



ANS

June 2016

No. 25

The ANS Globe

...e-news from the ANS International Committee

From the editors

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 us your letters, articles, news and/or comments for consideration towards the next issue.

Ben Rouben

roubenb@alum.mit.edu



Mauro L. Bonardi

mauro.bonardi@mi.infn.it



Acknowledgements: The editors would like to thank [Ms. Valerie Vasilievas](#) of the ANS for her invaluable help in ensuring the correctness of contact information for International Committee members and Agreement Societies, and her assistance in communicating with the Agreement Societies.

Contents

[From the Chair](#)

p. 2

[The ANS International Committee's Web Page](#)

p. 3

[News from Sister Societies and International News \(Canada, Italy, Japan, Spain, OECD, Taiwan, USA\)](#)

pp. 3-15

[News from ANS Divisions](#)

p. 15

[Societies with Collaboration Agreements with ANS](#)

p. 16

[Calendar of Events](#)

p. 17

[Contact ANS International Committee Members by E-mail](#)

p. 19

[Appendix 1 – Lessons Learned from Fukushima – Applied to](#)

[Emergency Preparedness in Taiwan \(Nuclear Data Safety Ctr, AEC Taiwan\)](#)

p. 21

The ANS International Committee's Web Page

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

- 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
- Connections to 30 ANS Agreement Societies/Organizations, and
- Current/back issues of *The ANS Globe*, which features ANS International Committee activities and related items.

News from Sister Societies and International News

- **Canadian Nuclear Society (CNS) (<http://www.cns-snc.ca>)**

The annual change in the CNS Executive will take place on June 19. Current president Paul Thompson will become the Immediate Past President. The incoming CNS President will be Dr. Peter Ozemoyah, of Tyne Engineering. The CNS First Vice-President will be Daniel Gammage, of AMEC Foster Wheeler.

Within the past 3 months the CNS has held 3 courses:

- 2016 March 7-9, CNS CANDU Technology and Safety Course, Toronto, Ontario, Canada
- 2016 May 16-17, Nuclear-101 Course, Mississauga, Ontario, Canada.

These will also most probably be repeated in 2017.

And the CNS is looking forward to its busy conference schedule in the next 12 months:

- 2016 June 19-22: 36th Annual Conference of the CNS and 40th Annual CNS/CNA Student Conference, Toronto, Ontario, Canada, <http://www.cns2016conference.org>
- 2016 August 15-18, 13th International CANDU Fuel Conference, Kingston, Ontario, Canada, <https://www.cns-snc.ca/events/candufuel2016/>
- 2016 September 11-14, 3rd Canadian Nuclear Waste Management, Decommissioning and Environmental Conference, Ottawa, Ontario, Canada, <http://nwmdr2016.org/>
- 2016 November 2-4, 4th International Technical Meeting on Small Reactors (ITMSR-4), Ottawa, Ontario, Canada, <https://www.cns-snc.ca/events/4tm/>
- 2017 May 7-11, CANDU Maintenance and Nuclear Component Conference (CMNCC-2017), Toronto, Ontario, Canada
- 2017 June 4-7, 37th Annual Conference of the CNS and 41st Annual CNS/CNA Student Conference, Niagara Falls, Ontario, Canada
- 2017 September 17-22, 2nd CNS Conference on Fire Safety and Emergency Preparedness (FSEP-2017), Toronto, Ontario, Canada

- [Italy](#)

[Dr. Prof. Mauro Bonardi](#), Professor of Chemistry, Radiochemistry, Radiopharmaceutical Chemistry, Health Physics; Expert in Radiation Protection and Dosimetry at the Università Degli Studi di Milano & National Institute of Nuclear Physics, Co-Editor of the *ANS Globe*, submits the following observations about the situation in Italy:

Italy with no NPP operating, is the most polluted country in Europe! In Northern Italy especially, “particulate pollution” is at least three times higher than the maximum value allowed by European regulations. While the present situation is unbelievable, still no nuclear options are discussed by the Italian government.

- [Japan](#)

[Kiyoshi Yamauchi](#), ANS Japan Local Section and IC member, sent the following report from Japan:

1. Energy Policy

(1) Energy Basic Plan

The revised “Energy Basic Plan” was approved by the Cabinet on April 11, 2014, where it was emphasized that restoration and reconstruction of Fukushima would be the starting point of nuclear energy and it was expressed that use of nuclear energy should place first priority on the pursuit of safety enhancement.

It was also stated 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 dependence on nuclear power generation would be reduced as much as reasonably possible by energy saving, introduction of renewable energy as well as improvement in thermal efficiency of fossil power.

Concerning nuclear fuel cycle issues, it was stated that the Government would take leadership to find a solution for High Level Radioactive Waste (HLRW) final disposal, would maintain reprocessing and LWR-MOX project in order to assure firm future outlook on energy security and HLRW management.

(2) Ministry of Economy, Trade and Industry (METI) Activities

The Ministry of Economy, Trade and Industry (METI) started to discuss how to realize the above energy basic plan and formed two working groups under the Nuclear Subcommittee. One was “Radioactive Waste Working Group”, where the final disposal of HLRW and TRU would be discussed. The revised basic policy proposed by the WG was approved by the Cabinet on May 22, 2015 and the Ministerial Meeting decided this policy on December 18, 2015.

