

PROGRESS REPORT

(November 2006 – October 2007)

ASIAN NUCLEAR SAFETY NETWORK

**EXTRABUDGETARY PROGRAMME
ON THE SAFETY OF NUCLEAR INSTALLATIONS
IN THE SOUTH EAST ASIA, PACIFIC AND FAR EAST COUNTRIES**

INTERNATIONAL ATOMIC ENERGY AGENCY

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International Atomic Energy Agency
Extrabudgetary Programme (EBP) on the Safety of Nuclear Installations in the
South East Asia, Pacific and Far East Countries
Asian Nuclear Safety Network

PROGRESS REPORT

November 2007

OVERVIEW

In 1997 the IAEA established the Extrabudgetary Programme on the Safety of Nuclear Installations in the South East Asia, Pacific and Far East Countries (EBP). The overall objective of the EBP is to assist participating countries to further strengthen safety of their nuclear installations and to maintain a continuous process of safety improvements by assisting nuclear power plant and research reactor regulators and operators through the conduct of safety review missions, expert advice and training. From November 2006 until October 2007, 59 activities including the management of the Asian Nuclear Safety Network (ANSN), regional and national activities were implemented. **Furthermore, about 20 activities are planned until the end of the year 2007.** The level of activities of the EBP in 2007 is the highest since its establishment.

Table: The number of activities of the EBP

	Nov 2006 – Oct 2007
ANSN Management	14
Regional	19
National	27
China	16
Indonesia	5
Malaysia	3
Philippines	1
Thailand	1
Vietnam	1
Total	60

INTRODUCTION

This report describes the activities implemented from November 2006 until October 2007 and those further planned for 2007. Activities implemented from November 2005 to October 2006 were presented earlier in the PROGRESS REPORT, EBP-ASIA-259, which was distributed to all participating countries in November 2006.

More details about the results of activities described in this report are available in the Asian Programme Management Database (APMD) and the IAEA web site of the Asian Nuclear Safety Network (ANSN).

1. MANAGEMENT OF THE ANSN

1.1. Coordination Meetings

1.1.1. *Fifth Steering Committee Meeting*

Date: 30 November-1 December 2006

Place: Vienna

This meeting of the Steering Committee of the ANSN represented an important milestone for the development of ANSN. After the steady progress of the past few months, the SC approved the Strategic Plan for 2007-2009. The Plan is based on three main objectives: the ANSN should be an effective management tool of EBP-Asia; be a knowledge management centre for nuclear safety in the region; and promote close interaction and integration between these two functions.

The SC agreed to further strengthen human networking within ANSN by having more active communication among the SC members, the Topical Group (TG) members, the National Centres (NCs), and the Agency. As far as the content of ANSN is concerned, the SC noted that there is a need for a systematic review of the APMD documents to select relevant ones for uploading, with modifications as required. The TGs should undertake this work for documents in their area of responsibility and that the content of the ANSN would be strengthened by having documents that address the needs of different audiences (e.g. decision-makers, undergraduates, specialists). The role of the TGs will also be increased in the future. The SC noted that Australia has committed to activate the TG on Safety Management of Research Reactors in 2007. The Terms of Reference of the TG of Education and Training (TGET) has been approved and the SC agreed that all TG's should prepare Terms of Reference based on the format used by TGET. Each TG is expected to establish performance indicators and then to regularly report to SC on progress based on the performance indicators. A work plan has been agreed upon and the progress will be reviewed during the next SC meeting.

1.1.2. *Technical Meeting*

Date: 5-7 December 2006

Place: Vienna

The Technical Meeting (TM) was convened by the IAEA to review progress and further activities of the EBP. The plenary meeting was attended by 26 representatives from 12 countries.

Bilateral consultation meetings between the IAEA and representatives from the 6 countries in the region were held on 4 December 2006 to discuss national activities for 2007.

At the plenary meeting, the following agenda items were presented and followed by discussion:

- Overview of the 2006 Programme Implementation;
- Requirements for sustainable safety infrastructure;
- Enhanced Strategy for Phase II in 2007 and beyond;
- Progress report on Achievement and Future Assistance Needs – Integrated Safety Evaluation (ISE);
- New Regional Activities;
- Review of ANSN Activities; and
- Work Plan for 2007.

The TM:

- Generally agreed the work plan for 2007 involving national and regional activities and the Topical Groups;
- Agreed with the Secretariat's proposal for the Enhanced Strategy for Phase II in 2007 and beyond (so-called, Strategic Plan for 2007-2009);
- Recognized the value of the ISE as an appropriate tool for evaluation of progress on the improvement of safety, and requested the Secretariat to enhance the ISE guidance and scope considering the proposals made during the meeting; and
- Shared the view that the ANSN should be in the future the platform addressing policy and technical safety issues for maintaining sustainable nuclear safety in the Asian region.

As requested by the TM participants, the Secretariat prepared a "Report on Country Specific Achievements to enhance Nuclear Safety". This report is based on the results of the self-assessment of the Integrated Safety Evaluation (ISE) – see following paragraph – carried out by the countries participating in the EBP-Asia. It makes use of the results of the IAEA's Safety Review Services (SRS), provided to regulatory bodies, nuclear power plants and research reactors.

This report (EBP-ASIA-294, available on ANSN) consolidates the information provided by the countries and the assessment of the IAEA and addresses the three main areas of evaluation proposed in the current ISE process:

- Legal and governmental infrastructure,
- Safety of research reactors (and nuclear power plants if applicable)
- Education and training in nuclear safety

1.1.3. *Integrated Safety Evaluation (ISE) Consultancy Meeting*

Date: 5-9 March 2007

Place: Vienna

The ISE is a self-assessment process by which Member States can evaluate their safety practices against IAEA nuclear safety standards. It was agreed at the Technical Meeting (TM)

of November 2002 that the ISE report would be the main tool for the member states and the IAEA to prioritise activities and assistance requests.

During the last Technical Meeting in December 2006, the value of the ISE process was recognized as an appropriate tool for evaluation of progress on the improvement of safety. The IAEA was requested to further develop the ISE and to enhance its scope and guidance. The Consultancy Meeting on Integrated Safety Evaluation was held in Vienna, Austria from 5 to 9 March 2007. Seven consultants from China, Japan, the Philippines and the USA discussed ways to improve the ISE, and how to incorporate it fully into the ANSN.

The improved ISE process was based on a mechanism focusing more on mutual learning and peer discussions considering insights from review missions and self assessment. The planned methodology was organized in five steps, starting with a self assessment, shared electronically through the ANSN; and is followed by peer discussions, also using the Network. The self-assessment process would then be discussed and validated topic by topic during the corresponding Topical Group (TG) meetings. Results would be reported by each TG during the annual TM and a final report would be prepared by the IAEA.

To complement the previous 3 areas of evaluation – Legal and Governmental Infrastructure, Safety of Research Reactors and Education & Training – 3 new topics have been added: Safety of Nuclear Power Plants, Emergency Preparedness and Response and, Radioactive Waste Management.

The ISE guidelines prepared during the meeting was finalized and the electronic self-assessment questionnaires were prepared.

1.1.4. *IT Support Group Meeting*

Date: 18-20 April 2007

Place: Tokyo, Japan

The meeting of the Information Technology Support Group was hosted by the Japan Nuclear Energy and Safety Organization (JNES) and thirteen representatives participated in the meeting. In advance, the hub meeting was held in the same place from 16-17 April 2007 and eight representatives from China, Japan, Korea, USA and IAEA participated in the meeting.

The objectives were to discuss technical issues related to the implementation of the ANSN, to discuss various policies related to the operation of ANSN, to identify future needs for hubs and National Centres, and so on.

Concerning the design of the ANSN software, the meeting was restricted to the countries such as China, Japan, Korea, USA and IAEA. Korea demonstrated the special software to be used by the ANSN Topical Groups, especially the discussion forum. Several corrections and modifications to the software were suggested for implementation by Korea within a month. The main issues that were discussed during the meeting included the new access policy with more documents open to the public without password, more centralisation of the network, the development of a new search system based on the 6 topics of the ANSN and the creation of a new structure in the ANSN IAEA web page that would be used as a model for the other sites.

1.1.5. *Sixth Steering Committee Meeting*

Date: 5-6 June 2007

Place: Beijing, China

The 6th meeting of the Steering Committee of the ANSN was held in Beijing from 5 to 6 June. The Beijing Institute of Nuclear Engineering (BINE), which operates the ANSN Chinese Hub – as well as the ANSN French site – organised the meeting. Twenty participants from ten Member States attended the meeting.

After some general comments by the Chairperson and the adoption of the agenda, each coordinator of the Topical Groups made a brief status of the activities and future plans of their respective groups.

A large part of the meeting was devoted to active discussions based on an IAEA presentation on the key issues for the next six months. The participants debated on the future of the ANSN – how to make the network more active, more visible and more tangible – and other topics including the management of the ANSN and the new Integrated Safety Evaluation (ISE) process.

The Steering Committee noted that all the Topical Groups, including the new one on Safety Management of Research Reactors, have been active during the last six months. The new Topical Groups have prepared Terms of Reference which were approved by the SC.

The SC also confirmed their agreement with the principle of less restricted access to material within ANSN, allowing general public to have access on information on nuclear safety without any password. The remaining issue is how to categorise information.

