



# **Nuclear Governance in Asia after the Nuclear Security Summit Process**

**A Conference Report of the  
CSCAP Nuclear Energy Experts Group Meeting**

**by  
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### **Pacific Forum CSIS**

Based in Honolulu, the Pacific Forum CSIS ([www.pacforum.org](http://www.pacforum.org)) operates as the autonomous Asia-Pacific arm of the Center for Strategic and International Studies in Washington, DC. The Forum's programs encompass current and emerging political, security, economic, business, and oceans policy issues through analysis and dialogue undertaken with the region's leaders in the academic, government, and corporate areas. Founded in 1975, it collaborates with a broad network of research institutes from around the Pacific Rim, drawing on Asian perspectives and disseminating project findings and recommendations to opinion leaders, governments, and members of the public throughout the region.

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## **Key Findings and Recommendations**

### **Nuclear Energy Experts Group**

#### **September 19-20, 2016, Singapore**

The Nuclear Security Summit (NSS) process was successful in raising awareness and in urging countries to move forward on issues such as the adoption of relevant treaties on nuclear security and improving accountability of fissile material. The entry into force of the amendment of the Convention on the Physical Protection of Nuclear Materials (CPPNM), acceptance of the Joint Statement on Strengthening Nuclear Security Implementation (INFCIRC 869) by several states, and the removal of highly enriched uranium (HEU) from several countries were important results of the process.

Despite these achievements, the summit process failed to fully address important issues, including plutonium accumulation, military fissile materials, sabotage, and cyber security. The final NSS also failed to outline a clear post-summit strategy, leaving the future of nuclear security governance uncertain. Some participants attributed this failure to the lack of participation of countries like Russia at the 2016 summit. Other participants noted that Russia's absence reflected differences in views on the NSS agenda and on how to move forward but that, nonetheless, Moscow has economically contributed to the nuclear security fund and has continued to cooperate with the United States on nuclear security issues.

There were different views regarding the value of the summit process for a nuclear security agenda. While some believed it focused attention on specific topics such as removal of fissile material and enhanced physical security at nuclear facilities, others believed that a broader agenda that included nuclear safety would be preferable as it would give countries more incentives to actively participate and would contribute to maintaining momentum from the NSS process.

There was general consensus that the International Atomic Energy Agency (IAEA) through its efforts to establish nuclear security guidelines has become an important actor in promoting nuclear security. It was also argued that the CPPNM review process could be used as a forum for nuclear security governance. Sustained involvement by heads of states is crucial and the “gift basket” approach is an efficient way to proceed. It was suggested that countries submit national reports on their progress in enhancing nuclear security.

The future of nuclear security governance is of particular concern for Asia. Mechanisms that could improve governance include the establishment of a global nuclear security system and a “connect framework” to enhance cooperation and information sharing among countries. The Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) was cited as a model. Several participants believed that the Centers of Excellence (COE) in China, Japan, and South Korea should combine efforts to improve regional nuclear security. The IAEA could help coordinate a division of labor between COEs.

The ASEAN Network of Regulatory Bodies on Atomic Energy (ASEANTOM) provides an official framework to facilitate cooperation among the nuclear regulatory bodies of

ASEAN member states to promote nuclear safety, security, and safeguards. It serves as the key point of contact with the IAEA to promote cooperation in these areas, including capacity building for the benefit of all member states. While ASEANTOM has been designated as a sectoral body under the ASEAN Political-Security Community, it does not have a dedicated secretariat, which would provide continuity and enhance regulatory cooperation since the current organizational structure requires the ASEANTOM chair to rotate annually in conjunction with the rotation of the ASEAN chair. It was suggested that links between the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) be established to share information and explore their inclusion in emergency exercises. Stronger collaboration between ASEANTOM and the Asia-Pacific Safeguards Network (APSN) was also suggested.