The other WG named “Safety enhancement / technology/ human resources Working Group” proposed safety enhancement means on May 27, 2015. Safety technology and human resources roadmap was also published on June 16, 2015 and their rolling activity has been continuing.

Further, “Energy demand/supply prospectus Subcommittee” was also formulated. Receiving the investigation results of this Subcommittee, METI decided “Long Term Energy Demand/Supply Prospectus” based on “The Energy Basic Plan”. The desirable “power best mix” in 2,030, 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. Nuclear Regulation

(1) Nuclear Regulatory Authority

Two of the five original NRA commissioners, Kunihiro Shimazaki (seismologist) and Kenzo Oshima (former ambassador to the United Nations), expired their tenure of two years in the end of September 2014. The Diet approved two new commissioners in June 2014. The new commissioners are Professor Satoru Tanaka of nuclear engineering at Tokyo University, the former Chairman of the Atomic Energy Society of Japan, and Professor Akira Ishiwatari at Tohoku University, the former chairman of the geological society of Japan. They have their term of 5 years. Two of the remaining commissioners, Toyoshi Fuketa (nuclear engineering) and Kayoko Nakamura (radiologist), expired their tenure of three years in the end of September 2015. Toyoshi Fuketa was re-assigned and Kayoko Nakamura was replaced by Nobuhiko Ban (Tokyo Healthcare University). Their 5-year term will expire at the end of September 2020. The 5-year term of Chairman Shunichi Tanaka (physicist) will expire at the end of September 2017.

Commissioners realize the importance of communication with industries and they started dialogue with CEOs of Electric Power Companies. So far, Commissioners executed dialogue with CEOs of 9 Electric Power Companies owning nuclear plants. The second-round dialogue has been started on February 2016.

(2) Fracture Zone Issue

Concerning the issue of fracture zones at nuclear site, “A Knowledgeable Specialist Subcommittee” formed by the NRA, concluded in March 2015 that fracture zones at Tsuruga-site and Higashidori-site should be treated as active faults since the Subcommittee could not deny that these would not be active faults from the view point of geology. Final decision will be made in the plant re-start application review. Concerning Mihama-site, Subcommittee reported to NRA on September 2015 that the possibility of activity after Late Pleistocene would be small, whereas they could not deny that the fault at Shika site would not be active on July 2015.

(3) 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 (Japan Atomic Energy Agency) 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. The Committee started on Feb. 19, 2016.

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 February 2016 are; 16 sites 26 reactors (16 PWR, 4ABWR, 6 BWR).

Sendai NPP unit 1 & 2, Takahama NPP Unit 3&4, and Ikata NPP unit 3 obtained design safety approval on conformity with new safety standard from NRA. Kyushu, Kansai and Shikoku Electric Power Company started necessary procedures for restart such as application for operation license, application for construction plan for restart and communication with local government/local communities etc. 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 and Takahama unit 3 started commercial operation in January 2016.

Applicant	NPP	Type	Commercial 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	July, 2013
	Mihama 3	PWR	1976	March, 2015
	Takahama1 Takahama2	PWR PWR	1974 1975	March, 2015
	Takahama 3	PWR	1985	Restarted(January2016) but shut down(March2016) *
	Takahama 4	PWR	1985	Approval obtained (February 2015)
Shikoku	Ikata 3	PWR	1994	Approval obtained (July, 2015)
Kyushu	Sendai 1	PWR	1984	Restarted (September,2015)

	Sendai 2	PWR	1985	Restarted (November, 2015)
	Genkai 3 Genkai 4	PWR PWR	1994 1997	July, 2013
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 Hamaoka 4	BWR BWR	1987 1993	June 2015 Feb. 2014
Hokuriku	Shika 2	ABWR	2006	Aug. 2014
JAPC	Tokai 2 Tsuruga 2	BWR PWR	1978 1987	May 2014 Nov 2015
EPDC	Ohma (Full Mox)	ABWR	Not yet	Dec.2014

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

4. Juridical Issue

- (1) 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. Kansai Electric Power Company stated strong objection to this disposition. Chairman Tanaka of NRA also stated that this disposition was based on errors in finding fact. The Cabinet stated that they would not change their policy to proceed to restart the plants as far as the safety would be assured. Fukui District Court in the objection trial cancelled the above disposition on December 25, 2015 and Takahama unit 3 was restarted on January 29, 2016. However, on March 9, 2016 Ohtsu District court, which area is adjacent to Fukui prefecture, issued provisional disposition to prevent the restart and Takahama unit 3, which was once restarted, turned to shutdown on March 10, 2016.
- (2) On April 22, 2015, Kagoshima District Court rejected a request by a group of local anti-nuclear residents for a temporary injunction prohibiting 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 to this decision, Fukuoka High Court rejected this request in the Immediate Appeal Court on April 6, 2016.

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

- (1) NRRC was formed in the Central Research Institute of Electric Power Industry in October 1, 2014. The NRRC is aimed for research and development of the comprehensive risk assessment utilizing PRA and other probabilistic approach. This is coming from the understanding that in light of the Fukushima Daiichi Nuclear Power

Station Accident, it is vital for nuclear industries to continually strive for even higher levels of safety, to go further than simply meeting regulatory requirements, and to pursue sustained commitment to reduce nuclear risk. Dr. George Apostolakis, the former NRC Commissioner is the Head and Dr. Richard A. Meserve, the former NRC Chairman is the Executive Advisor.

