize extensive impact of radioactive materials, and to evaluate radiation dose and the accumulation of radioactive materials in the evacuation areas, etc. in the future, MEXT and U.S. DOE worked together to conduct airborne monitoring, finding air dose rates on the level of 1m high above the ground and the accumulation situation of radioactive materials on the ground surface within 80km radius from the Fukushima Dai-ichi NPS.

・ From May 18, MEXT conducted the 2nd airborne monitoring within 80 to 100km radius from the Fukushima Dai-ichi NPS. Currently, the results of measurements are being analyzed. Also, from May 31, MEXT has been conducting the 3rd airborne monitoring within 80km radius from the Fukushima Dai-ichi NPS, with assistance from the Ministry of Defense. MEXT is working together with U.S. DOE and to analyze the monitoring data.

(Measuring method)

・ Radiation dose rates in the air were measured beyond 30km from the Fukushima Dai-ichi NPS, using a JAXA's small aircraft on Mon/Wed/Fri from March 25 to April 4 and a TEPCO helicopter on Tue/Thur/Sat from March 31 to April 21, respectively on an every other day basis, with radiation measuring instruments of the Nuclear Safety Technology Center on board.

・ From March 24 to April 1, an aircraft of the Ministry of Defense with dust samplers on board conducted measurement of concentration of radioactive materials in dust in the air at

5,000 feet high above from Ibaraki Prefecture to Niigata Prefecture, and off the coast of Fukushima.

・ From April 6 to 29, MEXT and U.S. DOE, working on the air zone allocated for each, measured air dose rates on the level of 1m high from the ground surface, using NaI scintillator radiation detectors on aircraft and helicopter, flying over 150m to 300m high within 80km radius from the Fukushima Dai-ichi NPS. Along with that, using NaI gamma-ray spectrometers on the same aircraft, energy of spectra specific to each nuclide was analyzed, and based on the analysis results of nuclides of gamma-ray observed on the ground with energy analysis equipment (in-SITU analyzer), the accumulation of radioactive cesium on the ground surface was found. These results were disclosed to the public on May 6.

(Measurement results)

・ The two airborne monitorings by MEXT as mentioned above in which JAXA , TEPCO and the Ministry of Defense worked together, found that radiation dose rates and radioactive concentrations in the air were not high, resulting in these measurements being suspended.

・ Meanwhile, on May 6, based on a joint airborne monitoring with the U.S. DOE, MEXT created a map showing radiation dose rates on the level of 1m high above the ground surface and the accumulation of the radioactive materials on the ground surface, in order to complement monitoring on the ground (Attachment V-17).

b. Survey on environmental radioactivity conducted nationwide

(a) Survey on environmental radioactivity level by Prefecture

In order to obtain the picture of the environmental radioactivity level nationwide, the monitoring posts for measuring radiation dose in the air installed in each prefecture and have been in operation since March 12.

(Contents of measurement)

・ Radiation dose rate in Prefectures (Fukushima Prefecture measures independently and make the dose rates open to the public; Miyagi Prefecture was not able to measure due to damage caused by the earthquake, but started from March 28 using alternate equipment).

・ With assistance from universities, etc., simple cumulative dosemeters are installed,

measuring cumulative radiation dose for 24 hours from 14:00 on a daily basis (On April 12, 28 measuring points were added, helped by universities, etc. in western Japan, amounting to 54 measuring points in total).

(Measuring method)

・ Radiation dose rates in each prefecture are continuously measured, using NaI scintillation detectors every hour, and disclosed the dose rates twice a day.

・ For measurement with assistance from universities, etc., cumulative dosemeters are installed to measure cumulative dose rates of 24 hours, and the dose rates are disclosed once a day.

(Measurement results)

・ Radiation dose rates in each prefecture are available on the MEXT website, with the tables and the figures of the diose rates.

(b) Fallout at the fixed time

In order to figure out the level of environmental radioactivity nation wide, radioactive concentrations in dust in the air in each prefecture are measured, starting with the sampling on March 18.

(Contents of measurement)

・ Radioactive concentrations (MBq/m^2) of fallouts from the air in each prefecture (except Miyagi Prefecture, where it is unable to measure due to the damage caused by earthquake) are measured (for 24 hours).

・ In Fukushima Prefecture, where measurements of radioactive nuclides contained in drinking water and suspended dust in the air, etc. are the first priority, fallouts were not measured due to unavailability of equipment for analysis, but the prefectrure started to analyze them with sampling on March 27 and 28 (for 24 hours).

