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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.

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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.

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From the Chair



In Anaheim, ANS will see a nearly 50% increase in international participation over the Reno meeting with more than 220 international registrants. This includes 128 from Asia, 40 from Europe, 6 from the Middle East, 13 from Canada, 4 from India and 3 from Latin America. The fact that Asia now accounts for 2/3 of the international ANS registrants continues to reflect the changing landscape of nuclear energy development globally. I encourage International Committee members to continue looking for opportunities for ANS to become more engaged in Asia.

I would like to congratulate the Chinese Nuclear Society on being selected to host the Pacific Nuclear Basin Conference during 6-9 April 2016. If the 2014 Nuclear Industry Congress (NIC) was any indication, this could be the biggest PBNC yet. And kudos to Canada for a successful PBNC 2014 in Vancouver, the bar has been set high for China! The IC and the Operations and Power Division (OPD) hosted the first joint panel on international nuclear energy development in Reno which was well attended, and will continue in Anaheim with panelists from Russia and Mongolia. I hope all IC members can attend, and please let Ted Quinn or me know if you have suggestions for panelists for future meetings.

Best Regards,

Corey McDaniel



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.

ANS 2015 National Election – Non-US Board Candidates

The non-US candidates for Board of Director who will be running in the 2015 national election are:

[Kune Suh](#)
[Hong Jiang](#)

News from Sister Societies and International News

- [Canadian Nuclear Society \(CNS\) \(<http://www.cns-snc.ca>\)](#)
[PBNC-2014 in Vancouver, British Columbia, Canada](#)

Abridged from a Report by
[Fred Boyd](#), Publisher of Canadian Nuclear Society Bulletin



The *19th Pacific Basin Nuclear Conference (PBNC-2014)* was organized by the Canadian Nuclear Society (CNS) and hosted by the CNS, the Canadian Nuclear Association, and Natural Resources Canada, in collaboration with the IAEA. It was held in Vancouver, August 23 -28, 2014, and was an outstanding success in all aspects. With the theme *Fulfilling the Promise of Nuclear Technology Around the Pacific Basin in the 21st Century*, it included 40 senior level presentations, 300 technical papers from countries around the Pacific Rim, over 50 student posters and a number of exhibits from several countries.

The venue of Vancouver proved attractive to the large contingent of attendees from the Asian side of the Pacific Ocean, who constituted over a third of the close to 600 delegates.

Planning was extremely thorough and matched by the execution, with all events running on schedule. The hotel coped well with the larger than anticipated attendance despite packed dining rooms that challenged the waiting staff. A warm ambience pervaded the event from the opening reception to the closing sessions (which were well attended).

Two optional technical tours were offered for the Friday - one to TRIUMF, the large accelerator adjacent to the campus of the University of British Columbia - the other to the laboratory of General Fusion Inc. in suburban Vancouver.

PBNC 2014 was the 19th in a series of biannual international conferences established by the Pacific Nuclear Council, a body composed of nuclear societies and associations of countries around the Pacific Rim. Member countries bid for the right to stage a conference. Previously to PBNC-2014, Canada held the 4th in 1983 and the 11th in Banff in 1998.

The Executive Chair of PBNC 2014 was Frank Doyle, a recent President of the CNS, who was greatly assisted by a large organizing team (over 70 members from all of the countries involved, including the members of the International Steering Committee). The Honorary Chair of PBNC-2014 was Tim Gitzel, President of Cameco Corporation. The Plenary and Keynote Speaker Program was headed by Ron Oberth, of Organisation of Canadian Nuclear Industries and Daniel Brady, of Natural Resources Canada. Bill Kupferschmidt was International Technical Program Chair. Emily Corcoran organised the Student Conference. All the above were very ably assisted by a large number of volunteers, too many to name here.

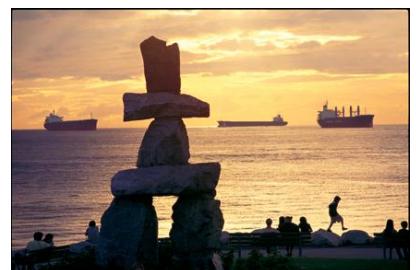
The Conference opened with a reception on the Sunday evening. Starting promptly at 8:00 a.m. on the Monday morning, the conference arrangement for all four days of presentations was a half day of plenary sessions and a half day of parallel technical ones, alternating mornings and afternoons.

