

...e-news from the ANS International Committee

From the editor

The ANS Globe is the Bulletin of the American Nuclear Society's International Committee. *The ANS Globe* has as its mandate the dissemination of news of international interest to International Committee members and to others.

We would like to keep *The ANS Globe* current and relevant. Please send your letters, articles, news and/or comments for consideration towards the next issue.



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From the Chair and Vice Chair

We enter the fourth quarter of 2017 with more good news than bad on nuclear energy. While Switzerland and Germany are exiting nuclear energy, the international nuclear energy world continues to move forward with new plants, advanced technologies and major research and development. The International Atomic Energy Agency (IAEA) has just released its new projections for world nuclear



generating capacity, identifying a "high case" and a "low case". As with most projections, we suspect that reality will finally be somewhere in the middle of these projections.



Here are some snapshots of nuclear

energy around the world:

- In the United Arab Emirates, the Barakah Nuclear Power Plant, Unit 1 is nearly complete and is expected to begin operating in 2018. It will be followed by three more units. Support in the UAE for nuclear energy remains high.
- Saudi Arabia has announced that it will soon be issuing a Request for Information from suppliers for building two large nuclear power plants. This represents the beginning of the National Saudi Atomic Energy Project, which will later include small modular reactors. Saudi Arabia plans to build 16 nuclear power reactors over the next 25 years.
- The National Action Plan for the development of Nuclear Energy in the Czech Republic includes provisions for a new unit at the Dukovany site and life extension of the existing unit there.
- According to Japan's Ministry of Trade and Industry, nuclear power plants continue to move back into operation in Japan (five are in operation now) after being shut down in

the post-Fukushima era. Nuclear energy's role in Japan's energy mix will fall to about 20% by 2030 from about 27% today. Renewables will fill the gap, as 11 units are slated for decommissioning.

- The United Kingdom is moving forward with plans for new nuclear units at Hinkley Point and Wylfa Newydd with longer-term plans at Sizewell C, Bradwell and Oldbury while it concurrently focuses on innovation and research. These new builds are offset by plans to decommission 17 reactors over the next century.
- China's robust nuclear energy picture includes 37 reactors, 20 more under construction and more about to start construction. Some of these reactors are highly advanced. They will deliver a 70% increase in nuclear capacity to 58 GW by 2021, with plans for up to 150 NW by 2030.
- In the U.S., Secretary of Energy Rick Perry has demonstrated his support for the baseload generation required to keep the grid stable and resilient. Secretary Perry recently asked the Federal Energy Regulatory Commission for a rule that enables power generators to recover their full costs through regulated pricing. If the Commission acts, it would remove financial threats to existing plants.

All in all, it's a reasonably promising picture. And let's not forget, it is we as nuclear professionals that have brought, are bringing, and will need to continue to bring this positive news on nuclear energy's use as sustainable energy source to the world.

So what does all this mean for the ANS International Committee? It means that we have opportunities to contribute to the success of these programs and others. We can share job opportunities with ANS members. We can bring more international members into ANS. We can start new ANS chapters in nuclear newcomer nations. We can become more involved – as an organization – with the IAEA.

Currently, we are benchmarking with other nuclear organizations to bring best practices into the ANS world. We'll be sharing these best practices with other nuclear societies as well. For example, one IC subcommittee has done benchmarking with organizations in many nations on best practices for Professional Engineering qualifications and is proposing a panel discussion on it for the 2018 ANS Annual Meeting. Another subcommittee is working on best practices in Human Resources, Personnel Qualifications and Financial Challenges for new nuclear construction. And we are chartering a group to benchmark best practices with other societies to determine how they provide value to their members.

This is just the beginning. We are building an International Committee that engages in interesting, important and value-building work for our members and for the societies we represent. The International Committee's merits are to mutually enrich the perspectives on nuclear energy internationally and nationally, to bridge across borders securing best practices being deployed, providing options for our young generation to again experience the wealth of international collaboration and, for us all, obviously to continuously learn from others. Indeed, this demands effort from all members of the International Committee within already packed agendas, though, we're confident we all can contribute making the International Committee the enriching information exchange forum hosted by ANS to ... again and again ... bring good news on nuclear energy's future.

Mimi Holland Limbach, ANS International Committee Chair Luc van den Durpel, ANS International Committee Vice Chair

The ANS International Committee's Web Page

Visit the enhanced ANS International Committee's Section on the ANS website, located at <u>http://www.ans.org/const/international</u>. It includes:

- o Background information about the ANS International Committee
- Connections to ANS International Local Sections
- An overview of Society alliances with international organizations (INEA, INSC, and PNC), along with contact information
- o Connections to 30 ANS Agreement Societies/Organizations, and
- Current/back issues of *The ANS Globe*, which features ANS International Committee activities and related items.

Non-US ANS Board Members

2017 ANS National Election

Congratulations to IC member **Fiona E. Rayment**, of the UK, who was the successful candidate in the 2017 ANS elections as the Non-U.S. At-Large Director!

Non-US Board Candidates in 2018 ANS National Election

The following candidates have been nominated by IC members to run for the Non-US Board position in the 2018 ANS election. Both candidates have accepted the invitation to run.

- <u>Prof. Lyndon Edwards</u> Head, Institute of Materials and Engineering Science, ANSTO (Australia)
- **Prof. Akio Yamamoto** Department of Material, Physics and Energy Engineering, Graduate School of Engineering, Nagoya University, AESJ (Japan)

News from Sister Societies and International News

• <u>Canada</u>, Canadian Nuclear Society (CNS) (http://www.cns-snc.ca)

The 13th International Topical Meeting on Nuclear Applications of Accelerators was a joint ANS-CNS Conference. It was held in Québec City, Québec, Canada, 2017 July 31-August 4, and was very successful. It had excellent plenary and technical programs, and attracted over 160 participants.