(Measurement method)

・ Measurements are carried out on fallout for the period of 24 hours by germanium semiconductor detector (it takes approximately six hours), and the results are disclosed to the public once a day.

(Contents of measurement)

・ The overall trend is that high radioactivity was detected in Tohoku and Kanto districts during the period from March 20 to 24, but it drastically decreased later. In addition, as mentioned above, note that measurement of fallout could not be conducted in Fukushima Prefecture (Fukushima City), which was directly affected by the disaster, and had prioritized the analysis on radioactive nuclide contained in drinking water, atmospheric air borne dust, etc. soon after occurrence of the disaster.

・ In the samples in Ibaraki Prefecture (Hitachinaka City) on March 20 and 21, Iodine-131 of 93 G Bq/k ㎡ and Cesium-137 of 13 GBq/k ㎡ were detected.

・ In the samples in Fukushima Prefecture (Fukushima City), Iodine-131 of 23GBq/k ㎡ and Cesium-137 of 790MBq/k ㎡ were detected. (The readings drastically decreased later.)

(c) Drinking water (tap water)

With an aim to figure out the nation-wide radioactivity concentration level, the radioactivity concentration contained in tap water in each prefecture is measured for samples on and after March 17.

(Contents of measurement)

・ The radioactivity concentration (Bq/kg) contained in tap water in each prefecture is measured. (However, Fukushima Prefecture measures and the data measured is disclosed to the public independently; and Miyagi Prefecture was not able to measure due to damage caused by the disaster.)

(Contents of measurement)

・ Measurement is carried out on two liters of tap water by germanium semiconductor detector (it takes approximately six hours), and the results are disclosed to the public once a day.

(Measurement results)

・ The readings are as per Attachment V-18.

・ Although Iodine-131 and Cesium-137 were detected in all prefectures in Tohoku and Kanto districts (except for Aomori), Niigata Prefecture and Yamanashi Prefecture, all the results were below the guideline on intake of food and drink (Iodine-131: 300 Bq/kg and Cesium-137: 200Bq/kg).

3. Measures for agricultural food stuffs and drinking water, etc.

(1) Measures for agricultural food stuffs, etc.

Regarding food stuffs including agricultural ones, because of the radioactivity detected from surrounding environments of Fukushima Dai-ichi NPS after the NPS accidents, the Ministry of Health, Labor and Welfare (MHLW) notified to each prefecture on March 17, based on technical advice from NSC Japan, that "Guideline values for food and drink intake restrictions" provided by NSC Japan should be provisional limit values for radioactive materials contained in food stuffs and that any food stuffs that contains radioactive materials exceeding these values should not be consumed pursuant to Item 2, Article 6 of the Food Sanitation Law.

MHLW has collected and disclosed the results of inspection findings transffered from local governments. In addition, in terms of items exceeding the provisional limit values, if their foodstuffa are thought to have covered wide areas, the Prime Minister, the Director-General of the Nuclear Emergency Response Headquarters, issued instructions on March 21 to relevant governors of prefectures about distribution restrictions, based on advice from the NSC Japan, under the provisions of Paragraph 3, Article 20 of Act on Special Measures Concerning Nuclear Emergency Preparedness (especially for items with very high detection values, intake restrictions have also been issued). (Attachment V-19: Instructions on food stuffs pursuant to the Act on Special Measures Concerning Nuclear Emergency Preparedness {List of instructions on distribution and intake restrictions})

In addition, the Ministry of Agriculture, Forestry and Fisheries (MAFF) notified related parties of how to dispose of vegetables and raw milk (including distribution-restricted vegetables, etc.), from which radioactive materials were detected, based on technical advice from Emergency Technical Advisory Body of the NSC on March 25, April 26, and May 6.

After setting provisional limit values under the Food Sanitation Law, the Nuclear Emergency Response Headquarters reviewed an inspection plan and how to set and lift these restrictions

to determine the necessity of food distribution restrictions, etc. based on accumulated inspection findings. Specifically, based on technical advice from NSC, the Headquarters decided the following and announced it on April 4: 1) the borders of distribution-restricted areas should be basically the same as those of prefectures, while the areas can be divided if prefectural and/or municipal governments can keep management on these areas; and 2) weekly inspections should be conducted in the distribution-restricted areas (these inspections should be conducted basically in multiple cities, towns and villages) and the restrictions can be lifted if inspection findings continue to be below provisional limit values three consecutive times. Subsequently, after April 8, distribution restrictions on items and areas that have met the instructions have been lifted.

