Regarding the Actions Based on Results of the Analysis of Seismic Data Observed at the Fukushima Dai-ichi and Dai-ni Nuclear Power Stations at the Time of the 2011 Tohoku District-Off the Pacific Ocean Earthquake

On May 16, 2011, the Nuclear and Industrial Safety Agency (NISA) received a report from Tokyo Electric Power Co., Inc. (TEPCO) on the results of an analysis of the seismic data observed and the interruption of the seismic data observed at the Fukushima Dai-ichi and Dai-ni Nuclear Power Stations at the time of the 2011 Tohoku District-Off the Pacific Ocean Earthquake that occurred on March 11, 2011.

Based on the contents of this report, NISA has today directed TEPCO to investigate the impact of seismic motion on the reactor buildings, turbine buildings and equipment and piping that are important in terms of seismic safety, while also directing Licensees of Nuclear Operation and the like to investigate problems with devices for recording seismic data, and draft a plan for any needed modifications. This is a notification of the issuance of these directions.

1. The nuclear reactors Units 1 to 3 at Fukushima Dai-Ichi NPS as well as Units 1 to 4 at Fukushima Dai-Ni NPS automatically shut down due to the 2011 Tohoku District-Off the Pacific Ocean Earthquake (hereafter “the Recent Earthquake”) of March 11, 2011. (Units 4 to 6 at Fukushima Dai-iichi were in periodic inspection).

2. Although the response spectra of the seismic data observed at the time of the Recent Earthquake on the basemat of the reactor buildings of Fukushima Dai-ichi NPS were roughly below the evaluation spectra of the standard seismic ground motion Ss in most frequencies, it exceeded the evaluation spectra of the standard seismic ground motion Ss by a maximum of approximately 30% at 0.2 ~ 0.3 sec. with respect to Units 2,
3 and 5.

3. The response spectra of the seismic data observed at the time of the Recent Earthquake on the basemat of the reactor buildings of Fukushima Dai-ichi NPS is smaller than that for Fukushima Dai-ichi NPS overall, and results that are smaller than the evaluation spectra of the standard seismic ground motion $S_s$ were obtained at all frequencies.

4. Based on the content of these reports, NISA today directed TEPCO to report on the results of the study pertaining to the impact of the Recent Earthquake motions on the reactor buildings, turbine buildings as well as equipment and piping systems that are important in terms of seismic safety.

5. Furthermore, it was identified that there was an interruption in part of the seismic data observed at Fukushima Dai-ichi NPS and Fukushima Dai-ni NPS due to software problems in the device used to record seismic data (hereafter “recording device”).

6. Given the aforementioned problems with the recording device, NISA directed Licensees of Reactor Operation and the like to investigate whether there are similar problems with recording devices installed for the purpose of obtaining seismic data, and report on the results of any ensuing and necessary modifications that are carried out, although it is thought that future studies will remain largely unaffected since comparisons to complete seismic data for proximal positions have confirmed that values such as maximum acceleration are roughly the same, and that complete seismic data were obtained on the foundation level.

Appendix 1: Submission of Report of Analysis of Observed Seismic Data Collected at Fukushima Daiichi Nuclear Power Station and Fukushima Daini Nuclear Power Station to the Nuclear and Industrial Safety Agency at the Ministry of Economy, Trade and Industry pertaining to the Tohoku-Taiheiyou-Oki Earthquake (TEPCO)


Appendix 2: Regarding the Action Based on the Results of the Analysis of Seismic Data Observed at Fukushima Dai-ichi and Dai-ni Nuclear Power Stations at the Time of the 2011 Tohoku District-Off the Pacific Ocean Earthquake (Instructions)
Appendix 3: Regarding the Action Based on Results of the Investigation into the Cause of the Seismic Data Observation Interruption at Fukushima Dai-Ichi and Dai-Ni Nuclear Power Stations at the Time of the 2011 Tohoku District-Off the Pacific Ocean Earthquake (Instruction)

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Regarding the Action Based on the Results of the Analysis of Seismic Data Observed at Fukushima Dai-ichi and Dai-ni Nuclear Power Stations at the Time of the 2011 Tohoku District-Off the Pacific Ocean Earthquake (Directions)

On May 16, 2011, the Nuclear and Industrial Safety Agency (hereafter “NISA”) received a report from Tokyo Electric Power Co., Inc. (TEPCO) on the results of an analysis of the seismic data observed at the Fukushima Dai-ichi and Dai-ni Nuclear Power Stations at the time of the 2011 Tohoku District-Off the Pacific Ocean Earthquake (hereafter referred to as “the Recent Earthquake”).