CNS events in the next 12 months:

- 2017 December 4-5, CNS Thermalhydraulics Course, Toronto, Ontario, Canada
- 2018 Spring (exact date and venue to be determined): Nuclear-101 Course
- 2018 June 3-6, 38th Annual Conference of the CNS and 42nd CNS/CNA Student Conference, with a component in Small Modular Reactors, Saskatoon, Saskatchewan, Canada

ONTARIO POWER GENERATION'S REFURBISHMENT NEWS

In October 2016, Ontario Power Generation started work on the \$12.8 billion refurbishment of the Darlington Nuclear station (4 CANDU 900-MWe reactors), located near Toronto, Ontario. This is a major, 10-year, project, with the reactors to be refurbished one at a time.

Quoting from the Ontario Power Generation's (OPG's) August report on its website:

"The refurbishment of Darlington Nuclear's unit 2 is now 25 per cent complete, on time and within the approved budget as confirmed in Ontario Power Generation's (OPG) 2017 secondquarter refurbishment progress report. "Darlington Nuclear is one of Ontario's most important generating assets by supplying almost 20 per cent of Ontario's electricity needs," said Dietmar Reiner, OPG's Senior Vice President for Nuclear "The refurbishment of Projects. Darlington will extend the life of this station for another 30 years while creating thousands of jobs." The Darlington Refurbishment project is a made-in-Canada initiative, with 96 per cent of expenditures happening related in Ontario. Right now, over 5,000 workers are on site and an additional 500 workers will join the work on the project this September. Over a hundred Ontariobased companies are involved in the project supporting thousands of jobs



across Ontario. The next major phase of the project is disassembling the nuclear reactor.

An independent report by the Conference Board of Canada estimates that the project and subsequent 30 years of station operation will generate a total of \$89.9 billion in economic benefits for Ontario, including supporting approximately 14,000 jobs. OPG generates safe, clean, reliable, low-cost power for Ontario. More than 99 per cent of this power is free of

smog and greenhouse-gas emissions. OPG's power is priced 40 per cent lower than other generators, which helps moderate customer bills."

BRUCE POWER'S LIFE-EXTENSION PROGRAM

Bruce Power operates the Bruce A and Bruce B nuclear stations (each comprising 4 900-MWe-class CANDU reactors). Quoting from Bruce Power's website:



Bruce Power's role in the future of Ontario's electricity supply was solidified on Dec. 3, 2015, when the company and the Independent Electricity System Operator (IESO) entered into an amended, long-term agreement to secure 6,400 megawatts of electricity from the Bruce site, through a multi-year Life-Extension Program. The life extension began on Jan. 1, 2016, and will continue through 2053, allowing Bruce Power's units to operate safely through to 2064.

The life extension also includes the Major Component Replacement Project, which will begin in Unit 6 in 2020 and extend the life of Units 3-8 over a period of 16 years. In 2005, Bruce Power entered into the Bruce Power Refurbishment Implementation Agreement (BPRIA) to enable the restart of Bruce Units 1 and 2, to return the site to its full operating capacity of eight units. The amended agreement enables the company to progress with a series of incremental life-extension investments, including Major Component Replacement, to secure a clean, reliable and low-cost source of electricity for Ontario families and businesses for decades, as outlined in Ontario's 2013 Long-Term Energy Plan (LTEP).

"This is a major milestone in the history of Bruce Power as we build on our existing agreement with the province and extensive experience to enter the next phase of our site development," said Mike Rencheck, Bruce Power's President and CEO. "This provides us the opportunity to secure our long-term role as a supplier of low-cost electricity by demonstrating we can successfully deliver this program incrementally."

Over the past 14 years, Bruce Power has returned its eight-unit site to its full capacity, allowing Ontario to phase out coal-fired power generation, while providing low-cost, reliable and carbon-free electricity to families and businesses.

Bruce Power is Ontario's lowest cost source of nuclear, currently producing over 30% of the province's electricity at 30% less than the average cost to generate residential power. Extending the operational life of the Bruce Power units will ensure Ontario families and businesses have long-term price stability.

The amended agreement, which took economic effect on Jan. 1, 2016, allows Bruce Power to immediately invest in life-extension activities for Units 3-8, followed by a Major Component Replacement program, optimizing the operational life of the site and offering significant ratepayer and system benefits. "In the short term, this amended agreement will allow us to establish the building blocks to be successful with our long-term program by investing to extend the operational life of the units, while also preparing for the first Major Component Replacement, which will commence in 2020," Mike said. "This will set us up for success by allowing us to manage resources and facilitate a coordinated schedule to complete this program."

• <u>IAEA</u>

We are reproducing here the statement of <u>Yukiya Amano, IAEA Director General</u>, to the Sixty-First Regular Session of IAEA General Conference (credit IAEA's website)



Madam President,

I am very pleased to welcome all participants to the 61st General Conference of the International Atomic Energy Agency.

The IAEA's 60th anniversary year is drawing to a close. In the past six decades, the Agency has contributed to international peace and security and made a real difference to the lives of millions of people. Thanks to the support of Member States and the dedication of our excellent staff, we can take pride in important achievements in all areas of our work.

Since becoming Director General nearly eight years ago, I have focused on ensuring that the IAEA remains an international organisation of excellence that delivers concrete results promptly.