The SC was pleased to see the improvements that have been made to the ANSN/IAEA website, including the new organization by topics which have facilitated uploading a large amount of knowledge gained during the recent activities performed in the framework of the Extrabudgetary Programme in Asia. Over 1 000 files have been uploaded by the IAEA in 2007.

Key issues for the future include improving on-line communication between the SC members and with the Topical Groups, preparing performance indicators, coordinating activities with other networks and implementing the new ISE process on-line.

1.2. Human network: the Topical Groups

1.2.1. *Second Meeting of the Topical Group on Operational Safety*

Date: 26-28 March 2007

Place: Haiyan, China

Representatives from China, Japan, France, Vietnam and IAEA staff participated in this 2nd meeting of the Operational Safety Topical Group.

The objective of the meeting was mainly to discuss and identify potential operational safety activities to be requested through EBP and any potential information exchanges for the technical group to pursue.

The issues identified during the meeting were ranked in order of priority:

- Top priority areas such as
 - Risk Informed decision making – PSA in Regulations;

- Human Error Prevention/Reduction – Skill and Behaviour Training; and
- Optimisation of Outage Duration – ensuring safety is maintained.
- High priority areas such as
 - NPP Supplier Qualification – Assessment and management;
 - Training, and Qualification of Licensed Operators (including Management and control of licences); and
 - Application of Management Systems to NPPs.

1.2.2. *Topical Group Meeting on Safety Management of Research reactors*

Date: 5-13 April 2007

Place: on-line

An on-line meeting was organised to officially establish the ANSN Topical Group (TG) on Safety Management of Research Reactors and to agree on the programme of activities for 2007.

This on-line meeting consisted of a review by the participants of the following topics:

1. Term of Reference of the Topical Group
2. Activities to be conducted in 2007:
 - Status and schedule for the decommissioning of Research Reactors in participating countries.
 - Provisions adopted for HIFAR decommissioning
 - Definition of the action plan for implementing the Research Reactor Decommissioning Demonstration Project (R²D²P) (see annex 3)
 - Presentation and evaluation of the results of the Regional Activities conducted in the framework of the ANSN:
 - Application of the Code of Conduct on the Safety of RRs
 - Workshop on promotion of Safety Culture in RR operation
 - Workshop on Integrated Management System

The Group has basically approved the ToR and the programme of activities.

1.2.3. *Annual Meeting of the Topical Group on Safety Analysis of RRs*

Date: 17-20 April 2007

Place: Hanoi, Vietnam

The annual Topical Group Meeting on Safety Analysis of RRs was attended by thirteen participants from China, Indonesia, Malaysia, the Philippines, Thailand and Vietnam, and two experts from Korea and Japan attended the meeting.

The main objective of the meeting was to provide a forum for the exchange of experience in the area of safety analysis and to discuss how to maintain and improve the knowledge acquired during the workshops on Safety Analysis Methodology and Use of Computer Codes held in 2001 and 2002, respectively.

As Vietnam and Indonesia plan to construct nuclear power plants in the near future, it was agreed at the meeting that the activity of the ANSN TG would be extended to cover the safety analysis of nuclear power plants as well as of research reactors. It was also agreed that the work of the TG on Safety Analysis would focus rather on the way to analyse the assessment results and to model the component/system than on RELAP5 assessment itself.

1.2.4. Bureau Meeting of the Topical Group on Education & Training

Date: 26-27 April 2007

Place: Vienna

Three main points were addressed in the meeting:

- The TG report intended to define an strategy for better use of the ANSN's information and platform to fulfil training needs;
- Progress made in the analysis of ten courses selected from the APMD; and
- Preparation of the agenda for the topical group plenary meeting 2007.

The TG report was redrafted in order to define a procedure for countries to evaluate their needs comparing themselves against the general framework for competencies, then identify, reference and make available as many ANSN and IAEA documents as possible in order to support training on the areas and competencies defined in the general framework. The general framework should be used as the reference by the countries to develop their own framework. Based on that national framework, each national coordinator should identify documents needed to be uploaded on their ANSN.

Next step would be to define national plans for training using all the available documents and finally define a mechanism for ensuring sustainability and self training by the countries as well as assessing the effectiveness of results.

The next plenary topical group meeting was agreed for 15-16 October 2007 in Vienna.

1.2.5. Second Meeting of the Topical Group on Emergency Preparedness & Response

Date: 11-12 June 2007

Place: Jakarta, Indonesia

The Topical Group Meeting on Emergency Preparedness and Response was attended by fourteen representatives from China, Indonesia, Japan, Malaysia, Philippines, Thailand and Vietnam, two experts from Hungary and Japan, and some IAEA staff.

The TG recognised the importance of the ISE as a management tool of the EBP, and agreed to start the ISE process in the framework of the TG as a trial. However, the TG suggested that the IAEA and Co-ordinator should prepare more practical guidance for the ISE, including the organization of a training event on the evaluation process. It was also recommended that the IAEA take appropriate measure to avoid unnecessary duplication of work by member states on the ISE and other related IAEA framework e.g. Emergency Preparedness Review (EPREV) self-assessment.

1.2.6. *Second Meeting of the Topical Group on Radioactive Waste Management*

Date: 3-4 September 2007

Place: Cronulla, Australia

The 2nd meeting of the ANSN Topical Group (TG) on Radioactive Waste Management (RWM) was held in coordination with the Australian Nuclear Science and Technology Organization (ANSTO). Thirteen representatives from Indonesia, Japan, Korea, Malaysia, Philippines, Thailand, and Vietnam, and IAEA staff participated in the meeting. The following topics were reported on or discussed: Terms of Reference of the TG; recent developments of the Asian Nuclear Safety Network (ANSN); information exchange on RWM in each country; and an overview of RWMTG activities.

The TG noted with appreciation the progress of the ANSN and TG activities. The TG's future activities and associated regional activities within the framework of the ANSN were planned. The group also decided upon its future involvement in the Integrated Safety Evaluation (ISE) process and agreed to use the draft procedure on a trial basis. Progress with radioactive waste management issues was reported upon and discussed by the participants.

1.2.7. *Second Bureau Meeting of the Topical Group on Education & Training*

Date: 15 & 18 October 2007

Place: Vienna

The objective of the first day of the meeting was to finalise the preparation of the 3rd meeting of the Topical Group on Education & Training.

The objectives of the second day were to review the actions and dates agreed in the plenary meeting and finalize the minutes of the meeting; to draft conclusions of the plenary and bureau meetings; to update the general work programme calendar for 2007-2008 and revise the E&T TG report and, to discuss the E&T TG strategy and future ANSN activities.

The Bureau concluded and agreed a strategy for the E&T TG work whose aim is harmonizing the ANSN countries' evaluation of training needs and training implementation based on the IAEA standards and documents. The Bureau proposed to the E&T TG an operational procedure to implement the first steps of its strategy including a common General Framework (GF) for training that will serve as a reference and basis for harmonized ANSN National Training Frameworks. This GF was defined from the IAEA standards and documents and is coherent with the current EBP/ISE guidelines, chapter 7. On this basis the ANSN/ETT countries training needs will be evaluated and implemented within on a common harmonized basis.

1.2.8. *Third Meeting of the Topical Group on Education & Training*

Date: 16-17 October 2007

Place: Vienna

After introductory presentations by IAEA staff and the group's coordinators, the national representatives presented their current status on national training activities. Most of them included the results of the Training Needs Assessment (TNA) and comments to the draft Education & Training Topical Group (E&T TG) report distributed in August 2007. China, Vietnam and The Philippines gave comments on the draft report, while Indonesia, the

Philippines and Malaysia included in their presentations information on their TNA activities and results.

Thailand suggested improved methods for communication and information on national plans for developing their nuclear program. Vietnam also commented on their TNA and proposed to hold and host a regional workshop on TNA. The objectives would be to share experience, to consolidate the methodology and available results for TNA, and to present the National Training Framework (NTF) from the ANSN/ETTGT countries. Pakistan offered to share most of the courses in English they have with the ANSN. Japan distributed information on the identification of a comprehensive number of Japanese courses and documents in support of the training areas.

Within the E&T TG report, the General education and training Framework (GF) was adopted as a general reference for competencies needs. Using the GF as a reference, participant countries agreed to develop and implement a NTF based on their national policy for training, their current and future nuclear programme and the results of their TNA. Japan offered to demonstrate their NTF implementation as a pilot study. This will be an interactive system and will be available on the Japanese ANSN hub.

1.2.9. *Topical Group Coordination Meeting on Operational Safety*

Date: 29-30 October 2007

Place: Beijing, China

During the coordination meeting, held to make future plan of the Topical Group on Operational Safety, members agreed to submit the Steering Committee its mid-term plan including review of operational experience feedback and seminar on lessons learned from the review, a workshop on operational experiences during commissioning, and training courses.

1.3. ANSN web sites

1.3.1. *IAEA web site*

During the period covered by this report, some major improvements have been implemented in the IAEA web site. The structure of the site has been modified to highlight the organisation by topics and the improved role of the Topical Groups (TGs). Each TG has now its own page, open to the members of the Group, where all information related to the activities of the Group can be exchanged.

Under the menu “topics”, a selection of workshops coming mainly from the past activities of the EBP-Asia programme, have been uploaded and sorted according to the taxonomy. This presentation offers to the users an alternative to the usual search system that still exists.

