



Post-quake status of the Kashiwazaki-Kariwa Nuclear Power Station (Report #10) - Update on the overall situation through to October 5 -

October 9, 2007

Rev.0

Japan Nuclear Technology Institute

The Report #10 summarizes the post-quake status of the Kashiwazaki-Kariwa Nuclear Power Station and gives the overview of the initiatives, trends and other details involving Tokyo Electric Power Company and other relevant organizations.

1. Status of main inspection and restoration work

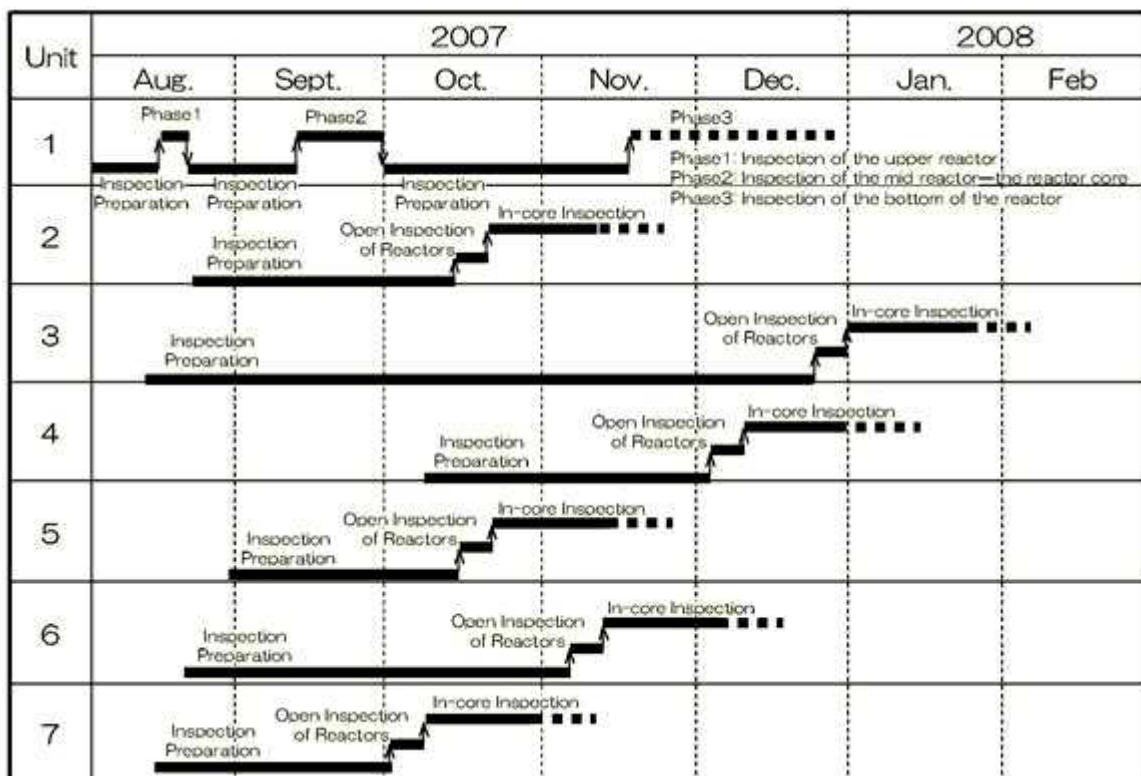
(1) Overall status

Currently, detailed equipment inspection and restoration work is systematically underway at the Kashiwazaki-Kariwa Nuclear Power Station. TEPCO is to summarize and release inspection results as soon as they are available.

See the attachment for the overall status of main inspection and restoration work.

(2) In-core inspection

a. Overall inspection schedule (plan): Excerpt from TEPCO press release issued on September 6



b. Status of in-core inspection at Unit 1

<Phase 1 (Inspection of the upper reactor)>

The inspection of the upper reactor was conducted from August 21 to 23, and identified no damage, disfigurement or dislodgment.

<Phase 2 (Inspection of the mid reactor --- the reactor core)>

The inspection of the mid reactor was conducted from September 14 to October 1, and identified the

following:

- No damage, disfigurement and dislodgement were found in the upper reactor (apart from sections checked in Phase 1), mid reactor and steam dryer that had been dismantled for outage and temporarily stored in the temporary storage pool.
- As for the steam separator, which had been also dismantled for outage and temporarily stored in the temporary storage pool, the inspection found disfigurement on the temporary legs for storage (4 out of 4) and guide pins (2 out of 2 pins), used to position the unit properly in the reactor. The legs and guide pins are auxiliary parts of the steam separator, and do not affect its functions or structure.