Madam President,

Since the last General Conference, we have continued to verify and monitor the implementation by Iran of its nuclear-related commitments under the *Joint Comprehensive Plan of Action*.

The nuclear-related commitments undertaken by Iran under the JCPOA are being implemented. Iran is now subject to the world's most robust nuclear verification regime.

The Agency continues to verify the non-diversion of nuclear material declared by Iran under its Safeguards Agreement. Evaluations regarding the absence of undeclared nuclear material and activities in Iran continue.

Madam President,

The nuclear programme of the Democratic People's Republic of Korea is a matter of grave concern. The nuclear test by the DPRK on September 3rd, its sixth and largest to date, is extremely regrettable. I call upon the DPRK to comply fully with its obligations under all relevant resolutions of the UN Security Council and the IAEA. The Agency is working to maintain its readiness to return to the DPRK when political developments make this possible.

Madam President,

The first *International Conference on the IAEA Technical Cooperation Programme* greatly enhanced awareness of our unique role in transferring nuclear technology to developing countries. In order for us to fulfil this role, it is important that all countries contribute on time and in full to the TC Fund. The TC programme helps countries to achieve the Sustainable Development Goals, in energy, food and agriculture, industry and water management, as well as in health. The modernisation of the IAEA nuclear applications laboratories at Seibersdorf continues to make excellent progress. The new Insect Pest Control Laboratory will be inaugurated a week from today. When completed in a few years' time, the expanded laboratory complex will greatly increase our capabilities as a technology holder, to the benefit of all 168 IAEA Member States.

Madam President,

Nuclear power plays a significant role in reducing greenhouse gas emissions and improving energy security. The Agency supports countries that wish to introduce nuclear power, or to expand existing programmes. Last month, the IAEA LEU Bank Storage Facility was inaugurated in Kazakhstan. Establishment of the IAEA LEU Bank will provide a last-resort mechanism to give countries confidence that they will be able to meet their future needs for nuclear fuel. The *Ministerial Conference on Nuclear Power in the 21st Century* will

start in Abu Dhabi on October 30. I encourage all Member States to participate at ministerial level.

Madam President,

Safety and security are extremely important in all uses of nuclear technology, whether for power or non-power purposes. They are national responsibilities, but the IAEA plays the central role in ensuring effective international cooperation. Lessons from the Fukushima Daiichi accident have now been incorporated into all IAEA nuclear safety requirements, ensuring that they become part of global safety practice. Safety culture must continue to be strengthened. Our *Ministerial Conference on Nuclear Security* last December was a great success. I am pleased that the Board adopted the *Nuclear Security Plan 2018-2021* last week by consensus. The IAEA will continue its work as the global platform for strengthening nuclear security.

Madam President,

Sound management of limited resources is essential if the Agency is to be able to meet the growing needs of Member States. We are continuously implementing efficiency measures, but demands for Agency support are increasing. We will continue to strike a balance between those real needs and the reality that many Member States face continued financial constraints. Modest real increases in our budget in recent years have been very helpful in enabling us to address priority areas such as technical cooperation and nuclear safety and security. I count on Member States to support modest real increases in the IAEA budget in the coming years. The proportion of women in the Professional and higher categories on IAEA staff is higher than it has ever been. I am confident that, with the active support of Member States, it will continue to grow. Finally, Madam President, I thank the staff of the Agency for their commitment and dedication. I share the great pride which IAEA staff take in their work.

I thank all IAEA Member States for their active support for the Agency and for me personally. And I am very grateful to Austria for being a generous and welcoming host country. Under our *Atoms for Peace and Development* motto, the Agency will continue to deliver high-quality programmes and respond promptly to Member State needs.

Thank you.

• Japan

<u>Kiyoshi Yamauchi</u>, 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. On August 9, 2017, "Strategic Policy Committee" of the "Advisory Committee for Natural Resource and Energy to METI" started to discuss the revision of the "Energy Basic Plan". In the discussion, it was pointed out that national policy on nuclear should be clearly shown and discussion on the necessity of new built/replace should be conducted. Also, METI newly established "Round Table for Studying Energy Situations" aiming to hold discussion on future directions of long-term energy policies based on the forecast for the circumstances surrounding energy in 2050. The first meeting was held on August 30, 2017.

2. Nuclear Regulation

(1) Nuclear Regulatory Authority

Toyoshi Fuketa, current Commissioner, succeeded the Chairman position on September 22, 2017.

(2) Fracture Zone Issue

No specific action by the "Knowledgeable Specialist Sub-Committee" was undertaken in this period. The final decision on the fracture zones at Tsuruga-site, Higashidori-site and Shika-site, which were judged as active faults, by this Sub-Committee, will be made in the plant re-start application review.

(3) Monju (prototype FBR) Issue

Based on the Government decision to decommission the Monju, whereas the promotion of fuel cycle and development of fast reactor be pursued, on Dec. 21, 2016, Government established "Monju Decommissioning Promotion Team" on May 25, 2017 in order to promote the decomissioning of Monju safely and stably. First meeting of "Monju Decommissioning Review Experts" in the MEXT (Ministry of Education, Culture, Sports, Science and Technology) was held on May 25, 2017 in order to advise the activities of the "Monju Decommissioning Promotion Team" and JAEA.

(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 "Study Team to Review the Current Inspection System" on May 11, 2016. Nuclear Reactor Regulation Law was revised to incorporate the concept of "Reactor Oversight Process (ROP)" and was issued on April 14, 2017. Total enforcement is within 3 years and trial operation is expected before that. Discussion on making detailed rule has been started and detailed rule and guide for trial use will be issued next year.