In a more restricted part of the site, all the material previously stored in the Asian Programme Management Database (APMD) is being progressively uploaded in the ANSN. To date, all the activities from 2004 until 2007 have been uploaded, corresponding to about 160 activities and 1500 reports and PowerPoint presentations.

The first two steps of the new ISE process are available on-line. It consists of six electronic questionnaires for self assessment and a forum for peer discussion. The progress is currently in progress and should be completed in November 2007.

The form for requesting activities to be implemented in 2008 is also available on the ANSN. As soon as the electronic form has been filled in by the country, the IAEA technical officers can make their evaluation through the Network, allowing a quick exchange of information between the Agency and the countries about the status of the requests. Based on this information, the page summarising the activities for 2008 will be automatically created.

1.3.2. *Public ANSN web site*

The ANSN public site contains only general information. However, the new documents entered in the ANSN are now flagged with the mention public or not, allowing them to be automatically uploaded in the public site as soon as authorised. In this framework, Japan gave the authorisation to make public several major training courses. France did the same with some key documents like the “EDF Memento on Nuclear Safety”.

1.3.3. *APMD*

The Asian Programme Management Database (APMD) is the EBP-Asia knowledge base and a management tool with a full text search and a direct link to the IAEA Technical Cooperation database TC-PRIDE. The APMD continues to present the basic information on activities supported by the extrabudgetary programme (titles, dates, venues, objectives, status, technical officers, outside experts, national counterparts and results) as well as bilateral agreements, summary and mission reports, training material, Country Nuclear Safety Profiles (CNSPs) and Integrated Safety Evaluations (ISEs).

It is continuously being updated and available only to registered users via internet. As indicated previously, a large amount of the knowledge coming from the APMD is now available on the ANSN website of the IAEA.

1.4. Promotion of the ANSN

1.4.1. *ANSN Promotional Meetings*

The main purpose of the meetings is to promote ANSN activities, including the use of ANSN when implementing EBP activities. These promotional meetings are sometimes referred to as “Caravan”. There was no planned ANSN Promotional Meeting for the period. However a Caravan is planned to be held in Vietnam on 22 November 2007.

1.4.2. *ANSN Newsletter*

The purpose of the newsletter is to provide a short and concise overview of the safety activities underway in the participating countries under the framework of EBP or ANSN and to increase the outreach of the network.

The newsletter is published bi-weekly and widely distributed to about 800 subscribers from the participating countries. Twenty issues have been published from November 2006 to October 2007.

1.4.3. ANSN Brochure

An eight-page brochure presenting the ANSN was designed and prepared by Japan Nuclear Energy Safety Organization (JNES). A pdf version is available on the ANSN web sites. More than 60 printed copies were distributed during the 2007 IAEA General Conference.

1.4.4. Board of Governors and General Conference

Member States have noted with appreciation the achievements and value of the ANSN during Board of Governors meetings and the General Conference in 2007.

At the margins of the 51st General Conference of the IAEA, Mr. Taniguchi, DDG-NS, met with representatives of China, Indonesia, Malaysia, the Philippines, Thailand and Vietnam, including 4 heads of delegation. The DDG reminds that ANSN is increasingly recognised as a model network for regional sharing nuclear safety knowledge. He stressed the need for mutual ownership of the ANSN and the intention to use the network to share policy issues related to Nuclear Safety. To this end, the DDG announced that early 2008, an ANSN meeting will be convened to share a big picture of nuclear safety in the region. Senior representatives from the countries will be invited. The proposal was welcomed by the participants. The head of the delegation of Thailand, the Minister of Science and Technology, indicated that nuclear safety was mentioned during the recent meeting of the Association of Southeast Asian Nations (ASEAN).

1.5. Development of a tool for the evaluation of Safety Analysis Reports

Countries embarking and expanding on nuclear power programme (NPPs) need to carry out a systematic review of the Safety Analysis Report of their nuclear power plants. To assist countries to carry out this important safety tasks, the IAEA initiated in 2006 the development of a Safety Analysis Report Review Plan (SARRP).

SARRP is a computer tool for reviewing a Safety Analysis Report against the relevant IAEA Safety Standards. Results of SARRP application to various NPPs are stored in a database that can be used for mutual learning among users. Therefore, the application of SARRP provides also valuable feedback for the continuous improvements of the IAEA Safety Standards.

A pilot study focused on containment systems and other engineering safety features was completed in 2006 to demonstrate the value of the system. During 2007, the system was expanded to cover other elements of a Safety Analysis Report. Version 01 is due December 2007 and will be further developed in 2008.

2. REGIONAL ACTIVITIES

2.1. Meetings, missions and workshops

2.1.1. *Safety Assessment and Verification for Nuclear Reactors*

Date: 6-10 November 2006

Place: Daejeon, Korea

The Training Course on Safety Assessment and Verification for Nuclear Reactors was held at the Korea Atomic Energy Research Institute (KAERI) in Daejeon, Korea. Twelve participants from China, Indonesia, Malaysia, Thailand and Vietnam, and 16 lecturers from KAERI, the Korea Institute of Nuclear Safety, and the Korea Power Engineering Company attended the meeting.

The purpose of the training course was to seek to improve participants' understanding of the comprehensive safety assessment of nuclear reactors (research reactors and nuclear power plants) and the independent verification thereof. The course provided training on systematic procedures and methods for performing the safety assessment from the initial design process, construction and operation to design modifications. It also provided instruction on the procedure for carrying out independent verification of reactor safety assessment.

The following topics were covered by the training course:

- Safety assessment and safety analysis;
- Safety requirements;
- Engineering aspects important to safety;
- Safety analysis methods and acceptance criteria;
- Assessment of computer codes used;
- Independent verification by the operating organization;
- Relationship between design, safety assessment and independent verification;
- Regulatory review and assessment;
- Experimental safety research; and
- Quality assurance.

Since this training course provided a comprehensive, systematic view of the entire safety assessment process and independent verification for nuclear reactors, it was most beneficial for those participants who are or will be involved in the design and operation of the nuclear reactors as well as for those from the regulatory body.

2.1.2. *Radiation Emergency Medical Preparedness Workshop*

Date: 13-17 November 2006

Place: Japan

The second Regional Workshop on Emergency Preparedness and Response Topical Group was held in Tokai-mura on 13-15 November and Chiba, Japan on 17 November 2006, with coordination of the Japan Atomic Energy Agency (JAEA) and the National Institute of Radiological Sciences (NIRS). About forty representatives from ANSN Member States (China, Indonesia, Japan, Korea, Malaysia, the Philippines, Thailand, and Vietnam), Argentina, Belarus, Brazil, France, the United States of America, and the International Atomic Energy Agency (IAEA) participated in the Workshop.

In addition, a Symposium on Awareness Enhancement and Confidence Building on Emergency Medical Preparedness in Japan and Asia was held in Tokyo, Japan 16 November 2006.

The purpose of the workshop and symposium was to establish a forum for exchange of experience, development of capacity and knowledge improvement in radiation emergency medical preparedness within the context of the Asian Nuclear Safety Network (ANSN). In particular, the purposes were (1) to share the information and knowledge on emergency medical preparedness and response, including discussions on lessons learned from medical response to past emergencies and recent progress in the treatment of radiation injuries; (2) to discuss future cooperation among ANSN countries in the field of medical preparedness and response; and (3) to enhance awareness and build confidence in emergency medical preparedness and response among ANSN countries.

The Workshop was attended by about 50 participants and observers from more than ten countries. The audience consisted of emergency medical doctors participating in preparedness and response to radiation emergencies and specialists of national preparedness for response to radiation emergencies. ANSN countries were represented by 2 participants from each country (except the Republic of Korea, and Malaysia, which sent 1 participant per country). The Symposium was attended by 244 participants.

The Workshop and Symposium programs included 1) lectures by experts, who covered lessons learned from medical responses to past emergencies, recent progress and state of art techniques in management of radiation injuries, and experience of cooperation in other regions; 2) technical tours into the Nuclear Emergency Assistance and Training Centre (NEAT) of Japan Atomic Energy Agency and Ibaraki Offsite Centre, JCO Criticality Accident Exhibition at Ibaraki Science Museum of Atomic Energy in Tokai-mura and the National Institute of Radiological Sciences (such facilities as Radiation Emergency Ward, Heavy Ion Medical Accelerator in Chiba (HIMAC) and Molecular Imaging Centre); and 3) panel discussions on future cooperation among ANSN countries in the field of medical preparedness with specific conclusions on possible ways forward in regional cooperation.

The overall accomplishments of the two events included the unique opportunity to share the experience from different countries, to discuss state of art techniques in medical management of radiation injuries and to build on regional/international networks and practical arrangements for cooperation and assistance in case of radiation emergency. The events were concluded by the development of specific proposals, implementation of which will allow ANSN countries to move forward in strengthening regional cooperation in medical response to radiation emergencies.

2.1.3. Meetings to Promote the Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste

Date: 13-17 November 2006

Place: Jakarta, Manila, Tokyo

The meetings to promote the Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste were held in Indonesia, Philippines and Japan.