The Plenary Sessions explored a number of important topics: *Developments Around the Pacific Rim, Alternative Fuel Cycles and Fuel Supply, Long-Term Used-Fuel Management, Building for the Future – Developing New Reactor Technologies and Applications, Plant Infrastructure Development and Life Management, Developing New Reactor Technologies and Applications, Trends in Regulatory Requirements to Ensure Safe Operation of NPPs, and Communications and Outreach.*

Following the Tuesday afternoon Plenary, the Student Poster Session was held, combined with a wine and cheese reception. There were 53 posters on display. Their high quality created a challenge for the small army of reviewers. After more than two hours of review the score sheets were gathered and sorted, and three winning student posters were announced.

The Wednesday evening was the occasion for the Conference Banquet, following which a Native Music and Dance show was presented by a First Nations group from the West Coast of Canada.

PBNC-2014 ended on Thursday afternoon with several procedural events: PBNC-2014 prime organizer Frank Doyle handed a symbolic cheque to Mimi Limbach, new chair of the Pacific Nuclear Council, as the Conference was held under the aegis of the PNC. Then Lixin Shen of the Chinese Nuclear Society extended an invitation to PBNC-2016. Shen presented a short slide show of Beijing, China, the



venue for the 20th Pacific Basin Nuclear Conference, .and the plans for the event.

The CNS is looking forward to several other major events it is organizing in 2015:

- 9-11 March: CNS CANDU Reactor Technology & Safety Course, Toronto, Ontario, Canada –
http://www.cns-snc.ca/events/2014_technology_and_safety_course/
- 2015 May 31-June 3: 36th Annual Conference of the Canadian Nuclear Society and 39th CNS-CNA Student Conference, Saint John, NB, Canada,
<http://www.cns-snc.ca>
- 17-19 June: 1st International Conference on Fire Safety and Emergency Preparedness, Mississauga, Ontario, Canada - <http://www.cns-snc.ca/events/fsep-2015/>
- 9-13 August: 17th International Conference on Environmental Degradation of Materials in Nuclear Power Plants, Ottawa, Ontario, Canada, <http://www.cns-snc.ca>
- 18-20 October: 7th International Conference on Simulation Methods in Nuclear Engineering, Ottawa, ON, Canada, <http://cns-snc.ca/events/7icsmne/>
- 1-4 November: International Nuclear Components Conference (INCC-2015), Mississauga, Ontario, Canada,
http://www.incc2015.org/INCC2015_html/INCC2015_home.html

- **India**

R.K. Singh, Head, Media Relations & Public Awareness, BARC, sent the following report:

Dr. R. K. Sinha, Chairman Atomic Energy Commission & Secretary Dept. of Atomic Energy, flagged off a consignment of MACE (Major Atmospheric Cherenkov Experiment) Telescope bound for Hanle, Leh, the second largest gamma ray telescope in the world designed by BARC Scientists at ECIL, Hyderabad on June 28, 2014.

Under our massive efforts of media coverage of BARC Technologies, RAJYA SABHA TV did telecast this function. The telecast was uploaded on you tube. The link for the English telecast is:

<http://www.youtube.com/watch?v=S1qu8DJ0smc&list=UUISgnSNwqQ2i8lhCun3KtQg&index=105>

- **Japan**

Mari Marianne Uematsu, of the Japan Atomic Energy Agency, sent the following contribution

[“Nuclear Energy Related Topics in 2014”](#)

1. Energy Basic Plan

The revised “Energy Basic Plan”, drafted by the Ministry of Economy, Trade and

Industry (METI), was approved by the Cabinet on April 11, 2014. As the role of nuclear energy in governmental energy plan, it was stated for the first time after the accident of the Fukushima Daiichi NPS that nuclear energy is one of the important base load power contributing to ensure the stability of the energy supply and demand structure.

In the energy basic plan, it is expressed that use of nuclear energy should place first priority on the pursuit of safety enhancement, and the government will respect the safety review of the Nuclear Regulation Authority. Dependency on nuclear power generation will be reduced as much as reasonably possible by energy saving, introduction of renewable energy as well as improvement in thermal efficiency of fossil power. An expected nuclear generation share in the future will be judged from the viewpoint of stable energy supply, reduction of global warming gas emission, securing technologies and human resources for nuclear safety.

It is emphasized that restoration and reconstruction of Fukushima is the starting point of nuclear energy. The government should be the first to undertake measures steadily for the completion of the TEPCO's Fukushima Daiichi NPPs decommissioning and for the contaminated water issue. Based on the policy, the Government and TEPCO will take all the challenges necessary for the reconstruction of Fukushima.

