

## VIII. Additional Safety Assessment Efforts at NPSs

## 1. Confirmation of the state of implementation of Emergency safety measures

## (1) Emergency Safety Measures

In order to avoid a severe event such as core damage and bring the situation to a state of cold shutdown even in the event that a tsunami on the same scale as in the recent nuclear accident should result in the loss of all AC power, the Nuclear and Industrial Safety Agency (NISA) has directed plant operators to take emergency safety measures and confirmed the progress of their implementation. (Reported on June 2011)

Thus far, NISA has directed the operators of all nuclear power stations (NPS) in Japan, excluding the Fukushima Dai-ichi NPS, to implement emergency safety measures and then received implementation status reports from each operator. Based on these reports, NISA confirmed on May 6 (for NPSs other than the Fukushima Dai-ichi and Dai-ni NPSs and the Onagawa NPS) and on June 1 (for the Onagawa NPS) that emergency safety measures have been implemented appropriately at each NPS.

NISA intends to continue to confirm progress in the state of implementation of mid- and long-term programs stringently as part of emergency safety measures, such as the construction of seawalls and watertight facilities.

## (2) Reliability Assurance of External Power Supply

External power supply was lost temporarily at Higashidori NPS of Tohoku Electric Power Company Inc. and Rokkasho Reprocessing Plant of Japan Nuclear Fuel Limited due to the earthquake off the coast of Miyagi Prefecture on April 7, 2011. So as to improve the reliability of an external electric power system, NISA hereby directed each electric utility to implement the actions listed below.

## 1) Direction 1

Analyze and evaluate the reliability of power supply of your company's electric power system, which may lead to a situation that may affect external power supply to NPS, etc. Also consider measures to improve the reliability of power supply to NPS, etc. , based on the analysis and evaluation.

2) Direction 2

Connect all the transmission lines linked to the plural power lines to each unit to enable power supply.

3) Direction 3

Evaluate the quake resistance of the power transmission line tower, stability of the foundation etc, and, based on the results, apply necessary reinforcements and measures.

4) Direction 4

Take measures to prevent the impact of tsunami on electric equipments at facilities such as switchyards at your company's NPSs (put equipments inside a building and strengthen water tightness).

In response, each electric utility has submitted reports regarding implementation status, on May 16, to NISA and NISA evaluated such reports (Besides Fukushima Dai-ichi and Dai-ni NPSs). Hereafter, NISA will severely check reports regarding implementation status.

As for securing reliable external power supply at Fukushima Dai-ni NPS, considering status on facilities' rehabilitation in this NPS, implementation status of emergency safety measures, necessary for keeping reactors' shut off by low temperature condition etc, TEPCO is requested to submit prompt reports to NISA hereafter.

Furthermore, taking the result of the analysis of seismic data observed at TEPCO Fukushima Dai-ichi NPS into account, each electric utility is directed to submit evaluation report and its implementing plan of countermeasures on the possible effects of damages or collapse which may lead to malfunction of electric equipments at facilities such as switchyards.

On July 7, implementing conditions were reported from each electric utility. NISA is strictly checking such reports.

(3) Regarding Implementation of Preparatory Measures for Severe Accidents in Other NPSs Taking into Account the Accident at Fukushima Dai-ichi NPS

In a report on The Accident at Fukushima Dai-ichi NPS put together by the Nuclear Emergency Response Headquarters on June 7, NISA confirmed that the emergency safety measures had been implemented adequately by each electric utility, etc. Given that accident, NISA laid out the measures to enable a speedy

response in case a severe accident occurs.

On June 7, NISA directed each electric utility to implement the following items as measures to be carried out immediately among the measures mentioned above, to be applied to NPSs other than Fukushima Dai-ichi NPS. NISA also directed each electric utility to report back the situation.

- 1) Direction 1  
Secure the working environment in the Main Control Room
  
- 2) Direction 2  
Secure the means of communication inside the NPS premises in case of emergency
  
- 3) Direction 3  
Secure supplies and equipment such as high-level radiation protective gear, and develop a system for radiation dose management
  
- 4) Direction 4  
Establish measures to prevent hydrogen explosion
  
- 5) Direction 5  
Deploy heavy machinery for removing rubble

In response, each electric utility reported back implementing conditions to NISA, and Nuclear Safety Inspector conducted an on-site inspection on June 18 so as to rigorously confirm implementation of measures for severe accidents (NPS other than Fukushima Dai-ichi ).