- (2) Ikata unit 3 of Shikoku Electric Power Company was selected as a pilot plant. State of practice of PRA technologies has been introduced in their level 1, 2 PRA (internal events, seismic, tsunami). Technical Advisory Committee has been held every three months.
- (3) Dr. Apostolakis also started to see CEOs of Electric Power Companies and to visit plant sites in order to convince plant site employees of the importance of Risk Informed Management. This is still continuing.
- (4) 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. Presenters were from the NRA, Local Government, Massmedia, Julist and so forth.

6.Activities of AESJ

In this report, Fukushima Daiichi Accident related activities of AESJ are focused as follows. These activities were also presented in the special session of AESJ Annual Meeting at Tohoku University in March 2016

- (1) “AESJ Investigation Committee on Fukushima Daiichi Nuclear Accident“ was organized in June 2012 and issued a report writing following proposals for preventing nuclear disasters in future in March 2014.
 - Clarification of safety goal and systematization
 - Deepening the Defense in Depth concept
 - Enhancement of coping capabilities with external events
 - Enhancement of Organizational activities such as nuclear society, industries, and regulatories
 - Utilization of Probabilistic Risk Assessment (PRA), High Performance Computer (HPC) technology
 - Enhancement of the foundation of nuclear safety research
 - Enhancement of international cooperation
 - Human resource development
- (2) “AESJ Fukushima Recovery Project“ was also organized in June 2012 in order to support the decontamination activities and analysis / advise on radiological effects, which are essential issues for the local people. As communication activities, seven symposiums have been held so far.
- (3) “AESJ Fukushima Daiichi Decommissioning Committee“ was organized in June 2014 and technical investigation for decommissioning has been performed. Public symposium was held in March 2016.
- (4) Each subcommittee or sprecial committee in AESJ has been investigating in thier own fields on the above issues and Standard Committee has been working to issue various standards.
- (5) “AESJ Special Committee on External Natural Phenomena“ was organized on September 26, 2014, asking for participation of specialists in the area such as

seismology, geotechnical engineering, and civil engineering. This committee was endorsed by the AESJ position paper named “The necessity of the safety review of the nuclear plants based on the scientific and rational perspectives and information sharing” issued on November 11, 2014. This recognition came from the fact that Fukushima Daiichi experienced the earthquake ground motion and tsunami height above the design basis. This committee focused the discussion on fault displacement and intermediate result was reported in the special session of the AESJ Annual Meeting in March 2016 and the final report is expected to be issued in October 2016.

7. Activities of ANS Japan Local Section

- (1) Local Section Executive Committee meetings were held five times in 2015 as scheduled.
- (2) Four Lecture Meetings for the members were held as follows in order to foster exchange of information on recent global nuclear technology and industrial activities.
 July 14, 2015: “Regaining Trust and Building Confidence Towards a Comprehensive Civil Nuclear Society” (Frank Winter, Amec Foster Wheeler)
 Sept.9, 2015: “Modeling Analysis of World Energy and Environment”
 (Yasumasa Fujii, University of Tokyo)
 Dec.18, 2015: “Status of Radioactive Waste Disposal in Foreign Countries”
 (Yusuke Inagaki, Radioactive Waste Management Funding and Research Center)
 March 27, 2016: “The French Nuclear Power Sector: Current Status and Future Trends”
 (Sunil Felix, France Embassy in Japan)
- (3) General meetings for members were held in the AESJ Annual Meeting and Fall Meeting every year.
- (4) Activities report was sent to ANS Local Section Committee on Oct.19, 2015.

8. Recent status of Fukushima Daiichi NPP on-site restoration

- (1) Road Map
 “The Intermediate and Long Term Road Map for Fukushima Decommissioning and Contaminated Water Removal” originally issued on December 2011, revised on June 2013, was revised again on June 2015, reflecting the progress of the recovery work at the site, comments from the Fukushima Council, and the strategic study by “Nuclear Damage Compensation and Decommissioning Facilitation Corporation” (NDF). 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”.
- (2) Workers environment
 Almost 7000 workers are working at the site and radioactive environment has been greatly improved. Currently, an average radiation is between 0.6~0.7mSv and around 7mSv per year. An office was prepared near Daiichi site and meal can be taken there and place for rest are provided.
- (3) Groundwater Bypass
 “Fukushima Daiichi D&D Engineering Company” started groundwater bypass operation at Fukushima Daiichi NPS. Pump up of groundwater started in April, 2014 and water drain operation started May, 2014. Groundwater is pumped up before

entering the site, is stored in storage tanks for detection of radioactivity, and will be drained to the sea if radioactivity is below the operation target level. The target radioactivity level of groundwater to be drained is under 1 Bq/l for ^{134}Cs and ^{137}Cs , under 5 Bq/l for beta emitters, under 1500 Bq/l for tritium. Concerning the water in the buildings, total volume has been reduced and activities to make frozen ground have been successful. The amount of radioactive materials will be reduced to half in 2018 and treatment of the water will be completed in 2020.