Concerning nuclear fuel cycle issues, the Government will take leadership to find a solution for High Level Radioactive Waste final disposal, will maintain reprocessing and LWR-MOX project in order to assure firm future outlook on energy security and HLRW management, while obtaining understanding and cooperation of municipalities hosting nuclear facilities and international community. For Monju, the organizational restructure was done in October with respecting international cooperation and taking into account lessons learned from previous efforts in order to accomplish its R&D project including transmutation of radioactive nuclide.

2. Nuclear Regulatory Commission

The Diet approved two new commissioners for the Nuclear Regulatory Authority (NRA) in June 2014. Two of the five current NRA commissioners, Commissioner Shimazaki (seismologist) and Commissioner Oshima (former ambassador to the United Nations), expired their tenure of two years in the end of September. The two new commissioners have their term of 5 years. The term of the other NRA commissioners is 5 years for Chairman Tanaka (till September 2017) and 3 years for Commissioner Fuketa and Commissioner Nakamura (till September 2015).

The new commissioners are; Professor Satoru Tanaka, the professor of nuclear engineering at Tokyo University and the former chairman of the Atomic Energy Society of Japan, and Professor Akira Ishiwatari, the professor at Tohoku University and the former chairman of the geological society of Japan.

3. Commercial Reactors

The new safety regulation for commercial LWRs was enforced in July 2013, and applications for NRA review on conformity with new safety standard were started.

Status of applications as of October 2014 is; 13 sites 20 reactors (12 PWR, 2 ABWR, 5 BWR).

Sendai NPP unit 1 and 2 obtained design safety approval on conformity with new safety standard from NRA in September 2014. Kyushu EPCo 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. of these two plants.

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 Takahama 3 Takahama 4	PWR PWR PWR PWR	1991 1993 1985 1985	July, 2013
Shikoku	Ikata 3	PWR	1994	July, 2013
Kyushu	Sendai 1 Sendai 2	PWR PWR	1984 1985	Approval obtained (10 September, 2014)
	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 4	BWR	1993	Feb. 2014
Hokuriku	Shika 2	ABWR	2006	Aug. 2014
JAPC	Tokai 2	BWR	1978	May 2014

4. Fukushima Daiichi NPS on-site restoration (topics in 2014)

- Fukushima Daiichi D&D Engineering Company

The Fukushima Daiichi Decontamination and Decommissioning (D&D) Engineering Company was established in April 2014. The company has responsibility for the decommissioning and cleanup of Fukushima Daiichi NPS. The mission is to decontaminate, decommission and cleanup the Fukushima Daiichi NPS with the greatest degree of expertise, safety, and efficiency; with the greatest possible regard for the environment and those who live in it.

- Groundwater Bypass

Fukushima Daiichi D&D Engineering Company started the groundwater bypass operation at Fukushima Daiichi NPS. Pump up of groundwater started in April 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.

- Unit 4: Fuel-Assembly Removal From Spent-Fuel Pool

At the time of the earthquake disaster, the unit 4 was in periodical inspection, and all the assemblies were discharged from the core and stored in the spent fuel pool. The operation of fuel assembly removal form spent fuel pool was started in November 2013 in preparation for unit 4 decommissioning. As of the end of September 2014, 1,254 fuel assemblies of total 1,533 assemblies have been discharged and transferred to the common pool. The planned completion is by the end of 2014.