Universal adoption of the relevant liability conventions is fundamental to a strong nuclear safety regime in Asia. Given Southeast Asia's fast-growing interest in nuclear energy, nuclear safety is an area of increasing concern. Several participants emphasized the need for training courses on nuclear technology to ensure adequate human resources. A participant backed South Korean President Park's proposal to create a mutual consulting body for China, Japan, and South Korea as a way to strengthen nuclear safety. Also recommended was the creation of a nuclear safety inspection regime for Asian nuclear power plants.

Nuclear power generation is challenged by the public perception of nuclear and radioactive waste. To deal with public reaction to uncertainty, participants suggested the adoption of short-term and long-term communication strategies to educate the public on the threats and risks associated with waste management. Nongovernmental organizations' involvement in the process was considered crucial.

Public awareness and education are also critical in dealing with nuclear incidents and accidents. Enhanced training courses along with drills and exercises with constantly-changing scenarios would help develop adaptability skills, which are decisive in the event of a nuclear incident/accident. Such exercises should be organized not only for nuclear operators, but also for other stakeholders, including first responders such as medical personnel, rescuers, police, and civilians.

Among the technical tools suggested for preventing and preparing for nuclear incidents/accidents, participants emphasized the adoption of radiological monitoring systems, as they facilitate quick responses and quick impact assessments. It was suggested that a working group within the IAEA be established where stakeholders could exchange knowledge and information on the use of these tools.

Cyber threats are another emerging nuclear concern. Participants noted that cyber-attacks at nuclear facilities are becoming a very real possibility. Part of the problem derives from obsolete systems and the lack of capacity in dealing with such attacks. Further studies on the issue were encouraged.

# **Nuclear Governance in Asia after the Nuclear Security Summit Process**

**A Conference Report of the Nuclear Energy Experts Group Meeting  
September 19-20, 2016, Singapore**

**By Carl Baker and Federica Dall 'Arche\***

The Pacific Forum CSIS, in partnership with the S. Rajaratnam School of International Studies (RSIS) and with the support of the Carnegie Corporation, held a Nuclear Energy Experts Group (NEEG) meeting in Singapore, on Sept. 19-20, 2016. The conference brought together some 40 experts from Asia and beyond, all attending in their private capacities. The discussions focused on the outcomes of the Nuclear Security Summit (NSS) process, nuclear security governance, nuclear safety, radioactive source management, and nuclear accident/incident response. The following report reflects the view of the authors.

## **After the Nuclear Security Summit Process**

The first session of the Nuclear Energy Experts Group meeting looked at the Nuclear Security Summit (NSS) process. Miles Pomper (James Martin Center for Nonproliferation Studies, USA) assessed the major successes and shortcomings of the NSS, and reflected on ways to sustain the momentum arisen from the summit. The NSS process was successful in raising awareness on nuclear security and in urging countries to move forward on timing and crucial issues related to nuclear security. The adoption of relevant treaties, the entry into force of the amendment to the Convention on the Physical Protection of Nuclear Materials (CPPNM), the acceptance of the Joint Statement on Strengthening Nuclear Security Implementation (INFCIRC 869) by several states, and the involvement of the industry and civil society are some of the most important achievements. The summit process, however, failed to address relevant issues such as plutonium accumulation, military fissile material, sabotage, and cyber security. It also failed to develop a clear post-summit strategy for institutionalizing nuclear security governance. Pomper identified five priorities that still need to be addressed:

- Universal ratification of nuclear security treaties and universal endorsement of INFCIRC 869, considered as the cornerstone of the nuclear security regime; securing military materials, including naval highly enriched uranium (HEU), and civil materials, including radiological sources
- Sharing best practices and standards through centers of excellence
- Creating highly enriched uranium free zones (HEUFZ) and minimizing the production of plutonium

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- Increasing funding for the International Atomic Energy Agency (IAEA) division of nuclear security to strengthen and promote a nuclear security regime

Other major successes of the summit process included the adoption of the “gift basket” approach to putting forward initiatives from individual and groups of countries, and the successful program to remove highly enriched uranium (HEU) from several countries. The discussion also included a range of ideas on how to sustain the momentum created by the NSS process. The CPPNM review process was regarded as the most appropriate forum for continued engagement on nuclear security policy issues. Continued involvement by heads of states was considered crucial. Continued cooperation between the United States and Russia in promoting the nuclear security agenda was also seen as a key element in creating an atmosphere of cooperation in the process.