(5) Geological Scientific Characteristic Map for high level radioactive waste disposal

METI has been studying the geological mechanism of the high level radioactive waste disposal and scientific characteristics of each area in Japan and published the "Scientific Characteristic Map" in July 2017, to be used for the selection of the potential disposal site. As shown below, green area is suitable whereas yellow area is not.

3. Status of LWRs Restart & Plant Life Extension

- (1) Applications of restart for NRA review on conformity with new safety regulation, enforced in July 2013, were started. Applications as of August 2017 are still 26 reactors at 16 sites (16 PWR, 4ABWR, 6 BWR).
- (2) Most recently, Ohi 3&4 granted approval of restart in May 2017 and total number of approved plants are 11, all of which are PWRs. 5 plants among11 approved plants have already been restarted. Concerning BWRs, Kashiwazaki-Kariha 6&7 is expected to be approved in this September 2017.
- (3) Concerning the NRA review of installation plan of Special Mitigating Means for Specific Major Events such as airplane crash, Takahama 3&4 and Sendai 1&2 already granted approval, and Ikata 3 will grant approval soon.
- (4) Plant life extension approval was granted for Takahama 1 & 2 in June 2016 and Mihama-3 in November 2016.

Applicant	NPP	Туре	Commercia 1 Operation start	Application
Hokkaido	Tomari 1 Tomari 2 Tomari 3	PWR PWR PWR	1989 1991 2009	July, 2013
Kansai	Ohi 3 Ohi 4	PWR PWR	1991 1993	Approval Obtained (May, 2017)
	Mihama 3	PWR	1976	March, 2015 (Life Extension Approved November 2016)
	Takahama1 Takahama2	PWR PWR	1974 1975	Approval Obtained (June 2016) (Life Extension Approved June 2016)
	Takahama 3	PWR	1985	Restarted (July, 2017) *
	Takahama 4	PWR	1985	Restarted (June 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 Genkai 4	PWR PWR	1994 1997	Approval Obtained (January 2017)
Tokyo	Kashiwazaki-Kariwa 6 Kashiwazaki-Kariwa 7	ABWR ABWR	1996 1997	Sept. 2013
Chugoku	Shimane 2	BWR	1989	Dec. 2013
Tohoku	Onagawa 2 Higashidori 1	BWR BWR	1995 2005	Dec. 2013 June 2014

Chubu	Hamaoka 3	BWR	1987	June 2015
	Hamaoka 4	BWR	1993	Feb. 2014
Hokuriku	Shika 2	ABWR	2006	Aug. 2014
JAPC	Tokai 2	BWR	1978	May 2014
	Tsuruga 2	PWR	1987	Nov 2015
EPDC	Ohma (Full Mox)	ABWR	Not yet	Dec.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 restarting on March 28, 2017. Takahama Unit3 was restarted.

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

(1) Takahama Unit 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. After Otsu District Court rejected KEPCO's objection, Osaka High Court approved KEPCO's appeal pertaining to temporary restart and Takahama Unit3 and Unit 4 were restarted in July 2017 and June 2017 respectively.

(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. Sendai Unit1 and Unit 2 were restarted in September 2015 and November 2015 respectively. After Fukuoka High Court rejected the request from anti-nuclear residents against above decision, they 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. Ikata Unit3 was restarted in September 2016. On March 30, 2017, Hiroshima District Court rejected the injunction request.

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

- (1) NRRC was formed in the Central Research Institute of Electric Power Industry (CRIEPI) on October 1, 2014 for R&D of the comprehensive risk assessment utilizing PRA based on the lessons learned from Fukushima Daiichi Accident. Development of "Good PRA model" and "pilot plant studies" have been continued.
- (2) CRIEPI held the "Annual Research Report Symposium 2017" focused on NRRC activities on May 18, 2017 as a disclosure process. NRRC held the "Workshop on Risk

Informed Decision Making (RIDM)", on June 1&2, 2017, introducing US actual field experiences including successful cases and unsuccessful cases by US industrial experts. Discussion among attendees from Japanese electric companies on how to implement RIDM in Japan was conducted.

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

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.

(1) Annual Conference

2017 Autumn Annual Meeting was held at Hokkaido University in Sapporo-city, on September 13-15, 2017, where many special plenaries and sessions, such as post-Fukushima session, were organized and implemented successfully under cooperation with the Local Section of AESJ and a local organising committee. More than 1700 people attended including many students. This is a record in the recent 17 years. Attached are pictures of Fukushima-Daiichi Session, Poster Session, Connecting Network Session and Traditional Dansing by Hokkaido Univercity Students.





(2) Fukushima Daiichi Accident related activity

"Fukushima Decommissioning Committee" of AESJ continues a scientific advice activity for the decommissioning of the Fukushima Daiichi plant and a follow-up activity suggested in "AESJ Fukushima Daiichi Nuclear Accident Report". This

Committee held a symposium on Fukushima Daiichi Decommissining on March 11, 2017 in Tokyo. Also, "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. This Project held the symposium on the "Consummers questions on food and sightseeing in the Fukushima area" in Tokyo on March 26, 2017. Besides, several residential talk forums in Fukushima area, support activities for decontamination facilitation, and making suggestions for middle-long term measures for environmental remedy activities have been continued.

(3) Symposium co-hosted by Science Council of Japan.

"Nuclear Symposium focused on Fukushima Restoration" was held on June 8, 2017 and the "Safety Engineering Symposium" was held on July 5-7, 2017.