The meeting in Jakarta on 13 November was hosted by the Indonesian nuclear regulatory authority, BAPETEN. The meeting was attended by senior officers from BAPETEN and

BATAN, the main nuclear operator in the country, and representatives from several ministries, foreign affairs, customs, and energy.

The meeting in Manila was organized on 15 November by the Philippine Nuclear Research Institute, PNRI. Representatives from different ministries and the two chambers of the parliament attended the meeting in addition to the PNRI senior officers.

The meeting in Tokyo on 17 November was held with the Coordinator of the Radioactive Waste Management Topical Group of the Asian Nuclear Safety Network, officers from the Ministry of Economy, Trade and Industry (METI), officers from the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and the staff members of Japan Nuclear Energy Safety Organization.

In the Asian region, Korea, Japan and China are the only Contracting Parties. Indonesia and Philippines have signed, but have not yet ratified the Joint Convention. Indonesia is a Contracting Party to the Convention on Nuclear Safety. A series of promotional information seminars on the Joint Convention were conducted in January 2005 in several countries from the Asian region. In particular Indonesia and Philippines were the countries which appeared at that time as the most advanced in the process of ratification. The main objective of the meetings was to follow up with relevant Indonesian and Philippine authorities their on-going process to ratify the Joint Convention.

One of the main concerns for countries having a small amount of radioactive waste to manage was the cost to be incurred as a contracting party of the Joint Convention, and in particular, the cost related to the participation to the Review Meeting. The countries suggested that the Agency consider setting up a mechanism to cover the travel cost of the participants from the developing countries to attend the Review Meeting of the Joint Convention. The more Member States from developing countries become Contracting Parties, the more such requests will be received by the Agency.

2.1.4. *Workshop on Research Reactor Ageing Management*

Date: 4-8 December 2006

Place: Beijing, China

The Regional Workshop on the Management of Research Reactor Ageing was held in Beijing, China on 4-8 December 2006 and hosted by the Institute of Nuclear and New Energy Technology (INET).

The purpose of the workshop was to provide the research reactor personnel, from operating organizations and regulatory bodies within the countries in the region, with practical information related to the management of research reactor ageing and to foster information exchange between the participating experts on the same subject.

The workshop was conducted by an IAEA staff member and three invited IAEA external experts, which served as lecturers at the workshop. The workshop was attended by 19 participants representing 12 organizations (including INET), from 5 countries in the region; China, Indonesia, Malaysia, Thailand, and Vietnam. Mr. H. Kim, HANARO reactor, Korea Atomic Energy Research Institute, participated in the workshop as an observer.

The workshop covered a wide range of the topics related to the ageing management of research reactors and concentrated mainly on demonstrating practical examples and the lessons learned from experience rather than the theoretical aspects of the subjects. It consisted

of presentations and technical discussions by the IAEA team members and the participants. The following topics were covered during the workshop:

- Code of Conduct on the Safety of Research Reactors and IAEA Safety Standards Related to Research Reactors;
- Basic elements of the ageing management programme for research reactors;
- Proactive ageing management strategy;
- Environmental operating conditions and its control for ageing management;
- Overview of the ageing detection methodologies;
- Maintenance, periodic testing and inspection programmes for research reactors;
- Safety in the modifications of research reactors;
- Periodic safety review for research reactors;
- Safety considerations for research reactors in extended shutdown;
- Experience acquired from refurbishment activities and ageing management programmes of various research reactors; and
- Ageing management activities of the research reactors at the participants' organizations.

The workshop, which was held at the regional level for the first time, provided an excellent forum for sharing information and exchanging experience on the lessons learned from the refurbishment and ageing management activities of different research reactors, which will help establishing more effective ageing management programmes for the research reactors at the region.

2.1.5. Consultant's Meeting on Planning of Training Needs Assessment

Date: 19-23 February 2007

Place: Vienna

The objective of the meeting was to prepare a plan for training needs assessment for Indonesia, Malaysia and Philippines.

One expert from Pakistan and some relevant IAEA staff participated the meeting. Experts reviewed current situation of each country and made some prerequisites for assistance and a work plan for each country.

In view of the varying needs and stages of developments, it was advised that all the three countries should complete systematic training need assessment to ascertain the real gaps in needed competency on which their training program can be based. Completion of systematic training need assessment by each country is essential before moving on to development and design of training as it quite resource intensive and time consuming. A standard/unique training program would not be suitable for all the three countries. ANSN efforts in education and training can supplement but not substitute for systematic training need assessment.

2.1.6. Safety Assessment for Radioactive Waste Disposal

Date: 2-6 April 2007

Place: Jakarta, Indonesia

The lectures for the Training Course on Safety Assessment for Radioactive Waste Disposal were provided by one IAEA staff and two external experts from Sweden and Germany. Presentations on examples of safety demonstration were made by 2 experts from Japan and South Korea. The course was attended by two participants each from China, Philippines,

Thailand and Vietnam, five from Malaysia and eight from Indonesia. The course was also attended by the coordinator of the Topical Group on Radioactive Waste Management.

The purpose of the training course was to provide basic training in safety assessment for near surface radioactive waste disposal facilities; providing background lectures on the concept of near surface disposal, introducing participants to the safety assessment process and its relationships to safety standards, its role in developing the safety case and in the licensing and regulatory control process.

The course was presented as a series of lectures followed by a working session on use of safety assessment software. The latter progressed from tutorials on use of the software to application on a test case using the IAEA Improvement and Application of Safety Assessment Methodology (ISAM/ASAM).

Of the various countries involved in the project, only China has developed radioactive waste disposal facilities, which are still going through the licensing process. A number of the other countries have announced their intention to pursue nuclear power programmes and others have research reactors. In addition, the development of waste disposal facilities is under serious consideration in most of the countries. As such there is considerable interest in developing capacity in safety assessment for disposal facilities. From the level of interaction during the course, the enthusiasm for the software application exercises and the generally good results in the examinations it can be deemed that the course was successful.

The course was of limited scope and depth and intended to introduce participants to the basics of safety assessment for disposal and to give the participants a feeling for the extent and complexity of work necessary to demonstrate the safety of a radioactive waste disposal facility. It was agreed that it would be worthwhile identifying a group of young professionals from within the region to train more in depth in safety assessment for radioactive waste disposal. It was also agreed that a good way to do this would be to encourage the countries involved to engage such persons in actual assessment work ongoing within the countries concerned as part of their development. Possible mechanisms to realize such a proposal will be discussed at the next meeting of the topical group in September this year.

2.1.7. Application of the Code of Conduct on the Safety of Research Reactors for Asia Region Countries

Date: 30 April-11 May 2007

Place: Argonne, USA

The Regional Meeting on the Application of the Code of Conduct on the Safety of Research Reactors for Asia Region Countries was hosted by the Argonne National Laboratory (ANL) and took place at ANL's site located in Chicago, USA. The activities were implemented by a team of two IAEA staff members, assisted in lecturing by five Staff from ANL. This regional meeting was the third of a series being held during 2006 and 2007 in response to the recommendations of the December 2005 Open-ended Meeting. These regional meetings are leading up to another international meeting in 2008.

The meeting was attended by 12 participants representing 6 MS (Japan, Korea, Malaysia, Indonesia, Thailand and Vietnam). Each MS was represented by one participant from the operating organisation and one participant from the Regulatory Body.

The purpose of the meeting was to bring together senior experts from Member States (MS) having or planning research reactors so that IAEA representatives could explain the

background, content and legal status of the Code and provide the Agency's views on the benefits to be derived from applying the Code. The meeting allowed for discussion of the status of research reactor safety in the participating MS and for exchange of information relative to the recommendations in the Code.

The first week of the meeting was devoted to a tutorial on the Code and self assessments on the Status of implementation of its provisions. The tutorial included presentations on the following topics:

- Background, History, and Status of the Code;
- Contents of the Code;
- IAEA Safety Standards Useful for Application of the Code;
- Legal Aspects and Commitments to the Code; and
- Benefits to the MS of Implementing the Code.

The second week of the meeting was spent providing detail on issues which earlier meetings on the Code of Conduct had identified as requiring further explanation and clarification. These issues included management systems, development of a good safety culture, training of personnel, emergency preparedness, extended shutdown and decommissioning of research reactors.

The meeting provided an excellent forum for discussion and exchange on information relative to application of the Code as well as for identification of the common safety issues and the opportunities for regional cooperation, which will help improving the safety of the research reactors in the region.

Out of the discussions made on the results of the self-assessment exercise of application of the Code, it was recognized that there is a common need in the region to:

- Establish criteria for extended shutdown and for release from regulatory control for decommissioned research reactors;
- Address human factors in all phases of a research reactor's lifetime;
- Establish criteria for, and to perform accordingly, site re-evaluation for the existing research reactors; and
- Improve emergency planning.

2.1.8. *Safety Assessment and Verification for Nuclear Reactors (II)*

Date: 14-18 May 2007

Place: Daejon, Republic of Korea

The Training Course on Safety Assessment and Verification for Nuclear Reactors (II) was attended by 12 participants from China, Indonesia, Malaysia, Thailand and Vietnam, and 13 lecturers from KAERI, the Korea Institute of Nuclear Safety and the Korea Power Engineering Company.

The purpose of this training course was to seek to improve participants' understanding of the detailed comprehensive safety assessment of nuclear reactors (research reactors and nuclear power plants) and the independent verification thereof.

