

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)

The revised “Energy Basic Plan”, approved by the Cabinet on April 11, 2014, emphasized that nuclear energy would be one of the important base load power and that dependency on nuclear power generation would be reduced as much as reasonably possible. Consistent with the above energy basic plan, METI, decided the desirable “power best mix” in 2,030, as electric power base, on July 2015, features 20-22 % of nuclear, down from about 30 % before “the Great earthquake disaster” of 2011. The “Energy basic Plan” is expected to be revised this year.

2. Nuclear Regulation

(1) Nuclear Regulatory Authority

We have five Commissioners in the NRA and the term of Shunichi Tanaka, as Chairman will expire in September 2017. Toyoshi Fuketa, current Commissioner, is expected to take over this position for the next term of 5 years.

(2) Fracture Zone Issue

Although the “Knowledgeable Specialist Sub-Committee” formed by the NRA, concluded that the fracture zones at Tsuruga-site, Higashidori-site and Shika-site should be treated as active faults, final decision has not been made in the plant re-start application review. Concerning Mihama-site and Monju-sate, Sub-Committee reported to NRA that the possibility of activity after Late Pleistocene would not be recognized.

(3) Monju (Prototype FBR) Issue

NRA issued a recommendation that the existences of Monju (Prototype FBR) should be reviewed unless an alternate organization having the capability to perform safety power operation of Monju be identified in place of JAEA on Nov. 13, 2015. After receiving the MEXT (Ministry of Education, Culture, Sports, Science and Technology) final report to the above request, the Government decided that Monju will be decommissioned, whereas the promotion of the fuel cycle and the development of fast reactors will be pursued. The Road Map will be made by 2018.

(4) Review of Current Inspection System

In order to respond to the IAEA Integrated Regulatory Review Service (IRRS) held in January 2016, the NRA formed the “Study Team to Review the Current Inspection System” on May 11, 2016. The intermediate proposal for the revised system incorporating the concept of “Reactor Oversight Process” (ROP) currently used in the US, was formulated on November 18. The Revised Nuclear Reactor Regulation Law reflecting this issue was approved by the Cabinet on February 7, 2017 and was approved by the Parliament on April 7. A discussion on making a detailed rule will proceed.

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 April 2017 are still 26 reactors at 16 sites (16 PWR, 4ABWR, 6 BWR). Most recently, Genkai 3&4 granted approval of restart in January 2017 and the total number of approved plants is 9, all of which are PWRs. 3 plants among 9 approved plants have already been restarted. Also, plant life extension approval was granted for Takahama 1&2 in June 2016 and Mihama-3 in November 2016.

| 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 (Life Extension Approved, November 2016) |
| | Takahama1 | PWR | 1974 | Approval Obtained (June ,2016) (Life Extension Approved, June 2016) |
| | 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 | Approval Obtained (January ,2017) |
| | Genkai 4 | PWR | 1997 | |
| Tokyo | Kashiwazaki- | ABWR | 1996 | September, 2013 |

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|----------|----------------------|------|---------|----------------|
| | Kariwa 6 | | | |
| | 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 |

* Although Takahama unit 3 was shut down due to Otsu District Court, Judgement on March 10, 2016, High Court approved KEPCO's appeal on pertaining to temporary restraining on March 28, 2017. Takahama Unit3 is expected to be restarted in May 2017.

4. Juridicial Issue (Related to the plants already restarted)

(1) Takahama Units 3&4

After restart of Takahama Unit 3, Otsu District Court issued provisional disposition to prevent the restart and Takahama unit 3 turned to shutdown on March 10, 2016. KEPCO raised objections, but Otsu District Court rejected this objection in July 2016. KEPCO raised appeal pertaining to temporary restarting order to Osaka High Court in July 2016 and the High Court approved KEPCO's appeal on March 28, 2017. Takahama Unit3 is expected to be restarted in May 2017.

(2) Sendai Units 1&2

On April 22, 2015, Kagoshima District Court rejected a request by a group of local antinuclear residents for a temporary injunction to prohibit the restart of the Sendai 1&2 of Kyushu Electric Power Company. 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. On March 30, 2017, Hiroshima District Court rejected the injunction request.

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

(1) NRRC was formed in the Central Research Institute of Electric Power Industry (CRIEPI) 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 Adviser. Technical Advisory Committee has been held every three to six months.

(2) Ikata unit 3 of Shikoku Electric Power Company was already selected as a PWR pilot plant and Kashiwazaki Kariha unit 6 & 7 as a BWR pilot plant. “Risk Informed Decision Making(RIDM) Promotion Team“, formed in July 2016, has been working to support utilities‘ to establish the process of risk-informed decision making. Dr. Apostolakis has been continuing to see CEOs of Electric Power Companies and to visit plant sites. CRIEPI will have an annual Research Report Symposium 2017 focused on NRRC activities on May 18 this year.