According to this report, although the response spectra of the seismic data observed for the basemat of reactor buildings at Fukushima Dai-ichi NPS at the time of the Recent Earthquake tended to fall below the evaluation spectra of standard seismic ground motion Ss in most frequencies, it exceeded the evaluation spectra by a maximum of around 30% at 0.2 ~ 0.3 sec, with respect to Units 2, 3, and 5.

Based on the analysis results above, NISA considers that assessing the impact of the Recent Earthquake on the reactor buildings, turbine buildings and instruments and piping significant to seismic safety is extremely important in verifying the safety of these structures and facilities during the Recent Earthquake as well as in the aftermath.

The report further states that with regard to the multiple seismic
instrumentation which had been voluntarily installed to record seismic data, there was an interruption in the record of the Recent Earthquake between the start of the log to the 130-150 second mark, due to issues with the device used to record seismic data (hereafter “recording device”).

The report lists the cause of this interruption as 1) a program configuration that stopped recording once it detected seismic motion below the threshold value, even when it detected motion that exceeds the same threshold value afterwards, and 2) a malfunctioning recording media that prevented the program from resuming recording once it detected above-threshold motion even after the recording device suspended recording, as it was designed to.

Based on the above, NISA requests your company to report the following to NISA by the below date:

**Required items**

1. Regarding the Fukushima Dai-ichi NPS and Fukushima Dai-ni NPS
   ① The result of seismic response analysis into the impact of the seismic motion from the Recent Earthquake, that couples the reactor buildings for Dai-ichi NPS Units 2 and 4 with accompanying equipment of particular importance, such as the primary containment vessel and reactor pressure vessel.
      • Reporting deadline: June 17, 2011
   ② The result of seismic response analysis into the impact of the seismic motion from the Recent Earthquake, that couples the reactor buildings for Dai-ichi NPS Units 1 and 3 with accompanying equipment of particular importance, such as the primary containment vessel and reactor pressure vessel.
      • Reporting deadline: July 29, 2011
   ③ The result of seismic response analysis into the impact of the seismic motion from the Recent Earthquake that couples the reactor buildings for Dai-ichi NPS Units 5 and 6 as well as every unit of Fukushima Dai-ni NPS with accompanying equipment of particular importance, such as the reactor containment and reactor pressure vessel, and the result of a seismic response analysis of the turbine buildings and equipment and piping that are important in terms of seismic safety at every unit of both power stations
2. Regarding the Recording Device Installed for the Collection of Earthquake Data

An investigation into the presence and extent of the recording device issues revealed in the TEPCO report, for every recording device voluntarily installed at every nuclear power station owned by your company, as well as the outcome of improvements carried out in response to the result

- Reporting deadline: June 17, 2011
On May 16, 2011, we received a report from Tokyo Electric Power Co., Inc. (TEPCO) detailing the results of an analysis of the seismic data observed at the Fukushima Daiichi and Dai-Ni Nuclear Power Stations at the time of the 2011 Tohoku District-Off the Pacific Ocean Earthquake (hereafter referred to as “the Recent Earthquake”).

According to the report, with regard to the multiple seismic instrumentation which had been voluntarily installed to record seismic data, there was an interruption in the record of the Recent Earthquake between the start of the log to the 130-150 second mark, due to issues with the device used to record seismic data (hereafter “recording device”).

The recording device is designed to begin recording when it detects motion that exceeds the threshold value, continue recording for a certain amount of time after the motion drops below threshold value, then stop, and immediately resume recording when it again detects motion that exceeds the same threshold value. In practice however, recording is thought to have stopped when the following issues with the recording device program manifested at the same time.

1) The program was configured to stop recording once it detected seismic
motion below the threshold value, even when it detected motion that exceeds the same threshold value afterwards

2) a malfunctioning recording media prevented the program from resuming recording once it detected above-threshold motion even after the recording device suspended recording, as it was designed to.

Based on the above earthquake-related investigation results by TEPCO, Nuclear and Industrial Safety Agency requires an investigation into the presence of similar issues with recording devices installed at nuclear facilities owned by Licensees of Reactor Operation, Licensees of Reprocessing Activity and Licensees of Radioactive Waste Storage, and to report the outcome of any improvements carried out in response to the result, by August 17, 2011.