Confidence Building in Peaceful Use of Nuclear Energy
Transparency and Human Resource Development in Asia Pacific Region

Yusuke Kuno

Nuclear Nonproliferation Science and
Technology Center
Japan Atomic Energy Agency (JAEA)
&
Nuclear Engineering and Management,
The University of Tokyo (UT)

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Regional Cooperation in Nuclear Energy

- Forum for <u>Nuclear</u> Cooperation in Asia (FNCA)
  - Subject
    - <u>Use of Research reactor</u>
    - <u>Application of radiation</u> etc.

- Regional Cooperative Agreement for Research, Development and Training Related to <u>Nuclear</u> Science and Technology (RCA)
  - Subject
    - Use of Research reactor
    - Application of radiation etc.
- ASEAN Regional Forum (ARF)
  - Objectives
    - to foster constructive dialogue and consultation on political and security issues of common interest and concern; and
    - to make significant contributions to efforts towards <u>confidence-building</u> and preventive diplomacy in the Asia-Pacific region, including <u>nuclear security</u>
- Asian Senior-level Talks on Non-Proliferation (ASTOP)
  - Subject
    - <u>Denuclearization</u> of Korean Peninsula
    - <u>PSI</u>
    - <u>Export Control</u> etc.

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Accession to Frameworks in the Region

Country or Region	ASEAN (+3)	Nuclear Power Station (Research Reactor)	FNCA	RAC	ARF	ASTOP	NPT	IAEA Safeguards	Additional Protocol	CTBT	NSG	PPC	PSI
China	(O)	O (O)	O	O	O	O	O	Voluntary	O	△	O	O	
Korea	(O)	O (O)	O	O	O	O	O	O	O	O	O	O	
Japan	(O)	O (O)	O	O	O	O	O	O	O	O	O	O	O
(Taiwan)		O (O)						**	**				
DPRK		(O)			O		*	*					
Singapore	O			O	O	O	O	O	O	O			O
Malaysia	O	(O)	O	O	O	O	O	O	△	O			
Thailand	O	(O)	O	O	O	O	O	O	△	△			O
Philippines	O		O	O	O	O	O	O	△	O		O	O
Indonesia	O	(O)	O	O	O	O	O	O	O	△		O	
Vietnam	O	(O)	O	O	O	O	O	O	△	O			
Laos	O				O	O	O	O		O			
Cambodia	O				O	O	O	O		O		O	O
Myanmar	O			O	O	O	O	O		△			

ASTOP : Asian Senior-level Talks on Non-Proliferation
FNCA : Forum for Nuclear Cooperation in Asia
RAC : Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology
PPC : Convention on the Physical Protection of Nuclear Material
*DPRK announced its withdrawal from the NPT on Jan. 10, 2003
**IAEA applies safeguards, including the measures foreseen in the Model Additional Protocol, in Taiwan, China.
For Additional Protocol, CTBT and PPC, :O:in force, △:signature

Nuclear Transparency

- Nuclear transparency was actively discussed in 1990's along with growing internet technology in the stream of,
  - arms control,
  - IAEA safeguards with Additional Protocol implementation, and
  - disclosure of safety information

- In Japan
  - Nuclear facility operators and local governments share information on facility and environmental safety using internet
  - Its purpose is to share the information with domestic public

Nuclear Transparency Features

- ## Definition (JAEA-based)
  - "a cooperative process of providing information to all interested parties so that they can independently assess the safety, and legitimate management of nuclear materials."

    References : "Nuclear Facility Transparency: Definitions and Concepts",
    C. D. Harmon, J. N. Olsen, and H. D. Passell, SAND2000-2400C, October 2000

- ## Features
  - Voluntary process
  - Beyond information disclosure
  - Qualitatively (and quantitatively) enough for understanding and for independent assessment.

