Passing the Torch

ANENT

The Asian Network for Education in Nuclear Technology

by Fatimah Mohd Amin

Recent trends show that the nuclear industry is poised for expansion for the first time in decades. The greatest expansion is seen in Asia. Out of 15 new nuclear power plants connected to the grid during the period 2000-2002, 12 are in Asia. In 2002, all new nuclear plant construction was in Asia. Besides energy generation, nuclear technology has an important role in meeting basic human needs — clean water, modern health care and food security.

The expansion in the nuclear industry requires a sustainable, qualified and experienced workforce to ensure a high level of safety and performance as well as the next generation of innovative technologies. Even where no expansion is foreseen, it is vital that steps are taken to prevent the loss of accumulated knowledge to ensure that the operation of existing nuclear facilities meets the highest safety requirements and to prepare for decommissioning activities. Ageing of the nuclear workforce in many countries has prompted the nuclear community to initiate various programmes to address the issue of the ageing workforce, which is worsened by the declining interest in the nuclear field among the young.

In 2002, the IAEA General Conference adopted a resolution on "Nuclear Knowledge" (GC(46)/RES/11B), which was reiterated in the 2003 General Conference (GC(47)/RES/10B). These resolutions emphasized the importance of nuclear knowledge management and called on Member States to strengthen their efforts in this activity. In response to the resolutions, the Agency convened a consultancy meeting to prepare the groundwork for the establishment of the Asian Network for Education in Nuclear Technology (ANENT).

ANENT was established in 2004 to promote, manage and preserve nuclear knowledge and to ensure the continued availability of talented and qualified human resources in the nuclear field in the Asian region. The First Coordinating Committee meeting in Febuary 2004 in Kuala Lumpur, Malaysia, marked the official formation of ANENT. Membership is open to universities, research centers, government agencies and other institutions involved in nuclear education and training. As of April 2004, 17 institutions and three collaborating institutions had become participating members.

Sharing the Know-How

ANENT operates based on the principle of cooperation for the mutual benefit of its members. The objective of ANENT is to facilitate cooperation in education, related research and training in nuclear technology through:

✔ sharing of information and materials of nuclear education and training;

✔ exchange of students, teachers and researchers;

✔ establishment of reference curricula and facilitating mutual recognition of degrees; and

✔ facilitating communication between ANENT member institutions and other regional and global networks.

Countries in Asia are diverse with respect to the development and utilization of nuclear technology. Some countries have nuclear power programmes, such as Japan, the Republic of Korea, China, India and Pakistan. Others focus their resources on applying nuclear technology to generate new varieties of crops, generate new industrial products and processes, diagnose and treat diseases, and protect the environment. A few countries that have yet to exploit nuclear technology for power production have plans for the introduction of nuclear power programmes in the near future. On the whole, the penetration of nuclear technology applications is still below optimum in many countries in the Asian region.

Differences in the level of knowledge and resources are observed among countries in Asia, depending on the national development level and usage of nuclear technology. This diversity provides an opportunity for sharing of know-how and experience among ANENT members. On the one hand are countries that have well-developed nuclear power programmes that also have well-established education and training programmes in nuclear science, technology and engineering — they are the potential knowledge donors. For example, there are 14 universities in Japan that offer nuclear and related courses and six universities in the Republic of Korea that offer courses in nuclear engineering.

On the other hand, countries that only now are planning their nuclear power programmes need to acquire knowledge and develop their human resources — they are the recipients. Vietnam, for example, requires between 500-700 graduates with nuclear engineering and related degrees to prepare for the introduction of the nuclear power programme. At the same time, Vietnam is very short of experienced and qualified people to teach in these courses. In this case, through ANENT, the more developed countries can provide teaching staff to conduct courses in Vietnam or offer places for Vietnamese students in their universities.

The exchange of students and teaching staff would be greatly enhanced with the mutual recognition of degrees among ANENT members. This in turn would accelerate capacity building in the less-developed Member States. Human resource development is also vital for the development of innovative technologies through research and development (R&D) activities. Significant innovation could be realized through cooperation, networking and sharing of resources, both for nuclear power and non-power applications.

Through ANENT, members could pool expertise and share facilities, some of which may be beyond the affordable reach of some countries. Basic facilities required for education and training of the nuclear workforce such as research reactors and accelerators require large resources to operate and maintain. ANENT enables institutions without these basic facilities to have access to other institutions for the purpose of education, training and research.

The establishment of basic requirements for reference curricula could contribute towards maintaining the professional standards of nuclear engineers and technicians. It would enhance the mobility of the nuclear workforce as well as widen their career opportunities. Such prospects could draw the young and talented to take up courses in nuclear science, technology and engineering thus overcoming, to a certain extent, the problem of the ageing nuclear workforce.