In addition, regarding radioactive iodine in fishery products on which NSC Japan has decided no guideline values, no provisional limit values were set either, immediately after the accident. However, based on case reports on a considerable amount of radioactive iodine detected from fishery products, MHLW decided to use the same provisional limit values for radioactive iodine in vegetables as for fishery products as well, referring to technical advice from the NSC Japan, and notified of the decision each prefecture, etc.

In terms of rice, before the arrival of period for planting, the Nuclear Emergency Response Headquarters announced its thoughts on rice planting based on technical advice from NSC Japan on April 8. Based on the Headquarter's thoughts, the Prime Minister, the Director-General of the Nuclear Emergency Response Headquarters, issued instructions on April 22 about rice planting restrictions to relevant prefectural governors, under the provisions of Paragraph 3, Article 20 of the Act on Special Measures Concerning Nuclear Emergency Preparedness.

(2) Measures for drinking water

In terms of drinking water, MHLW issued a notice to the waterworks office of the each prefectural government and waterworks operators of each prefecture, etc. on March 19 and 21 that drinking tap water that contains radioactive materials exceeding the guideline values etc. set by the NSC should be avoided, and MHLW has publicized the measurement readings by related local governments, etc. MHLW requested water operators, etc. to implement intake restrictions and notify the relevant residents of the restrictions if the radioactive materials that is contained in tap water has exceeded the guideline values, etc.

MHLW takes more general safety measures, for example, by developing the "Future monitoring policy on radioactive materials in tap water" on April 4 in which MHLW requests local governments to carry out the inspection of tap water mainly in Fukushima Prefecture and its neighboring ten prefectures more than once per week, while daily inspection should be conducted if the readings exceed the guideline values, etc. or they are likely to exceed them, because MHLW thinks it desirable to inspect radioactive materials in tap water on a frequent basis to confirm the safety of tap water.

As stated above, MHLW promptly makes public the results of the inspection of radioactive materials in food products, including agricultural ones, and tap water, properly sets and announces regulation values and issues relevant instructions on distribution and intake restrictions.

4. Measures for additional protected areas

(1) Background of setting Deliberate Evacuation Areas and Emergency Evacuation Preparation Areas

1) Environmental monitoring and its evaluation

After the accident occurred, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) continues conducting environmental monitoring around Fukushima Dai-ichi and Dai-ni NPSs and NSC Japan continuously evaluates monitoring results. It was thought that the integrated dose in the areas where the air radiation dose rate of over 100μSv/h was measured may reach the guideline values for in-house evacuation (10 to 50 mSv) based on "Disaster prevention measures for nuclear facilities, etc. (developed by NSC Japan in June, 1980)" (hereinafter referred to as "Disaster prevention guide"), however, it was found that only a limited area was in such a state. Based on this fact, NSC Japan requested the Nuclear and Industrial Safety Agency (NISA) on March 18 to check the existence of houses, etc. and MEXT to install integrating dosimeters and observe the readings carefully (Note 1). Based on the readings of the dose rate etc., NSC Japan expressed its view on March 25 that the situation was not such that change of in-house evacuation areas is necessary at present while giving technical advice to the Nuclear Emergency Response Headquarters to request residents to voluntarily evacuate from areas where relatively high dose was expected. However, in the "Evaluation on environmental monitoring findings" on March 26, NSC Japan announced its views and requests it made after March 18 and it also

announced that weight coefficient 0.6 of the value multiplied by reduction coefficient 0.4 (Note 2) was used for calculating the accumulated dose in 16 hours of in-house evacuation. From March 25 to April 4, NSC Japan maintained its view that the situation was not such that change of in-house evacuation areas is necessary, but after April 5 it changed its view that it was now organizing necessary technical data for future measures, considering the readings of dose rate, etc.

(Note 1) http://www.nsc.go.jp/ad/pdf/20110318_1.pdf
http://www.nsc.go.jp/nsc_mnt/110325.pdf

(Note 2) reduction coefficient 0.4 of wooden houses in the Table 2 of Appendix 8 to "Disaster prevention measures for nuclear facilities, etc."