Real time Output Data of Nuclear Power Plant of Tokyo Electric Power Company in Japan

http://www.tepco.co.jp/fukushima2-np/monitoring/index1.html

2008年6月10日 15:10

●発電機の定格出力1100MWに対する割合

号　機	発電機出力現在値
1号機	101 %
2号機	102 %
3号機	101 %
4号機	102 %

Cooperation in Nuclear Non-Proliferation

- **Council for Security Cooperation in the Asia Pacific (CSCAP)**
  - Second track forum
  - Membership：
    - Australia, Brunei Darussalam, Cambodia, Canada, China, EU, India, Indonesia, Japan, DPRK, South Korea, Malaysia, Mongolia, New Zealand, Papa New Guinea, Philippines, Russia, Singapore, Thailand, USA, Vietnam
  - Confidence and Security Building Measures in the Asia Pacific
    - Building Confidence through Nuclear Transparency
    - Nuclear Transparency in the Asia Pacific

Confidence Building through
Nuclear Transparency

http://www.cscap.nuctrans.org/
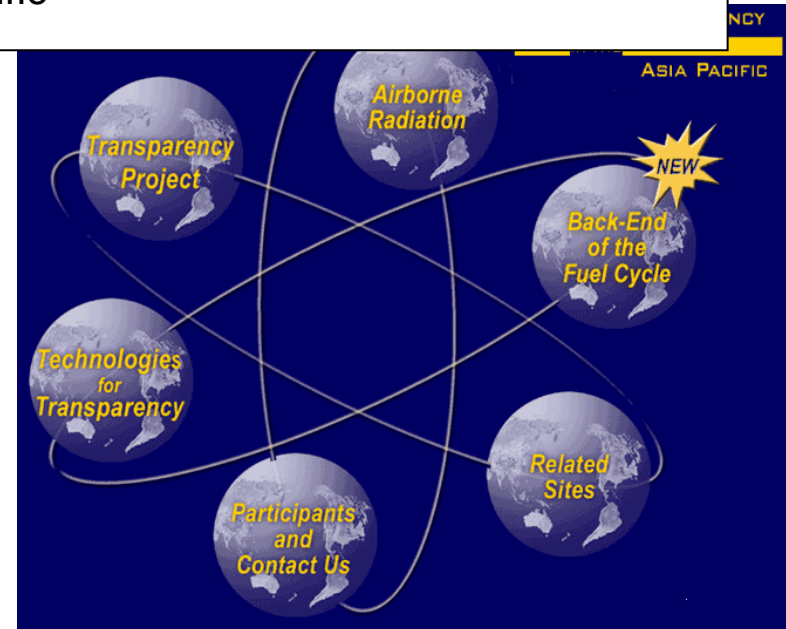
Workshop on Transparency Technology for Nonproliferation Cooperation in the Asia Pacific
– Applications of Remote Monitoring and Secure Communications for Regional Confidence Building –

Tokyo, Japan, 20-22 February 2008

Co-Sponsored by JAEA/NPSTC and the University of Tokyo GLOBAL-COE/NERI

- Participants: approx. 70 nuclear energy professionals, experts, and students.

- Invited attendees included government agencies and ministries, research laboratories, industry, facility operators, NGOs, and academia involved with Asia Pacific nuclear energy development. Representation included Indonesia, Vietnam, Republic of Korea, Australia, Japan, and the US

- The intersection of transparency, technology, and regional confidence building were discussed and explored.

The focus of discussions were:

- Increasing regional confidence in traditional IAEA safeguards and the NPT regime using cooperative technology and confidence building activities as supplemental transparency measures.

- Transparency technology, remote monitoring, and secure communications methods supportive of nonproliferation commitments and goals that further the development and acceptance of peaceful nuclear energy in the Asia Pacific.

- Practical technical applications, issues, and problems associated with remote monitoring transparency when used as a confidence building measure that is complementary, but supplemental, to IAEA safeguards.

