

Technical Meeting on Planning Support Activities to the World Nuclear University

10-11 June 2004, Vienna, Austria

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Objectives of the meeting

The objective of the meeting was to bring together major stakeholders in the WNU process, including Founding Supporters, academia and potential donors, to review the overall status of WNU activities and their implementation, and to prepare a WNU Action Plan including the preparation of first milestones.

Background

The World Nuclear University (WNU) was established in September 2003. The WNU network of partnership includes the four “Founding Supporters” (WNA, WANO, IAEA, and OECD-NEA) and a worldwide array of leading institutions of nuclear education and research. Full details on the WNU network may be found on the WNU website at www.world-nuclear-university.org.

In the months following the inauguration, the WNU concept was further developed on an international level. Discussions involved all stakeholders, including Founding Supporters, educational and research institutions participating in the WNU network, potential corporate donors, and IAEA Member States.

In June 2004, under the Agency’s subprogramme C3 on *Managing Nuclear Knowledge* the Agency, as a Founding Supporter, convened a consultancy meeting to draft an Action Plan for WNU for the period 2005-2006, and this Technical Meeting to address the objective outlined above.

Work done

Mr. Y. Yanev opened the meeting and introduced the objectives and Terms of Reference; Mr. A. Alonso, Spain, chaired the meeting.

Mr. J. Ritch, DG WNA, presented the concept of WNU, the steps leading to the WNU inauguration, and subsequent progress including the results of discussions from the preceding consultancy meeting on WNU on 8-9 June 2004. Building on previous work, the consultancy had produced:

- A draft WNU Action Plan for 2005-2006;
- The draft concept of a WNU Summer Institute, beginning in 2005.

Advantages of WNU

The meeting agreed on the advantages of WNU for four groups of stakeholders: students, participating universities, industries using nuclear technology, and governments/multinational policy. These advantages are listed in Attachment 1.

WNU Action Plan for 2005-2006

The meeting discussed the present status of WNU, further developed the draft WNU Action Plan that had been prepared by the preceding consultancy meeting, and agreed that the WNU Action Plan should now be implemented by all stakeholders, including all of those with responsibilities for resource support and operational participation.

The agreed WNU Action Plan, shown in Attachment 2, covers the operation of the WNU in 2005-2006.

WNU Summer Institute in 2005

The meeting discussed and agreed on concept and content of a WNU Summer Institute as first deliverable of WNU. The concept of a WNU Summer Institute, to be held annually at different locations, has been developed as:

- A special contribution to building future leadership for the nuclear community;
- A valuable means of galvanizing cooperation within the WNU network during the initial stages of the WNU partnership.

The meeting agreed on the following Mission Statement for the WNU Summer Institute:

The purpose of the annual WNU Summer Institute is to provide a unique educational experience aimed at building future global leadership in the fields of nuclear science and technology.

The Summer Institute will do so by providing, to a select group of students and young professionals from throughout the world, a period of intense high-quality training designed to:

- *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;*
- *Inspire participants to commit themselves to advancing the global contribution of nuclear science and technology.*

The Summer Institute will serve both as a symbol and as a substantively valuable manifestation of the ongoing partnership established by the WNU among the world's leading institutions of nuclear learning, technology development, commerce, and policy governance.

The concept of the WNU Summer Institute is outlined in Attachments 3, 4, and 5, which cover Participation, Timeline for necessary preparation, and Courses to be delivered.

It was agreed that high-priority action should now be taken by all relevant stakeholders to implement the concept of the WNU Summer Institute.

Other expected deliverables of WNU

The WNU Working Groups will help to support the preparation of the Summer Institute. Other projected deliverables of WNU are listed in Attachment 6, including a major WNU Symposium in fall of 2006 to present and review the results of all of this cooperative activity.

Support mechanisms for WNU

Mr. Yanev presented the IAEA's position paper *Agency's Support to the World Nuclear University*, which had been developed through inter-departmental consultation following the WNU inauguration. This summary of the Agency's WNU support mechanisms is shown in Attachment 7. In addition, the *Abdus Salam International Centre for Theoretical Physics*, an important component of the UNESCO-IAEA family, will play an important role in the WNU, particularly through training and research involving physicists from developing countries.