2) NSC Japan's views

On April 7, the Chief Cabinet Secretary announced that the Government was reviewing the handling of areas where accumulated dose was on an increase and expressed its opinion that it would seek technical advice from NSC Japan while referring to opinions of IAEA and ICRP.

Outside the evacuation area in 20km radius of Fukushima Dai-ichi NPS, there were places with a possible increase in accumulated air dose. In this situation, the Director-General of the Nuclear Emergency Response Headquarters sought opinions of NSC Japan on the following matters: In the situation that there were places with a possible increase in accumulated air dose outside 20km radius of Fukushima Dai-ichi NPS, what the concept should be on the areas that required the implementation of emergency response measures, as well as what should be notified to residents within the areas. In addition, amid unsettled condition of the NPS accident, the other matters that required consideration were how to decide the areas that required the implementation of emergency response measures within in-house evacuation areas in the 20-30km radius, as well as what should be notified to residents within the areas. Regarding the abovementiond matters, NSC Japan acknowledged as follows: On March 15, the Fukushima Dai-ichi NPS had events such as a possible damage to the pressure suppression chamber of Unit 2 in the Fukushima Dai-ichi NPS, and the release of a considerable amount of radioactivity was probable. The radioactive cloud released, then moved in the northwest direction and rainfall occurred. This caused a considerable amount of radioactive materials to deposit on the land surface of the areas, which was considered to be

the primary cause of continued relatively high air dose rate in the said areas. On the other hand, guideline values for protective measures under the disaster prevention guide of NSC Japan were set in a possible short-period case of about one week or so. From the perspective of keeping the exposure level low as long as reasonably achievable, NSC Japan made a judgment that 20mSv/yr, which was the lowest of the reference 20-100mSv (acute or annual) range for protecting the public in the emergency exposure condition at the accident specified by ICRP's advise given in 2007, should be the proper standard for protection measures. NSC Japan proposed that an area with the possibility of accumulated dose reaching 20mSv within one year after the accidents was regarded as "Deliberate Evacuation Area." In addition, among "In-house Evacuation Area" as of April 10, areas other than those falling under the "Deliberate Evacuation Area" were proposed as "Evacuation-Prepared Areas in Case of Emergency" because in these areas there may be necessity of an urgent response due to unsettled condition of the NPS accident. Furthermore, NSC Japn also proposed that a review on setting of the "Deliberate Evacuation Preparation Area" and "Evacuation-Prepared Areas in Case of Emergency" was necessary at the point when radioactive materials discharged from the NPS are judged to have became basically manageable. For these proposals, standard values (20 to 100 mSv/yr) of radiation protection in the emergency exposure condition of ICRP and IAEA were considered.

Attachment V-20 summarizes the concept and basis for dose standards of radiation protection. On April 10, NSC Japan received the reports on "Estimating Accumulated Dose in Surrounding Areas Outside 20km Radius of Fukushima Dai-ichi NPS" and "Accumulated External Exposure Dose (SPEEDI trial calculation values from March 12 to April 5)." These data were used when deliberate evacuation areas were actually designated. (Attachment V-21)

3) Basic concept of Deliberate Evacuation Areas and Emergency Evaluation Preparation Areas

The Chief Cabinet Secretary announced the basic concept for establishing the Deliberate Evacuation Area and the Evacuation-Prepared Areas in Case of Emergency on April 11. According to the basic concept, areas where accumulated dose was likely to reach 20mSv within a year after the accidents were designated as "Deliberate Evacuation Areas", while those other than the Deliberate Evacuation Preparation Areas in the In-house Evacuation Zone were designated as "Evacuation-Prepared Areas in Case of Emergency" because emergency responses were may be required due to unsettled situation of the accident at the NPS. The Deliberate Evacuation Preparation Areas are Katsurao Village, Namie Town, Iitate

Village, part of Kawamata Village and part of Minamisoma City except for Evacuation Areas. The Evacuation-Prepared Areas in Case of Emergency are Hirono Town, Naraha Town, Kawauchi Village, part of Tamura City and part of Minamisoma City except for Evacuation Areas.

Establishment of the Deliberate Evacuation Areas and Emergency Evacuation Preparation Areas will be reviewed when discharge of radioactive materials from Fukushima Dai-ichi NPS has become considered as bacically manageable.