(*) The identical legs for temporary storage were also bent at the Onagawa Nuclear Power Station of Tohoku Electric Power Company and TEPCO's Fukushima Daiichi Nuclear Power Station at the time of the Miyagi offshore earthquake in May 2003. Similar damage was also reported at the Shika Nuclear Power Station of Hokuriku Electric Power Company at the time of the Noto Peninsula earthquake in March 2007.

- The disfigurement of the steam separator's temporary legs also caused scratches on the floor of the temporary storage pool, but no water leakage was identified from the location.

<Phase 3 (Inspection of the bottom of the reactor)>

Inspection preparation commenced on October 2.

d. Status of preparation work at Unit 7

Reactor opening work takes place from October 2 to 8, to be followed by Phase 1 and Phase 2 inspections.

2. Status of non-conformity management (associated with the Niigataken Chuetsu-oki Earthquake)

TEPCO defines the management status of non-conformities at power stations into six grades (As – Not applicable) and regularly releases the information. The screening status of non-conformities as of September 26 is as follows. There are 2,850 earthquake-related non-conformities, and most of them are classified as minor events of Grade C or below.

Grade	Description	No. of non-conformities			Remarks
		July	August	September 1 – 26	
As	Reportable event as stipulated by law or Safety Regulations (events that have a serious impact on plant performance and safety)	10	0	0	<ul style="list-style-type: none"> • Flooding of the operating floors • Fire of the in-house transformer at Unit 3, etc.
A	Serious non-conformity against quality assurance requirements (events that have a serious impact on outage schedule) etc.	33	1	0	<ul style="list-style-type: none"> • Displacement of the duct connecting to the main exhaust stack • Damage to fire protection system's piping, etc.
B	Non-conformity pointed out in a government inspection (events that require enhanced operation monitoring, etc.)	28	5	0	<ul style="list-style-type: none"> • Dislodgment of a blwout panel, etc.
C	Minor non-conformity against quality assurance requirements, etc.	562	277	46	
D	Event within the scope of normal maintenance, etc.	841	932	109	

N/A	Replacement of a consumable and equivalent event, etc.	4	1	1	
Total		1,478	1,216	156	

(Note) Examples of Grade C events include “leakage from the mechanical seal of a pump” and “damage to passageway windowpanes” (events concerning human safety), while examples of Grade D events include “valve seat pass that can be addressed with increased tightening”.

3. Geological survey

TEPCO has decided to expand the scope of geological survey to cover land areas around the Kashiwazaki-Kariwa Nuclear Power Station, adding underground prospecting to marine sonic prospecting.

The next survey will conduct underground prospecting on land areas near the power station as well as the land area that includes the Seiryoku fault belt in the Nagaoka Plain, so as to assess underground structures to confirm / evaluate the group of active faults in the region.

On the station premises, a boring investigation will be conducted to confirm / assess the structure of underground areas underneath the plant. Samples will also be collected to check the post-quake properties of the sub-grade to determine the possibility of land subsidence and liquefaction.

4. Moves by electric utilities

In an effort separate from the seismic safety assessment, electric utilities have compared the seismic records of the earthquake’s main shock, observed on the foundation level of reactor buildings at the Kashiwazaki-Kariwa Nuclear Power Station, against the benchmark seismic motion used when designing a nuclear power station, so as to examine the earthquake’s impact on important station facilities that serve the functions of “shutting down”, “cooling down” and “containing”.

On September 20, the companies compiled and submitted a report to the Ministry of Economy, Trade and Industry, concluding that the safety functions of their key facilities, serving the functions of “shutting down”, “cooling down” and “containing”, will be maintained under a similar earthquake.

In regard to this report, the Nuclear and Industrial Safety Agency expressed its opinion that the assessment covered main facilities that serve such functions that count in terms of plant safety, and that the safety functions of these facilities were assessed appropriately.

5. Initiatives and trends of relevant organizations

(1) METI (Nuclear and Industrial Safety Agency)

a. Examination at the investigation committee regarding nuclear facilities affected by the Niigataken Chuetsu-oki Earthquake

This committee was set up to undertake an investigation into the specific impact of the Niigataken Chuetsu-oki Earthquake on the power station, and to explore future tasks and actions to be taken by the government and nuclear energy companies in light of this earthquake.

Working groups under this committee will examine the following specific issues and submit the findings to the committee for deliberation. The committee convened its third meeting on September 12.