(4) Investigation on the evaluation of potential faults

AESJ formed "Advisory Committee on Seismic Faults Displacement and Engineering Risk Assessment" with Many experts from other academic societies such as geologies, earthquakes, civil engineering. Final report was issued in March 2017.

(5) International Conferences (AESJ hosted)

"International Congress on Advances in Nuclear Power Plants (ICAPP 2017)", was held on April 24-28, 2017 at Fukui and Kyoto. "9th International Symposium on Radiation Safety and Detection Technology" was held on July 10-14,2017.

(6) W. Bennett Lewis Award

Mr. Kazuaki Matsui, AESJ was honorably given "W. Bennett Lewis Award 2017". This award is established by the Decommissioning & Environmental Sciences Division (DESD) to recognize persons who have made major lifetime contributions in nuclear science and engineering towards minimizing environmental footprint, attaining long-term global sustainable energy and development, and having shown great foresight in elucidating these goals as recorded in archival publications.



Monday, June 12, 2017 Hyatt Regency San Francisco, San Francisco, CA

(Kazuaki Matsui fourth from the right)

Japan Section (http://aesj.or.jp/kaigai/en/index.html)

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

(1) Two lecture meetings by invited lecturers were as follows;

- "Planning, Information and Knowledge Management activity at IAEA" by Wei Huang, Director of Planning, Information and Knowledge Management Department of Nuclear Energy, IAEA on July 18, 2017.
- "Current Energy Policy and Nuclear Energy in USA" by Ross Matzkin-Briger, Energie Attache of Embassy of USA in Japan and Director of US DOE Japan Office, on September 14, 2017. Please find attached picture of his presentation.
- (2) Semi-annual General Meeting for Section members was held in the AESJ's Autumn Meeting on September 14, 2017 at Hokkaido University.

8. Recent Status of Fukushima Daiichi NPP Restoration

(1) 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, was revised on June 12, 2015. In order to provide the technical basis to the above road map, NDF issued "The Technical Strategic Plan 2015"



on April 30, 2015 and revised this as "The Technical Strategic Plan 2016" on July 23, 2016. "The Technical Strategic Plan 2017" was just issued on August 31, 2017, where the approach to take out the fuel debris is determined as "access from the lateral direction in the air" whereas the original idea was "access from the top direction in the water".

(2) Means for Contaminated Water Treatment

Contaminated water has been increased due to undergroud water flow into the reactor building where fuel debris exists. As to the efforts to reduce the amount of underground water, the extracting of contaminated water and the blockage of the Sea Water piping trench was completed in March 2017. A sater shieding wall at the sea side was cunstructed in October 2015. Partial freezing operation of water shielding wall at the mountain side has been started on March 2016 and total operation is expected soon.

(3) Fuel Removal from Spent Fuel Pit

All spent fuel in Unit 4 was already removed by December 22, 2014. As for Unit 1, the reactor building cover dismantle has been started in May 2015 and removal of pillars and beams has been started from March 2017. As for Unit 3, removal of large rubble in the spent fuel pit was completed this year.

(4) Investigation inside the containment vessel (PCV)

Investigation by camera inside the PCV of Unit 2 and Unit 1 were conducted in February 2017 and in March 2017 respectively. These were the first trial of taking pictures by camera inside the PCV. Investigation by underwater camera inside the PCV of Unit 3 was conducted in July 2017. This was the first trial of taking pictures of the lower head of reactor vessel. Multiple structures were destroyed and some of the support bracket were lost. This information could be important to decide the method to take out the fuel debris.

(5) Research and Development

The Internationl Research Institute for Nuclear Decomissioning (IRID) has been

working for R&D of decomissioning of Fukushima Daiich using the METI fund in accordance with the Road Map and Technical Strategic Plan. Major areas are as follows;

- · Investigation technology inside PCV and RPV
- · Monitoring inside PCV and RPV
- · Technology and engineering method of fuel debris removal
- Integrity of structures such as reactor building and reactor support structures.

• <u>OECD Nuclear Energy Agency</u> (http://www.nea.fr)

The following articles are gleaned from OECD NEA monthly reports.

International Workshop Launches The NEA Nuclear Education, Skills and Technology (NEST) Framework



On 11-12 May 2017, the NEA organised the launch of the NEA Nuclear Education, Skills and Technology (NEST) Framework with а workshop that brought together 50 representatives from 19 member countries. Nuclear skills and education is an increasingly important challenge for NEA member countries, all of whom need to have a new generation of highly-qualified scientists and engineers to

ensure the continued safe and efficient use of nuclear technologies for a wide range of industrial, scientific and medical purposes. The NEA has developed the NEST Framework in partnership with its member countries in order to help address gaps in nuclear skills capacity building and knowledge transfer through multinational collaboration. Participants at the workshop discussed national education and training needs, priorities and practices. The workshop concluded with a common understanding on and a shared interest in the NEST Framework. Formal decisions by member countries on the practicalities associated with the framework will follow in the coming months.

EPRI and NEA sign MOU to Advance Global Nuclear Research



A Memorandum of Understanding for Cooperative Activities was signed between the NEA and the Electric Power Research Institute, Inc. (EPRI) on 13 June 2017, recognising the value of increased collaboration between both parties. The purpose of the MOU is to deepen both parties' understanding of the global research needs in the area of nuclear energy, taking into consideration the consolidated perspectives of

utilities and the industry, as well as those of regulators and government organisations. The MOU seeks to reduce knowledge gaps by facilitating exchange between EPRI and NEA

on global research activities in various fields of nuclear energy, such as safety, radioprotection, scientific and technology developments, operational experience, economic analysis and waste management. It outlines the scope and objectives of a five-year agreement for NEA and EPRI to establish a formalised dialogue.

