

# OVERVIEW

## 1. Introduction

The Japan Nuclear Technology Institute (hereafter, JANTI) Review Team visited the Tokyo Electric Power Company's Fukushima Daiichi Nuclear Power Station (hereafter, station) from May 22<sup>nd</sup> (Tuesday) until 25<sup>th</sup> (Friday), 2007 in order to conduct a follow-up review (hereafter, review). The purpose of this review was to identify what sort of improvements the station has been implementing to address the areas for improvement needed (hereafter, AFIN or AFINs) that were identified in the JANTI Peer Review on January 2006 and to make proposals in the case that additional items needing improvement are found.

The station has six Boiling Water Reactors (BWR). During the review period, Unit 1 was in scheduled refuel outage, Unit 4 was undergoing annual inspection after restart up from refuel outage, and Unit 2 was operating at rated electrical output, whereas all of the other units were in steady rated thermal output operation.

## 2. Review Schedule

The review was conducted for four days from May 22<sup>nd</sup> (Tuesday) to May 25<sup>th</sup> (Friday), 2007 at the station as shown in Table 1.

Table 1: Review Schedule (Results)

	Review Description
22 <sup>nd</sup> (Tue)	<ul style="list-style-type: none"><li>• Entrance Meeting (introduction of the review team, etc.)</li><li>• Discussions with counterparts with respect to results of on-site observations, interviews, and document review.</li><li>• Team meeting, including station representatives.</li></ul>
23 <sup>rd</sup> (Wed) 24 <sup>th</sup> (Thu)	<ul style="list-style-type: none"><li>• Discussions with counterparts with respect to results of on-site observations, interviews, and document review.</li><li>• Team meeting, including station representatives.</li></ul>
25 <sup>th</sup> (Fri)	<ul style="list-style-type: none"><li>• Final confirmation of the state of addressing AFINs that review team had identified.</li><li>• Exit meeting (to brief the state of addressing AFINs and supplementary explanation in response to station request).</li></ul>

## 3. Review Process

The review team consisted of the Team Leader and four JANTI reviewers.

The review team focused on the state of the progress at the station to remove 14 AFINs identified in the previous peer review. There were five areas to be focussed; Organization and Administration, Operations, Maintenance, Engineering Support, and Radiological Protection.

## 4. Outline of Review Results

### 4.1 State of addressing AFINs

After the previous peer review ended (since January 27, 2006), the station executives took on the management responsibility for station policy to address 14 AFINs, with each one appointing a person or persons responsible for implementation, and personnel to be in charge

of implementation were selected for each item. Besides,, a draft policy and specific schedule of the plan (Plan) was developed, and its content was scrutinized.

In addition, station executives from vice president to directors reviewed and discussed the state of progress of improvements (Do) in the bimonthly meetings, but also issues needing further investigation (Check), as well as measures and further developments (Action).

#### 4.2 Review Results

In the previous peer review, JANTI proposed to establish high level of expectations in order to execute the maintenance and operational activities. In response to this, the station vice president issued the message "Restoration of Fukuichi<sup>1</sup> through putting improvement activities into practice" and clarified the direction of improvements and level of expectations at the station. The draft of the level of expectations and implementation plan was developed and embodied utilizing the benchmarking results including overseas nuclear power stations.

For example, "my area patrol," activities provide station personnel with opportunities to go job site. The Operation and Maintenance departments cooperate to walk through allocated job site area and observe with critical attitude in order to maintain equipments condition at job site.

In addition, details of improvements are communicated to station personnel including contractors, but also training of guidelines and manuals revision and changes.

However, it is desirable that Maintenance Department personnel visit job site more frequently and on-site guidance by station employees is reinforced.

The afore-mentioned improvement activities have also integrated into TEPCO's ongoing nuclear power plant common reform activities (peer activities) and evolved into a diverse variety of improvements.

Thus, summing up the endeavours over the past approximately one year and a half since the previous peer review, although there are certain items that were identified to be still in need of further improvement, it has been confirmed that work improvements regarding the previous proposals have been implemented continuously in accordance with the implementation plan.

The details of the state of each improvement and the additional improvements needed are listed below according to area.

#### [Operations]

- (1) An implementation plan of management observation has been developed, and is steadily being implemented in accordance with the plan. Specifically management observations utilizing check sheet onto operators' primary activities such as periodic surveillance test and rounds are promoted. With regard to control panel monitoring in main control room and restrictions against entry by non-operational personnel, it is desirable for steady progress to be made in accordance with the station's plan and to promptly put this into effect.**

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<sup>1</sup> "Fukuichi" is an abbreviation for Fukushima Daiichi

- (2) Management criteria for operator aids have been established, and these criteria are steadily being implemented effectively. Specifically posted locations and methodology have been determined, and are regulated using log books. Operator aids are administrated well in main control room, but some uncontrolled operators aids were observed on job site, and therefore it is desirable to manage these even more thoroughly.
- (3) Criteria for autonomous maintenance activities have been established, and activities by shift, activities by veteran operators, and activities as established by "my area" and the like are promoted systematically. As the result, on-site equipments are well-kept-up. Materials and equipment were for the most part temporarily stored appropriately, but a few were not labeled and so on, and it was noted that the state of management is not sufficient; therefore there is still room for improvement.