It was understood by all meeting participants that implementation of the WNU Action Plan will depend crucially on the prompt contribution of necessary resources in the form of staff secondments to the WNU and financial support. Mr. Ritch emphasized that initial work in obtaining financial contributions and commitments had been highly encouraging. Thus, the critical component now remaining was the question of receiving high-quality staff secondments from key participating institutions and supporters.

In this regard, particular appreciation was expressed to France and China, both having committed to second one highly qualified staff contribution to the WNU HQ in London. Appreciation was also expressed for the IAEA's support for the WNU, as reflected in its hosting the meeting and its plans as reflected in Attachment 7.

Results achieved

Through hosting the meeting, the Agency supported the WNU process as outlined in the Agency's position paper on WNU.

Through the combination of this meeting and the preceding consultancy on 8-9 June, considerable progress was achieved in charting a path forward for implementing the WNU concept. This progress is reflected in the WNU Action Plan for 2005-2006 contained herein.

Recommendations

The meeting agreed that all relevant stakeholders should promptly take the full range of actions – and make the resource contributions – necessary to implement the WNU Action Plan, starting with the urgent steps needed to produce a first WNU Summer Institute in 2005.

Attachment 1: Advantages for WNU Stakeholders

1. Students

- At Participating Universities
 - Stronger curricula
 - Scholarship support for nuclear education
 - Enhanced qualifications for a global marketplace
- WNU Summer Institute Participants
 - Participation in a unique world-class educational experience
 - Global networking with peers and high-level professionals
 - Prestige and career advancement

2. Participating Universities

- Faculty opportunity for mobility and networking
- Prestige for nuclear department and university
- Funded world-class students (after creation of WNU Fellowship Fund)
- Enriched curriculum
- Efficient sharing of R & D facilities

3. Industries Using Nuclear Technology

- Increased prestige of the industry and profession
- Direct influence on coursework development
- Larger and stronger recruitment pool (equipped with “globalised” qualifications, teamwork experience and critical thinking)
- Opportunity to identify top recruitment prospects

4. Governments and Multinational Policy

- Stronger national educational systems
- Enhanced recruitment pool for policy and regulatory agencies
- A new generation of global “nuclear statesmen”
- Improved public perception of a technology critical to policy objectives
- A strengthened global industry to achieve those objectives

Attachment 2: WNU Action Plan

1. Overall Objective

- Identify, integrate and implement advanced strategies to enhance global education in nuclear science and engineering.

2. Near-Term Goals

- Initiate ongoing collaboration within the WNU network:
 - Inter-institutional cooperation (in harmony with the ENEN, ANENT, ERASMUS, EMNT) in the sharing of faculty, students, facilities, coursework through distance-learning
 - Identify and share best-practices in coursework and curricula, and develop new coursework where needed
 - Implement plan for unique future-leader-oriented WNU Summer Institute
 - Develop Industry Leadership Courses for nuclear CEO's, CFO's and board members
 - Pursue full results-oriented WNU agenda (see Attachment VI)
- Events
 - 2005 Summer Institute (leading students)
 - 2006 Summer Institute (leading students)
 - 2006 WNU Fall Symposium (culmination of 2 years of WNU collaboration)

3. Longer-Term Goals

- Prepare and deliver Public Education programme
 - Orientation Courses for government, commercial, scientific, media leaders
 - Public Presentation workshops for industry officials
- Establish WNU Fellowship Programme (philanthropic and corporate support)

4. Necessary Resources

- Staff secondments
- Funding

Attachment 3: Annual WNU Summer Institute Participation

Qualification criteria:

1. Master's level or equivalent experience in science or engineering, with knowledge of nuclear fundamentals; demonstrated academic or professional excellence
2. Proficiency in English, particularly oral communication
3. Maximum age of 30