Advanced Research Activities Contributing to Fukushima Daiichi Decommissioning



On 5-7 July 2017, a preliminary meeting for the NEA Preparatory Studies on Fuel Debris Analysis (PreADES) Project was held in Tomioka, Fukushima, Japan. The PreADES Project was proposed by the Nuclear Regulation Authority (NRA) of Japan and the Japan Atomic Energy Agency (JAEA) as a follow-up project of the NEA Senior Expert Group on Safety Research Opportunities Post-Fukushima (SAREF), reflecting the recommendations in the SAREF report issued in February 2017. Participants discussed the draft programmes for the proposed research projects focusing on fuel debris characterisation, as well as on a future R&D framework for fuel debris analysis. Based on the suggestions and comments made at the meeting, the project proposals will be revised and prepared for the next steps.



IC Member Santiago San Antonio sent a report on Sociedad Nuclear Española Activities:

"43ND SNE ANNUAL MEETING"



The 43nd Annual Meeting of the Spanish Nuclear Society, held last 4-6 October 2017 in Málaga, Spain, gathered nearly 700 congresspersons. The 339 papers presented at the Congress, divided into oral, poster and promotional sessions, dealing with areas such as radiological protection, waste management, nuclear safety, nuclear fuel, materials, engineering or communications, showed the state of the art of nuclear industry and research.



The exhibition congregated 36 of the principal nuclear industry companies in Spain.

The intense technical program included two plenary sessions, two monographic sessions and three workshops, of the upmost relevance and importance, focused on topics from the nuclear sector, energy sector, or of general interest in which experts of the highest level participated.

Plenary sessions addressed these issues of general scope:

- Nuclear energy for sustainability
- The electrification of the energy demand: Smart Energy

The monographic sessions covered the following topics:

- Future developments: New reactors
- Project DONES: International installation for irradiation of materials

The workshop session expanded knowledge on:

- Cybersecurity: Something for Everyone
- Dynamic Training to Improve Human Performance

Development of Working Groups. Team Building Activities



The Meeting included activities for outreach and training of society in general, such as the Basic Course on Science and Nuclear Technology, taught by the SNE Commission of Nuclear Youth, which had the participation of students from the city who wished to learn more about energy and nuclear technologies. Also, WiN Spain organized a conference highlighting the importance of nuclear technology with other applications often not completely understood by the public.

You can find all the relevant information about the meeting in this <u>web page</u>. You can also consult the summary video of the Annual Meeting on our <u>YouTube channel</u>.



SPANISH NUCLEAR INDUSTRY REPORT

"SPANISH NUCLEAR GENERATION UNTIL SEPTEMBER 2017"

The electricity generation share of Spanish nuclear power plants until September 2017 was 23.5%. Once again nuclear was the major source of power generation in Spain, followed by wind (19.1%), coal (16.4%), combined cycle gas (12.3%), cogeneration (11.6%), hydro (8.3%), solar (3.5%) and other renewable thermal (1.5%).

"NEWS ON NUCLEAR FACILITIES"

The Ministry of Energy, Tourism and Digital Agenda of the Government of Spain has denied the request for renewal of authorization for the operation of the Santa María de Garoña nuclear power plant, despite the favourable report issued a few months ago by the Nuclear Safety Council a few months on the continuity of the installation. On the other hand, the operators of the nuclear power stations of Vandellós and Almaraz have begun the process of renewal of exploitation license to the Nuclear Safety Council.

• <u>Taiwan</u>

For information, IC member <u>Wei-Wu Chao</u> forwarded NEST's June-2017 Taiwan report submitted to the INSC:

1. Political situation

Since President Ing-Wen Tsai took office on May 20, 2016, the Democratic Progressive Party's energy policy of phasing out nuclear power by 2025 remains firm. The use and development of renewal energy, such as wind and solar, are expected to increase in the coming years. The new government continues to strive toward its goal of nuclear-free homeland when the existing nuclear power plants shut down permanently as their 40-year operating licenses expire.

There are three NPPs at Chinshan, Kuosheng and Maanshan, operated by state-run utility Taipower, with two units at each site. They contributed to 12% of total electricity generated in 2016, down from 14.1% in 2015 and 16.3% in 2014. The 40-year operating licenses of these six units will first expire in December 2018 for Chinshan Unit 1, followed by Unit 2 in July 2019, then Kuasheng Units 1&2 in December 2021 and March 2023, and finally Maanshan Units 1&2 in July 2024 and May 2025, respectively.

To comply with the government's policy of phasing out nuclear power by 2025 which has been stipulated in the Electricity Act amended in January 2017 (see further details in Item 3 below), Taipower has begun assessing alternative uses of the two ABWRs at the fourth plant, Lungmen, which have been mothballed since 2015. These include resale of nuclear fuel and components, on-siting planning for fossil fuel power units, among other possibilities. The decision of mothballing was announced in April 2014 (and became effective in July 2015) by the previous government, in response to growing public concerns over the safety of nuclear power following the Fukushima nuclear accident of 2011.

