

## Japan

**Kiyoshi Yamauchi**, ANS Japan Local Section and IC member, sent the following report from Japan, which I have edited slightly:

### **1. Energy Policy and Activities of Ministry of Economy, Trade and Industry (METI)**

(1) The revised “Energy Basic Plan”, approved by the Cabinet on April 11, 2014, emphasized that restoration and reconstruction of Fukushima would be the starting point of nuclear energy, and that nuclear energy would be one of the important base load power contributing to ensure the stability of the energy supply and demand structure, and that dependency on nuclear power generation would be reduced as much as reasonably possible. The “Energy demand/supply prospectus Subcommittee”, formulated by METI, decided “Long Term Energy Demand/Supply Prospectus” on July 2015, consistent with the above energy basic plan and the desirable “power best mix” in 2030 as electric power base, features 20-22 % of nuclear, down from about 30 % before “the Great earthquake disaster” of 2011, and 22-24% of renewable energy in order to contribute to CO2 reduction of 26% from 2013.

(2) “Safety enhancement / technology/ human resources Working Group”, formulated by METI, proposed safety enhancement means on May 27, 2015 and published safety technology and human resources roadmap on June 16, 2015. This WG was restarted on June 17, 2016 and the rolling activity is continuing.

(3) “Radioactive Waste Working Group”, formulated by METI, proposed the revised basic policy of the final disposal of HLRW and TRU and the Ministerial Meeting approved this on December 18, 2015. This WG is still underway discussing how to proceed the dialogue at the scientifically promising site.

### **2. Monju (prototype FBR) Issue**

NRA issued a recommendation about Monju (Prototype FBR) on Nov. 13, 2015. NRA recommended that an organization having the capability to perform safety power operation of Monju in place of JAEA should be identified within half year and that the existences of Monju should be reviewed unless an alternate organization be identified. MEXT (Ministry of Education, Culture, Sports, Science and Technology) formed a Committee how to respond to the above on December 28, 2015. The final report, proposing the conditions which the operating organization should have, was presented to the Minister on May 27, 2016 and the Minister responded to NRA on May 31, 2016. The activities to identify the specific conditions, which the new organization should have, will be followed.

### 3. Status of LWRs Restart

The new safety regulation for commercial LWRs was enforced in July 2013, and applications for NRA review on conformity with new safety standard for restart were started. Applications as of September 2016 are 16 sites 26 reactors (16 PWR, 4ABWR, 6 BWR).

In September 2015, Sendai unit 1 started commercial operation. This is the first unit to be restarted after the “Great Earthquake” in 2011. Sendai unit 2 started commercial operation in November 2015. Takahama unit 3 started commercial operation in January 2016. Ikata unit 3 started commercial operation in September, 2016. Takahama NPP Unit 1&2 obtained approval in April, 2016. Takahama Unit 1&2 granted approval in June 2016 and Mihama Unit 3 is expected to grant approval by November 2016. Further, Kansai Electric Power Company (KEPCO) applied long term operation beyond 40 years for Takahama Unit 1 & 2 in April 2015 and for Mihama unit 3 in November 2015.

Applicant	NPP	Type	Commercial Operation	Application
Hokkaido	Tomari 1	PWR	1989	July, 2013
	Tomari 2	PWR	1991	
	Tomari 3	PWR	2009	
Kansai	Ohi 3	PWR	1991	July, 2013
	Ohi 4	PWR	1993	
	Mihama 3	PWR	1976	March, 2015
	Takahama1	PWR	1974	March, 2015
	Takahama2	PWR	1975	
	Takahama 3	PWR	1985	Restarted (January 2016) but shut down (March 2016) *
	Takahama 4	PWR	1985	Restart, Jun. 2017
Shikoku	Ikata 3	PWR	1994	Restarted (September, 2016)
Kyushu	Sendai 1	PWR	1984	Restarted (September, 2015)
	Sendai 2	PWR	1985	Restarted (November, 2015)
	Genkai 3	PWR	1994	July, 2013
	Genkai 4	PWR	1997	
Tokyo	Kashiwazaki-Kariwa 6	ABWR	1996	September, 2013
	Kashiwazaki-Kariwa 7	ABWR	1997	
Chugoku	Shimane 2	BWR	1989	December, 2013
Tohoku	Onagawa 2	BWR	1995	December, 2013
	Higashidori 1	BWR	2005	June, 2014
Chubu	Hamaoka 3	BWR	1987	June, 2015
	Hamaoka 4	BWR	1993	February, 2014