(2) Background to establishment of Deliberate Evacuation Area and Evaluation-Prepared Areas in Case of Emergency

The Director-General of the Nuclear Emergency Response Headquarters issued the instructions on April 22 according to the abovementioned basic concept under ASMCNE. According to the instructions, residents etc. in the Deliberate Evacuation Areas were basically required to move out of these areas for evacuation within about a month after the instructions were issued. Residents etc. in the Emergency Evacuation Preparation Areas were required to keep prepared for moving out of the areas or in-house evacuation. In addition, voluntary evacuation continues to be requested for residents of the areas.

The instruction to stay in-house issued to residents within 20km-30km radius of Fukushima Dai-ichi NPS was lifted when Deliberate Evacuation Areas and Emergency Evacuation Preparation Areas were established.

Before establishing these areas, the government discussed with relevant local governments regarding specific areas by explaining these plans to relevant cities, towns, and villages that can become included in either of these areas, and established these areas as a judgment of the natonal government.

5. Assessment of nuclear emergency response

Regarding response to the NPS accidents, as a result, rapid progression could not be prevented and the release of radioactive materials to outside, which is essentially impermissible, affected extensively and for a long period. To the extent of knowledge obtained at this point, understanding on current situation mainly from technical standpoint is reviewed below.

(1) General

As an emergency response after occurrence of disaster, basic procedures were implemented such as declaration of the Nuclear Emergency, establishment of the Nuclear Emergency Response Headquarters, etc., direction of evacuation, etc. pursuant to the provisions of the ASMCNE.

As to protective activities for residents, etc., in an environment that available plant information are limited due to influence of earthquake and tsunami, under the severe circumstances that release of radioactive materials, explosion of the reactor buildings, etc. occurred in succession within a few days, the responses including establishment of evacuation area, etc. were carried out.

Moreover, at the same time, the efforts on ensuing confidence and safety of residents are being promoted such as environment monitoring, ingestion limit of food or beverage, health consultation, mental healthcare, etc.

On the other hand, in the responses, call up personnel to establish the initial system was small due to influence of earthquake disaster, the Off-site Center (OFC) was forced to be moved, emergency response measures implementation area was expanded to the area exceeding 10-kilometer radius from the NPS, and evacuation of residents, etc. is prolonged, and as a result, it needed to amend, strengthen, etc. the existing framework. Moreover, it is considered that the advance preparation was not adequate for a series of responses from establishment of initial responses to measures for restoration.

As background against it, because we have not experienced the disasters subject to the ASMCNE since it was established in the wake of the JCO criticality accident, it is thought that the effectiveness of the emergency preparedness has not been fully verified with considering occurrence of severe accident into reality

In addition, in the past operation of the nuclear emergency response drill, etc., it is thought in some aspects that the failure of safety function was assumed to be restored relatively early during the assumed severe accident. The details and the system of emergency response have been developed and managed in some aspects on the presumption that if the nuclear disaster has occurred by any cause, the situation is ceased in a relatively short time with emergency measures by the nuclear operator using the existing facilities, etc. and providing technical

instruction and advice and coordination by the Nuclear and Industrial Safety Agency in the local range with a central focus on the said facilities.

Moreover, assumption has not been made secifically about the situation where a nuclear accident occurs in combination with earthquake, tsunami, etc.

On the basis of the disaster, it is requested to restore, etc. the functions of damaged the Off-site Center (OFC) and to improve the management of the emergency measures immediately in cooperation among related ministries and agencies, related local governments, the nuclear operator, etc. as well.

It is also required to conduct a review of system, structure, etc. thoroughly and continue to improve them as well in order to secure the rapid and adequate emergency response and smoothly to take measures focusing on post-event response against any kind of situation, including a disaster which occurs with combination of an earthquake and tsunami.

(2) Particular items

1) Assessment and prediction of the situation concerning disaster events.

Since the information on situation of reactors were not available due to breakdown of communication system by earthquake, the information on amount of radioactive materials released form the facilities were not obtained. As a result, the prediction of the effects of radioactivity, SPEEDI's original function, was unavailable. Under such situation, ERSS and SPEED was used to calculate the estimation with various assumptions for the internal examination of the situation by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), the Nuclear and Industrial safety Agency (NISA) and the Nuclear Safety Commission (NSC) Japan. For this purpose, MEXT made some estimation at every hour after 16:00 on March 11, which are the airborne concentration of radioactive materials and air absorbed dose rate in the surrounding environment for the reference amount or 1 Bq released from Fukushima Dai-ichi NPS. The estimation was not disclosed at the early stage of the accident, because the calculated results of SPEEDI are supposed to be shared by the parties involved in the nuclear emergency preparedness activities and it was also feared that the disclosure of the estimation may bring unnnecessary confusion, as the estimations at that time were very different from that calculated based on the actual readings. In addition, these early estimations were not shared with other governmental agencies.