2. News on nuclear facilities (NPP's, WSF's etc.) in your country (power upgrades, lifetime extensions, new build etc.)

Both Unit 1 of Chinshan Plant and Unit 2 of Kuosheng Plant have been under prolonged shutdown. Chinshan Unit 1 was shut down and went out of service since December 2014 due to the failure of the water rod connecting bolt in a fuel assembly during retrieval. Kuosheng Unit 2 was taken offline in May 2016 after the damage on surge protection device between generator and main transformer, forced the unit to shut down while the unit was being connected to the grid after a month-long refueling outage. The AEC has investigated both incidents and released the safety evaluation reports on its website, but the Congress (Legislative Yuan) requested the AEC to report to the legislators and it is still holding its consent on the time for such reporting. Meanwhile,

Unit 1 of Kuosheng Plant also experienced a 6-month shutdown since the last refueling outage starting on 30 November 2016, and safety evaluation of a design change request in which the cask loading pool adjacent to the spent fuel pool was converted to accommodate additional spent fuel was approved by the AEC on April 6, 2017. With the modification made at both of Kuosheng units, 440 more spent fuel assemblies can be stored at each fuel building, allowing the units to operate 3 years longer, closer to their 40-year operating license expiration dates. Kuosheng Unit 1 returned to service on 9 June 2017.

Taipower submitted Chinshan Plant's decommissioning plan to the AEC for review in November 2015. Review of the plan by the AEC is targeted for completion in 2018. Once Taipower obtains a permit for decommissioning from AEC, the decommissioning of the plant will start and be completed within 25 years.

The first phase (small scale) on-site spent fuel dry storage projects at Chinshan and Kuosheng plants have both been delayed pending approval by the local government on water & soil conservation and waste water reduction requirements, respectively. For the second phase (large scale) developments, the AEC has asked Taipower to adopt the indoor storage strategy favored by public opinion. The AEC also shortens the facility operating license to 20 years. A license renewal application, when required, must be submitted at least 2 years before the 20-year license expires.

3. News on companies (projects, financial results, production, etc.)

To create a developmental environment that generates electrical power using green sources, the

government formulated a two-stage plan to amend the "Electricity Act". On January 11, 2017, the first-round amendments passed their final reading in the Legislature, lifting restrictions on the generation, direct supply and sales functions for green energy sources, including solar and wind power, while establishing a market for diversified energy supplies that supports the development of green energy industries. The amendments also stipulate that all present nuclear power plants must stop running by 2025. The second round of Electricity Act amendments will lift restrictions on the direct power supply and wheeling functions, as well as power sales enterprises, for other traditional power sources, paving the way for energy industry reform.

The amendments will end a 70-year monopoly of the state-run utility Taipower, which will be privatized 6-9 years from now, and a holding company will be set up, under which there will be two separate entities, one for generating electricity and the other for distributing it. An electricity trade platform will be set up, and the government will establish an electricity price stabilization fund to prevent drastic price fluctuations.

4. Public opinion towards nuclear (results latest PO polls)

A research in public opinion on nuclear sponsored jointly by the Ministry of Science and Technology and the Atomic Energy Council has been ongoing since 2010. Results of the 2016 opinion poll showed that 50.4% considered nuclear power unsafe while 38% considered safe. The gap of 12.4% has been the smallest since the reversal (from 50.8% considered safe vs 34.7% unsafe in 2000) observed in 2011 after the Fukushima accident occurred. The poll also revealed that as high as 81% considered themselves not understanding nuclear issues well.

5. Stakeholder dialogue (Attitudes of NGOs, media, local communities towards nuclear)

While the DPP government's policy of phasing out nuclear power by 2025 has been further affirmed by newly amended Electricity Act, many NGOs, media and local communities are not satisfied with the government's goal of achieving nuclear-free homeland as the nuclear units reach the end of their 40-year operating licenses. Instead, they continue to block or protest operation resumption of any nuclear units after shutdown for refueling or for other reasons. The recent return to service of Kuosheng Unit 1 (see Item 2 above) is a good example. The NGOs have not been absent from any step in the whole process of the facility design modification especially in monitoring details of AEC's review process. Upon AEC's approval of the task, protests were held at various locations including the Executive Yuan and the Control Yuan (which is mandated to receive people's complaints against public servants or agencies), demanding investigations of several political appointees involved for any wrong doings.

• United States of America

Course Announcement

IC member Sama Bilbao y León forwarded the following Course Announcement (note, however, that this course will be over by the time of distribution of *The* ANS *Globe*):

With the increased activity in nuclear engineering around the world, we have offered our short course oriented towards nuclear systems thermal-hydraulics fundamentals and reactor applications hosted by the Energy Institute at City University of New York (CUNY) and the University of Wisconsin-Madison.

The course is led by **Drs. Sanjoy Banerjee, Mike Corradini, Geoff Hewitt and George Yadigaroglu** with noted guest lecturers. We will offer the course on Sept. 25 to 29th, 2017, in Washington DC in Bethesda, MD at the Bethesda Marriott Residence Inn. You can view the course website at: <u>http://dc2phase.org/</u>.

If you have any questions you can contact Mike Corradini (corradini@engr.wisc.edu) or Sanjoy Banerjee (banerjee@che.ccny.cuny.edu)

Mike Corradini and Sanjoy Banerjee UW-Madison and CUNY

Visit to Fuqing NPP

Prof. Lumin Wang of University of Michigan sent this photograph of U Michigan faculty and students visiting Fuqing NPP construction site in 2008 June. The two reactors in the background are the first and second of Chinese 3rd-generation PWR, Hualong #1.



Societies with Collaboration Agreements with ANS

The following is a list of nuclear societies with collaboration agreements with the ANS, along with the corresponding website addresses. The Table contains also a few other entries of interest to ANS International Committee members.