The training course constituted the extension of current activities on safety analysis with computational tools and provided a comprehensive, systematic overview of the entire safety assessment process rather than of safety analysis alone.

The following topics were covered by the training course:

- Emergency operating procedures and plant maintenance programme;
- Regulatory activities on review, inspection and R&D;
- Decommissioning;
- Fuel design and fuel fabrication;
- Detailed plant design process;
- Verification and validation of computer codes;
- Best estimate approach with uncertainty quantification; and
- Design, operation and maintenance for research reactors.

On the other hand, the first training course held from 6 to 10 November 2006, provided training on systematic procedures and methods for performing safety assessment, from the initial design process, construction and operation to design modifications. It also provided instruction on the procedure for carrying out independent verification of reactor safety assessment.

This course provided a comprehensive, systematic overview of the entire safety assessment process and of the procedure for carrying out independent verification for nuclear reactors. It was therefore most beneficial for those participants who are, or will be, involved in the design and operation of nuclear reactors as well as for those from the regulatory body.

KAERI proposed to offer to the IAEA, free of charge, the web based PC simulator that it has developed based on the RELAP5 code, and suggested that it be made available to Member States through the related IAEA website. The PC simulator can be applied for both pressurized water reactors and research reactors.

The next, and final, training course is scheduled for May 2008 in Daejeon, Korea.

2.1.9. Co-ordinators' Meeting on the Incident Reporting System for Research Reactors (IRSRR)

Date: 28 May-1 June 2007

Place: Vienna

Forty-three coordinators representing 35 Member States (MS) attended the 5th Technical Meeting of coordinators for IRSRR. About 50 % were National Coordinators from the Regulatory Authority and 50 % operators (local co-ordinators).

The major part of the first day was devoted to a presentation of methods for incident and accident investigation. The proposed investigation method is the Event and Causal Factors Chart, together with the support techniques of Barrier Analysis, Change Analysis and Task Analysis. These methods are considered to be applicable without many difficulties and have the potential to generate good insight on the event. These techniques could lead to useful improvements in event analyses within MS.

For the training sessions, the attendees were divided into 7 groups to review and analyse seven events, using the various Root Cause Analysis techniques. The results of the exercises were presented in plenary sessions.

The assignment to the groups was to review the reports and to apply the various Root Cause Analysis techniques and determine: what happened; how did it happen; why did it happen; perform a barrier analysis of the event and determine what the appropriate corrective actions should be. In addition, the groups reviewed the event classification criteria.

A prompt notification feature using E-mail (as implemented for NEWS) is regarded as essential to encourage the participants to retrieve data from the IRSRR in order to discuss the events within the MS. It is recommended that a record be added in the database to indicate the reactor type and power level. This information could be taken from the Research Reactor database. The added record serves the purpose of selecting events for the same type of facilities. Participants in the IRSRR were encouraged to submit a preliminary report promptly after an event in order to enable peer-to-peer advice if required.

2.1.10 Workshop specialized in Emergency Preparedness and Response Exercises

Date: 12-15 June 2007

Place: Jakarta, Indonesia

The Regional Workshop specialized in Emergency Preparedness and Response Exercises was held in coordination with the Nuclear Energy Regulatory Agency (BAPETEN). This Workshop was part of the activities adopted for implementation at the first TG meeting in 2006. 21 representatives and experts from China, Indonesia, Japan, Malaysia, Philippines, Thailand, Vietnam, Hungary and IAEA participated in the workshop.

The following topics were covered by the workshop:

- RANET, on the general concept of emergency exercises, on preparation process and exercise manual, and on regional inter-comparison exercises;
- Exercise objectives, scenario, inject and data, and on radiological data and other exercise data;
- Experience gained at the emergency exercise against the RDD in Indonesia in 2005, the national exercise to NPP emergency in Japan, and the regional IAEA/RCA exercises in Chernobyl; and
- Asian Tracer Experiment and EPREV process.

The workshop was very much appreciated by the participants and Japan made a proposal for an Asian knowledge base for exercises.

2.1.11 Technical Meeting on Best Practices in Organisation, Management and Conduct of Event Investigations

Date: 9-13 July 2007

Place: Vienna

The purpose of the meeting was to review and finalize the draft document on “Best Practices in the Organization, Management and Conduct of an Effective Investigation of Events” which was developed during the technical meeting held on this subject in September 2006. The publication is intended to form part of the suite of documents developing the principles set forth in the PROSPER guidelines. This publication has been created to provide guidance, recommendations and good practices for nuclear power plants to improve their process for developing, implementing and assessing the process of events investigation, directed to effectively feedback and share the lessons learned from operating experience in nuclear installations and prevent recurrence of events.

The outcome of the Technical Meeting is to support the continuous improvement of the safety performance and to further enhance the definition of the Standards in the area of investigation of events and determination of root causes based on experience and best practices.

The meeting was useful in improving the draft version of the publication and also in identifying number of challenges in the area of event investigation in particular and OE in general. The comments provided by the participants will be consolidated, reviewed and incorporated into the draft document. Once completed and published the document will be useful as a good practices reference for nuclear installations, IAEA PROSPER, OSART and other assessments, assistance missions and in OE workshops and seminars.

2.1.12 *Workshop on the Joint Convention and RWMTG*

Date: 4-7 September 2007

Place: Cronulla, Australia

The Workshop on the Joint Convention was held 4-7 September, 2007. Experts from Australia and China, Indonesia, Japan, Korea, Malaysia, Philippines, Thailand and Vietnam attended the workshop. The overall outcome of the first two review meeting of the Joint Convention was presented by the IAEA staff. Australia presented its experience in developing the national report, reviewing other reports and on attending the review meeting. Japan presented the activities of Radioactive Waste Management Project Group of “Forum for Nuclear Cooperation in Asia” (FNCA). After the general discussion on the above presentations, simulation of the review meeting was held. Participants from 6 participating countries (China, Indonesia, Malaysia, Philippines, Thailand and Vietnam) played the roles of the country group chair, rapporteur, and national delegates at the review meeting one by one. The workshop provided the ANSN countries with the practical experience and information to assist with the preparation of the National Report, to participate in the Review Meeting of the Joint Convention, and to become the Contracting Parties. It was also a chance to share the knowledge and experience on radioactive waste management within the Asian countries.

2.1.13 *Application of Deterministic Safety Analyses*

Date: 10-14 September 2007

Place: Tokyo, Japan

The Regional Workshop on Application of Deterministic Safety Analyses was organized at the Japan Nuclear Energy Safety Organization (JNES). All together ten participants from China, Indonesia, Malaysia, Philippines, Thailand and Vietnam attended the workshop.

The purpose of the workshop was to address the application of deterministic safety analyses by designers, operators, regulators and technical support organizations for the assurance of safety and reliability of nuclear installations.

The workshop addressed both conservative and best estimate approaches to deterministic safety analysis, with the aim to provide harmonised guidance for performing such analysis and applications. Deterministic safety analysis for design basis accidents and beyond design basis accidents are still considered to be the essential instrument for confirming the adequacy of safety provisions at nuclear installations.

In general, each participating country presented also their national report describing the activities on deterministic safety analyses in their respective institutions and the following topics were covered during the workshop:

- Initiating events and plant state classification;
- Conservative deterministic safety analyses and acceptance criteria;

- Best Estimate plus uncertainty analysis;
- Quality of thermal/hydraulic codes;
- Validation of thermal/hydraulic codes; and
- Application of deterministic safety analyses.

The workshop addressed the application of deterministic safety analysis for the assurance of safety and reliability of nuclear installations. The Agenda covered both conservative and best estimate plus uncertainty analysis methods. Initially deterministic safety analysis used rigorous conservative approaches. Licensing calculations have used conservative codes with conservative input data, mostly due to lack of knowledge and adequate data. Following increased experimental effort and code development advances, the world practice has expanded towards the best estimate approach with evaluation of uncertainties. The workshop covered all the important aspects of this approach and its applications and also touched on future trends in deterministic safety analysis.

2.1.14 Workshop on Incident Reporting System (IRS) / International Nuclear Event Scale (INES) Criteria and Reporting

Date: 29 October-2 November 2007

Place: Wuhan, China

The first joint Regional Workshop on the Incident Reporting System (IRS) / International Nuclear Event Scale (INES) Criteria and Reporting, hosted by the Research Institute of Nuclear Power Operation (RINPO), Wuhan, China, was attended by about 25 participants from China, Indonesia, Malaysia, the Philippines, Thailand and Vietnam. Two IAEA staff coordinated and lectured in the workshop for INES and IRS respectively and two external consultants from Czech Republic and Bulgaria also lectured during the workshop.

The workshop on INES was based on the new INES training package developed by the IAEA, which allows training customization in accordance with the needs of the audience, technical managers (nuclear facilities or radiation source and transport of radioactive material), and media or public information experts. The seminar consisted of lectures, movies, worked examples, and working group sessions. Four working group sessions were organized in order to enable participants to practice rating more than 30 events using INES, thus facilitating discussions on the applicability of the INES scale.

The workshop on IRS was divided in four parts starting with a presentation of all the Agency documents related to Operational Safety and Operating Experience. The second part was a detailed presentation of the IRS guidelines (background, objectives, use, operation, management, reporting categories) and of the web based IRS (live demonstration). The third part consisted of practical examples with a particular interest for the coding allowing participants to practice criteria and coding on four IRS events. The last part was a lecture on the recent and planned improvements of the Incident Reporting System and of the Web-Base.