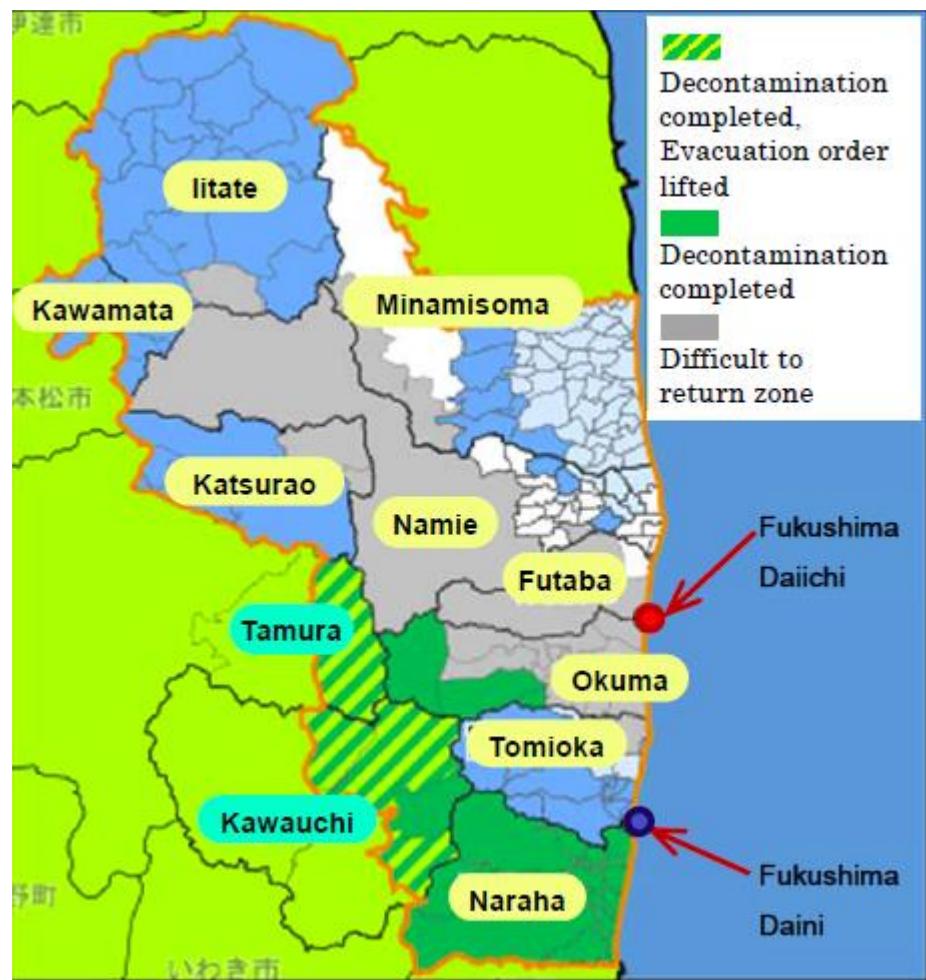
- Unit 1: Cleanup Operation

A cover was installed over the reactor building of Unit 1 in October 2011 in order to prevent diffusion of radioactive material. Safe removal of the cover is planned to be started, and the remained debris at the operating floor will be removed in preparation for fuel removal and decommissioning.

5. Fukushima Off-Site Environmental Remediation

The “Decontamination special area” was designated by the Minister for the Environment in accordance with the "Act on special measures concerning the handling of pollution by radioactive materials (proclamation in August 2011)", where the government is responsible for the decontamination. The area basically includes the “Restricted area (zone within a 20 km radius of the Fukushima-Daiichi NPS)” and the “Planned evacuation area (zone where the accumulative dose during 1 year after the accident might exceed 20mSv)”. The 11 municipalities are partially or fully included in this area.

To date, full-fledged decontamination work was completed in 4 municipalities; Tamura city, Naraha town, Kawauchi village, and a part of Okuma town. Reconstruction of the basic infrastructures (municipal office, post office, electricity, gas, water and sewerage etc.) has been done or is under way in parallel. Tamura city lifted the “Evacuation order” of the “preparation for the lifting of the evacuation order area” on 1 April, 2014. It is the first



case that the municipality decided to return home after 3 years since the earthquake disaster. As the second case, Kawauchi village decided to lift the “Evacuation order” on 1 October, 2014. Some residents started to return to their home. Some residents decided not to return to their home, for the reason of remaining radioactivity, difficulties in living environment (road maintenance, transport means, medical services, etc.), insufficient educational and employment opportunity.

Decontamination is under way for the transport infrastructures. In the decontamination special area, a railway company in eastern Japan (JR east) started railway commercial operation in June, 2014. Joban highway was partially re-opened in February 2014. National road traversing the decontamination special area was fully reopened (but only for vehicle traffic) on 15 September, 2014.

- **Kazakhstan**

Natalya Zhdanova, Executive Director of the Nuclear Society of Kazakhstan, sent the following articles.

KAZAKHSTAN SCIENTISTS IN CADARACHE

by

Sergey Borissov, Nuclear Society of Kazakhstan

In the global ranking in the field of nuclear energy, France ranks one of the top lines. Eloquent testimony of this is the proportion of its nuclear power plants in the country's energy balance, which is more than 80 percent. Therefore, this country has not been chosen randomly as the place of business trip for the delegation trip of RSE NNC RK.

The purpose of our scientists' trip to research center in Cadarache was their participation in a working meeting with representatives of the Commissariat for Atomic Energy and Alternative Energy Sources of France (SEA). The results of the ongoing cooperation, and the future prospects in the study of severe accidents of nuclear reactors, as well as participation in the International Workshop PLINIUS2 held in Marseille were discussed in more detail. Director General of RSE NNC RK E. G. Batyrbekov, IAE scientists A.D. Vurim, A.V. Pakhnits, V.A. Vityuk, N.V. Koshnenko were involved in the business trip.