(4) Fuel Debris Removal

NDF has been working the strategy and methods how to remove fuel debris. International Research Institute for Nuclear Decommissioning (IRID) has been doing R&D work in these areas. Japan Atomic Energy Agency (JAEA) will open the mock-up facility in April 2016.

- **OECD Nuclear Energy Agency (<http://www.nea.fr>)**

The following articles are gleaned from OECD NEA monthly reports.

Nuclear Energy: Combating Climate Change

The international response to global climate change is a key policy concern of the 21st century. Governments around the world have reached a general consensus on the need to achieve large cuts in greenhouse gas emissions over the coming decades, to adapt to the impacts of climate change and to ensure the necessary financial and technical support for developing countries to take action. NEA Director-General William D. Magwood, IV, and NEA experts explain the role of nuclear energy in combatting climate change within the 2°C (the "2DS") scenario. Watch the video here: youtu.be/Dtqw11m2c_Q.

The NEA Takes Part in COP21

The NEA officially launched its new brochure on *Nuclear Energy: Combating Climate Change* at the 21st Conference of the Parties (COP21) of the UN Framework Convention on Climate Change (UNFCCC). In co-operation with the International Atomic Energy Agency (IAEA) the NEA also held two side-events on "Why the Climate Needs Nuclear Energy" on 10-11 December 2015. The purpose of the events was to highlight the role of nuclear power in helping to achieve the agreed target of limiting the rise in global mean temperatures to below 2°C above pre-industrial levels. The side-events benefitted not only from good co-operation among the NEA, the OECD and the IAEA, but also from a lively exchange with an interested and receptive audience. NEA representatives were present throughout the Conference at the OECD pavilion and the exhibition booth.

Nuclear Innovation 2050 (NI2050) – A Roadmap to a Carbon-Free Energy Future

The **NEA Nuclear Innovation 2050 (NI2050) initiative** aims at i) mapping the ongoing nuclear fission R&D programmes and infrastructures, ii) defining R&D priorities to foster innovation and to enhance the long-term contribution of nuclear fission in a low-carbon future and iii) evaluating potential opportunities for co-operation to implement some of these priorities. On 14-15 January 2016, the **NI2050 Advisory Panel Group** met to discuss the objective, scope, methodology and process of the NI2050 roadmapping, and to

finalise its Terms of Reference. The scope of the NI2050 roadmapping will be reflected in the organisation of the forthcoming expert meetings. The Terms of Reference were also endorsed by the **NEA Nuclear Development Committee (NDC)** during its meeting on 27-28 January 2016.

New NEA report on Five Years after the Fukushima Daiichi Accident

On 29 February 2016, the NEA held a live webcast and press conference for its latest report on *Five Years after the Fukushima Daiichi Accident: Nuclear Safety Improvements and Lessons Learnt*. Opening remarks were delivered by his Excellency Ambassador Kazuo Kodama, Permanent Representative of the Delegation of Japan to the OECD, and Mr William D. Magwood, IV, NEA Director-General. A detailed presentation was then given on the report's main findings and key messages, followed by a question and answer session. If you missed the live webcast, you can watch the video recording at oe.cd/1hw.

- **Spain**



Santiago San Antonio, of the Spanish Nuclear Society (SNE) and IC member, sent the following report about SNE activities.

MEETING ON “SPANISH NUCLEAR POWER PLANTS IN 2015 AND PROSPECTS EXPERIENCES”

Last year, SNE held the conference *"Nuclear Power Plant in 2015. Experiences and Perspectives"*, in which representatives of the Spanish nuclear industry dealt with relevant issues of the operation of nuclear power plants in the last year and the future status of the sector. The meeting was held at the School of Industrial Engineers of the Polytechnic University of Madrid, and was also attended by teachers and students of several nuclear energy masters.



At the end of the Meeting, the “Nuclear España 2015” awards were delivered. The prize for the best article of the magazine published by Nuclear Spanish Society was awarded to Juan de Dios Sanchez Zapata for his article “Application of Noble Metals in Cofrentes NPP and Operating Experience”. The best Nuclear España 2015 issue was awarded to “Chemical Applications in the Nuclear Industry”.

The SNE award for the best doctoral thesis of 2015 was given to Vicente Becares Palacios, student of Madrid Polytechnic University, for his work “Evaluation of Reactivity Monitoring Techniques at the Yalina Booster Subcritical Facility”.



Finally, the award for the best nuclear master project in 2015 was granted to Sergio Morató for his work “Planning Radiotherapy Using Custom Realistic Models of Patients from CT Image Unstructured Mesh”.

ONE-DAY TECHNICAL MEETING ON “QUALITY IN NUCLEAR INSTALLATIONS”

The SNE One-Day Technical Meeting was held on April 13 at the Valencia Technical School of Industrial Engineers. The Meeting had a large participation of nuclear sector professionals. The Session was organized by the SNE Technical Commission on the subject “Quality in Nuclear Installations”.



“42ND SNE ANNUAL MEETING”



The 42nd Annual Meeting of the Spanish Nuclear Society will take place from 28 to 30 September 2016 in the city of Santander, in the north of Spain. The operator of Santa María de Garoña NPP, NUCLENOR, will be the host company of the meeting.