2.1.15 Workshop on Promotion of Safety Culture in Research Reactor Operation

Date: 29 October-2 November 2007

Place: Beijing, China

The main objective of the workshop, hosted by the Institute of New Energy and Technology (INET), Tsinghua University, Beijing, was to provide the research reactor decision makers, from the operating organizations from the countries in the region, with practical information on developing, enhancing and assessing safety culture in their organizations. The workshop also aimed at promoting the IAEA Safety Review Services on Integrated Safety Assessment for Research Reactors (INSARR) and Safety Culture Assessment (SCART).

The Workshop was attended by 15 participants representing nine organizations, from six countries in the region: China, Indonesia, Malaysia, Philippines, Thailand, and Vietnam.

The workshop covered a wide range of topics related to safety culture and concentrated mainly on providing practical examples and lessons learned from experience. It consisted of presentations and technical discussions by the IAEA staff members, external experts, and participants. The following subjects were covered during the workshop:

- The Code of Conduct on the Safety of Research Reactors and the IAEA Safety Standards for Research Reactors;
- The IAEA Safety Standards on Integrated Management System and Safety Culture;
- The IAEA Safety Review Services (SCART and INSARR);
- Safety culture concepts and characteristics;
- Lessons learned from shortcomings in safety management and safety culture;
- Conflict resolution and management in operating teams;
- Blame tolerance and accountability;
- Early signs of weakening safety culture;
- Assessment of safety culture;
- Safety issues and trends for research reactors.

The external experts presented also their national experience from the Russian Federation and the United Kingdom in the establishing and assessing safety culture in nuclear facilities, in particular at research reactor operating organizations. The participants presented the activities related to developing safety cultures in their organizations.

A top-table exercise was performed in the frame of the workshop activities. The participants were asked to develop an “Action Plan” on enhancing safety culture in their organizations. The results of this exercise were presented and discussed. Additional guidance was provided by the IAEA team.

The Regional Workshop on Safety Culture Promotion in Research Reactor Operating Organizations, which was held in the regional level for the first time, provided an excellent forum for exchanging information and sharing experience on lessons learned from establishing and assessing safety culture, which will help establishing strong safety culture in the research reactor operating organizations in the region.

2.2. International Conferences and Symposia

The following are international conferences and symposia attended by ANSN member countries. These events are part of the nuclear safety programme of the IAEA and therefore funded by the IAEA’s regular budget.

2.2.1. International Conference on Lessons Learned from Decommissioning of Nuclear Facilities and the Safe Termination of Nuclear Activities

Date: 11-15 December 2006

Place: Athens, Greece

The International Conference on Lessons Learned from Decommissioning of Nuclear Facilities and the Safe Termination of Nuclear Activities was organized by the Agency, in cooperation with the Organization for Economic Cooperation and Development (OECD)/Nuclear Energy Agency (NEA), the European Commission (EC) and the World Nuclear Association (WNA).

The objective of the conference was to share experience and knowledge and to identify areas of international harmonization in the decommissioning of various facilities with different complexities and hazard potentials and for which one of the three main decommissioning strategies has been selected or considered – immediate dismantling, deferred dismantling or entombment. Two hundred and ninety-two participants from fifty Member States attended the conference.

One of the main conclusions from the conference is that the suite of international safety standards applicable to decommissioning now covers all relevant areas. The conference illustrated that there is significant experience worldwide that needs to be utilized and reflected in the revision of the existing Safety Guides. A recommendation arising from the conference was that the existing international mechanisms addressing decommissioning safety, such as the Joint Convention need to be used more effectively to increase awareness of governments and interested parties of the need for early planning, adequate funding, governmental support and long term management strategies for decommissioning. The development of an enhancing mechanism to provide for the sharing of lessons learned from decommissioning on a regular basis was recommended by the conference. The IAEA presented a plan to establish a Decommissioning Network, which will bring together organizations with specific experience and competence in decommissioning and that are willing to share their experience with other organizations.

2.2.2. Special Symposium for the IAEA 50th Anniversary "Global Challenges for the Future of Nuclear Energy and the IAEA"

Date: 11 April 2007

Place: Aomori, Japan

The Special Symposium for the IAEA 50th Anniversary “Global Challenges for the Future of Nuclear Energy and the IAEA” was organized by the IAEA and hosted by the Government of Japan and the Japan Atomic Industrial Forum, Inc (JAIF). A technical visit to the nuclear fuel cycle facilities in Rokkasho-mura was held on 12 April.

The objective of the symposium was to review the 50-year history of the IAEA and the current status of nuclear power and the fuel cycle in the world and to discuss the future development and safety of nuclear power, the fuel cycle and international cooperation. The symposium presented strategic directions concerning the roles of nations, regions and the IAEA in enhancing the development of nuclear energy, and the safety, security and safeguarding of nuclear installations.

The number of participants was almost 1,500 including 120 non-Japanese.

Topical sessions on Nuclear Power and Fuel Cycle, Nuclear Safety and Security, and Non Proliferation examined relevant issues. The major activities of the IAEA were introduced by senior officials of the IAEA. Other senior officials and experts presented their national activities and insights for the future.

A roundtable discussion provided an opportunity for a more intensive exchange of views on important issues, for example an evaluation of the activities of 50 years of the IAEA, the Agency's future role and limits on further streamlining its administrative structure. No specific recommendations were made but many speakers echoed the important role to be played by the Agency to enable expansion of nuclear power while minimizing proliferation risk and securing safe, reliable operation.

The symposium chairperson summarized the principal observations made during the symposium. All materials and movies are on the IAEA web site and the news page of the Asian Nuclear Safety Network (ANSN).

Presentations at the symposium and Q&A at the press conference contributed to improve understanding of Agency's activities by Japanese, especially people in Aomori, of Japan's and the IAEA's safeguards activities on the reprocessing plant. Moreover, IAEA presentations addressed not only a Japanese audience but also international participants especially from neighbouring countries.

2.2.3. International Conference on the Challenges faced by Technical and Scientific Support Organizations in Enhancing Nuclear Safety

Date: 23-27 April 2007

Place: Aix-en-Provence, France

The objectives of the International Conference on the Challenges faced by Technical and Scientific Support Organizations in Enhancing Nuclear Safety were: to provide TSOs from different countries and other organizations and experts the opportunity to discuss and develop a common understanding of the TSO's responsibilities, needs, and opportunities; to explore appropriate approaches for addressing current and expected challenges in nuclear and radiation safety as well as technology, and to discuss the roles, functions, and value of TSOs, sharing their knowledge and experience; and to discuss the challenges faced by TSOs in supporting regulators and operators, and at the same time maintain credibility and transparency.

A total of 170 participants from 45 countries, 4 international organizations and 2 observers participated in the conference.

The conference concluded that TSOs are playing an important role in the safe, reliable and secure use of nuclear energy and associated technologies in a technically sound manner both at present and in the future, and TSOs are thus an essential participant in efforts to achieve global energy security and sustainable development. The importance of TSOs having a strong knowledge base and technical competencies, including adequate resources was affirmed, and it was agreed that TSO should be able to provide independent technical and scientific advice without pressure from outside bodies. In addition, effective regional and international cooperation between TSOs was considered important in ensuring and continuously improving their ability to provide services necessary for safety. It was further agreed that the TSOs should meet regularly to discuss common challenges and to exchange and share experience.

2.2.4. *International Conference on Knowledge Management in Nuclear Facilities*

Date: 18-21 June 2007

Place: Vienna

More than 270 participants from 50 countries and 10 international organisations met in Vienna for a *Conference on Knowledge Management in Nuclear Facilities*. The conference featured an opening policy forum and four thematic sessions focusing on the role of nuclear knowledge management. Areas covered included the safe operation of existing plants, the achievement of gains in economic and operational performance of nuclear facilities, the preservation of existing knowledge and its use in relation to future innovations, and the smooth and effective transfer of knowledge to the next generation.

In his address, Mr. Tomihiro Taniguchi, Deputy Director General, Department of Nuclear Safety and Security, stressed the importance of the human factor in knowledge management for issues relating to nuclear safety and security. “Knowledge management is vitally important for nuclear safety. Not only scientific knowledge, but also practical knowledge based on hands-on experience and international information-sharing are particularly relevant,” he said. He pointed out that transparency, openness and information-sharing are all practices that can contribute positively to the creation of an effective global safety knowledge culture. But, he warned, at a national level safety knowledge can only be achieved through a long, laborious process.

A total of 145 papers, posters and keynote speeches were presented by experts, scientists and officials during the four-day event. ANSN activities were introduced through a live presentation of the network in the exhibition area and, both a leaflet and the ANSN newsletter were distributed.

3. NATIONAL ACTIVITIES

Activities are presented for each country chronologically for each activity type

3.1. China

3.1.1. Workshop on Experience Exchange on CANDU Fuel Defect Investigation and Fuel Performance at TQNPP

Date: 6-8 November 2006

Place: Haiyan Zejiang (CPR)

This workshop was requested by China in 2004 to discuss fuel failure occurred at the two units (CANDU) of the Third Qinshan Nuclear Power Plant (TQNPP), but it was postponed. Twenty seven participants from Atomic Energy of Canada (AECL, Canada), Korea Hydro and Nuclear Power (KHNP, Republic of Korea), Korean Atomic Energy Research Institute (KAERI, Republic of Korea), JGR Chemical Inc. (Canada) and four Chinese organizations (BNFP, CIAE, SNERDI and TQNPC) participated in the workshop.

