

The World Nuclear University Summer Institute

Sharing Experience



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JL Gray Building, Deep River - November 24, 2005



The World Nuclear University Summer Institute

Sharing Experience

- **What is the WNU?**
- **What is the Summer Institute?**
 - Goals
 - Location and hosts
 - Fellows
 - Topics
 - Leadership lecturers and special speakers
 - Mentor groups and project teams
 - Field trips and tours
- **After all...**

What is the WNU?



Founding Organizations

- International Atomic Energy Agency (IAEA)
- Nuclear Energy Agency (NEA) of the Organization for Economic Development (OECD)
- World Association of Nuclear Operators (WANO)
- World Nuclear Association (WNA)

Mission

- *“to strengthen the international community of people and institutions so as to guide and further develop the safe and increasing use of nuclear power as the one proven technology able to produce clean energy on a large global scale; and the many valuable applications of nuclear science and technology that contribute to sustainable agriculture, medicine, nutrition, industrial development, management of fresh water resources and environmental protection.”*



What is the Summer Institute?

Goals

- *Present cutting-edge knowledge and broad international perspective on the full range of political, environmental and social issues surrounding the peaceful application of nuclear technology;*
- *Expose participants to the world's leading thinkers and educators in topics relevant to nuclear applications;*
- *Enable participants to experience practical teamwork, and to establish lasting bonds, with peers from many nations; and*
- *Inspire participants to commit themselves to advancing the global contribution of nuclear science and technology.*

What is the Summer Institute?

Hosts

- US Department of Energy
- Idaho National Laboratory
- Center for Advanced Energy Studies
- Idaho State University
- Boise State University
- University of Idaho

Location

- Idaho Falls, Idaho
- Las Vegas, Nevada



What is the Summer Institute?

Fellows

- 76 students and young professionals
- 63 organizations
- 33 countries



What is the Summer Institute?

Leadership Lecturers

- Susan Eisenhower
- James Lake
- Rich Hooper
- Dimitri Perricos
- Geoffrey Ballard
- Zack Pate



Special Speakers

- John Ritch
- Hans Blix
- Senator Crapo
- Senator Craig
- Warren Nyer

What is the Summer Institute?

Lectures / Topics

- global environmental issues
- geopolitics and economics
- nuclear law
- security and safeguards
- public communication
- excellence in management/operations
- technical topics included radiation protection, nuclear fuel cycle, waste management, decommissioning, reactor designs
- future applications such as hydrogen economy, space applications and fusion





Public Communication

■ Health

- Medical diagnosis
- Cancer treatment
- Clean air benefits
- Health effects of a radiation dose (statistics and delayed effects)

■ Safety

- Operating records
- Safe plant design
- Technology for waste disposal and storage
- Transport safety
- Operating experience
- Safety analysis (statistics)

■ Technical Applications

- Food irradiation
- Crop development
- Sterile insect technology
- Thickness measurement
- Limited daily exposure to technical applications



Public Communication

- Research, prepare and understand
- Be aware
 - ...of the advantages and understand the issues
 - ...of statistics and strictly technical information
- Be proactive and honest
- Use positive language
 - For example, talk of safety rather than risk and refer to inherent or natural safety systems rather than passive (implies lazy, not doing anything)
- Communicate a clear message



Geopolitics and Economics

■ Complexity of the situation

- ✓ World population growth \Rightarrow increasing energy demand
- ✓ Environment - emission trading / Kyoto
- ✓ Lack of natural resources
- ✓ Oil dependency
- ✓ Deregulation
- ✓ Waste management

**Bottom line is sometimes ignored
(referenda in Germany and Sweden)**



Geopolitics and Economics

- For new build:
 - ✓ Need to internalize the externalities (full life cycle needs to be considered)
 - ✓ At the end, economics is the main driver so the nuclear option will be chosen if proven to be the most cost-effective



Operational Excellence

- QA Full Circle - Efficiency versus number of procedures
- Safety and operation are intertwined due to consequence of accident (downtime and public perception)
- Safest plants show highest capacity factors
- PSA: transition from risk-based to risk-informed approach
- For accident/incident management, TMI taught to move from event-based procedures to symptom-based procedures



Operational Excellence

- Efficient use of feedback (database of event, WANO, INPO, OPEX...)
- Importance of training
- Optimised preventive maintenance
- Continuous improvement mentality
- Three key elements:
 - ✓ trust
 - ✓ foster questioning attitude
 - ✓ have in place a solid corrective action program



Human Factor/Networking

- Besides knowledge imparted by speakers, mentors and other fellows... ⇒ **human factor/networking**
- More advanced technology (communication and travel) does not necessarily result in better communication ⇒ **relevance of meeting people**
- Worldwide perspectives and opinions, develop an understanding of where different countries are at with respect with public opinion, operation, new build, waste management...
- Two of the goals of WNU: build relationships + increase commitment



Human Factor/Networking

- What has been done so far?
 - ✓ Networking between participants (fellows, speakers, mentors)
 - ✓ Networking within our company
 - ✓ Tours being organized in various countries
 - ✓ Writing a paper and attending conference
 - ✓ Tying up to YGN network
 - ✓ Better appreciation/understanding of other cultures
- What can be achieved?
 - ✓ Larger network
 - ✓ Young people but take time to build a network

What is the Summer Institute?

Mentor Groups

- Case studies
 - Safety culture
 - Nuclear law
 - Communications



- Lecture study sessions

Mentors:

Bob Seidel, Gil Brown, Yves Chelet,
Waclaw Gudowski, Debu Majumdar,
Jean-Louis Nigon, John Sackett and Alan Waltar



What is the Summer Institute?