Two plenary and a special sessions are scheduled, as well as several workshops and monographic, oral and poster sessions. More than 600 delegates are expected attend the Meeting. All the information about SNE Annual Meeting is available on the website (www.reunionanualsne.es).

SPANISH NUCLEAR INDUSTRY REPORT “SPANISH NUCLEAR GENERATION IN 2015”

The electricity generation share of Spanish nuclear power plants in 2015 was 21.9%. Once again nuclear was the major source of power generation in Spain, followed by coal (20.3%), wind (19%), hydro (11%), cogeneration (10.6%), combined cycle gas (10.1%) and solar and other renewable thermal (7.1%).

“NEWS ON NUCLEAR FACILITIES”

The current political situation - no defined Government after the elections of last December and new elections next June- delays three important decisions for nuclear facilities: extend the Santa María de Garoña NPP operating life, as well as the other Spanish plants, and construction of a Centralized Nuclear Storage to hold the spent fuel from plants.

To date, no decision has been made regarding these subjects. The Spanish Regulatory Authority (CSN) is still assessing safety subjects of Santa María de Garoña NPP. The other seven Spanish reactors keep normal operation. Regarding public opinion in Spain on nuclear energy, according to the last poll (June 2015), 28% of the Spanish population favours nuclear energy and 60% is against it. On June 2016 we will have new results.

“SPANISH NUCLEAR INDUSTRY”

The Spanish nuclear industry with more than 57 members is an international sector present today in nuclear projects in more than 40 countries. Among other activities and commercial missions, the Spanish sector will participate again in the Nuclear Industry China and in the World Nuclear Exhibition.



Spanish Pavilion in 2015 (Beijing)



Spanish Pavilion in 2015 (Paris)

The Spanish companies ENUSA (fuel assemblies) and ENSA (manufactures *large nuclear components*) have signed a collaboration agreement for the provision of services in the area of spent fuel management. With this signature, both companies will offer an integrated package of services in a market with a growing demand of spent fuel management. ENUSA, TECNATOM (engineering company) and Suzhou Nuclear Power Research Institute have signed a collaboration agreement related with systems and inspection equipment of nuclear fuel. This agreement will enhance the activity of ENUSA and TECNATOM in China.

- **Taiwan**

Dr. Wei-Wu Chao, IC member, sent a presentation prepared by the Nuclear Safety Duty Center, Taiwan Atomic Energy Council. The presentation is entitled “Lessons Learned from Fukushima - Applied to Emergency Preparedness in Taiwan”, which reflects the efforts the Nuclear Safety Duty Center made for the past five years since the occurrence of the Fukushima accident in 2011.

The presentation is attached as [Appendix 1](#).

- **United States**

Sue Aggarwal, IC Co-Chair, sent the following notice of conference:

DECOMMISSIONING & REMOTE SYSTEMS (D&RS) 2016 TOPICAL MEETING

The ANS D&RS 2016 Topical Meeting will be held in Pittsburgh, PA USA from July 31 to August 4, 2016. D&RS is a joint effort of the Decommissioning and Environmental Science (DES) and Robotics and Remote Systems (RRS) Divisions. This meeting serves as a forum for the discussion of the social, regulatory, scientific, and technical aspects of decontamination, decommissioning, reutilization, waste management and the use of remote

technology. The 2016 conference program will include commercial, government, and international project updates as well as present project management, technology, and regulatory developments in the areas of decommissioning, waste management, site closure, and legacy management. DR&S 2016 is co-sponsored by 11 International professional societies. Some of the keynote speakers and panelists attending the D&RS 2016 meeting are listed below.

Keynotes:

- Danny Roderick - Westinghouse
- Bill Magwood - NEA
- Monica Regalbuto - DOE Robotics Program

Panelists:

- Robin Murphy - TAMU
- Jorgen Pederson - RE2
- David Allard - PA Bureau of Radiation Protection
- Pam Collins - Exelon Zion
- Alejandro Tomas Rodriguez Fernandez - Westinghouse Spain/UK D&D
- Pete Leombruni (Asia D&D Needs) - Westinghouse

In addition to a comprehensive technical program, there will be a Technology Expo, technical tours, and numerous networking activities and opportunities for attendees and guests. More information can be found on the D&RS 2016 website: <http://drs.ans.org/>. Check back often for updates!

For more information or any questions about the meeting please contact Jim Byrne at jbyrne4424@comcast.net or Sue Aggarwal at saggarwal@nmnuclear.com.

News from ANS Divisions

Fusion Energy Division (FED)

Leila El-Guebaly, of University of Wisconsin and member of the FED, forwarded the following: The December 2015 newsletter of the FED has been archived on <http://fti.neep.wisc.edu/fednews>.