The discussions during the workshop were focused on root cause investigations of fuel defects and measures to eliminate them based on the experiences of fuel defects observed at Canadian and Korean reactors and results of root cause investigations done by each organization.

The workshop provided recommendations not only for improvement of fuel performance but also for enhancement of information exchange among CANDU operators worldwide.

3.1.2. Improvement on Defects Depth Sizing Techniques in Stainless Steel and Dissimilar Metal Welds Ultrasonic Testing

Date: 13-17 November 2006

Place: RINPO, Wuhan, China

The objective of the training course was to perform a theoretical and practical training on Manual Ultrasonic Techniques for Defects Depth Sizing, and to transfer reliable metallic welds NDE Techniques for Nuclear Power Plants.

Three external experts from PNNL, USA, Davis NDE, USA and the Japan Power Engineering and Inspection Corporation shared their knowledge and experience on related topics, and trained the RINPO participants.

The following topics were addressed during the course:

- An overview of how manual sizing techniques were developed, including a brief history of the sizing techniques developed in the U.S. by EPRI and European sizing techniques;
- An introduction to current status of UT sizing technologies in Japan and outcomes from Japanese R&D projects; and
- A comprehensive discussion and practical exercises for the manual sizing techniques such as ID creeping wave, tip diffraction, bi-modal techniques, and high angle longitudinal methods.

The manual UT technology for assessment and evaluation of the status of nuclear components is an important means in overall NPP safety. RINPO is the only Technical Support Organization to provide safety class I components ISI for all the NPPs in China and Chashma NPP in Pakistan.

China (RINPO) should consider procuring one or more transducer sets to include state-of-the-art probes for ID Creeping Wave, Shear wave tip-diffraction, BiModal and HALT capabilities as well as an appropriate 10% - 90% notched standard. These would allow practice of learned material and stage RINPO to meet some level of urgent need. China (RINPO) should also consider procuring several training samples of cracked pipe that are fabricated in the same fashion as pipe in China's nuclear power plants and contain flaws of known depths.

China has received information about the application of various codes in line with import of NPPs and is principally capable of applying it in the field of in service inspection of nuclear components. However, it is recommended that one unified concept be decided upon and followed in the case of the evaluation of nuclear components with cracks. The inspection on DMWs and SSWs and their evaluation still remain a difficult area. Qualification and performance demonstration of inspector should be conducted in national framework; procedures should be developed according to national regulation.

It would be beneficial for China to sponsor a conference each year where plant personnel can exchange information on problems and learn from one another's experience.

3.1.3. Workshop on Verification and Validation Technology for Advanced Control Room of NPP

Date: 20-24 November 2006

Place: Shenzhen - Daya Bay Nuclear Site, China

All together 22 participants attended the workshop. The participants were coming from different Chinese organizations. Apart from the majority of participants that came from CNPEC, the following other organizations were represented in the workshop: Suzhou Nuclear Power Research Institute, Qinshan NPP Phase I and Phase III, Beijing Institute of Nuclear Engineering and Shanghai Nuclear Engineering Research and Design Institute. Also two Electricité de France (EDF) advisers to CNPEC and one representative of EDF Asia Pacific Branch – China Division from Beijing were present during the entire workshop.

The purpose of the workshop was to address the human factor issues for advanced MCRs which use digital control systems and Verification and Validation approaches for human-system interface (HSI) in advanced MCRs. Three invited experts from Areva NP, Germany, Halden Reactor Project, Norway and KINS, Republic of Korea supported the workshop by perspective and extensive discussions.

The presentations by the invited experts showed the principle design approaches chosen for the control room design for Chinese CNP1000 project and for the LingAo Phase 2 project, and also conceptual elements for the Qinshan CANDU 6 plant display system. It gave to the experts a first impression of the scope of activities performed by the Chinese design institutes, and was also a very good opportunity for the design institutes to inform each other about their respective design approaches.

The workshop covered the full range of principles, guidelines, examples and recommendations related to the design and evaluation of control rooms, human-system

interfaces, operator support systems and alarm systems for nuclear power plants, and also the elements of a licensing authorities' perspective.

3.1.4. *Workshop on Operational Safety Support Processes (II)*

Date: 22-26 January 2007

Place: Qinshan Phase III NPP, China

The purpose of this workshop was to present and discuss critical operational safety support processes of an operating nuclear power plant, attending new specific requests from the technical support department personnel of Qinshan phase III project. This workshop was complementary to the similar one conducted in April 2006.

The workshop was attended by thirty eight participants, the vast majority from Qinshan phase III. RINPO, Qinshan phase I and Tianwan NPP sent three representatives from each organization. The workshop consisted in demonstrating last and updated processes related to low level events, near misses and effective corrective action programmes.

The two external experts – from Brazil and Spain – gave several examples of their own experience and also lessons learned from recent OSART and PROSPER missions. Related IAEA documentation was provided to the participants in electronic form. The most important events/incidents of the past four years were presented in details with the root causes and lessons learned. Although some of the experts had already utilized some IAEA Standards, most of the participants were not fully aware of their existence and availability. As such, explanation on the use of the IAEA Standards, the different categorization of IAEA documents, how to officially acquire them and how to down load them from the web were presented.

The evaluation of the importance and the quality of the workshop, conducted by the participants and by the management of the Qinshan III revealed its fully accomplishment and success.

3.1.5. *Training Course in Nuclear Safety for the National Nuclear Safety Administration (NNSA)*

Date: 29 January-9 February 2007

Place: Vienna

The training was related to the need of the NNSA to review the Safety Analysis Reports of new units of the NPP with the objective to transfer the experience gained by the IAEA in conducting Engineering Safety Review Services in the areas of Site Safety and Design Safety Review Services.

Lectures were provided by IAEA and seven international experts from USA, France, Italy, Germany, and Netherlands. 11 personnel from different organizations in China attended the training course.

The training course consisted of 5 programs:

- Train the trainers;
- Workshop on site evaluation and design review;
- Train the trainers for senior technical staff;

- Training for NNSA staff; and
- Workshop on design related feedback.

Concerning the above mentioned workshops, major topics in the area of Design were:

- Accident Analysis and PSA (Lev 1 and Lev 2);
- Containment Systems;
- Instrumentation and control;
- Tools used and under development at the IAEA for safety reviews; and
- Practical examples and exercises

Major topics in the area of site evaluation were:

- General aspects of site evaluation;
- Seismic hazard and seismic PSA; and
- The training is aimed at giving the tools for the review of Safety Analysis Reports.

3.1.6. *Workshop on Modification management and control*

Date: 5-9 March 2007

Place: Qinshan, China

The Third Qinshan Nuclear Power Co, Ltd (TQNPC) held a workshop on "IAEA operational safety performance support process" in April 2006. TQNPC requested a further workshop on management of modifications.

The objectives of the workshop were to share good practices in the following:

- NPP modification management system and philosophy;
- NPP modification process;
- Good practices and lessons learned for modification management at other NPPs in the world; and
- Qualification and training requirements for modification engineers.

One IAEA staff and two external experts from Brazil and Czech Republic made presentations and also reviewed the existing TQNPC modification control system. The workshop audience consisted of not only the TQNPC staff but of representatives from other NPPs and support organisations such as Tianwan NPP, Qinshan NPP Phase 1 and 2, and Sanmen NPP. For the Zhejiang Sanmen NPP project, started in July 2003, it is very important to establish an effective modification control system at an early stage. The same applies to Tianwan NPP, which is in the early stage of operation.

The workshop was split in three parts:

- Presentations on the basic principles of modification control and configuration management;
- A practical exercise on the review of the existing modification control system of TQNPC; and

- Detailed presentations on all of the aspects of modification control and configuration management with reference to the review results.

During the workshop, eight suggestions were developed that can improve the existing TQNPC modification control system:

- Enhancement of the established process of modification control;
- Development of a process for urgent modifications;
- Effective control of temporary modifications;
- Development of a check-list for the modification review process;
- Establishing an agreement with the Regulatory Body on classification of modifications that should be submitted;
- Considering the development of the modification classifications based on QA grading approach;
- Considering establishing a filing system for the modification review history; and
- Considering establishing of an own group or contracting an external institution that can play role of Design Authority.

3.1.7. Expert Mission to Qinshan Nuclear Power Company (QNPC) on “How to do Streamlined Reliability Centred Maintenance Analyses”

Date: 23-27 April 2007

Place: Qinshan, China

The mission was requested and hosted by the QNPC operating the first NPP in China – i.e. Qinshan-I, Pressurized Water Reactor (PWR), 300 MWe, under operation since 1991. Thirty participants from five NPPs and the Research Institute of Nuclear Power Operations (RINPO) attended the mission. Two experts were invited by the IAEA to contribute to the mission conduct.