Within four days at Cadarache Research Centre, they discussed various aspects of preparation and conduct of in-core experiments to study the severe accidents of Generation IV advanced fast fission reactor being developed in France (project ASTRID). The reason for a working meeting was the completion of the SAIGA project concluded between RSE NNC RK and CEA in 2013.

The work program involves, up to the end of 2018, the preparation and conduct of three experiments on the IGR reactor to research the processes accompanying postulated severe accidents of ASTRID reactor with core disruption.

Cost of works was pre-evaluated at 7.2 million USD, but the CEA leadership believes that their cost may increase in conjunction with the offer of French specialists to expand the range of issues that need to be solved in the implementation of program of experiments. In particular, essential value for the successful implementation of the

project is creation of simulated core assemblies using different enriched fuel that was not previously envisaged.

In general, the results obtained so far on this project were evaluated by the French side as positive ones, and that was reflected in the relevant report signed by the parties subsequent to the results of the discussions.

In addition, after the meeting the statement of intent was signed by the parties, to discuss the issues of preparation and holding of experiments at IGR reactor in support of reactor safety with pressurized water in terms of the study of the corium behavior inside and outside of the reactor vessel in the event of a severe accident.

CEA experts suggested the IGR reactor (and it was a pleasure for us) as the most appropriate installation for the experiments simulating the behavior of molten core materials in the PWR reactor. It was stressed that such experiments may interest not just France, but the international community as well. The parties agreed to continue consultations on this matter with a view to search for potential partners and funding to implement the preliminary studies.

The last day of the visit of the Kazakhstan delegation in France was entirely devoted to International Seminar PLINIUS 2, where our scientists presented an overview report “Reactor and out-of-pile experiments to study severe accidents of sodium-cooled fast reactors at the National Nuclear Center of the Republic of Kazakhstan”.

At the initiative of the French side, the prospects of cooperation between CEA and RSE NNC RK on various aspects of the peaceful use of atomic energy were discussed. The French side was represented by the Director of the CEA Nuclear Energy Department Mr. Christophe BEHAR and program manager for Generation IV reactors of the CEA Nuclear Energy Department Mr. François GAUCHE. During the conversation, much attention was paid to the potential expanding of cooperation of the parties, both in terms of the shared usage of experimental installations, and in terms of the joint research of different fields. Preliminary it was agreed to arrange a meeting of the leadership of CEA and RSE NNC RK in October 2013 in Kurchatov city. As a final result thereof, it is expected to sign contract to continue works in the field of fast reactors and in the field of light water reactors.



At the end of trip, the scientists of NNC, of course, could not leave out in the cold the unique Cadarache facility – the Jules HOROWITZ Material Test Reactor under construction. But that is another story.

- Morocco

Prof. Oum Keltoum Bouhelal, Professor at the Higher National Engineering School of Mines , Rabat, Morocco, sent the following report:

PHYTRA3 INTERNATIONAL CONFERENCE
University A. ESSADI, Tetouan, Morocco
2014 May 12-14

The Moroccan Association for Nuclear Engineering and Reactor Technology (GMTR) organized the third edition of the PHYTRA conference which took place from 12 to 14 May 2014 in the city of Tetouan. As in the previous instances, PHYTRA3 was sponsored by the American Nuclear Society, the Société Française d'Énergie Nucléaire, the Canadian Nuclear Society and the French Commissariat à l'Énergie Atomique.

The PHYTRA3 conference was rich in its variety of country participants and in the breadth of subjects in the papers presented.

Thirteen countries were represented, and there were 34 participants from outside Morocco. Almost all the disciplines of reactor physics and reactor technology were covered: neutronics, nuclear data, thermal hydraulics, safety, security, education and training, design, as well as various applications of experimental reactors.

52 papers were presented at the conference: 11 at the Plenary sessions, 17 oral presentations in 4 technical sessions, and 24 posters in 2 poster sessions.

Keynote speakers included Dr. F. Rahnema, Dr. A.R. Haghigat, Dr. R. Sanchez, Dr. A. Hébert, Dr. A. Santamarina, and Dr. P. Ravetto.

PHYTRA3 was organized jointly with the first INMM Moroccan chapter workshop on nuclear security. During the last two years great effort was expended to introduce Nuclear Security in the curriculum of nuclear sciences at Moroccan Universities, thanks to the support received from the United States Partnership for Nuclear Security and from the International Atomic Energy Agency. Our association played a large part in these efforts. We can certainly report that the workshop was very successful: a relatively large number of participants registered, the topics presented were very important and there was a very good interaction between the participants and the speakers.