After that, the Nuclear Safety Commission Japan estimated release source in combination with dust sampling results and diffusion simulation by SPEEDI from the NPS to the measurement point, and calculates concentration of radioactive materials and air dose rate around the facilities retroactively by entering the estimated release source data into SPEEDI, and estimate the cumulative dose of internal exposure and external exposure from the time of the accident based on those data, and the results are released on and after March 23. Incidentally, this prediction method is was not assumed in using SPEEDI in the Basic Plan for Disaster Preparedness.

・ In this way, the calculation results of SPEEDI were not released at first when the accident occurred, but MEXT, the NISA and NSC Japan release the results of initial internal discussion sequentially on their websites on and after May 3. From the standpoint of contributing to evacuation of residents, etc., the results of utilization of SPEEDI should have been released and information should have been provided to related local governments at the early stages of the accident.

・ In terms of crisis management, the concrete methods of data utilization, information sharing and release, etc. should have been fully prepared including the estimation results on the certain assumption like this, etc., with the prospect that the larger the disaster, it may be more difficult to obtain information, as a general trend at disaster.

2) Emergency response measures for disaster events

a. Handling obstructive factors for on-site activities

In the emergency response, the dose limit for personnel engaged in radiation work have been raised, and radiation constitutes barriers to personnel activities. Long-term personnel work under the influence of radiation might not have been concretely assumed, and deployment of equipment for radiation protection, development and instruction of remotely-operable equipments and facilities, etc. might not have been prepared adequately.

Earthquake and tsunami have a significant impact on the factors for restricting on-site activities, and it’s necessary to carry out activities while bewaring earthquake and tsunami, securing the power supply and doing provisional works in consideration of these influence, eliminating traffic barriers on and outside the site, etc. It is thought that in the event of

complex disasters like this, the secondary effect caused by surrounding damage should be considered as well as direct influence on site.

Moreover, in addition to explosion, fire or smoking that may be associated with it occurred at Units 3 and 4, and personnel working on site had to take shelter and work had to be interrupted. For this reason, it is considered to be important to enhance the fire protection response, such as reduction of quantity of combustibles on a normal basis.

b. Information provision to related institutions

We needed to receive support from related institutions for emergency cooling of reactors and we should have provided information on current situation and outlook of disaster events, details necessary for receiving support, information necessary for on-site safety management, etc. adequately from the stage when requesting to the related institutions as a nuclear operator.

Moreover, although the on-site arrangement center was placed on the gathering spot of dispatched personnel (J Village) by direction of the Prime Minister this time, the secretariat should have prepared the coordination scheme among parties engaged in the wotk at site from the early stage of dispatching.

3) Protective action for residents, etc.

The existing framework of the Act on Special Measures Concerning Nuclear Emergency Preparedness generally assumes, based on the emergency preparedness guidelines of the NSC Japan, to implement in a step-by-step manner defining a certain scope in consideration of scale of abnormal event, climate condition, etc. in the event of actual application of the protection response including evaluation and sheltering. In addition, based on the indices provided in the emergency preparedness guidelines, in the national and local plan for disaster preparedness, it assumed to set the Emergency Planning Zone (EPZ) within approximately 10 kilometers of the NPS, use 10mSv for sheltering and 50mSv for evacuation (external exposure) as an indicator for the protective measures for residents, etc. These measures for resident protection based on the emergency preparedness guidelines of the NSC Japan might have been developed so far with the main aim of protecting and reducing the influence around the NPS relatively in a short term.