The Newsletter includes several articles on ongoing Fusion Research:
Neutron Sources for Fusion Applications:

- Status and Prospect of Neutron Sources for Fusion Applications in China, by [Y. Wu](#), Chinese Academy of Sciences
- A Low-Cost, 14 MeV Fusion Neutron Irradiation Materials Test Facility, by [G.L. Kulcinski](#) (University of Wisconsin), [R.F. Radel](#) (Phoenix Nuclear Labs LLC), [A. Davis](#) (University of Wisconsin)
- Taking Advantage of the Neutron Environment in the FNSF for Materials Testing, by [L. El-Guebaly](#) (University of Wisconsin), [A. Rowcliffe](#) (ORNL), [C. Kessel](#) (Princeton Plasma Physics Laboratory)

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	wwwsoc.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	www.nuklearno-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	ns@kia.ru
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	www.snus.sk
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%20Institute/Home
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**

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

2016

- 12-16 June: ANS Annual Meeting, New Orleans, LA, USA – <http://www.ans.org/meetings> ☀
- 19-22 June, 36th CNS Annual Conference and 40th CNS/CNA Student Conference, Toronto, ON, Canada - www.cns2016conference.org
- 20 June, Conference of Latin American Section of ANS, Rio de Janeiro, Brazil
- 15-18 August: 13th International CANDU Fuel Conference, Kingston, Ontario, Canada, <https://www.cns-snc.ca/events/candufuel2016/>
- 22-25 August, 22nd ANS Topical Meeting on the Technology of Fusion Energy (TOFE-2016), Philadelphia, PA, USA - <http://tofe2016.ans.org> ☀

- 11-14 September, 3rd Canadian Conference on Waste Management, Decommissioning and Environmental Restoration (WMDRE-2016), Ottawa, ON, Canada – <http://nwmdre2016.org/>
- 11-15 September, Top Fuel 2016, Boise, Idaho, USA - <http://www5vip.inl.gov/topfuel2016/>
- 25-30 September: Advances in Nuclear Nonproliferation Technology and Policy Conference (ANTPC), Santa Fe, NM, USA - <http://nnp.ans.org> ☀
- 9-13 October, European Nuclear Conference 2016 (ENC-2016), Warsaw, Poland – www.enc2016.org
- 2-4 November: 4th International technical Meeting on Small Reactors (ITMSR-4), Ottawa, Ontario, Canada - <https://www.cns-snc.ca/events/4tm/>
- 6-10 November: ANS Winter Meeting, Las Vegas, NV, USA – <http://www.ans.org/meetings> ☀



2017

- 5-8 February, Conference on Nuclear Training and Education, CONTE-2017, Jacksonville, FL, USA - <http://www.ans.org/meetings>
- 7-11 May: CANDU Maintenance and Nuclear Component Conference (CMNCC-2017), Toronto, Ontario, Canada – <http://www.cns-snc.ca>
- 3-7 June, 37th CNS Annual Conference and 41st CNS/CNA Conference, Niagara Falls, ON, Canada – <http://www.cns-snc.ca>
- 11-15 June: ANS Annual Meeting, San Francisco, CA, USA – <http://www.ans.org/meetings> ☀
- 31 July-4 August, 13th International Topical Meeting on Nuclear Applications of Accelerators (AccApp '17), Québec City, QC, Canada – Organised jointly by ANS and CNS - <http://www.ans.org/meetings>
- 17-22 September: 2nd CNS Conference on Fire Safety and Emergency Preparedness (FSEP-2017), Toronto, Ontario, Canada – <http://www.cns-snc.ca>

- 29 October -2 November: ANS Winter Meeting, Washington, DC, USA – <http://www.ans.org/meetings> ☀

2018

- 17-21 June: ANS Annual Meeting, Philadelphia, PA, USA – <http://www.ans.org/meetings> ☀
- 23-27 September: Is the LNT Obsolete? The Linear Non-Threshold Question, Pasco, WA, USA – <http://www.ans.org/meetings> ☀
- 30 September – 3 October: Pacific Basin Nuclear Conference 2018 (PBNC-2018), San Francisco, CA, USA – <http://www.ans.org/meetings>
- 11-15 November: ANS Winter Meeting, Orlando, FL, USA – <http://www.ans.org/meetings> ☀

➔ **Contact ANS International Committee Members by E-mail:**

Officers	Office	e-mail
Corey K. McDaniel	Chair	corey.mcdaniel@inl.gov
Sue Aggarwal	Co-Vice-Chair	saggarwal@nmnuclear.com
Hamad Alkaabi	Co-Vice-Chair	alkaabi@uae-iaea.org
Mimi Limbach	Co-Vice-Chair	mlimbach@pcgpr.com
Luc G.G. Van Den Durpel		yddurpel@nuclear-21.net
Ex-Officio	Organization	e-mail
Raymond T. Klann	Pacific Northwest National Laboratory	ray.klann@pnnl.gov
Jorge Spitalnik	Consultant	jspitalnik@las-ans.org.br
Sandra Dulla	Politecnico di Milano	sandra.dulla@polito.it
Staff Liaison	Organization	e-mail
Valerie Vasilievas	American Nuclear Society	vvasilievas@ans.org
Committee Members	Organization	e-mail
Sukesh K. Aghara	University of Massachusetts Lowell	sukesh_ghara@uml.edu
Rian M. Bahrán	Los Alamos National Laboratory	bahrán@gmail.com
Sama Bilbao y León	Virginia Commonwealth University	sbilbao@vcu.edu
David C. Blee	US Nuclear Infrastructure Council	dblee@forrestalgroup.com
Mauro L. Bonardi*	Università degli Studi di Milano	mauro.bonardi@mi.infn.it
Oum Keltoum Bouhelal	EMR Engineering School of Mines	bouhelal@enim.ac.ma
John W. Brister	AECOM	jay.brister@aecom.com
Gilbert J. Brown	University of Massachusetts Lowell	gilbert_brown@uml.edu
C.E. (Gene) Carpenter	US NRC	gene.carpenter@nrc.gov
Wei-Wu Chao	TECRO Science & Technology Division	wwchao0326@gmail.com
Paul T. Dickman	Argonne National Laboratory	paul.dickman@anl.gov
Juan Eibenschutz	Comisión Nacional de Seguridad Nucl. y Salv.	je@cnsns.gob.mx
Valerie Faudon	SFEN	valerie.faudon@sfen.org
Gale Hauck	Westinghouse	hauckge@westinghouse.com
Kannan Iyer	IIT Bombay	kiyer@iitb.ac.in