- Promote university nuclear energy student participation and leadership in nuclear energy development and nonproliferation.
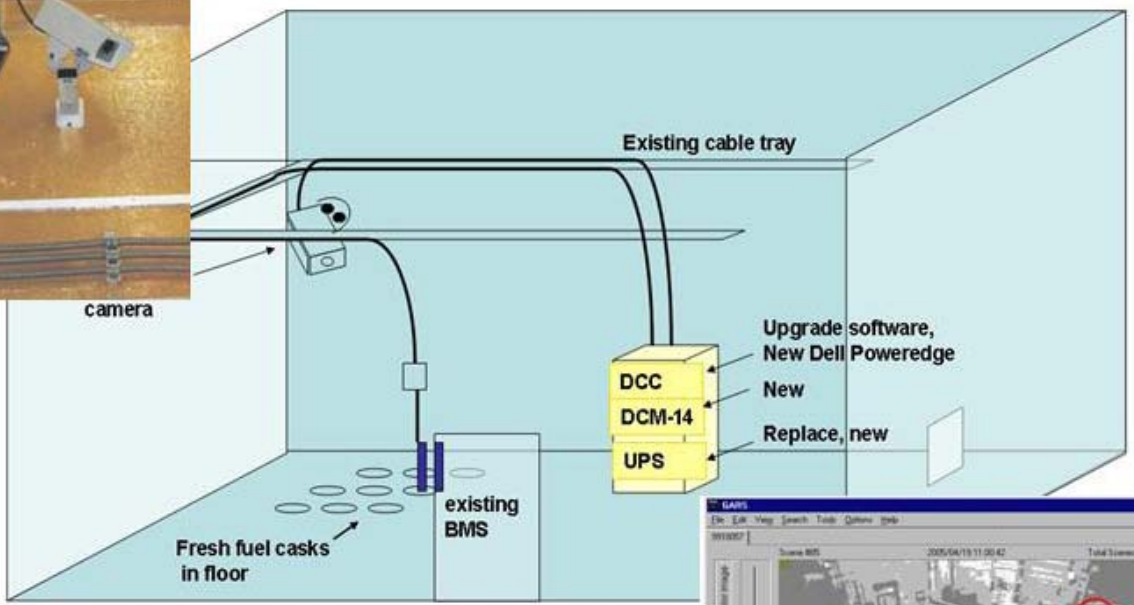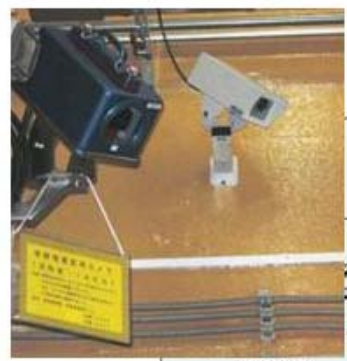
Transparency and the IAEA

- Standardized IAEA methods, technologies, and hardware were duly acknowledged as the reliable, time-tested, cornerstone and benchmark of traditional Safeguards.

- Some participants argued that the IAEA safeguards system was itself a transparency measure. Others felt that the IAEA safeguards system is distinctly not transparent – depending on the perspective of the viewer.

- Therefore, some additional assurances could also help to support the credibility of the IAEA. The concept of cooperative transparency, therefore, supplements international Safeguards.

- To be effective, an important goal of cooperative transparency is to synergistically work in parallel with the IAEA Safeguards process; not in competition with it. Therefore, cooperative transparency is envisioned as a voluntary approach by participating parties that increases confidence in the reviewed party's openness and willingness to comply with nonproliferation goals.

Regional Transparency Activities

- The Workshop was designed to explore the concept of transparency as used for nonproliferation within the region.

- Regional safeguards research consortium, such as recently proposed by the Australian Safeguards and Nonproliferation Office or even a regional system of accounting (a "PACATOM" or "ASIATOM" for example), would have important regional transparency benefits.

- JAEA and KINAC participants both pointed to their long-term efforts to establish a bilateral data exchange program as an effort which might pave the way for broader, regional cooperation in the future.

Experimental Test Bed – Joyo Fresh Fuel Storage Remote Monitoring Transparency Technology

Concept Development for a Regional Transparency Technology Network

Future cooperation between Japan and the ROK may allow regional technology & information sharing, and network development

- Japan, ROK, & US as charter members

- Other regional parties could join

- IAEA as interested observer

- Sharing development of remote monitoring and secure communication technology

- Potential future sharing of safeguards-related information for enhanced transparency
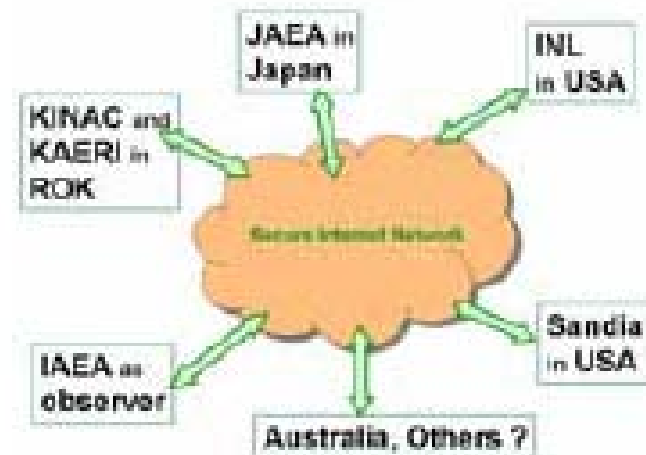
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Vulnerability of Transparency

- Nearly all Workshop participants highlighted that there are some potential downsides to transparency. Most commonly noted were concerns that transparency efforts might create security vulnerabilities, e.g. the data should respond if the data suggested an anomaly.