Since the original functions of SPEEDI were unavailable to be utilized in this response, concentric zone was set for direction of evacuation and sheltering provided on March 11, 12 and 15 on the assumption that large amount of radioactive materials or radiation, etc. were released around, and the zone was expanded in stages depending on progress of disaster events. Even under such restriction, we should have estimated the diffusion trend of radioactive materials, etc. by SPEEDI based on climate data, etc. on a certain assumption, and utilized as reference of evacuation activities, etc. As to cooperation and coordination with related local governments with regard to the zone setting, in evacuation direction on March 11 and 12, the national government partially arranged candidate refuges, prepared transportation, etc., and as a result residents, etc. could move to outside the evacuation area relatively smoothly. On this occasion, although adequate response was not taken to prior communication because it was emergency response in the situation that communication and transportation were stopped due to the disaster, on the other hand, in order to promote awareness of evacuation direction promptly, the Chief cabinet Secretary held an interview soon after each direction and made an announcement about the details of direction, and information was transmitted utilizing television, radio, etc. In addition, information on the accident outline, the results of monitoring, etc. were not fully provided to the related local governments and residents due to the reasons mentioned in the above 1. (1) 2).

After that, based on that the radioactive materials released from the NPS were accumulated locally and cumulative dosage was high in some areas, the DeliberateDeliberate Evacuation Area was set in the shape different from concentric circle on April 22 according to the view newly shown in Attachment V-20 from a long-term standpoint. The Evacuation-Prepared Areas in Case of Emergency were also set at the same time and the previous sheltering was lifted. Setting the Deliberate Evacuation Area and the Evacuation-Prepared Areas in Case of Emergency, setting the alert zone and implementation of temporary access to the evacuation zone were carried out after arranging details and steps with the related local governments. In addition, sheltering is originally positioned as a tentative averted measure, but it took more than one month till lift this time. Against it, based on the actual conditions that many residents evacuated voluntarily after providing direction of sheltering on March 15 and it became difficult to maintain the social life due to decrease in commerce, logistics, etc. in the zones, the government took the response of voluntary evacuation promotion and life support on March 25, and as a result the next step on assumption of lengthening of the nuclear disaster should have been considered immediately.

Based on the responses mentioned above, it is thought to consider the framework of the Act

on Special Measures Concerning Nuclear Emergency Preparedness, measures on the emergency preparedness guidelines, etc. On this occasion, it is necessary to organize concrete views and measures about setting the zones in the event when the nuclear disaster may influence widely in the long term, evacuation preparation for people requiring assistance during a disaster from the early stages, relation between emergency evacuation and prior announcement in the event when disaster events drastically make progress, requirements for change, release, etc. of the resident protection measures, etc.

4) Implementation structure for emergency response

a. Structure of the whole government

While response needs in disaster countermeasures are varied in response to manners of disasters so that desirable implementation structure is varied case by case, it is contemplated that the implementation structure adopted this time should be utilized in establishing future structures for nuclear emergency preparedness as an example of actions to an actually-occurred nuclear disaster and a complex disaster. This time, Integrated Headquarters for the Response to the Incident at the Fukushima Nuclear Power Stations (Government-TEPCO Integrated Response) was established in a situation where there was restriction in grasping a current state of reactor facilities and so on, and it has been contributing to facilitate information exchange, etc.

In order to promote a variety of actions based on the structure of the whole government (see 1.(2) 3)a above), Secretariat of the Nuclear Emergency Response Headquarters has been set up in Emergency Response Center (ERC) of NISA at the working level. Substantially, it was established and has been operated based on the emergency measures by nuclear operator and NISA so far.

Recently, crisis management structure in Japan has been enhanced with a focus on the Office of the Prime Minister, and actions in this time pursuant to the Act on Special Measures Concerning Nuclear Emergency Preparedness such asa sharing general information in the initial stage and coordinating roles, etc. were conducted via the emergency team convened at the Office and liaison members of each ministry or agency in addition to actions for the earthquake and tsunamis pursuant to the said Act. Also, regarding the matters required for focused actions such as livelihood support, etc., the organizations in charge have engaged in communication and coordination after they were enhanced.

In relation with the Local Nuclear Emergency Response Headquarters, since the accident events rapidly proceeded in a situation where communication with the Off-site center was difficult due to the disaster, the initial collection of information and communication were conducted mainly by ERC. Also, as the disaster affected a broad range of area, more municipalities other than Fukushima Prefecture were related to restriction of food, etc., communication and coordination should have been performed by the Director-General of Local Nuclear Emergency Response Headquarters as a member of the Joint Council under normal conditions, but they have been done by the headquarters in Tokyo as an exception.

Based on the above situation, it is deemed to be important that we will operate the function in a quick and smooth manner through reviewing a function we should serve as a bureau in the whole with a use of functional teams and systems of ERC, and a way of communication and coordination with members, and related ministries and agencies, etc..