Society	Website or E-Mail Address
Asociación Argentina de Tecnología Nuclear	www.aatn.org.ar
Associação Brasileira de Energia Nuclear	www.aben.com.br
Association des Ingénieurs en génie atomique du Maroc	-
Atomic Energy Society of Japan	www.soc.nii.ac.jp/aesj/index-e.html
Australian Nuclear Association	www.nuclearaustralia.org.au
Bangladesh Nuclear Society	-
Bulgarian Nuclear Society	www.bgns.bg
Canadian Nuclear Society	www.cns-snc.ca
Chinese Nuclear Society	www.ns.org.cn
Croatian Nuclear Society	<u>www.nuklearno-</u> drustvo.hr/en/home.html
Czech Nuclear Society	www.csvts.cz/cns
European Nuclear Society	www.euronuclear.org
Hungarian Nuclear Society	www.kfki.hu/~hnucsoc/hns.htm
Indian Nuclear Society	www.indian-nuclear-society.org.in
Israel Nuclear Society	meins@tx.technion.ac.il
Korean Nuclear Society	www.nuclear.or.kr/e_introduce.php
Lithuanian Energy Institute	www.lei.lt

Malaysian Nuclear Society	www.nuklearmalaysia.org/index.php?id=18mnu=1
Nuclear Energy Society of Kazakhstan	www.nuclear.kz
Nuclear Energy Society of Russia	<u>ns@kiae.ru</u>
Nuclear Energy Society of Slovenia	www.drustvo-js.si
Nuclear Energy Society of Thailand	www.nst.or.th
OECD/Nuclear Energy Agency	www.nea.fr
Polish Nuclear Society	www.ptn.nuclear.pl
Romanian Nuclear Energy Association	www.aren.ro
Romanian Society for Radiological Protection	www.srrp.ro
Slovak Nuclear Society	<u>www.snus.sk</u>
Sociedad Nuclear Española (SNE)	www.sne.es
Sociedad Nuclear Mexicana	www.sociedadnuclear.org.mx
Ukrainian Nuclear Society	www.ukrns.odessa.net
United Kingdom Nuclear Institute	www.nuclearinst.com/ibis/Nuclear <u>%20Institute/Home</u>
Women in Nuclear – Global	www.win-global.org
Affiliated National Societies	Website or E-Mail Address
Belgian Nuclear Society	www.bns-org.be
Associated Nuclear Organizations	Website or E-Mail Address
International Nuclear Societies Council	http://insc.ans.org
Pacific Nuclear Council	http://www.pacificnuclear.net/pnc/
Non-U.S. Local Sections	Website or E-Mail Address
Austrian Section	
French Section	http://local.ans.org/france/
India Section	http://local.ans.org/india/
Italian Section	
Japanese Section	
Latin American Section	www.las-ans.org.br
Korean Section	
Swiss Section	
Taiwan Section	u805301@taipower.com.tw

Calendar of Events

Some Upcoming International Conferences on Nuclear and Related Topics

(Please send us information about your upcoming conferences, for inclusion in this space.)

Legend:

***** ANS Event

□ Non-ANS event co-sponsored by ANS

o For all other conferences, ANS is NOT a sponsor, nor are these conferences endorsed by ANS.

2017

- <u>29 October 2 November</u>: ANS Winter Meeting, Washington, DC, USA <u>http://www.ans.org/meetings</u>
- <u>12-17 November</u>, 9th International Conference on Isotopes (9ICI), Doha, Qatar, organized by the Qatar Physics Society, the University of Qatar, and the World Council on Isotopes <u>http://www.9ici.org</u>

2018

 <u>8-11 April</u>: 2018 International Congress on Advances in Nuclear Power Plants (ICAPP 18), Charlotte, NC -<u>http://www.ans.org/meetings/c_2</u>



• <u>22-26 April</u>: Physics of Reactors 2018 (PHYSOR-2018), Cancún, México - <u>http://www.physor2018.mx/</u>



- <u>13-18 May</u>: ANS International Conference on Best-Estimate Plus Uncertainties Methods (BEPU-2018), Lucca, Italy <u>http://www.nineeng.com/bepu</u>
- <u>14-16 May</u>: PHYTRA-4, Marrakech, Morocco
- <u>3-6 June</u>: 38th CNS Annual Conference and 42nd CNS/CNA Conference, Saskatoon, SKN, Canada – <u>http://www.cns-snc.ca</u>
- <u>17-21 June</u>: ANS Annual Meeting, Philadelphia, PA, USA <u>http://www.ans.org/meetings</u>
- <u>9-14 September</u>: 21st International Conference on Water Chemistry in Nuclear Reactor

Systems, San Francisco, CA, USA

- <u>23-27 September</u>: Is the LNT Obsolete? The Linear Non-Threshold Question, Pasco, WA, USA <u>http://www.ans.org/meetings</u>
- <u>30 September 3 October</u>: Pacific Basin Nuclear Conference 2018 (PBNC-2018), San Francisco, CA, USA <u>http://www.ans.org/meetings</u>
- <u>14-18 October</u>: NUTHOS-12, Qingdao, China
- <u>11-15 November</u>: ANS Winter Meeting, Orlando, FL, USA <u>http://www.ans.org/meetings</u>

2019

- <u>15-19 April</u>: 2019 International Congress on Advances in Nuclear Power Plants (ICAPP '19), Juan les Pins (French Riviera)
- <u>9-13 June</u>: ANS Annual Meeting, Minneapolis, MN, USA <u>http://www.ans.org/meetings</u>
- <u>17-21 November</u>: ANS Winter Meeting, Washington, DC, USA <u>http://www.ans.org/meetings</u>

→ <u>Contact ANS International Committee Members by E-mail</u>:

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