<Working Group on in-house fire fighting corps and liaison / provision of information in relation to the Niigataken Chuetsu-oki Earthquake >

- In-house fire fighting corps system
- Information liaison system for plant operators
- Initial response & preparation system in emergency
- Information provision to local governments and the public

<Subcommittee on anti-quake and structural designs>

- Using research data on this earthquake from relevant organizations, observation data of seismic

motions and study data used in designing the plant to identify why the observed seismic motions recorded in the earthquake on the foundation level of reactor buildings at the power station were greater than their design figures

- Examining the earthquake's impact on the Kashiwazaki-Kariwa Nuclear Power Station
- Examining items that should be reflected to the seismic safety assessment of the Kashiwazaki-Kariwa Nuclear Power Station
- Summarizing the insight obtained from this earthquake and identifying items that should be reflected to other nuclear power stations from the perspective of ensuring seismic safety of nuclear facilities

<Working Group on nuclear plant administration, management and facility integrity assessment>

- Operation management immediately after an earthquake
- Assessment of facility integrity

b. Establishment of the Fire Management Office

In cooperation with the Fire and Disaster Management Agency, the Fire Management Office was established within the Nuclear Emergency Planning Section to urgently compile effective measures for preventing and controlling fires at nuclear power stations, and provide guidance on such measures to electric utilities.

At the meeting of the "Working Group on in-house fire fighting corps and liaison / provision of information" convened on September 20, the Fire Management Office presented the policy for reinforcing the in-house fire fighting system (software, hardware) to enhance its abilities for "making immediate response", "controlling fire" and "sustaining fire fighting activities".

(2) Nuclear Safety Commission

The expert committee on nuclear safety standards has set up the "Fire Prevention and Management Subcommittee" to examine the current fire protection system at the time of earthquake, including a review on the fire protection guidelines. (First meeting: September 25)

(3) International Atomic Energy Agency (IAEA)

On August 18, the International Atomic Energy Agency (IAEA) released a report on the inspection carried out by its fact-finding mission from August 6 to 10. The outlines of the report are as follows:

<Outlines of the report by the IAEA fact-finding mission>

- a. The operating plants were automatically shutdown and all plants behaved in a safe manner, during and after the earthquake. The three fundamental safety functions (shutting down, cooling down and containing) were ensured.
- b. The radioactive releases to the environment were very minor and estimated to result in an individual dose well below the authorized limits.
- c. Safety related structures, systems and components of the plant seem to be in a general condition much better than expected for such a strong earthquake, with no visible damage. This is probably due to the conservatism introduced at different stages of the design process.
- d. Any re-evaluation of the seismic safety of the plant in accordance with the new seismic guidelines needs to be done taking into account the effects of this earthquake, and the issue of the potential existence of active faults underneath the site.
- e. Another consideration is the possibility that a component remains functionally available under normal operating conditions but sustains hidden damage.

(4) Moves by related academic societies

On September 11, an emergency forum "Niigataken Chuetsu-oki Earthquake --- What happened at the Kashiwazaki-Kariwa Nuclear Power Station" was convened as part of the 2007 annual conference of

the Japan Society of Mechanical Engineers. TEPCO explained the outline of the earthquake as well as the quake's impact on plant management and facility integrity, which was followed on with an active Q&A session.

On September 28, the Atomic Energy Society of Japan conducted a briefing on the Niigataken Chuetsu-oki Earthquake and the safety of the Kashiwazaki-Kariwa Nuclear Power Station as part of its annual autumn conference for 2007. In various presentations, the following notable opinions were expressed as the "reasons the nuclear reactors maintained their safety functions despite being struck with tremors well above the design basis seismic motion":

- a.Reactor facilities are highly resilient because of requirements unrelated to anti-quake criteria (e.g. nuclear containment, retention of internal pressure).
- b.Conservative anti-quake mechanical designs are applied.
- c.Shaking table tests, etc. suggest that the facilities' actual seismic margin is greater by scores of times.

6.Initiatives by JANTI

Main activities by JANTI, conducted after Report #6 issued on August 10, include visiting relevant overseas organizations for briefing (See Reports #7 and #9), and establishing the Reactor Equipment Integrity Assessment Committee (chairman: Toshiharu Nomoto, professor emeritus of the University of Tokyo) within JANTI to assess and examine the integrity of the power station's key equipment, which was subject to tremors above the design-basis seismic motion.

On September 26, the Committee convened the first meeting, attended by around 60 people including experts of structural strength, inspections and quake resilience, as well as relevant parties representing electric utilities and plant manufacturers. The Committee plans to meet once every month through to the end of this fiscal year.

<Description of content>

- ① Examining the approach and method of integrity assessment for equipment exposed to seismic load
- ② Assessing quake damage of individual equipment, and conducting analysis to evaluate the integrity of equipment / parts. Also conducting precautionary assessment on the tolerance level of the current anti-quake design

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