Also at disaster, since the government organization related to Nuclear Emergency Preparedness is divided into such as Nuclear Industry and Safety Agency, a primary regulatory body, NSC Japan which gives an advice from outside, and local governments and related Office and ministries which perform environmental monitoring for example, their roles and responsibilities are unclear, there are aspects that we could not responsively act to such a massive nuclear accident. It is necessary to review the total structure relating to the above crisis management as well as the implementation structure of safety regulation at normal times.

b. Local Nuclear Emergency Response Headquarters

(a) General situation

As preparation for earthquakes and tsunamis, etc. in power supplies, communication and reserves, etc. was not sufficient at the Off-site Center (OFC) where the Local Nuclear Emergency Response Headquarters was set up, and also, as enough information on the plant was not obtained as an external factor, expected function of information gathering and communication was not performed from the beginning.

Also, effect of radiation had not been considered specifically regarding, locations, architectural structures, and facilities, etc. responding to a situation like this time in the conventional framework, which consequently prevented continuing activities at OFC.

Meanwhile, convening related parties and dispatching them to the site planned in the framework of the Act on Special Measures Concerning Nuclear Emergency Preparedness was also insufficient in the initial startup stage. This was partly because advanced notices and the register of members to be convened was not fully performed and is to be improved. There is also a background factor that many of current members are planned to be convened from a long distance and improvement should be made for realistic response to a case in which a disaster event proceeds rapidly as in this time. Also engagements in preceded earthquake disaster measures, influence on communication and transportation means by the earthquake disaster should be considered as the points to be noted in a complex disaster.

This time it is contemplated that OFC failed to effectively function under such combined conditions leading to a delay in full-fledged operation of the Local Nuclear Emergency Response Headquarters. Also, following the subsequent relocation of the Local Nuclear Emergency Response Headquarters, the major responsibilities for emergency measures related to control disaster events shifted to Fukushima Nuclear Power Station Integrated Headquarters for Accident Countermeasures.

This time, accidents occurred at multiple units so that commands from the Nuclear Emergency Response Headquarters were important. Meanwhile, based on the JCO Criticality Accident, it is planned that the Director-General of Local Nuclear Emergency Response Headquarters sets evacuation area through sharing information and consulting with related cities, towns and villages at Joint Council for Nuclear Emergency Response, but the Council could not play an intendedl role due to the restrictions as in 1(2)b. above.

As an operational problem for the Local Nuclear Emergency Response Headquarters, in the case that a disaster influences on a broad area and lasts long period as in this time, it is necessary to pay a special attention on safety management of people going in and out of OFC including media relations conducted by OFC as planned in the Basic Plan of Disaster Countermeasures, for example. Also, while Directors-General of Emergency Preparedness Headquarters of related local governments (governors, and mayors of cities, towns and villages) are among the members of the Joint Council, buildings of a related local governments or their neighborhood facilities seem to be realistic as places for continued coordination of protection activities for residents and measures for restoration, etc. (cf. the local response headquarters for natural disasters are like this in many cases.). It is deemed to be important to review functions to be secured at OFC and alternative facilities, and

members to be convened at the assigned place, noting on these points in order to have more responsive operation to a progression and scale of a disaster event, and phase of disaster countermeasures.

(b) Restoration of OFC affected in the East Japan Great Earthquake Disaster, etc.

Affected OFCs in the East Japan Great Earthquake Disaster were not only in Fukushima but also in Onagawa, where buildings were damaged by tsunamis, and human damages on personnel also occurred.

Regarding the affected facilities, it is necessary to immediately restore their functions. In doing this, it is necessary to determine a location of the Off-site Center (OSC) facilities, architectural specifications, communication means with resistance to disaster, reserved materials and equipment, and requirements for alternative facilities, considering direct impacts on the subject facilities by the earthquake and tsunamis, secondary effects associated with the affected neighborhood area, and effect of radiation in the time of nuclear disaster ,etc.

Also, it is necessary to review other OSCs from the same viewpoint and take required measures.

5) Nuclear Disaster Countermeasures Drill

Considering emergency responses for this time, thorough review on Nuclear Disaster Countermeasures Drill will be necessary, including a startup of an initial system in a case of a rapid progression of a disaster event, a series of responses in a case where it leads to a severe accident and an emergency response covers a broad area and extends for a long time, and responses in a case in complex with natural disasters such as earthquakes and tsunamis, in addition to plans and guidelines, etc. as the basis of the responses.