Now and in the future, by urging each electric utility to undertake the task continuously, NISA will conduct further improvement in measures for severe accidents.

## 2. Implementation of safety assessments based on stress tests

### *Background*

Of Japan's nuclear power stations (NPSs), units in operation have been operated in compliance with existing laws and regulations, and those undergoing regular inspections have also been confirmed in terms of safety under existing laws and regulations. In addition, following accident at TEPCO's Fukushima Dai-ichi Nuclear Power Station (Fukushima accident), the Nuclear and Industrial Safety Agency (NISA) has confirmed that the existing NPSs have implemented emergency safety measures, with safety thus being assured more meticulously than before.

Meanwhile, regarding NPS's resuming operations after the regular inspections, some accept NISA's safety assessments and many others question them, thus making it difficult to say that sufficient acceptance has been obtained from the public and local residents.

In this context, aiming to further improve safety at NPSs and to reassure and regain public trust in terms of nuclear safety, the Japanese government announced on July 11 that the government will implement safety assessments based on new procedures and rules, basically by making use of the knowledge and experiences of the stress tests implemented in European countries. (On July 6, based on the facts at Fukushima accident, the Nuclear Safety Commission (NSC) requested the NISA to comprehensively assess robustness for beyond-design-basis external events of existing commercial nuclear power reactors, and to prepare comprehensive assessment procedures and implementation plans, by showing view points of assessment, and report them back to the NSC. (Attachment VIII-2))

The announced assessment sets out that units currently undergoing regular inspections that are ready to resume operations will sequentially undergo safety assessments in terms of the degree to which safety margins are secured for facilities and equipment important to safety against beyond-design-basis events (preliminary assessment), and in addition, taking into consideration the state of the implementation of stress tests in European countries and of the discussions by the Investigation Committee on the Accident at the Fukushima Nuclear Power Stations, all existing NPSs including those units in operation and those units examined by preliminary assessment will also undergo comprehensive safety assessments (secondary assessment).

The NISA will formulate items for assessment and plans for implementing the assessment, subject to NSC's confirmation, and operators are supposed to conduct assessments accordingly. The NISA will evaluate the findings submitted by operators, after which the validity of the evaluation will be confirmed by the NSC.

Accordingly, the NISA has established the assessment procedures and the implementation plans for comprehensive safety assessment of NPSs and has amended them based on the suggestions of NSC. Finally, their validity was confirmed on July 21 by the NSC. Based on this, on July 22, the NISA directed operators to conduct safety assessments as stated in the plans.

*Assessment procedures (cf. Attachment for details)*

Safety margins will be assessed in simulations, assuming the following events:

- Earthquakes, tsunamis, and composite events thereof
- Loss of all AC power, loss of ultimate heat sink, and composite events thereof
- Responses in the event of severe accidents

Preliminary assessment determines safety margins in comparison with values (tolerable value) with which functions and integrity are deemed to have been securely maintained on a design basis.

Secondary assessment determines safety margins in comparison with values (maximum tolerance) with which functions are actually lost, as in pipe rupture.

*Nuclear facilities to be assessed*

All existing commercial nuclear power facilities, including prototype fast breeder reactor Monju, Incorporated Administration Agency, Japan Atomic Energy Agency (JAEA), are subject to safety assessments, including those units under construction (Unit 3 of the Shimane NPS, the Chugoku Electric Power Co., Inc., the Oma NPS, Electric Power Development Co., Ltd., TEPCO's Higashidori NPS). However, TEPCO's Fukushima Dai-ichi and Dai-ni NPSs, as well as any decommissioned nuclear facilities not having any fuel remaining on site, are excluded. (Units 1 and 2 of the Hamaoka NPS, Chubu Electric Power Co., Inc. and prototype advanced thermal converter Fugen, Japan Atomic Energy Agency, which have spent fuel remaining on site, are subject to assessment.)

## Chapter VIII

### *Future prospects*

Regarding the preliminary assessment, operators will conduct safety assessments, sequentially, of nuclear facilities currently under regular inspections that are ready to resume operations and conduct reporting to the NISA. The NISA will then evaluate the findings, after which validity of the the evaluation will be confirmed by the NSC.

In regard to the secondary assessment, operators will report to the NISA on all NPSs except the Fukushima Dai-ichi and Dai-ni plants by around the end of the year. Again, the NISA will evaluate the findings, after which the validity of the evaluation will be confirmed by the NSC.