Transparency, Data Authentication, and Security

- There was a healthy debate about the importance of authenticating or securing the data being shared.

- Some participants argued that data, which are not authenticated or secured, offer little value.

- There may even be a risk that in the absence of such data protections, data might be maliciously manipulated before it reaches the receiver with the intent of exacerbating suspicions and tensions.

- Majority of participants appeared to agree that authentication of data is needed only when to apply to the acquisition and transmission of IAEA safeguards information, while data transfer for transparency purpose on specific information such as plant operation should be secured.

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The Effectiveness of Transparency

- Additional cost and burden for the operators?

- However, it was acknowledged by the participants that transparency in general, even though difficult to measure its effectiveness, is a positive approach toward developing regional understanding and acceptance of the development of peaceful nuclear energy.

- And, in practice, there may be cost-saving benefits of the supplemental monitoring activities that could, in the long run, help lessen the burden on, and/ or show additional effectiveness of traditional safeguards information if it were complementary and supportive in nature.

The Importance of Transparency Education

- Educational needs of the public and professional communities are identified as an area where further collaboration and educational activities could add value to cooperation and transparency, overall.

- Education of the next generation of nuclear energy experts who can understand the importance of the transparency was also recognized as a critical need for the development of safe and peaceful nuclear energy. This education was encouraged through the interaction and involvement of the gathered group of experts.

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The Importance of Transparency Education (cont'd)

- The nuclear energy students reported that they gained useful knowledge and insights, not only regarding the technical aspects of the Workshop subject, but also valuable experience in the conduct and self-participation in such events.

- In conclusion, a valuable lesson learned from the Workshop is the realization, emphasis, and need for adequate and appropriate education at all levels, and on an on-going basis as issues, events, and technologies unfold. Therefore, education regarding the IAEA, a state's nuclear energy plans, etc, is clearly as important for Transparency as the technical approaches and methods that are used for monitoring and verification.

Conclusion and Recommendations

- The participants agreed that transparency has many roles and definitions, and that its usefulness ranges for verification and compliance with the NPT to building trust and confidence in the activities of the state and other regional nuclear energy players.

- Cooperative transparency and technologies are complementary to, but do not replace a country's traditional approach to IAEA Safeguards

- The use of remote monitoring and cooperative transparency technologies for nonproliferation support the regional acceptance of nuclear energy development.

Conclusion and Recommendations (cont'd)

- Technology, hardware, software, and methods might be used in a cooperative demonstration of information or data sharing.

- The needs for education among the professional community, public, operators, and regulators, as well as those for the next generation of nuclear energy experts are a key factor in transparency effectiveness.

- As evidenced by this Workshop, transparency for nonproliferation and confidence building in a regional, or any other, setting is a complex subject that requires time, perseverance, and creativity to accomplish. The Workshop confirmed that there remains keen interest in the transparency subject despite its many challenges, and opportunities.