Jay Z. James	KEPCO International Nuclear Graduate School	jzjames@pacbell.net
Hong Jiang	CNPEC	jianghong@cnpe.cc
Myron M. Kaczmarzsky	CB & I Power	kaczmmamm@westinghouse.com
Jaakko Leppanen	VTT	jaakko.leppanen@vtt.fi
Gail H. Marcus	Consultant	ghmarcus@aol.com
Odilon A. Marcuzzo do Canto	ABACC	odilon@abacc.org.br
Rita N. Patel	University of Pittsburgh	rita.nalin.patel@gmail.com
Pran K. Paul	USDOE	paulp@y12.doe.gov
Patricia D. Paviet	DOE	patricia.paviet@nuclear.energy.gov
Fiona E. Rayment	UK National Nuclear Laboratory	fiona.e.rayment@nnl.co.uk
Benjamin Rouben*	12 & 1 Consulting	roubenb@alum.mit.edu
Santiago San Antonio	TECNATOM, S.A.	ssanantonio@tecnatom.es
Arkady Serikov	Karlsruhe Institute of Technology	arkady.serikov@kit.edu
Zdenko Simic	University of Zagreb	Zdenko.Simic@fer.hr
Kune Y. Suh	Seoul National University	kysuh@snu.ac.kr
Lumin Wang	University of Michigan	lmwang@umich.edu
Kiyoshi Yamauchi	Mitsubishi Nuclear Energy Systems, Inc.	yamauchi_kiyoshi@yahoo.co.jp


*Co-Editors of the *ANS Globe*

Appendix 1

**Presentation from Nuclear Safety Duty Center,
Atomic Energy Council of Taiwan**


**Lessons Learned from Fukushima - Applied to
Emergency Preparedness in Taiwan**

**(Presentation Forwarded by Dr. Wei-Wu Chao,
IC Member)**



Lessons Learned from Fukushima - Applied to Emergency Preparedness in Taiwan

Nuclear Safety Duty Center
Department of Nuclear Technology
Atomic Energy Council, Taiwan



Outline

Introduction


Regulations & Mechanisms

Cross-Border and International


Preparedness

Conclusions

2




Nuclear Power Plants in Taiwan




Plant	Capacity/Type	Operating License
Chinshan	1804 MW/unit GE BWR4 X 2	Unit 1: 1978.12.06 Unit 2: 1979.07.16
Kuosheng	2943 MW/unit GE BWR6 X 2	Unit 1: 1981.12.28 Unit 2: 1983.03.15
Maanshan	2822 MW/unit WH PWR X 2	Unit 1: 1984.07.27 Unit 2: 1985.05.18
Lungmen	3926 MW/unit GE ABWR X 2	Deferred

3




Post-Fukushima Re-examination




- Nuclear Safety
- Radiation Protection
- Emergency Preparedness

To cope with extreme natural disasters, including earthquake, tsunami, flooding



Beyond Design-Basis


Re-examination to meet design-basis safety standard



AEC issued "The Near-Term Overall Safety Assessment Report for Nuclear Power Plants in Taiwan in response to the Lessons Learned from Fukushima Daiichi Accident" October 2011

AEC issued "The Overall Safety Assessment Report for Nuclear Power Plants in Taiwan in Response to the Lessons Learned from Fukushima Daiichi Accident" August 2012

4



Missing Puzzles - Lessons Learned from Fukushima

Complex Disasters

Victim's Viewpoint


New Technology

Disaster Prevention

Transparency & Communication


- Humility in the face of natural disasters
- Risk awareness of residents
- Fukushima experience
- Bring into EP program
- Notification
- Utility disaster prevention strategy
- Disaster prevention and management system
- Evacuation Plan
- New evidences
- Transparency and openness
- Onsite and offsite emergency response plan
- Public Communications

5



Regulations & Mechanisms

Nuclear Emergency Response Act



EPR
Basic Plan

EPR Plan for Local Gov.