The Way Forward

A pragmatic and stepwise approach will be adopted in implementing ANENT activities. At the 1st Coordination Committee meeting, five activities were identified for implementation during the first phase beginning in 2004 and ending with the full operation of ANENT at the beginning of 2006. For each activity, an Action Plan was agreed upon and is being implemented, each being led by one lead institution. The activities are:

Activity	Lead Institution and Country
Exchange of information and materials for education and training	Korea Atomic Energy Research Institute (KAERI), Republic of Korea
Exchange of students, teachers and researchers	Malaysian Institute For Nuclear Technology Research (MINT) Malaysia
Distance learning	Philippine Nuclear Research Institute (PNRI), The Philippines
Establishment of reference curricula and facilitating credit transfer and mutual recognition of degrees	Hanoi University of Technology (HUT), Vietnam
Liaise with other networks and organizations	Atomic Energy Authority, Sri Lanka

The first activity that will be implemented involves taking stock of resources and materials for education and training in nuclear technology in the Asian region. Information and material are to be collated and placed on the ANENT web portal, which is expected to be fully operational by the end of 2004. The web portal will — as a key enabling technology — play a central role for networking among ANENT members. Member institutions could then use this information to identify education and training institutions suitable for placement of their staff. At the same time, a working mechanism will be established to support the exchange of

students, teachers and researchers, with member institutions encouraged to implement exchange through bilateral cooperation as a starting point for multilateral networking.

The exchange of students and teachers would be greatly facilitated with the mutual recognition of degrees and transfer of credits. Towards this end, ANENT member institutions will exchange and evaluate existing curricula and establish recommended requirements for reference curricula in nuclear science, technology and engineering.

Distance learning would be one of the main approaches used by ANENT to teach and train students from diverse locations. Education and training materials already available will be compiled and distributed on the ANENT website. ANENT will utilize already available material — for example, that produced by the IAEA and other regional networks and associations — and will only consider developing new materials where none exist.

ANENT will seek to learn from experiences of other networks already in operation such as the European Nuclear Education Network (ENEN) and, where appropriate, collaborate with them. ANENT will serve as a facilitator to link its member institutions with other regional and global networks. At the 1st Coordination Committee meeting, representatives of ENEN, the World Nuclear University, the Asian Regional Cooperative Council for Nuclear Medicine and the Asian School of Nuclear Medicine were invited to share with ANENT members their experiences in nuclear education and training.

ANENT will strive to work in synergy with IAEA activities and programmes. By focusing on education, ANENT complements existing IAEA activities and would support IAEA initiatives for the preservation of nuclear knowledge. ANENT is a comprehensive initiative in education and training in that it will give equal importance to energy and non-energy technologies, thus meeting the diverse needs in the Asian region. ANENT aspires to become an important contributor towards national efforts in the development of a skilled and qualified workforce that is critical for the sustainable development of the nuclear industry.

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Peter Gowin, IAEA Nuclear Knowledge Management Unit, and Scientific Secretary of the first ANENT Coordination meeting and K.W. Han, Republic of Korea, contributed to this paper.

International Conference on

Nuclear Knowledge Management

Strategies, Information Management and Human Resource Development
7-10 September, Saclay, France

Like any highly technical endeavor, the use of nuclear technology relies heavily on the accumulation of knowledge. This includes technical information in the form of scientific research, engineering analysis, design documentation, operational data, maintenance records, regulatory reviews and other documents and data. It also includes knowledge embodied in people — for example, scientists, engineers, technicians.

In recent years, a number of trends have drawn attention to the need for better management of nuclear knowledge. Depending on region and country, they include an ageing workforce, declining student enrollment figures, the risk of losing nuclear knowledge accumulated in the past, the need for capacity building and transfer of knowledge, and recognition of achieving added value through knowledge sharing and networking.

In response to this growing concern, the IAEA along with the Commissariat de l´Energie Atomique (CEA), Government of France will be organizing a conference to address the issue of Nuclear Knowledge Management.

The objective is to reach a clear and common understanding of issues related to nuclear knowledge management for sustaining knowledge and expertise in nuclear science and technology.

The conference will provide a forum for professionals and decision makers in the nuclear sector, comprising industry, governments and academia as well as professionals in the knowledge management and information technology sectors. Aims ares:

› to exchange information and share experience on nuclear knowledge management, comprising strategies, information management and human resource development;

› to identify lessons learned and to embark on the development of new initiatives and concepts for nuclear knowledge management in IAEA Member States;

› to discuss the present status and future developments of the Agency's International Nuclear Information System (INIS).

For more information, visit the IAEA web site: www-pub.iaea.org/MTCD/Meetings/Announcements.asp?ConfID=123

For more information on the IAEA's knowledge management initiative, visit www.iaea.org/km/