Selection

- WNU will recruit applicants through the WNU network (WNU Founding Supporters and participating WNU institutions); applications to be submitted to London headquarters
- WNU Country Representatives will supervise national selection process, using national perspective and institutions to apply qualification criteria
- A WNU centralised selection committee makes final decision, choosing approximately 60 participants, aiming to reach a broad geographical distribution and a balance between developed and developing countries
- Overall aim is a synergistic mix of leading students and top young professionals already in the nuclear industry
- Funding support for students to come from various sources, including the WNU budget, special corporate contributions, and IAEA TC (as outlined in the IAEA's position paper on WNU support)

Attachment 4: WNU Summer Institute Implementation Timeline

	Jun 04	Jul 04	Aug 04	Sep 04	Oct 04	Nov 04	Dec 04	Jan 05	Feb 05	Mar 05	Apr 05	May 05	Jun 05	Jul05	Aug 05
Set Curriculum	x														
Confirm Site	x														
Activate WG Collaboration		x													
Begin Country Selection Prep		x													
Assure Funding				x											
Establish Action Team				x											
Issue S.I. Announcement				x											
Select Key Faculty					x										
Application Deadline						x									
Select Students							x								
Develop S.I. Programme		x	x	x	x	x	x	x	x	x	x	x	x		
Conduct First WNU S.I.														x	x

Attachment 5: WNU Summer Institute Courses

Activity	Sessions
Instruction	35
Teamwork	20
Field Trips, Special Activities	5
Total	60
Plus: Evening Lectures and Events	

Instruction Content	Sessions (units)	Topic
Global Setting		
	1	Global Energy Demand / Supply
	2	Global Climate / Environment / Sustainability
	2	Non-Power Applications
	1	Developing Country Presentations
International Regimes		
	4	Safety (Standards, Regimes, Risk Assessment, Roles of IAEA, WANO, ICRP)
	2	Radiological Protection / Health / Public Debate / LNT & Other Issues
	3	Security (Non-Proliferation, Physical Protection, Future Systems)
	3	Waste Management & Decommissioning (Science / Politics / Plans)
	1	Nuclear Transport
	2	Nuclear Law
Nuclear Industry		
	1	Nuclear Excellence & Operational Focus
	1	Comparative Risk Assessment
	2	Industry Economics
	2	Knowledge Management (Nuclear Work Force Projections, Succession Planning)
	1	Technology and Social Ethics

Instruction Content	Sessions (units)	Topic
	2	Public Communication (Polling / Psychology / Risk Communication)
Innovation		
	2	Innovative Nuclear Science & Technology (Gen-IV, INPRO, Advanced Fuel Cycle, national programmes)
	2	New Technologies (Hydrogen, Desalination, Fusion, Health)
	1	Global Emissions Control (Potential Regimes)
Total	35	

Attachment 6: Innovative Collaboration within the WNU Partnership: Projected Results

1) Knowledge Management

WNU Asset: Couple IAEA Programme to comprehensive WANO/WNA membership

- Activate worldwide knowledge retention plan at nuclear facilities
- Develop knowledge bases in various areas of nuclear science & technology
- Identify recommendations on succession planning
- Devise institutional strategies for nuclear information management

2) Global Nuclear Safety Culture

WNU Assets: Couple IAEA Materials to WNU University Network; Use WANO-Identified Needs to Shape WNU Education & Training

- Collate IAEA Safety Materials for Assimilation into WNU Network
- Devise safety education & training courses based on WANO experience
- Create special orientation courses for industry leadership

3) Reactor and Isotope Research

WNU Assets: Combine with ENEN and ANENT to Foster Trans-Regional Cooperation Among WNU Universities; Potential to Win Philanthropic Support for WNU-Sponsored Research

- Catalogue research programmes at WNU Universities
- Identify potential research partnerships
- Foster facility sharing
- Develop strategy for attracting philanthropic support for WNU-sponsored research

4) Nuclear Law

WNU Asset: Couple ISNL (Montpellier School) to WNU Network

- Identify needs in global nuclear law education
- Develop and implement plan for globalizing instruction in nuclear law