**[Maintenance]**

- (4) Maintenance work criteria and expectations are being reviewed and established as station common rules. The contents of said rules are communicated to station personnel including contractors through meetings and on-site confirmations. Since lack of thoroughness are observed in some places during this review, steady achievement for improvement might be behind. It is desirable to carry out review and make repeated efforts hereafter as well as continuing on-site management observations.
- (5) In regard to foreign materials intrusion in the vicinity of the spent fuel pool and the areas around the turbines, the situation has been improved systematically with enhanced countermeasures such as reinforcement of foreign materials control and building a new fence, and so on. It is also desirable for the station to make steady progress in action plan applied at fuel handling floor where all of the clear plastic materials will be replaced clear plastic foam-materials.
- (6) In regard to spare parts and supplies, improvement action plan has been implemented on schedule. According to the action plan, thorough control of temperature and humidity inside the warehouse was applied as well as improving air-tightness and installing air conditioning equipment. Also, measuring instruments and tools are controlled appropriately in general with developed administrative manuals according to the action plan. However, a few measuring instruments without appropriate label were identified in the measuring instrument room. Therefore more thorough management is needed.
- (7) In preparation for the review of the nuclear power plant inspection system planned for 2008, preparations are under way in the project system for introducing reliability centered maintenance (RCM) and condition based maintenance (CBM). Accordingly, conditions needed for implementation of those maintenances are in effect, and improvements are progressing in accordance with the station's plans.

**[Engineering Support]**

- (8) As far as materials and machinery inside the plant, measures for preventing from falling over during seismic events have been implemented one by one as station

planned based on the evaluation in terms of the impacts to safety significant facilities and equipments. It is hoped that measures will progress systematically in other units as planned. Furthermore, it is desired that temporarily stored items are controlled more thoroughly by management system currently under development and communication of the cautions for such objects.

- (9) In regard to the management of storage of flammable items within the plant including control room, progress is being made in the development of a management system to calculate overall volume of temporarily placed items. The checkpoints for patrolling inside the station, including management of flammable items, are listed on the check sheets, but it is desirable to clarify the usage rules. Also, in regard to reinforcing the functionality of the system for managing temporarily placed items some time in the future, it is hoped that consideration will continue to be given hereafter as well.

#### [Radiological Protection]

- (10) Effective improvements are being made in the posting at work-site areas in minute detail about dose equivalent rates and low radiation-dose standby areas, and reminders about reducing radiation exposure of workers are progressing according to plan. It is hoped that further improvements will be made hereafter toward providing easy to understand information to workers by making use of stickers related to radiation management.
- (11) In order to implement appropriate detailed consideration about prevention of the spread of contamination, systematic improvements are being made regarding the method of displaying surface contamination density measurement points and sample sink litter prevention covers. In addition, handbooks are being issued and workers are trained on the basic points about radiation protection, as well as these matters also being explained at liaison meetings.

#### [Organization and Administration]

- (12) Efforts are being made to review the station's criteria and expectations, and in addition to clarifying the requirements for contractors and communicate them thoroughly through various opportunities. Efforts are also being made in the area of training for the purpose of on-site management observation for station personnel, and reinforcement of on-site patrols. On the point of further raising the frequency of station personnel's visit at job site, improvement is lagging, and therefore it is desirable to review and reinforce efforts to continue on-site management observations.
- (13) Station vice president issued the message entitled "Restoration of Fukuichi through putting improvement activities into practice." This is a message denoting reformation directionality and "the way things should be, the way we want things to be" and it clarifies the station's level of expectations. Based on this message, criteria have been prepared and a higher level of expectations has been established and is being implemented at the station. In the development of this level of expectations, benchmarking results including overseas stations are also considered.

**Hereafter, it is desirable to steadily promote the currently promoted activities so that they become an integral part of the work site.**

- (14) The activities reinforcing worker's safety awareness, for instance, routine job-safety workshops for station personnel including contractors are being systematically implemented. As far as the wearing of personal protective equipments is concerned, steady progress are identified in the clarification of criteria and thorough communication, but there are postings for which it is difficult to interpret the on-site scope of application and an insufficient state of management was noted in some areas, and therefore there is still room for further improvement.**