While there was general agreement on the role of the International Atomic Energy Agency (IAEA) and its guidelines in promoting nuclear security, disagreement occurred when participants tried to outline a future nuclear security governance agenda. Particularly, it was noted how some countries do not consider plutonium minimization as a priority, and, while some believed that focusing attention on specific topics such as removal of fissile material and enhanced physical security at nuclear facilities has been a successful strategy, others believed that a broader agenda that included nuclear safety would be preferable, as it would give countries more incentives to actively participate in the process.

Another topic that garnered interest during the discussion was the perception that cyber threats to nuclear facilities are growing and could pose an even greater problem than physical threats because they are harder to detect and counter. Part of the problem derives from obsolete systems and the lack of capacity in responding to such attacks. Further studies on the issue were encouraged to better determine the scope of the problem and possible preventive measures and responses.

### **Nuclear Security Governance in Asia**

In the second session, the focus was on the impact of the NSS process in Asia. Zhu Xuhui (China National Nuclear Corporation) noted the growing interest in nuclear issues in Asia, making continued momentum created through the NSS process a common interest as well as an inherent responsibility for countries in the Asian region. The establishment of a global nuclear security governance system and a “connect framework” to enhance security and cooperation among countries was defined as paramount. To this end, Zhu suggested cooperation between the Centers of Excellence (COE) of China, Japan and Korea. He also evaluated China’s role in enhancing regional nuclear security, suggesting that it should begin by improving its nuclear security laws and regulations to ensure they are in line with international standards. The country should also share its experiences and best practices in nuclear security. The Chinese COE, designed to train Chinese officials, should become a training platform for countries throughout Asia. Finally, China should improve its cooperation with the United States on nuclear security-related issues.

Pantip Ampornrat (Office of Atoms for Peace, Ministry of Science and Technology, Thailand) offered an overview of the work being undertaken by the ASEAN Network of Regulatory Bodies on Atomic Energy (ASEANTOM). The network was established in 2011 to facilitate cooperation and information sharing on nuclear safety, security, and safeguards among the regulatory bodies of the ten ASEAN member states. Since its establishment, the group has convened three times: in Bangkok, Chiang Mai, and Alor Setar. All other network's activities, including workshops and training courses, have been planned accordingly to members' interests, including emergency preparedness and response (EP&R), environmental radiation monitoring, nuclear safety, and nuclear security. ASEANTOM serves as the key point of contact with the IAEA and, in 2015, was designated as a sectoral body under the ASEAN Political-Security Community. This designation will give the group increased visibility within the ASEAN community and help insure top leadership involvement and oversight of its activities.

Zhu's proposal of increased cooperation among COEs was welcomed by participants. The IAEA was suggested as the ideal focal point for coordinating division of labor between COEs to help avoid unhelpful competition, duplication of work, and wasting of resources. The Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) was cited as a model in establishing stronger relations among agencies that promote safeguards, sharing of information, and providing mutual assistance in case of nuclear accidents and radiological emergencies.

Participants also welcomed the work of ASEANTOM. In discussing ways to enhance the role of the network, some proposed the establishment of a dedicated secretariat – currently the chair of the network rotates each year to coincide with that of ASEAN. The argument made was that a regular, permanent secretariat would provide continuity and enhance regulatory cooperation. Stronger collaboration between ASEANTOM and the Asia-Pacific Safeguards Network (APSN), and ASEANTOM and the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) was also suggested. There were also suggestions that ASEANTOM expand the scope of its discussions to include ways to reduce the role of radiological sources in industrial and medical applications.