6. Activities of Atomic Energy Society of Japan (AESJ) (<http://www.aesj.or.jp/en/>)

ANS and Atomic Energy Society of Japan (AESJ) have established a bilateral agreement in 1999 to provide a mutual cooperation and since then AESJ is one of the so-called “sister-societies” of ANS.

Atomic Energy Society of Japan (AESJ, established in 1959) and AESJ have been promoted our activities for the purpose of the public safety with priority, the promotion of the science and technology in nuclear energy and radiation for the peaceful use, the utilization and widespread thereof, and hence the environmental preservation and the contribution to the development of society, following the Articles of Incorporation, which was amended in 2013, out of regret that the Fukushima Accident was not prevented beforehand.

(1) Domestic Activities

In 2016, as a Fukushima-related activity, the Fukushima Decommissioning Committee of AESJ continues a scientific advice activity for the decommissioning of the Fukushima Daiichi plant and a follow-up activity of about fifty suggestions in the “The Fukushima Daiichi Nuclear Accident”, a report compiled by the AESJ Investigation Committee. Also, the Fukushima Special Project of AESJ has continued activities such as Symposium or a support to Fukushima resident in conjunction with both domestic and international

organizations. In 2016, AESJ held two Symposiums in Iwaki-city, Fukushima and Tokyo as well as several residential talk forums in various places in Fukushima area, support activities for decontamination facilitation, and making suggestions for middle-long term measures for environmental remedy activities.

Moreover, as an academic activity, AESJ had a “Investigative Advisory Committee on Seismic Activity of Faults and Engineering Risk Assessment”, where many experts from other academic societies joins, and AESJ hosted an information exchange meeting and promoted a activity as a host society in “the Academia Network to Contribute to Fukushima Recovery and Decommissioning Promotion”, where more than 30 academic societies join. For annual conference and meetings, 2016 Fall Meeting was held at Kurume-city in Kyushu and 2017 Spring Annual Meeting at Tokai University in Hiratsuka-city, Kanagawa, where many special plenaries and sessions, such as post-Fukushima session, are organized and implemented successfully under cooperation with the Local Section of AESJ and a local organising committee.

For presentation of Awards, AESJ Society’s Award, Follow Award, Local section Award, Sub-committee Award and others are presented at the Annual Meeting. In addition, in order to promote efficient management and to improve financial basis of AESJ, a special “Management Improvement Committee” continues its activity. The current number of members is 7,297. There are also 230 corporate members.

(2) International Activities

(2-1) International Conferences

- AESJ hosted:
 - Asia Nuclear Prospects International Conference 2016 (ANUP2016), October 24-17 at Sendai-city.
 - 10th Japan-Korea Symposium on Nuclear Thermal Hydraulics and Safety (NTHAS-10), November 21-30 at Kyoto.
 - Also, started preparation for ICAPP2017 in April, 2017, where AESJ is a host organizer.
- AESJ co-hosted:
 - 2016 International Congress on Advances in Nuclear Power Plants (ICAPP2016) , April 17-20 at San Francisco.
 - 11th International Conference on Tritium Science and Technology, April 17-22 at Charleston.
 - PHYSOR2016, May 1-5, at Sun Valley.

- PATRAM2016, September 18-23 at Kobe.
- 11th International Topical meeting on Nuclear Thermal Hydraulics, Operation and Safety (NUTHOS11), October 9-11 at Gyeongju.
- AESJ sponsored or supported:
 - OPTICS & PHOTONICS International Congress 2016, May 17-20, Yokohama.
 - The 24th International Conference on Nuclear Engineering (ICONE24), June 26-30, Charlotte.
 - Decommissioning and Remote Systems (D&RS 2016), July 31-August 4, Pittsburgh.
 - Joint 8th Intelligent Systems and 17th International Symposium on Advanced Intelligent System (SCIS&ISIS2016), August 25-28, Sapporo.
- Top Fuel 2016, September 11-16, Idaho.
 - 13th International Conference on Probabilistic Safety Assessment (PSAM13), October 2-7, Seoul.
 - The 20th Nuclear Plant Chemistry Conference (NPC 2016), October 2-7, Brighton.