A group photo from PHYTRA3 is shown below.

The next conference in the PHYTRA series, i.e., PHYTRA4, is expected to be held in 2017.



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

Strengthened co-operation between the NEA and the National Nuclear Safety Administration of China

A Memorandum of Understanding in the Field of Regulation of Nuclear and Radiation Safety has been signed by the NEA and the National Nuclear Safety Administration (NNSA) of China, strengthening co-operation between the parties. One of the goals of the co-operation will be to share experience on the effective regulation and oversight of nuclear safety, as well as best practices in licensing and oversight of civil nuclear facilities. The MOU also foresees co-operation on nuclear safety research, the development of international legal frameworks and the performance of analyses which are essential for the safe and environmentally friendly use of nuclear energy.

Nuclear power and adaptation to climate change

On 12 June 2014, the NEA participated in the International Energy Agency's (IEA) 4th Forum on the Climate-Energy Security Nexus, which was hosted by the World Business Council for Sustainable Development (WBCSD) in Geneva, Switzerland. The forum focused on the water-energy nexus, and involved stakeholders from industry, experts on climate change modelling and adaptation strategies as well as policymakers. The NEA presented the current status of its activities conducted through the Ad hoc Expert Group on Climate Change: Assessment of the Vulnerability of Nuclear Power Plants and Cost of Adaptation. This expert group is looking in detail at the particular threats that climate change is likely to pose to the nuclear power sector, such as the availability and quality of cooling water, or the risk of floods. On 23-25 June 2014, the expert group met to discuss the economic impact of climate events on NPP operation and possible adaptation strategies, some of which have already been implemented to strengthen the resilience of NPPs against climate change. The group also discussed the potential impact of extreme weather events on the front end of the nuclear fuel cycle, in particular uranium mining activities, and the challenges of operating NPPs in hot climates. A report is targeted to be published at the end of 2014.



Nuclear Safety Defence-in-Depth

On 17-19 September 2014, the NEA Senior-level Task Group on Defence-in-Depth held its second meeting on the preparation of the report on defence-in-depth in the post-Fukushima Daiichi accident context. One of the main objectives of the report is to explain the background, concept and context of defence-in-depth, which is a well-established tool to assist in delivering high levels of nuclear safety. The report also aims to make recommendations to enhance the implementation and use of defence-in-depth. At the meeting, participants made good progress, achieving consensus on selected topics for the report, including implementation and emergency arrangements.

Effectiveness of international operating experience programmes

On 8-10 September 2014, the International Workshop on Operating Experience Programme Effectiveness Measures was held in Garching, Germany, and hosted by the *Gesellschaft für Anlagen- und Reaktorsicherheit* (GRS). Organised by the [NEA Working Group on Operating Experience \(WGOE\)](#), this workshop provided a forum for the exchange of information on licensees' and regulators' programmes on operating experience and approaches to evaluate the effectiveness of these programmes. During the workshop, 41 participants from 14 countries discussed topics such as identifying and gathering operating experience, processing operating experience information and assessing outcomes of operating experience.



- **Slovakia**

Juraj Klepac, Secretary General of the Slovak Nuclear Society (SNS) sent the following report on a publication of the SNS:

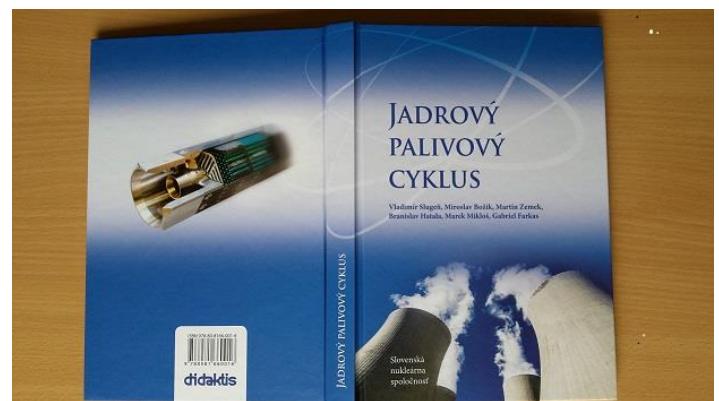
Nuclear Fuel Cycle Book

It is not so common that a Nuclear Society publishes books. The Slovak Nuclear Society does. Not too often, but it does. This time it is a comprehensive monograph titled “NUCLEAR FUEL CYCLE”. Here is an appetizer.