### **The Nuclear Safety Regime**

Jor-shan Choi (UC Berkeley Nuclear Research Center, USA) began the third session with a presentation on the nuclear safety regime, outlining its major goals and components, and evaluating the role of international organizations and stakeholders. Choi noted that even though most countries in the Asia-Pacific have made efforts to implement nuclear safety standards, a stronger regime is needed. Two suggestions included the creation of an inspection regime for Asian nuclear power plants where two or more inspectors would monitor each Asian nuclear reactor twenty-four hours a day and the establishment of an Asian institute of nuclear power operators.

Julius Trajano (Center for Non-Traditional Security Studies – RSIS, Singapore) looked specifically at nuclear safety in Southeast Asia. Several countries, including the

Philippines, Vietnam, and Cambodia have recently taken steps to develop or evaluate the feasibility of nuclear energy programs. The region, however, does not seem to be adequately prepared for nuclear power, lacking a sufficient group of nuclear experts and an efficient cooperation structure among networks that would allow ASEAN countries to share knowledge and best practices. Stronger collaboration between regional and inter-regional networks such as ASEANTOM, the ASEAN Nuclear Energy Cooperation-Subsector Network (NEC-SSN), the APSN, the Ibero-American Forum of Radiological and Nuclear Regulatory Agencies (FORO), the Forum of Nuclear Regulatory Bodies in Africa (FNRBA), or the Arab Network of Nuclear Regulators (ANNuR), to name a few, was considered fundamental.

Discussion highlighted that successful cooperation would also require engaging local stakeholders, such as universities and research centers. Participants also emphasized the need for training courses on nuclear technology to ensure adequate human resources and to develop a group of experts to maintain nuclear facilities. Given Southeast Asia's fast-growing interest in nuclear energy, the lack of expertise, both in nuclear safety and nuclear security, is highly problematic. The United States and Northeast Asian states could play a major role by sharing best practices and providing knowhow. The COEs in China, Japan, and South Korea were mentioned as excellent venues for training officials from the entire Asian region. The involvement and assistance of the industry is critical in this process. Nevertheless, the priority should be the universal adoption of relevant liability conventions as a first step.

### **Radioactive/Nuclear Waste Management**

After a brief introduction on the nature of nuclear and radioactive waste, this session analyzed the efforts by some Asian countries to deal with radioactive waste. Wen-Chuan Chen (Atomic Energy Council, Taipei) defined radioactive waste as material that contains, or is contaminated with, radionuclides at concentrations or activities greater than clearance levels set by the regulatory body. All activities connected to the nuclear fuel cycle produce radioactive waste. Medical, agricultural, and industrial activities can produce small quantities of radioactive waste, as well. Chen explained that waste is managed according to the amount and types of radioactivity it contains. The IAEA classifies radioactive waste in six categories: exempt waste (EW), very low level waste (VLLW), very short lived waste (VSLW), low level waste (LLW), intermediate level waste (ILW), and high level waste (HLW). Spent fuel (SF) and HLW require the greatest degrees of containment and isolation as the generation of heat is significant. Typically, there are two main ways to manage HLW: through the open cycle (pool storage, interim storage, final disposal) and through the closed cycle (which includes reprocessing). New strategies proposed include centralized storage, and deep borehole sites. While China and Japan have established reprocessing facilities, countries like South Korea intend to adopt one and plan to construct a centralized storage facility by 2051.

Managing radioactive waste is particularly challenging due to difficulties associated with siting, the high costs, uncertainties regarding long-term impacts, and adverse public

perception. Chen explained how public involvement and regional cooperation are essential to overcome these challenges.

Togzhan Kassenova (Carnegie Endowment for International Peace, USA) presented Kazakhstan's experience in managing nuclear and radiological waste. The country inherited significant amounts of spent fuel, nuclear waste, and numerous nuclear military facilities, including 1,410 nuclear warheads, from the Soviet Union. In an effort to manage a large quantity of radioactive waste, Kazatomprom, the national operator of Kazakhstan for power plants, proposed to buy and import foreign waste and to use the revenues to dispose domestic waste as well. The proposal was later abandoned due to fierce public opposition. Thanks to the assistance of the United States Department of Energy, Kazakhstan was able to remove spent fuel from the reactor site and transport it to a long-term storage facility for encapsulated radiation sources at a former nuclear testing site (Baikal-1 at Semipalatinsk). The spent fuel was placed in 60 dry casks weighing 100 metric tons each.

