

Status of the investigation conducted by the Investigation Committee on the Accidents at the Fukushima Nuclear Power Station of Tokyo Electric Power Company (TEPCO)

September 27, 2011

1. Progress of the investigation (as of September 26)

The number of investigative interviews (total of respective investigation teams): 275 persons in total

The total hours of interview: Approximately 581 hours

2. Investigation status of the Social System Investigation Team.

(1) Whether the tsunami countermeasures were sufficient?

Circumstances as premise: Fukushima Daiichi Nuclear Power Plant assumed the tsunami wave height as O.P.+3.122m as of the 1972 installation approval. Then scientific knowledge about tsunami was developed, and in February 2002 the Tsunami Evaluation Subcommittee of the Nuclear Civil Engineering Committee at JSCE (Japan Society of Civil Engineers) formulated the "Tsunami Assessment Method for Nuclear Power Plants in Japan". Under the Review Guide for Seismic Design of Nuclear Power Plant Facilities (Nuclear Safety Commission of Japan) which was revised in September 2006, tsunami is mentioned as an event accompanying earthquake. Based on this revision, the Nuclear and Industrial Safety Agency (NISA) tried to process seismic back-checks. Collaterally, TEPCO modified tsunami wave height assumption for Fukushima Daiichi Power Plant to O.P. + 5.4 to 6.1m based on the "Tsunami Assessment Method" and took necessary measures, but after the earthquake, tsunami as high as O.P.+approximately 14 to 15 m hit the plant and all AC power source was lost.

Major investigation items

- How scientific knowledge was developed about tsunami.
- As for "Tsunami Assessment Method": process of the formulation, composition of the Tsunami Evaluation Subcommittee, discussion during its formulation, summary of evaluation method, and appropriate tsunami countermeasures for the nuclear power plant.
- How the "Review Guide for Seismic Design of Nuclear Power Plant Facilities" has

been developed, composition of the seismic guideline study subcommittee, discussion about tsunami at this subcommittee or at the earthquake/seismic motion working group which was set up under the subcommittee, administration of the Secretariat of the Nuclear Safety Commission,

- The safety evaluation approaches for seismic back-check implementation by the NISA, aseismic back-check implementation statuses, practical business administration system of the NISA
- Scientific knowledge development status about earthquake and tsunami after "Tsunami Assessment Method" was developed (Including development of the Jogan Tsunami knowledge)
- Tsunami evaluation status for Fukushima Daiichi and Daini nuclear power plants (Tsunami evaluation including the Jogan Tsunami, etc. and examination progress about how they are addressed)
- Tsunami evaluation progress at other nuclear power plants including Onagawa plants

(2) Whether severe accident countermeasures were sufficient?

Items which need to be reviewed: Whether severe accident countermeasures were properly positioned within the regulatory framework

Major investigation items

- Circumstances and concept of the severe accident countermeasures which were proposed and introduced in the U.S.
- Circumstances of how accident management as a severe accident countermeasure was recommended as operator's voluntary effort in response to the NSC's decision in 1992 in Japan. At that time, how external events were not clarified, but only internal events were mentioned during operation as cause events which require accident managements
- Review progress of the severe accident countermeasures thereafter and how operator's accident management has been addressed
- Accident management handling conditions after Periodic Safety Review (PSR) was required in laws and ordinances in 2003

3. Investigation status of the Accident Causes Investigation Team

(1) Actual damage condition, damage control measures at the accident site, decision

making process of the damage control

Major investigation items in chronological order

- Reactor conditions, emergency D/G generator, startup status of water pouring system, etc. after the earthquake occurrence
- Each unit status when all AC power source was lost after the tsunami arrived
- Unit-1 IC (emergency condenser) operation and startup status and recognition of those
- What condition occurred when venting preparation was instructed for Units -1 and -2, the government reaction toward venting
- For Unit-1, conditions in which preparing tasks for venting was difficult. Minister of Economy, Trade and Industry's directive for venting, circumstances and conditions when Prime Minister Kan visited the Fukushima Daiichi plant, specific venting status for Unit-1
- For Unit-1, alternative water pouring preparation and its implementation status
- Hydrogen explosion status at Unit-1 reactor building, recognition of hydrogen explosion possibility at that time and with or without prior knowledge
- Conditions when the alternative pouring task was resumed after Unit-1 explosion, the consideration by the Prime Minister's Office about the possibility of sea water pouring and measures taken at the accident site
- For Unit-3, preparation conditions toward pressure reduction and water pouring after HPCI (High Pressure Coolant Injection System) stopped. Communication with the Prime Minister's Office, measures taken at the accident site
- Circumstances of hydrogen explosion at Unit-3 reactor building, and damage by the hydrogen explosion
- For Unit-2, preparation status toward venting before and after RCIC stop
- For Unit-2, communication with the Prime Minister's Office and head office of TEPCO about tasks toward alternative pouring, and measures taken at the accident site.
- Measures taken at the accident site and head office of TEPCO to cope with Unit-2's relentless conditions, communication with the government, reaction of the Prime Minister's Office, the establishment of the Unification headquarters of measures for Fukushima Nuclear Power Plant accident and its role.
- Damage conditions of Units-2 and -4 etc.

Major investigation items regarding the entire countermeasures

- Communications between Emergency Headquarter and the central operation room, etc. in the Fukushima Daiichi Power Plant
- Information gathering/transmission and other handling at TEPCO Head Office, offsite center, NISA (ERC, safety inspector, etc.), Prime Minister's Office and their influence on the measures taken at the accident site.