EPR Plan for Nuclear Power Plant


Nuclear Emergency Public Protective Action Guides

EPR: Emergency Preparedness and Response

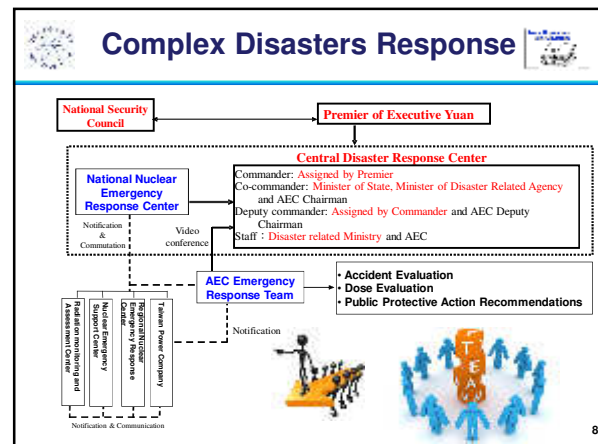
6

EPZ Expansion

- Before 311: 5km
- After 311 : 8km
- considering multi-units and more conservative PAG



7



Cross-Border and International

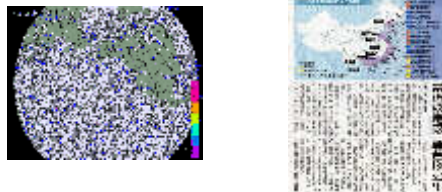
- Cross-Strait Nuclear Power Safety Cooperation Agreement (Date Signed: Oct. 20, 2011)
- Statement of Intent between TECRO (AEC) and AIT (DOE/NSA) regarding nuclear and radiological incident response and emergency management capabilities (Date Signed: May 26, 2011)



9

Cross-Border Nuclear Incident


- Response Guidelines for the Cross-Border Nuclear/Radiological Incidents
- Enhancing dose evaluation analysis capacity through atmospheric dispersion model



10

Cross-Border Nuclear Incident

- Establish aerial and maritime radiation detection and monitoring capability



11

Preparedness

- NPPs EP Enhancements
- Alert and Notification System
- Radiation Monitoring Stations
- Iodine Tablet Arrangement
- Emergency Response Information System
- Evacuation
- Public Outreach/Communication
- Nuclear Emergency Exercise

12

NPPs EP Enhancements


- NRC NTTF Recommendations. (Staffing and Communications)
- Ultimate Response Guidelines (URG) including injecting seawater when necessary.
- Earthquake Resistant Building.




13

Alert and Notification System


- More Alert Stations Established (expanded EPZ)
 - CS NPP(4→30), KS NPP(7→36), MS NPP(6→27)
- To make sure all residents (100% coverage) within EPZ be notified within 45 minutes during a nuclear accident
- By all means:




Alarm Stations / Village Broadcast system




TV



Radios



Text Message

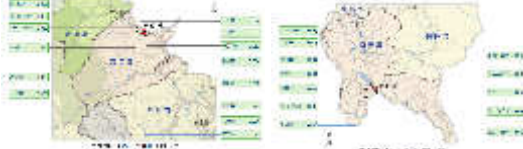


Vehicles Broadcast

14

Radiation Monitoring Stations

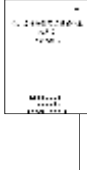


- More Radiation Monitoring Stations Established
 - CS NPP(5→12), KS NPP(5→14), MS NPP(5→12)
- 40 more Mobile Environmental Radiation Monitoring Detectors with wireless connection
- Establishing the Integrated Environmental Radiation Information System for Protective Action Guides






15

Iodine Tablet Arrangement

- Three Layers: Pre-distribution, Local Stockpiles, National Stockpiles
 - Pre-distribution to residents, schools, hospitals, etc. within EPZ (8 km)
 - Established Local Stockpiles at Local Government.
 - Established two National Stockpiles (800 thousands tablets) for extra need in case of a nuclear accident.







16

Emergency Response Information System

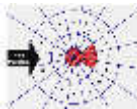
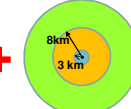
- A database providing graphical, real-time information to responders.
- Cross-platform communication and information-sharing among response units such as Central Gov. and Local Gov., Support Center by Army, TSC by NPP, and Center of Radiation Monitoring and Dose Assessment

17

Evacuation

- Precautionary Evacuation
 - Priority: Schools, Nursing homes, Hospitals within EPZ (8 km)
 - Residents within 3 km
- Evacuation
 - Downwind side Residents within 3~8 km
 - Residents within 3~8 km
- Transportation Needs Survey to each household within EPZ


+

=

Staged keyhole evacuation

18

Evacuation - Host Schools

19

Schools within EPZ

- Conducts the schools evacuation drill annually.
- Annual survey for transportation needs
- Enacting school emergency response plan
- Making emergency information cards for parents
- Precautionary evacuation management

20

Public Outreach/Communication

21

Nuclear Emergency Exercise

- The Nuclear Emergency Response Act
 - ✓ Each nuclear power plant is required to conduct an onsite EP exercise once per year
 - ✓ Annually, a full participation exercise is conducted together with an onsite EP exercise

22

Tabletop Exercises

23

Onsite EP Exercise

24



Conclusions

- Be humble in face of nature
- Improving capabilities of emergency preparedness and response to reduce risk and mitigate consequence
- Earn trust of residents through transparency and communications

27

Thank You for Your Attention!

28

This slide features a night-time photograph of the Taipei skyline, with the Taipei 101 building prominently lit up. Above the photograph, there are two logos: the 'Taiwan' logo on the left and the 'Nuclear Power of Taiwan' logo on the right. The text 'Thank You for Your Attention!' is centered over the photograph.