The Kazakh experience demonstrated how poor public awareness, inadequate information, and the lack of trust in governments can complicate management of radioactive waste and nuclear-related issues in general. To deal with public reaction to uncertainty, participants suggested the adoption of short- and long-term communication and trust-building strategies to educate the public on the threats and risks associated with waste management and nuclear power generation. The discussion highlighted how the involvement of nongovernmental organizations (such as Pacific Forum and RSIS) is crucial, given their bridging role between governments and civil society.

Doug Osborn (Sandia National Laboratories, USA) provided a summary of an ongoing project to evaluate the dynamics between safety-security-safeguards considerations involved in the shipment of spent nuclear fuel. With the increase in international transportation of spent nuclear fuel (SNF), it is important to understand how these considerations, which are often handled separately and disjointedly, can create unexpected problems with unanticipated consequences. The study provided an integrated evaluation of the threat environment, the response to credible malevolent acts, and the operational security requirements for protecting spent fuel and high-level waste while in transport. Using this integrated approach, the study concluded that while some interdependencies may reduce overall risk, others are potentially conflicting and increase risk. Specifically, slow, inefficient safeguards inspections and safety-mandated speed limits could increase security risk. Tamper-indicating devices could cause cask integrity issues. The research showed the need for additional work to develop a technically rigorous approach that took the integrated risks into account to evaluate and mitigate SNF transportation risks.

### **Nuclear Accident/Incident Response**

The fifth session focused on nuclear emergencies and on the different response strategies to them.

After explaining the differences between nuclear accidents and nuclear incidents, Manpreet Sethi (Center for Air Power Studies, India), offered an overview of the most common strategies employed to handle both types of nuclear emergencies. On-site nuclear incidents usually require only technical fixes to address the cause of the incident, and might not necessarily require informing the public; off-site nuclear incidents and nuclear accidents, on the other hand, often require coordination with domestic and international agencies, and public mobilization. Despite the existence of a strong international framework on nuclear emergencies response, which includes the Convention on Early Notification of a Nuclear Accident and the IAEA Code of Conduct, and a wide range of efficient technological tools that allow a quick detection, impact assessment, and response to emergencies, nuclear emergency preparedness and response still needs significant improvement. Inter-agency cooperation, greater national commitment, and joint drills and exercises were some of the suggestions proposed. Sethi highlighted that attention should be given to national cultural traits, which often play a role in understanding and implementing international guidelines.

Doug Osborn (Sandia National Laboratories, USA) focused his presentation on the US Nuclear Regulatory Commission's State-of-the-Art Reactor Consequence Analyses (SOARCA) Project. The project began in 2007 with the primary objective of developing "knowledge of the realistic outcomes of severe reactor accidents in the US civilian nuclear reactor sites" and of establishing "new approaches to evaluating consequences of severe accidents that are not equivalent to current full scope PRA concepts." The project specifically looked at three nuclear power reactors in the United States: the Peach Bottom Atomic Power Station, the Surry Power Station, and the Sequoyah Nuclear Generating Station. During the analysis, the project combined up-to-date information about the plants' layout and operations with local data and emergency preparedness plans. This information was then analyzed using state-of-the-art computer codes that incorporate decades of research into severe reactor accidents. The project has so far drawn conclusions suggesting that public health consequences from severe nuclear accident scenarios modeled are smaller than 1982 SNL Siting Study (NUREG/CR-2239); the delay in releases calculated provide more time for emergency response actions such as evacuating or sheltering; a major determinant of source term magnitude is the length of time the safety relief valve remains open; health-effect risks vary sub-linearly with the source term because people are not allowed to return to their homes until dose is below habitability criterion; the use of multiple regression techniques provides better explanatory power in determining which input parameters are most important to uncertainty in results.