Final Project Teams



- Development of a national energy policy for a specific country (Slovakia, Indonesia, China, South Africa, Germany and USA)
- Recommendations for new non-proliferation paradigms
- Programs of action for cancer therapy in developing countries (PACT)

National Energy Policy - Indonesia



Could Nuclear be an answer?

- Demand outpacing supply
- Weak power generation portfolio
- Severe air and water pollution problems
- Four decades of nuclear research experience



Yes...Nuclear Energy is a viable option for
Indonesia



There will be Challenges...

- Market Deregulation
- Seismic Activity
- Security Issues
- Fuel Cycle
- Workforce Training
- Knowledge Management
- Research Collaborations
- Organisational Infrastructure

National Energy Policy - Indonesia

■ Main conclusions for Indonesia



Deregulation



Workforce



Seismic



Knowledge



Security



Collaboration



Fuel Cycle



Organisation

PACT Mongolia



- 2.5 million people
- 1.565 million km²
- 60% in urban areas
- 1/3 desert
- Well educated people, high literacy rate (98%)

Health Care

- financing, insurance and framework

Cancer

- Highest incidence of liver, stomach, lung, esophagus, cervix and breast cancer



PACT Mongolia

Cancer Treatment Capacity

- 2 teletherapy ^{60}Co machines (one old)
- 2 brachytherapy units (HDR and LDR)
- Simulator (broken)
- Dosimetry system
- 2 treatment planning systems

Issues to be solved for increased capacity

- Technology
- Location
- Building modification
- Funding (donation?)
- Staff training



PACT Mongolia

Linear Accelerator or ^{60}Co -source

- No source replacement
- Precision in dose delivery
- No waste
- New technology
- Variable dose rate per min.
- Purchasing cost (\$1-2 million)
- New technology
- High power requirement



PACT Mongolia

Education and awareness

- Partner with existing organizations and participate in existing programs
- Prevention awareness at schools and with the public on diet and treatment options





What is the Summer Institute?

Field Trips & Tours

- Idaho National Laboratory
- Experimental Breeder Reactor I
- Yucca Mountain
- Hoover Dam

What is the Summer Institute?

Field Trips & Tours



■ Yucca Mountain

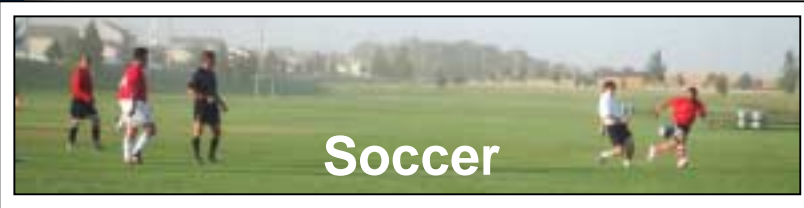
What is the Summer Institute?

Field Trips & Tours



■ Experimental Breeder Reactor I

Beyond the classroom



Soccer



Rodeo



Yellowstone



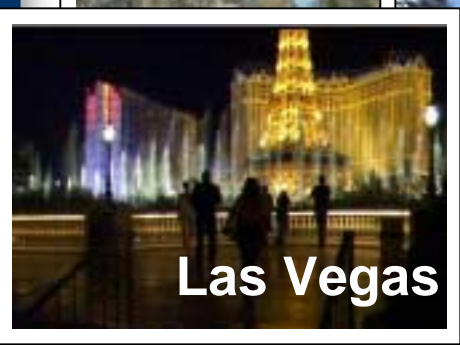
Rafting



Idaho Falls



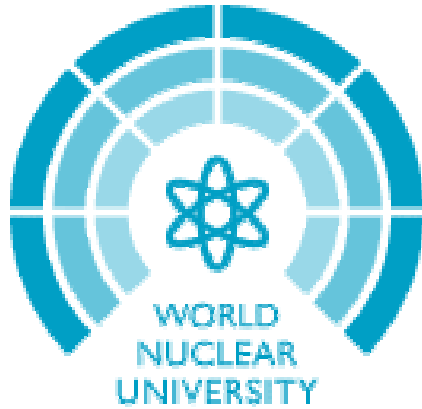
Mountain River Ranch



Las Vegas



Grand Teton National Park



Fellows' Declaration 1st World Nuclear University Summer Institute

Idaho Falls, USA
August 16, 2009

Today global energy demand is rising to new heights as the rapid growth of world population continues with an increasing international commitment to meet the needs of developing countries. The challenge of delivering an affordable and reliable energy supply to all while protecting the global environment will require greater energy efficiency and changes in energy consumption, particularly in the developed nations. The primary necessity, however, is a global transformation to a clean and sustainable energy supply. Nuclear power can make an important contribution to this goal.

Beyond providing a reliable source of electricity, nuclear technology is used in such areas as agriculture and food preservation, medical diagnosis and treatment, environmental research, industrial quality analysis, and insect pest control. We are confident that even more applications remain to be discovered. We also see the need to further expand the use of such valuable nuclear technologies.

We recognize that the use of nuclear technology poses unique challenges, including the need for strong and evolving safety and security standards, measures to minimize proliferation risks, and responsible management of radioactive waste from all nuclear applications.

We see these as global challenges that must and can be met through strong international collaboration.

We, the Fellows of the inaugural Summer Institute of the World Nuclear University, appeal to students and young professionals from around the world to join us in carrying the Atoms-for-Peace vision into the 21st century of nuclear science and technology. Our efforts must include contributing to public discussions, ensuring the responsible use of nuclear energy, and applications of nuclear technology for the benefit of humankind.



A collection of handwritten signatures in various colors and styles, arranged in several columns. The signatures are placed over a grid of lines, likely representing the names of the Fellows who signed the declaration. Some legible names include 'Roy Freund', 'Ma Stobbe', and 'Ch. A. Lopez'.



After all...



www.world-nuclear-university.org