Nuclear fuel is a significant powerful source of energy in nuclear installations. Production of uranium, its processing to the form of fuel elements, their use in nuclear reactors, the associated handling up to the proper reprocessing of used fuel, and final disposal, are individual phases in the nuclear fuel cycle.

Uranium is a natural element with an abundance of 4 ppm in the Earth crust. Although it seems that nuclear reactors are highly sophisticated equipment devised during the turbulent development of nuclear physics in the first half of 20th century and the accelerated research stimulated by WWII, the natural analogy of nuclear reactors formed about 2 billion years ago. Natural conditions in the area of Oklo (Gabon, Africa) were such that after abundant rains or floods water penetrated into geological formations with a high content of uranium, and began to play the role of neutron moderator. The content of the U-235 isotope in the uranium deposits at that time was many times higher than today's 0.712 %, so no enrichment was required. Preconditions for a sustainable chain reaction based on thermal neutrons formed, and heat was produced until the evaporation of moderating water. A half century ago, radiographers found unambiguous evidence in the form of signs of sintered minerals, as well as of high concentrations of radionuclides, which could originate only as a consequence of a nuclear-fission chain reaction. High concentrations of radionuclides from Oklo, such as we today try to immobilize in solid matrices and dispose of in deep geological repositories, can serve as a source of knowledge for safe management of spent nuclear fuel.

The book describes in detail the front and back ends of the nuclear fuel cycle, notwithstanding that numerous steps of the fuel cycle are not carried out in Slovakia and that final disposal of spent fuel in a deep geological repository in Slovakia has not yet been decided. The book places emphasis on fuel for power reactors of the VVER-440 type, which are in operation in the Slovak Republic. Our aim is to maintain operational experience with this fuel, a description of optimal operation and the evaluation of the significance of individual thermo-technical parameters.



Safe nuclear fuel handling, in our opinion, is extraordinarily significant, including its monitoring, temporary storage, as well as the back end of nuclear fuel cycle, because resolving items associated with optimal spent-fuel management, including its potential reprocessing and final disposal, is an essential task also for Slovakia.

United States

Patricia Paviet, Director of the Office of Systems Engineering and Evaluation, Department of Energy, Office of Nuclear Energy, has launched a series of free webinars on the Nuclear Fuel Cycle, which she is organizing in collaboration with the DOE EM Carlsbad Field Office, the US Environmental Protection Agency, and universities partners. The list of webinars is given below (dates may not be final). The plan is to have one webinar per month, on subjects related to the fuel cycle.

Series #4 Nuclear Forensics will follow in August 2015 (Brian Powell lead). A series is being developed on Nuclear Medicine topics (Mike Schultz lead).

Presenter	Title of Webinar	Date to submit for review	Date to pre- recording	Tentative date for Webinar presentation
Stephanie Cornet NEA/OECD	Introduction to the Fuel Cycle	June 13	June 18	June, 26 2014
Mikael Nilsson UC-Irvine	Front End--Uranium Mining, Milling, Enrichment and UO ₂ production	July 11	July 16	July, 25 2014
Kenya de Almeida UNM	<i>Environmental and human contaminant in the Front End of the Fuel Cycle for Uranium Mining and Milling</i>	August 8	August 13	August, 21 2014
Thomas Hartmann UNLV	Nuclear Fuel Fabrication	Sept 12	September 17	September, 25 2014
Robert Blomquist ANL	Overview of Nuclear Reactors	October 10	October 15	October, 23 2014
Dr. Robert Litman	"Chemistry and radiochemistry of the reactor coolant system	November 7	November 13	November 20 2014
Patricia Paviet??? DOE	The PUREX Process	December 5	December 10	December 18 2014
Jennifer Braley Colorado School of Mines	Advanced Partitioning Technologies in the U.S.	January 9	January 14	January 22 2015
Dominique Warin CEA	Advanced Partitioning Technologies in Europe	February 13	February 18	February 26 2015
Bruce Mincher (INL) and Stephen Mezyk (California State University Long Beach)	Radiation Chemistry at the Back End of the Nuclear Fuel Cycle	March 13	March 18	March 26 2015
Supathorn Phongikaroon Virginia Common- Wealth University	Pyroprocessing Technology	April 10	April 17	April 23 2015
Edward Mausolf PNNL	Nuclear Waste Management- Application to Technetium	May 7	May 14	May 21, 2015
Lindsay Shuller-Nickles Clemson University	Nuclear Repository Science and the Waste Isolation Pilot Plant	June 12	June 17	June 25, 2015
Rick Demmer INL	High Level Waste	July 10	July 13	July 24, 2015

News from ANS Divisions

To further the implementation of the Joint Protocol between the IC and the Professional Divisions Committee, we are pleased to include in the *Globe* some newsworthy Division items. While some items can be gleaned from the Divisions' web pages, please send us your most up-to-date and timely news to post in the *ANS Globe*!