The discussion focused on how public awareness, education, and proper communication strategies are a key variable in reducing anxiety associated with nuclear incidents/accidents. Nuclear accidents and off-site nuclear incidents, in fact, often require the adoption of extreme measures including evacuation of interested areas, which generate long term consequences such as public post-traumatic shocks. Adequately educating the population regarding the real risks deriving from radiation would help avoid irrational and dangerous behaviors dictated by fear and anxiety.

Several participants noted that one of the main problems during the 2011 Fukushima disaster was that emergency responders were not adequately prepared for an unexpected crisis. Enhanced training courses along with drills and exercises with constantly-changing scenarios would help develop adaptability skills, which are decisive in a nuclear incident/accident. Such exercises should be organized not only for nuclear operators, but also for other stakeholders, including first responders such as medical personnel, rescuers, police, and civilians.

### **Preventing/Managing a Nuclear Accident/Incident in Asia**

The workshop attendees also examined ways to prepare and prevent nuclear emergencies in Asia. Alistair Cook (Center for Non-Traditional Security Studies, Singapore) led off with an analysis of existing nuclear emergency preparedness and response mechanisms in East Asian countries, including Indonesia, Malaysia, Philippines, Thailand, Vietnam, Republic of Korea, and Japan. Cook also provided an overview of regional initiatives in Southeast Asia that are involved with the broader area of disaster management, including the ASEAN Vision 2025 on Disaster Management, the AADMER partnership group and the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre). He argued that greater coordination between such bodies and nuclear emergency and response planning would be a natural outgrowth from current practice. Coordination between the IAEA, ASEANTOM, and the Regional Organizations Humanitarian Action Network (ROHAN) would also promote greater understanding of requirements associated with nuclear emergency preparedness and response.

Nguyen Nhi Dien (Da Lat Nuclear Research Institute, Vietnam) provided an assessment of Vietnam's program to ensure local and national preparedness to prevent and manage nuclear emergencies. Vietnam is expected to sign contracts for its first Nuclear power plant (NPP) in 2017 and start construction between 2020 and 2028. At present, the country has approved national legislation, signed legal frameworks, and joined international treaties and initiatives. In particular, Vietnam approved its first Atomic Energy Law in 2008, which contains provisions on nuclear and radiological EP&R, and categorizes different nuclear emergencies. The country has also adopted a "Master Plan for radiological environment monitoring and warning network" with the aim of establishing a national network to promptly detect abnormal radiation and provide support and assistance during emergency response. The network is expected to be operating in 2020. Additionally, in October 2014, the country has signed Circular 25/2014/TT-BKHHCN, which requires the development and approval of local radiological and nuclear emergency plans. Despite notable national efforts in adopting regulations and in creating a strong legal framework, Nguyen noted how some regional facilities have lagged in preparing and implementing nuclear and radiological EP&R plans.

Discussion following the presentations included suggestions preventing and preparing for nuclear incidents/accidents. The integration of technical tools such as radiological monitoring systems was considered very important as they provide quick impact assessments to facilitate more timely responses to emergencies. It was also suggested that

an IAEA working group be established where stakeholders could exchange knowledge and information on the use of these tools.

### **Wrap up and next steps**

The meeting concluded with several suggestions for topics that require further exploration at the next Nuclear Energy Experts Group meeting, which will be held in the first months of 2017. Suggestions for the agenda included: new technologies for nuclear energy, radioactive waste management, spent fuel management, alternatives to radioactive sources for medical isotopes, nuclear forensics, safeguards, physical protection requirements for nuclear facilities, communication with the public, development of national nuclear energy policies, the role of ASEANTOM in promoting nuclear security and implementing nuclear energy programs, and cyber nuclear security.