New Department of University of Tokyo

for the needs for education the next generation of nuclear energy experts

Department of Nuclear Engineering and Management including non-proliferation study was established in Graduate School of Engineering of University of Tokyo in April 2005.
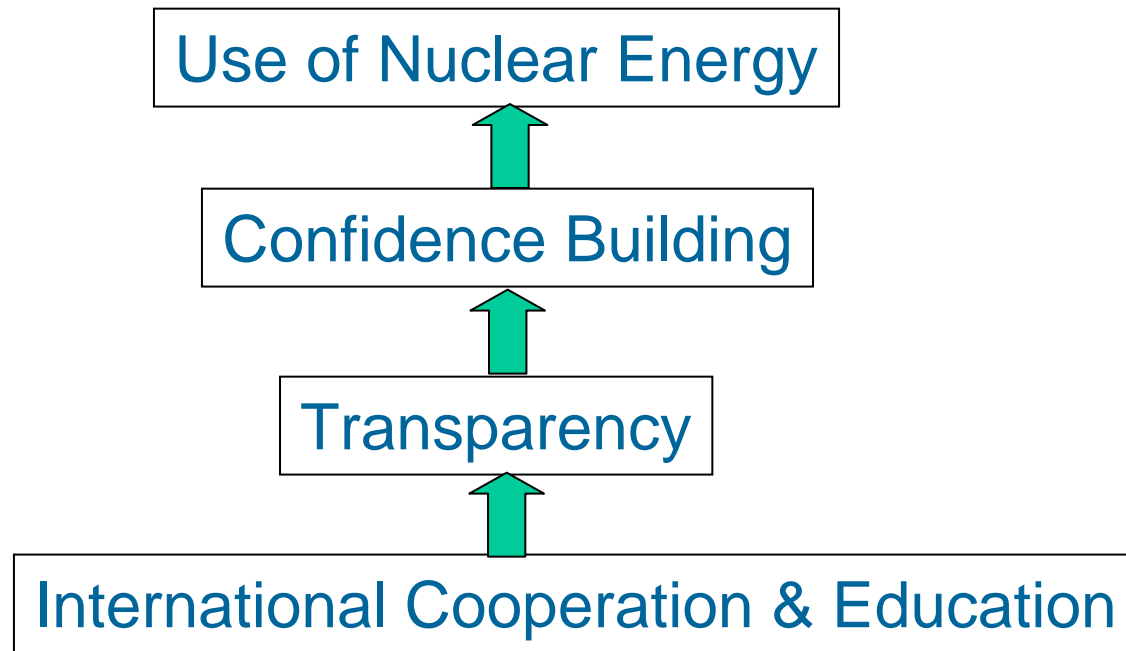
- Increase in international needs in nuclear infrastructure (need to increase the number of Japanese human resources contributing to the international nuclear activities)
- Increase in Japanese role of nuclear nonproliferation

Nuclear Socio-Engineering Network
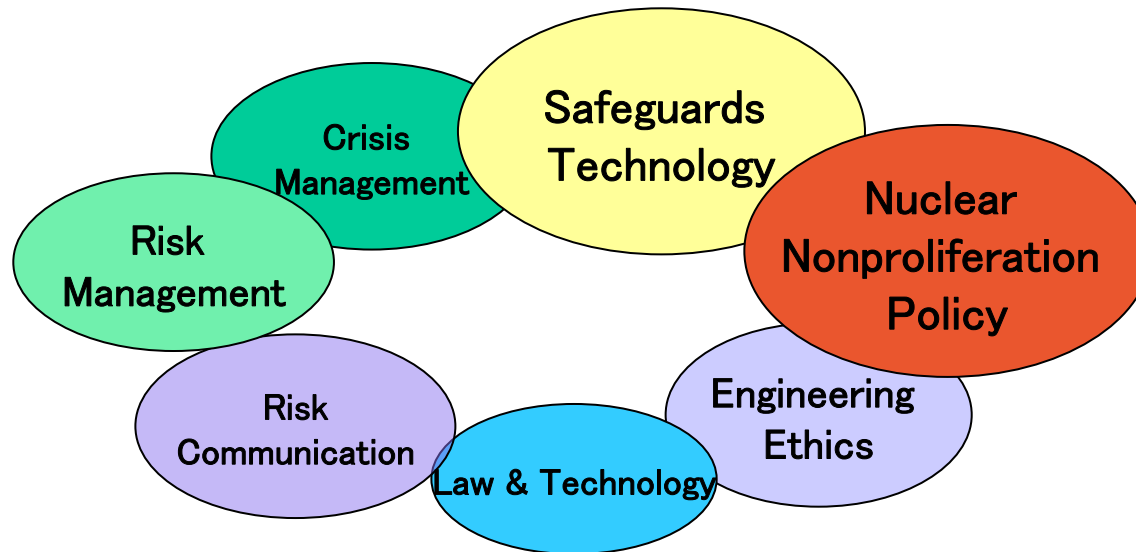
Study Areas of Nuclear Non-proliferation / Safeguards Technology

- Nuclear Nonproliferation Policies
- Proliferation-Resistant Technologies
- Advanced Technologies for International Safeguards
- International Projects / Multi-national Approach on Nuclear Fuel Cycles
- International and Regional Cooperation
- Others

Thank you for your attention