5) Nuclear Safeguards and Security

WNU Assets: Couple Institutional assets of IAEA, INMM, ESARDA, National Labs & Think Tanks to WNU Universities; Draw on World-Class Expertise in Creative Context

- Identify and make available best-practice non-proliferation courses
- Harmonise the work of non-proliferation institutions
- Support/complement the work of official IAEA activities with non-official consideration of innovative security concepts

6) Societies and Nuclear Technology

WNU Asset: Draw from Worldwide Experience to Develop Best-Practices in Public Education

- Design WNU-branded materials in multiple languages for school use
- Develop nuclear-orientation programmes for science teachers
- Establish WNU as a respected media-reference source
- Consider strategies for developing networks of influential nuclear-knowledgeable individuals and groups

7) Prospects in the Nuclear Profession

WNU Asset: Potential to assemble a global needed assessment – and deliver to a global audience of students – a comprehensive assessment of career prospects in the nuclear profession

- Prepare a comprehensive assessment of the future global use of nuclear power (building on studies by MIT/Harvard and UK's Royal Institute) and non-power technologies (building on national reports on the pervasive use of non-power applications)
- Consider possible feedback mechanisms by which industry can advise curriculum developers on anticipated industry needs
- Develop – for the use of faculty and students – a concise annual report outlining career prospects in the nuclear profession
- Design a transnational strategy for overcoming projected global shortfall in nuclear professionals

8) Special Projects

WNU Asset: Draw from Worldwide Expertise to Develop Unique and Respected Concept Papers on Topics of Critical Global Interest, with Substantial Value in Underpinning the Peaceful Use of Nuclear Technology

- Develop practical concepts for introducing nuclear expertise into all relevant international development agencies
- Devise the elements of a politically feasible global emissions reduction regime that would adequately incentivize a worldwide transformation to clean energy

Attachment 7: IAEA paper on *Agency's Support to the World Nuclear University*

The World Nuclear University (WNU) was inaugurated on the 4th September 2003 with a mission to strengthen the international community of people and institutions in their efforts to further develop:

- The safe and increasing use of nuclear power as a proven technology able to produce clean energy on a 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.

Through a worldwide network of established institutions of nuclear learning, the WNU will be seeking to promote academic rigour and high professional ethics in all phases of nuclear related activity. The WNU has been created as a forward looking initiative, offering new forms of co-operation for the world nuclear community and having as its main objective the synergy of people and ideas.

The Agency has been supportive in assisting WNU, particularly during the early formative stages, to define its mission and focus thus avoiding duplication and preventing potential rivalries and competition for the same resource. This paper represents the common approach in supporting WNU as an Agency wide knowledge management crosscutting activity*.

The overall objective in supporting the World Nuclear University is to leverage the value of the Agency's programmatic, training and educational activities by using WNU platform as an additional vehicle and tool for implementation, especially in cases where this offers better and more widely distributed results and impacts.

As a start it has been agreed that it will be appropriate for the Agency to:

- 1. Cooperate with WNU in activities aimed at improving the scope and quality of relevant nuclear science and technology-related educational courses worldwide. One particular aspect is course harmonization across the participating universities.
- 2. Offer students from developing countries access to good quality education courses in WNU member universities through dedicated fellowships, specific training courses, workshops and summer schools.
- 3. Promote the use of distance learning techniques for nuclear education by providing WNU access to Agency training material and participation in the development of new courses.
- 4. Work with WNU on attracting attention and increasing the number of students trained in nuclear science and technology worldwide by implementing outreach activities, facilitate networking in regions and involving students in innovative projects, field activities, etc.