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@kiae.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.sonus.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.

2014

- 9-13 November: ANS Winter Meeting, Anaheim, CA, USA – 
<http://www.ans.org/meetings>
- 14-18 December, 10th International Topical Meeting on Nuclear Reactor Thermal Hydraulics, Operation and Safety (NUTHOS-10), Okinawa, Japan

2015

- 1-4 February: Conference on Nuclear Training and Education (CONTE15), Jacksonville, FL, USA - <http://www.ans.org/meetings>
- 22-26 February: 9th International Topical Meeting on Nuclear Plant Instrumentation, Control, and Human Machine Interface Technologies (NPIC&HMIT 2015), Charlotte, NC, USA - <http://www.ans.org/meetings> *
- 23-26 February: Nuclear and Emerging Technologies for Space (NETS) 2015, Albuquerque, NM, USA – <http://www.ans.org/meetings> *
- 9-11 March: CNS CANDU Reactor Technology & Safety Course, Toronto, Ontario, Canada - http://www.cns-snc.ca/events/2014_technology_and_safety_course/
- 29 March - 1 April: Advances in Nuclear Fuel Management V, Hilton Head, SC, USA - <http://www.ans.org/meetings> *
- 12-16 April: International High-Lever Radioactive Waste Management Conference, Charleston, SC, USA - <http://www.ans.org/meetings> *
- 12-17 April: 10th International Conference on the Methods and Applications of Radioanalytical Chemistry (MARC X), Kaikua-Kona, HI, USA - <http://www.ans.org/meetings>
- 19-23 April: Mathematics and Computation 2015 & Supercomputing in Nuclear Applications (SNA) & the Monte Carlo Method, Nashville, TN, USA - <http://mc2015.org>



- 26-30 April: 2015 International Topical meeting on Probabilistic Safety Assessment & Analysis (PSA 2015), Sun Valley, ID, USA – <http://www.new.ans.org/meetings/> *
- 3-6 May: International Congress on Advances in Nuclear Power Plants (ICAPP-2015), Nice, France - <https://www.sfen.fr/ICAPP>



- May 31-June 3: 36th Annual Conference of the Canadian Nuclear Society and 39th CNS-CNA Student Conference, Saint John, NB, Canada – www.cns-snc.ca
- 7-11 June: ANS Annual Meeting, San Antonio, TX, USA – <http://www.ans.org/meetings> *

- 17-19 June: 1st International Conference on Fire Safety and Emergency Preparedness, Mississauga, Ontario, Canada - <http://www.cns-snc.ca/events/fsep-2015/>
- 9-13 August: 17th International Conference on Environmental Degradation of Materials in Nuclear Power Plants, Ottawa, Ontario, Canada, <http://www.cns-snc.ca>
- 30 August – 4 September: 16th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-16), Chicago, IL, USA - <http://www.ans.org/meetings>
- 13-17 September: International Conference on Nuclear Criticality Safety (ICNS2015), Charlotte, NC, USA - <http://www.ans.org/meetings> *
- 13-17 September: International Meeting on Reactor Fuel Performance (TOPFUEL-2015), Zürich, Switzerland, <http://www.topfuel2015.org>
- 20-24 September: GLOBAL 2015, Paris, France, <https://www.sfen.fr/GLOBAL>



- 18-20 October: 7th International Conference on Simulation Methods in Nuclear Engineering, Ottawa, ON, Canada, <http://cns-snc.ca/events/7icsmne/>
- 1-4 November: International Nuclear Components Conference (INCC-2015), Mississauga, Ontario, Canada, http://www.incc2015.org/INCC2015_html/INCC2015_home.html
- 8-12 November: ANS Winter Meeting, Washington, DC, USA – <http://www.ans.org/meetings> *

2016

- 17-22 April, 11th International Conference on Tritium Science & Technology (TRITIUM 2016), Charleston, SC, USA
- 1-5 May, PHYSOR-2016, Sun Valley, ID, USA- <http://www.ans.org/meetings> *
- 12-16 June: ANS Annual Meeting, New Orleans, LA, USA – <http://www.ans.org/meetings> *
- 6-10 November: ANS Winter Meeting, Las Vegas, NV, USA – <http://www.ans.org/meetings> *

2017

- 11-15 June: ANS Annual Meeting, San Francisco, CA, USA –
<http://www.ans.org/meetings>



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



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