(2-2) International Exchange Programs

- As a Japan-US-Europa Nuclear Student International Exchange Program, two students are despatched.
- As a Japan-Korea Nuclear Student and Young Generation Researcher Exchange, five Subcommittee groups of AESJ held Student Seminars.
- AESJ supported activities of INSC (International Nuclear Societies Council) and PNC (Pacific Nuclear Council). AESJ attended two INSC's Meetings, at April 19 in San Francisco and at September 27 in Vienna, respectively, where a statement "The Path Forward After COP-21", which announces the effectiveness of nuclear power generation for the COP21 statement in 2015 and COP22 statement in 2016, was declared.
- Articles of "Nuclear Power in Japan" was submitted for ANS Globe in April and September, respectively, where brief description of energy policy in Japan, restart of nuclear power plants, Fukushima recovery and AESJ's activities, was provided.
- AESJ sent three YGN committee members to IYNC2016 (International Youth Nuclear Congress 2016) in July 2016.

7. Activities of ANS Japan Section (<http://aesj.or.jp/kaigai/en/index.html>)

ANS Japan Section is managed by the International Nuclear Information Network (ININ) of AESJ.

The members about 190 and among them, the number of ANS national members is about 20. There are ten officers in the Executive Committee. Besides semi-annual Members General Meeting, and Executive Committee Meeting, seven times per year, major activities were four lecture meetings with invited lecturers:

- “The Nuclear Development in China” by Dr. Fengjun Duan, Senior Research Fellow in the Canon Institute for Global Studies, at June 30,
- “The UK Nuclear Industry, Past, Present and Future” by Dr. Keith Franklin, First Secretary(Nuclear), British Embassy Tokyo, at September 9,
- “Looking Forward: Nuclear energy Issues and Opportunities” by Mr. William D. Magwood IV, Director-General, OECD/NEA, at December 1,
- “OECD/NEA Databank: History, Current status, Future challenges and Relation with Japan” by Mr. Kiyoshi Matsumoto, Fellow at the Waseda University/ ex-Head of OECD/NEA Databank, at March 28.

One special activity is that we had an opinion-survey on the activities and the value on ANS Japan Section, as well as AESJ ININ’s activities and we had both positive comments and negative comments on our activities from our members. This will be an effective action for vitalization of local section activities. Also, the chair and the executive committee members had opportunities to meet Ms. Gale Hauck, a member of Board of Directors of ANS, in Japan and we got valuable advices on the our activities.

The Second General Meeting for Section members was held in the AESJ’s Spring Meeting in March 2017 at the Tokai University at Hiratsuka-city, Japan. The Officers for 2017 was elected in March 2017 and Mr. Hamamoto of Hitachi-GE Nuclear Energy, Ltd, become a new Chair of The Executive Committee for 2017, which is effective April 2017 to March 2018, and started activities for 2017.

8. Recent Status of Fukushima Daiichi NPP Restoration

(1) Means for Contaminated Water Treatment

“Fukushima Daiichi Decontamination and Decommissioning Engineering Company” has been working to cope with the contaminated water based on the three strategies, i.e., “removal of contaminated source“, “keeping of ground water away from the contaminated source“, and “preclusion of the contaminated water leakage“. The extraction of contaminated water and the blockage of the Sea Water piping trench was completed in March 2017. Freezing operation of water shielding wall at the mountain side has been started on March 2016 and freezing to 0°C was achieved on October 2016.

(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 dismantle has been started in March 2017 and fuel removal is expected to be started in 2020. As for Unit 2, fuel removal is expected to be started in 2020. As for Unit 3, removal of large rubble in the spent fuel pit was completed and fuel removal is expected to be started late this year.

(3) Investigation of in-core monitoring

Investigation by camera inside the containment vessel (PCV) of Unit 2 was conducted in March 2017. This is the first trial of taking pictures by camera inside the PCV. Debris appeared on the grating under the reactor vessel (RPV) and it is expected that this could be fuel debris with structures, melt through the RPV. This information could be important input to decide the technical method to taking out the fuel debris.

(4) Radioactive Waste Management

As of December 2016, the volume of contaminated water stored in the tanks is one million m³ and the volume of solid radioactive waste is 0.35million m³.

(5) Work Environment

According to the progress of radiation dose reduction means inside the site, areas around the reactor building were categorized based on the radiation level and the radiation protection burden during work activities at the low level radiation area could be relaxed. Limited trial has been started on March 8, 2016 and the expanded application has been started on March 30, 2017.

(6) Research and Development

“International Research Institute for Nuclear Decommissioning” (IRID) has been working for research and development of decommissioning of Fukushima Daiichi using the fund from Ministry of Economy, Technology and Industry (METI) in accordance with the road map described below.

Major areas of research and development are as follows;

- Removal of spent fuel
- Preparation of fuel debris removal (Investigation technology inside PCV, Investigation - technology inside RPV, Monitoring technology of fuel debris, Fundamental technology for removal of fuel debris and reactor internal structure, etc.

(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 and most recently revised, 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”. 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. The policy on how to take out the fuel debris is expected to be determined in the middle of 2017 and the procedure how to take out the first fuel debris in the first half of 2018.