## Appendix A

### COUNCIL FOR SECURITY COOPERATION IN THE ASIA PACIFIC Nuclear Energy Experts Group Meeting, Sept 19-20, 2016, Singapore

#### Agenda

##### Monday, September 19, 2016

8:45 **Registration/Welcome**

9:15 **Session 1: After the Nuclear Security Summit Process**

This session will assess the Nuclear Security Summit process and reflect on next steps for nuclear security governance. What has the Summit process achieved? What are the remaining gaps and limitations? To what extent does the Joint Statement on “Strengthening Nuclear Security Implementation” (INFCIRC/869) address those gaps and limitations? What does it entail? Specifically, are the “fundamental principles” and “recommendations” contained in the IAEA Nuclear Security Series adequate? Can they be improved? What else needs to be done?

Speaker: Miles Pomper

10:45 **Coffee Break**

11:00 **Session 2: Nuclear Security Governance in Asia**

This session will assess the impact of the Nuclear Security Summit process in Asia and identify options for future progress. What impact has the Summit process had in Asia, specifically? What regional institutions have a role in providing and promoting nuclear security governance in Asia? What are the priorities and next steps to enhance nuclear security governance in the region? What is the best strategy to do so? Who should/can lead these efforts in Asia?

Speaker: Zhu Xuhui  
Pantip Ampornrat

12:30 **Lunch**

13:45 **Session 3: The Nuclear Safety Regime**

This session will focus on the nuclear safety regime. What are its goals and main components? What is the role of the Convention on Nuclear Safety? What is the role of the IAEA? Are current nuclear safety standards adequate? What can be done to improve them? What are the roles and responsibilities of public and private entities in implementing nuclear safety? To what extent have Asian countries implemented the nuclear safety regime? What challenges are they facing? How can these challenges be overcome? Is there a need for a stronger nuclear safety culture in Asia? Which regional organizations should be involved in addressing nuclear safety? What nuclear safety cooperation exists in Asia? How can it be enhanced?

Speakers: Jor-Shan Choi  
Julius Trajano

15:15 **Coffee Break**

15:30 **Session 4: Radioactive/Nuclear Waste Management**

This session will examine radioactive/nuclear waste management. What is radioactive/nuclear waste? What are the sources of waste? How is it classified? How is it regulated? What are the options to manage waste in its initial “life” and over the long-term? How are Asian countries dealing with waste? What are the challenges in the region? How can these challenges be addressed?

Speakers: Wen-Chuan Chen  
Togzhan Kassenova  
Douglas Osborn

17:00 **Session adjourns**

**Tuesday, September 20, 2016**

9:15 **Session 5: Nuclear Accident/Incident Response**

This session will explore options to respond to a nuclear accident or incident. What treaties, conventions, and protocols relate to incident/accident response? What are the standard operating procedures to deal with a nuclear accident/incident? What capacities and capabilities are required to respond to a nuclear accident/incident? What are the roles and responsibilities of international organizations, in particular the IAEA? Does responding to a nuclear accident require a different approach from responding to a nuclear incident? [Asia-specific discussions should be withheld until the next session.]

Speakers: Manpreet Sethi  
Douglas Osborn

10:30 **Coffee Break**

10:45 **Session 6: Preventing/Managing a Nuclear Accident/Incident in Asia**

This session will look at Asia’s level of preparedness to prevent and manage a nuclear accident/incident. How prepared are Asian countries to respond to a nuclear incident/accident? How can they improve their level of preparedness? What are the roles and responsibilities of regional organizations and initiatives? What coordination exists between these organizations and initiatives? What improvements should be made?

Speakers: Alistair Cook  
Nguyen Nhi Dien

12:00 **Wrap-Up and Next Steps**

This session will summarize the meeting’s key findings and reflect on next steps to enhance nuclear safety and security governance in Asia.

12:30 **Lunch**

13:30 **Meeting Adjourns**

## Appendix B

### COUNCIL FOR SECURITY COOPERATION IN THE ASIA PACIFIC Nuclear Energy Experts Group Meeting September 19-20, 2016, Singapore

#### Participant List

- 1. Sulfikar AMIR**  
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