Hokuriku	Shika 2	ABWR	2006	August, 2014
JAPC	Tokai 2	BWR	1978	May, 2014
	Tsuruga 2	PWR	1987	November, 2015
EPDC	Ohma (Full Mox)	ABWR	Not yet	December, 2014

\*: Takahama unit 3 was shut down due to Ohtsu District Court Judgement on March 10, 2016.

#### **4. Juridical Issue (Related to the plants already restarted)**

##### **(1) Takahama Unit 3&4**

Fukui District Court issued provisional disposition to prevent the restart of Takahama Unit3&4 on April 14, 2015, stating that the current NRA requirement was not enough and the safety of Takahama Unit 3&4 would not be fully assured.KEPCO raised objection and Fukui District Court in the objection trial cancelled the above disposition on December 24, 2015 and Takahama unit 3 was restarted on January 29, 2016. However, on March 9, 2016 Otsu District Court, which area is adjacent to Fukui prefecture, issued provisional disposition to prevent the restart and Takahama unit 3 turned to shutdown on March 10, 2016. KEPCO raised objection, but Otsu District Court rejected this objection in July 2016. KEPCO raised appeal pertaining to temporary restraining order to Osaka High Court in July 2016.

##### **(2) Sendai Unit 1&2**

On April 22, 2015, Kagoshima District Court rejected a request by a group of local anti-nuclear residents for a temporary injunction to prohibit the restart of the Sendai 1&2 of Kyushu Electric Power Company, due to “no irrationalities in the NRA new regulatory standards”, in the context of the latest scientific findings. Although anti-nuclear residents raised immediate appeal against this decision, Fukuoka High Court rejected this request in the Immediate Appeal Court on April 6, 2016. Anti-nuclear group requested to Fukuoka District Court to cancel the approval of reactor permit on June 10, 2016.

##### **(3) Ikata Unit 3**

Temporary injunction to prohibit the restart of the Ikata Unit 3 by anti-nuclear group was raised to Hiroshima District Court on March 11, 2016, to Matsuyama District Court on May 13, 2016 and to Oita District Court on June 24, 2016.

#### **5. Activities of the Nuclear Risk Research Center (NRRC)**

(1 ) NRRC was formed in the Central Research Institute of Electric Power Industry on

October 1, 2014 for research and development of the comprehensive risk assessment utilizing PRA based on the lessons learned from Fukushima Daiichi Nuclear Power Station Accident. Dr. George Apostolakis, the former NRC Commissioner is the Head and Dr. Richard A. Meserve, the former NRC Chairman is the Executive Advisor. Technical Advisory Committee has been held every three months.

(2) Ikata unit 3 of Shikoku Electric Power Company was already selected as a PWR pilot plant introducing the state of practice PRA technologies. Kashiwazaki Kariha unit 6 & 7 was also selected as a BWR pilot plant in June 2016. Dr. Apostolakis has been continuing to see CEOs of Electric Power Companies and to visit plant sites in order to convince them the importance of Risk Informed Management. On September 2, 2015, the first Symposium by NRRC was held. “What is Risk Informed Management” and “What is expected for the NRRC” were discussed. The next Symposium is expected to be held in middle of 2017. The “Risk Informed Decision Making(RIDM) Promotion Team“, to support utilities’ efforts to establish the process of risk-informed decision making by clarifying the goals and developing the strategy plan, was formed in July 2016.

## **6. Activities of AESJ**

International conferences and large domestic conferences held by AESJ after April 2016 are focused as follows. Officers of the AESJ for 2016 were elected and authorized on June 17, 2016 and Dr. Uesaka, Professor of Nuclear Engineering and Management at University of Tokyo became a Chairman of AESJ.