(2) Tsunami countermeasure for the Fukushima Daiichi Nuclear Power Plant

Major investigation items

- Review about the wave height within TEPCO during the seismic back-check process which was instructed by the NISA and discussion about the countermeasures within TEPCO
- Explanation by TEPCO to the NISA about the tsunami evaluation based on the Jogan Tsunami and other tsunamis and response from NISA
- Circumstances and background of the hearing with TEPCO by NISA about the tsunami evaluation on March 7, 2011

(3) Severe accident countermeasures for Fukushima Daiichi Power Plant

Major investigation item

- Accident management countermeasures prepared by TEPCO
- Countermeasures for various natural disasters such as earthquake, tsunami assumed by TEPCO.

4. Investigation status of the Damage Expansion Prevention Measures Investigation Team

(1) Existing legislations and countermeasures

Major investigation items

- Nuclear hazard disaster drill framework, disaster drill implementation status in Fukushima Prefecture
- The efforts of the state and municipalities to prevent nuclear hazards at the multiple disasters
- Circumstances in which the NISA indicated that natural disaster causing nuclear

hazards is unlikely and its possibility is almost zero, and issued a guideline to instruct and make address concerning multiple disasters according to the current disaster prevention scheme.

- Circumstances of the multiple disaster drills by Niigata Prefecture in November 2010

(2) Situations after the accident

Major investigation items

- Systematic responses such as creating a task force
 - Systematic responses which are planned by the Act on Special Measures concerning Nuclear Emergency Preparedness or the national basic disaster prevention plan
 - National task force and its function
 - Communication between the Prime Minister's Office, NISA, and TEPCO
 - Circumstances of the establishment of the Unification headquarters by the government and TEPCO
 - Circumstances in which the Offsite center in Okuma-cho did not work enough
 - Communication and cooperation between government, prefecture and TEPCO at the accident site.
- Radiation monitoring status and availability and usage of the SPEEDI information
 - Existing monitoring framework and its performance after the earthquake
 - Monitoring conditions immediately after the accident
 - Circumstances under which the role of each government institution in monitoring has been changed on March 16. Increased monitoring efforts and disclosure of the monitoring information thereafter
 - Usage of the SPEEDI information within the government at the early stage of the accident, and circumstances under which the information was not disclosed
 - Circumstances under which SPEEDI was used for inverse estimation of emission source information and the calculation result was disclosed, .
- Exposure handling
 - Circumstances of how exposed dose limits for emergency workers was raised to 250mSv in the emergency operation area on March 14
 - Conditions of radiation control system by TEPCO
 - Exposure of persons to radiation, which exceeds the dose limit after the

- accident, and treatment of the persons
 - Implementation status of resident screening, circumstances of raising whole-body decontamination standard from 13,000cpm to 100,000cpm in Fukushima Prefecture
 - Distribution of stable iodine tablets to residents, etc.
- Evacuation measures
 - Decision of evacuation at the early stage of the accident (9:23 PM on March 11: residents within 3 km in radius to evacuate, residents within 3 - 10 km in radius to stay in indoor; 5:44 AM on March 12, residents within 10 km in radius to evacuate, 6:25 PM on March 12, residents within 20 km in radius to evacuate, 11 AM on March 15, residents within 20 - 30 km in radius to stay in indoor .)
 - Communication and implementation of the evacuation order and the problems caused by the evacuation implementation
 - Circumstances of the evacuation decision thereafter (April 11: announcement of the basic ideas about the planned evacuation area and emergency evacuation zone, April 22: cancellation of the order for residents' staying in indoor within 20 - 30 km in radius, etc., June 16: announcement of setting Specific Spots Recommended for Evacuation)
 - Setting the hazard area and consideration and implementation of temporary entrance into the area
- Contamination of agricultural and livestock products air, soil and water
 - Circumstances of the decision by the Ministry of Health, Labour and Welfare for provisional regulatory level based on Food Sanitation Act
 - Circumstances of the Nuclear Emergency Response Headquarter's decision for shipment restriction of some food items
 - Monitoring of foods
 - Circumstances of setting standards for usage of school building and schoolyards
 - Handling of the disaster wastes contaminated by radioactive materials, and of sewage polluted mud, etc.
- Contaminated water in the Fukushima Daiichi Nuclear Power Plant buildings
 - Circumstances of recognizing high density contaminated water accumulation within the buildings, and response to that
 - Circumstances of the decision to release contaminated water in the RW building and Sub-drain at Units-5 and -6 into the ocean

- Circumstances of introduction of the contaminated water purification equipment in order to do circulatory water cooling
- Evaluation of radioactive materials releasing to environments and INES evaluation
 - Circumstances of the estimation of total discharged amount by NSC and NISA respectively
 - Circumstances of gradual raising of INES evaluation from level 3 to level 7

(3) Disclosure of the information to the general public

Major investigation items

- Cases of inconsistent presentation of the important information
 - Explanation about reactor status
(At the NISA press conference at around 2 PM on March 12, high possibility of core melting for Unit-1 was announced-> at the NISA press conference at around 9:30 PM on March 12, NISA mentioned reactor status was not accurately confirmed. -> on April 18 the NISA mentioned that "fuel pellet melting" could have occurred.)
- Information which should be disclosed but was not disclosed, and its circumstances
 - Special nuclear species such as Tellurium 132 have been detected on the March 12 samples, but the NISA announced it on June 3

(4) Provision of the accident information to foreign countries, and cooperation with foreign countries

Major investigation items

- The mechanism for provision of information to the foreign countries after the earthquake, and the information which has been actually provided to the foreign countries
- Whether the disclosed information was enough according to Convention on Early Notification of a Nuclear Accident
- Assistance from foreign countries after the earthquake and responses to them

(Note) Major investigation items by investigation teams are samples. Whether they are going to be included in the interim reports or not has not been determined yet.