The following is an initial list of support actions that can be implemented in 2004 and 2005 that can be linked to WNU:**

I. Provision of high quality training and/or training material to the member universities of WNU network:

- Department of NE – Training material and courses on energy planning, reactor simulator training, radioactive waste management; nuclear knowledge management; reactor technology.
- Department of NS*** - Training material in Nuclear Safety, Radiation Protection, Waste Safety, Nuclear Security,
- Department of NA – Training material and courses on nuclear non power technology and application, nuclear medicine, nuclear techniques in agriculture,
- Department of TC - relevant courses and other training materials for activities supported by TC wherever it is considered appropriate to involve WNU,
- Department of SG/EXPO – Contributions to courses/course modules on the safeguards system of the IAEA and its role in the nuclear non-proliferation regime
- Department MT/OLA – Training on Elements of Nuclear Law,

II. TC-supported fellowships at University Networks of WNU: A number of TC-sponsored fellowships could be implemented in WNU member universities where the Agency has an existing programmatic activity within on-going TC programme, or when there are specific requests from recipient Member States to support such fellowships. Three universities - Russia -MEPhI, Italy-University of Pavia, Argentina - University of Buenos Aires – would meet this option at present. All of them are working with the Agency and are also founding members of WNU. In addition, WNU would be strongly encouraged to fund additional relevant fellowships through its network and contributors.

III. Facilitated access to INIS and the Agency’s Library nuclear information resources, made available to WNU students. This may involve (subject to resource allocation) some short visits and training in Nuclear Information Management at IAEA headquarters for students of WNU.

IV. Inviting WNU to relevant Agency meetings and providing Agency facilities as a focal point/venue for WNU meetings,

V. Providing lecturers, where appropriate (see I) and especially for key training events (such as major summer school and workshops of WNU).

* Within the Agency the interaction and support to WNU should be coordinated through a single focal point.

**The IAEA’s recognition in all of the above activities is necessary as it underpins our assistance to Member States.

***Use of all IAEA training material by WNU is unrestricted, however whenever used proper reference should be made to the IAEA.

Attachment 8: List of participants at the Technical Meeting

	Name (Participant/Nominated)	Organization	Country
1	Mr. Zuoyi Zhang	Institute of Nuclear Energy Technology, Tsinghua University	China
2	H.E. Mr. Raimundo González Aninat	Representante Permanente de Chile ante el OIEA	Chile
3	Mr. Roberto Ebert G.	Alterno Representante Permanente de Chile ante el OIEA	Chile
4	Mr. Julio Vergara A.	Chilean Nuclear Energy Commission	Chile
5	Mr. Ravi Bhushan Grover	Bhabha Atomic Research Centre	India
6	Ms Fatimah Mohd Amin	Research Management Centre Malaysian Institute for Nuclear Technology Research	Malaysia
7	Mr. Augustin Alonso	Universidad Politécnica de Madrid	Spain
8	Mr. Jean-Louis Nigon	COGEMA	France
9	Mr. Richard Clegg	Manchester University	UK
10	Mr. Alan E. Waltar	Pacific Northwest National Lab.	USA
11	Mr. Gilbert J. Brown	University of Massachusetts Lowell	USA
12	Mr. Anselm Schaefer	Institute for Safety and Reliability GmbH	Germany
13	Ms. Keiko Hanamitsu	Japan Atomic Industrial Forum, Inc.	Japan
14	Mr. Antonio Faucitano	University of Pavia	Italy
15	Mr. B. N. Onykiy	Moscow Engineering Physics Institute (State University)	Russia
16	Mr. Eduard Kryuchkov	Moscow Engineering Physics Institute (State University)	Russia
17	Mr. Peter Paul De Regge	European Nuclear Education Network	ENEN
18	Mr. Sig Berg	World Association of Nuclear Operators	WANO
19	Mr. Patrick Reyners	Organisation for Economic Co- Operation and Development/ Nuclear Energy Agency	OECD/NEA
20	Mr. Claudio Tuniz	The Abdus Salam International Centre for Theoretical Physics	ICTP
21	Mr. John B Ritch	World Nuclear University and World Nuclear Association	WNU and WNA
22	Mr. Yanko Yanev	IAEA (NE)	IAEA
23	Mr. Peter Gowin	IAEA (NE)	IAEA

	Name (Participant/Nominated)	Organization	Country
23	Mr. H.H. Rogner	IAEA (NA)	IAEA
23	Mr. Piero Danesi	IAEA (NA)	IAEA