In collaboration with the ANS, the following international conferences will be held:

- ICAPP 2017, Fukui and Kyoto, Japan, April 24-28, 2017.
- Decommissioning and Remote Systems (D&RS 2016), Pittsburgh, PA, July 31-August 4, 2016.
- 10th Japan-Korea Symposium on Nuclear Thermal Hydraulics and Safety (NTHAS-10), Kyoto, Japan, November 27-30, 2016.

## **7. Activities of ANS Japan Local Section**

Officers for 2016 Japan Local Section were elected in March 2016 and Mr. Mukunoki of JGC Cooperation became a Chairman of the Executive Committee of the Japan Local Section of ANS. The 1st General meeting for members was held in the AESJ Fall Meeting on September 9th at Kurume-city. The Activities Report of the Japan Local Section was sent to ANS Local Section Committee on July 27, 2016. The name of “International Affairs Committee (IAC)” of AESJ, which is also a body of ANS’s Japan Local Section, has been

renamed “International Nuclear Information Network (ININ)“.

## **8. Recent status of Fukushima Daiichi NPP Restoration**

### **(1) Means for Contaminated Water Treatment**

This issue is coming from the fact that ground water flowing into the building is mixed with the contaminated water to cool the fuel debris. “Fukushima Daiichi Decontamination and Decommissioning Engineering Company” started groundwater bypass operation at Fukushima Daiichi NPS based on the three strategies. The first is to “remove” the contamination source, the second is to keep ground water “away from the contamination source”, and the third is to “preclude the leakage” of contaminated water. Concerning “removal”, cleaning the contaminated water by the multi-nuclide removal equipment (ALPS) has been continued and the Sea Water piping trench was blocked. Concerning “away from the contamination source“, freezing operation of water shielding wall at the mountain side has been started in addition to the reduction of water flowing into the building by ground water bypass and sub-drain operation. Concerning “preclude the leakage“, water shielding wall at the sea-side and pumping up of ground water are under way.

### **(2) Fuel Removal from Spent Fuel Pit**

As for Unit 4, all spent fuel was already removed by December 22, 2014. As for Unit 1, the reactor building cover was dismantled and rubble removal has been started. As for Unit 2, the strategy of whole dismantling of the upper portion of reactor building was decided. As for Unit 3, removal of large rubble in the spent fuel pit was completed and radiation reduction in the operating floor is under way.

### **(3) Investigation of in-core monitoring**

As for Unit 1, investigation by muon and investigation inside the containment vessel (PCV) by robots were conducted. As for Unit 2, measuring by muon is under way and investigation inside the containment by robots is under preparation. As for Unit3, investigation device was inserted into the PCV and information was obtained.

### **(4) Waste Management**

Volume of water-process secondary waste due to progress of contaminated water treatment and volume of solid waste due to rubble removal have been increased. Tokyo Electric Power Company (TEPCO) strengthened the structure of the Waste Management Department and has been progressing the waste generation reduction. TEPCO announced

the 10 year plan for waste storage and management.

#### (5) Work Environment

Radiation dose reduction (additional effective dose rate at the site boundary down to under 1mSv/yr) has been accomplished. Dose reduction at high radiation in under way.

#### (6) Research and Development

“Decommissioning Research Development Cooperation Meeting” was formulated in “Nuclear Damage Compensation and Decommissioning Facilitation Corporation” (NDF) and study to effectively connect the R&D results of each organization to the actual decommissioning activities has been started. JAEA formed “Collaborative Laboratories for Advanced Decommissioning Science” (CLADS). Further, operation of the “Naraha Remote Technology Development Center” has started.

#### (7) Road Map and Technical Strategic Plan

“The Intermediate and Long Term Road Map for Fukushima Decommissioning and Contaminated Water Removal”, originally issued on December 2011, revised on July 2012, revised again on June 2013, revised again reflecting the progress of the recovery work at the site, comments from the Fukushima Council, and the strategic study by NDF, was approved by the Ministerial Meeting on June 12, 2015. Major points of this road map are “emphasis on risk reduction rather than speed“, “explicit schedule of near time frame“ and “keeping the same target as 30-40 years later for final target of decommissioning”. In order to provide the technical basis to the above road map, NDF issued “The Technical Strategic Plan 2015” on April 30, 2015, and “The Technical Strategic Plan 2016” on July 23, 2016.