The expert mission had the following specific objectives:

- To review the work done in the area of Reliability Centred Maintenance (RCM) by QNPC since the time of the first workshop under EBP Asia held in May 2005;
- To discuss the questions of QNPC specialists submitted before the mission in relation to the implementation of an RCM programme and advice on adjustments, if needed, and future steps; and
- To lecture on the latest developments in the area of RCM.

The expert mission effectively combined limited review activities in respect to the developments in the area of RCM programme for QNPC with discussions and lectures on current status, trends and advances in the area of RCM. In addition, a plant walkdown was conducted that was aimed at visiting the plant maintenance department (mechanical maintenance section), the technical support department (vibration and oil analysis sections), and the production planning department (electrical section). While visiting the latter, an exercise was performed aimed to get data from the computerized database “CEAS” on maintenance events for selected components to verify the possibility to use the system to support the RCM programme for QNPC.

The review activities were conducted through interactive parallel discussions in two groups such as RCM process and implementation and use of Probabilistic Safety Assessment (PSA) to support RCM.

A considerable progress was observed in the development of an RCM programme at QNPC. Since the time of the first IAEA-led workshop on RCM held in May 2005, an RCM team was established at QNPC and significant efforts were undertaken to study the analysis approaches and RCM processes. The expert mission provided information on the latest achievements in the area of RCM thus enhancing the participants' knowledge.

3.1.8. Workshop on the damages of reactor pressure vessel, reactor pressure vessel head and internals during operation

Date: 21-23 May 2007

Place: Lianyungang City, China

The workshop aimed to focus on in-service and pre-service inspections and life time assessment of the reactor pressure vessel (RPV) and core internals reactor pressure vessel (RPV) and core internals and to provide good practices in other Member States to manage degradation and ageing of these components.

The workshop was co-organized by the Agency and the Chinese counterpart, Jiansu Nuclear Power Company (JNPC). The IAEA team consisted of one IAEA staff and three international experts from Czech Republic and Croatia. Eighteen Chinese participants from JNPC, Qinshan Phase III NPP and Chinese inspection companies attended the workshop. In addition, two engineers from Atomstroyexport in Russia also joined the workshop as observers.

The external experts made presentations about the following subjects:

- IAEA activities on safe long term operation and ageing management of WWER RPV and internals;
- Comparison of ASME (American Societies of Mechanical Engineers) vs. Russian Codes regarding RPV inspection;
- Inspection and qualification of dissimilar welds for WWER-1000 components;
- Capabilities of Škoda JS in ISI (in-service inspection) of the RPV;
- Life time management of WWER RPVs;
- The scope and requirement of relevant inspection technologies in the USA;
- Limitation of visual inspection;
- Automated in-service inspections of WWER 1000 reactors in Škoda JS;
- Stress corrosion cracking of reactor core internals;
- Inspection practices of WWER-1000 RPV, RPV Head using advanced techniques;
- Risk informed inspection of WWER components - an example;
- Qualification of in-service inspection systems and methods for WWER components in Czech Republic;
- Review of qualified mechanized UT (Ultrasonic Testing) examination in relation to NDT (non destructive tests) qualification in WWER 440 and WWER 1000 NPPs; and

- The qualification technology and other requirements for inspection systems.

Experts from Chinese organizations also made presentations on the first day, which were on “Safety Evaluation experience for flaw indication by ultrasonic method on the RPV of the Tianwan Nuclear Power Station (TNPS) Unit 2 during Pre-service Inspection (PSI), or the other one”, “Pre-service and in-service examination of RPV, internals and reactor vessel head in Tianwan NPP” and “Sensitivity Analysis for PWR RPV during Pressurised Thermal Shock (PTS)”.

The workshop provided the latest information on ISI and its qualification of the RPV and RVIs of WWER-1000. The information was very much appreciated by all participants. As Tianwan NPP is the first WWER in China, the plant and associated technical support organizations need information exchange and cooperation with other WWER owner countries regarding operation, inspection and maintenance of safety related components. The IAEA may facilitate the information exchange and cooperation through the EBP Asia and TC projects.

Through the presentations and subsequent discussions during the workshop, it was emphasized by the IAEA experts that application of other codes, standards and rules to WWER plants would be able to be realised only after detailed analysis and comparison, taking into account difference in design rules, materials, safety factors, manufacturing, technology and Non Destructive Testing (NDE).

IAEA experts provided suggestions on ISI of the RPV and internals and on the qualification of ISI.

3.1.9. Workshop on Data Analysis of Steam Generator Eddy Current Testing for Nuclear Power Plants

Date: 21-23 August 2007

Place: Research Institute of Nuclear Power Operation (RINPO), Wuhan, China

The objective of this workshop was to improve the ability of data analysis of Eddy Current testing of steam generator.

There were 33 participants from 10 Utilities/NPPs and technical support organizations of China. The IAEA invited 3 international lecturers from Ontario Power Generation, Canada, Organisation for Technology Development and Application, Ltd., (HRID-NDT), Croatia and Mitsubishi Heavy Industry (MHI) from Japan. The workshop was consisted of presentations provided by the experts, status reports presented by the participants, round table discussions, and practical demonstrations.

Topics covered the following:

- Steam generator tube degradations and mechanisms;
- Data analysis skills of PWR, CANDU and WWER steam generators;
- Advanced ET probes and data analysis;
- Project management and field execution of steam generator tube ET service on a single site and multiple sites;
- ET qualification; and
- Experience in technology transfer and localization.

IAEA staff presented the IAEA activities and a strategy for assessment of steam generator tube integrity. International lecturers made the following presentations:

- Experience of steam generator tube degradations and mechanisms in Japan;
- Steam generator tube degradations and mechanisms (CANDU Monel 400 and I-800 tubing);
- Steam generator tube degradations and mechanisms of WWER;
- Description of equipment for EC inspection of WWER steam generator tubes and collector ligaments;
- Intelligent probe ECT technology;
- Qualification of ECT for SG Tube in Japan;
- Flaw characterization (Bobbin, X-probe, UT and metallurgical examination);
- Project management and field execution of steam generator tube ET service on a single site and multiple sites;
- Optimization of SG test plans;
- Project management and field execution of steam generator tube ET service; and
- Lesson learned in data analysis of WWER steam generators data.

Two practical demonstrations of both data analysis with field data and data being collected with novel probes were performed by Japanese experts and Croatian expert. The participants found this demo session very helpful.

The workshop was successful in disseminating and exchanging information on steam generator degradation mechanisms, new data acquisition probes, data analysis and project management. The workshop included presentations of all the three types of steam generators of PWR, CANDU, and WWER, which China operated. The practical demonstration was very impressive.

3.1.10 Safety Culture for NPP #2 (including Human Performance Support)

Date: 24-28 September 2007

Place: TQNPC, China

The main objective of the workshop on safety culture was to discuss the relationship between strong safety culture, integrated management system for safety and improved operational safety. Special attention was given to the application of the new IAEA Safety Standards (Fundamentals, Requirements and Guides) which are the basis for establishment of an integrated management system.

It was also considered important to provide a forum for dialogue within the process of enhancing safety culture in Chinese nuclear facilities.

A mixture of lectures, practical exercises and subsequent discussions increased the understanding for safety culture and allowed the highlighting of strengths in the Chinese approach to safety culture. The participants also identified inadequacies in several areas and developed plans for change and improvement. It was acknowledged both by the experts and participants that a long term Chinese strategy should be developed within the country for

gaining access to the world's best practices on safety culture. The Chinese side proposed a continuation of the cooperative effort on safety culture in the coming years.

One of the specific characteristics of this National Workshop on Safety Culture was the initiation of a discussion on new computer software support for interactive nuclear procedure development. One of the experts demonstrated several good practices, including using "Wikis" as advanced software tools. This was met with great interest from the Chinese safety culture specialists. Wikis are used to create collaborative products and are increasingly being installed by businesses to provide affordable and effective Intranets or for use in knowledge management. Any further cooperation on safety culture with the Chinese nuclear power plants will have to include the aspect of Wiki-usage and other increasingly innovative approaches to safety culture enhancement.

3.1.11 Dynamic Alarm Priority Management Technology of Nuclear Power Plant

Date: 8-12 October 2006

Place: Daya Bay, China

The purpose of the workshop was to present the international experience with regard to methodologies used to prioritize alarms in the main control room and technology involved, to review and discuss the achievements at CGNPC at Daya Bay and provide them with recommendations for further development. The purpose of the travel was to act as the Technical Officer for the workshop.

After the introductory remarks and introduction of lecturers and participants, the workshop proceeded in accordance with the established Agenda with presentation by China on Current Status of Alarm Inhibition Design for Ling Ao NPP Phase II. It was a very good starting point for the workshop as it established the current level of development in the area of alarm treatment at the China Nuclear Power Engineering Company. The rest of the workshop was devoted to presentations by the international experts and discussion, including safety implications of human-system interface; alarm system human performance issues and effectiveness, advanced alarm system for boiling water reactor (BWR).

In addition, a Lap Top demonstration of the BWR Simulator of an advanced alarm system based on Root Cause Analysis methods was made. It is a real-time simulation and the Root Cause in this context means the Primary Alarm. It demonstrated also the concept of dynamic alarm priority which basically means that the same component condition or a certain parameter can be in the normal mode or in an alarm condition depending on the state in which the plant operates at a certain time.

Other presentations include development and application of the dynamic alarm processing system for Korea Standard NPP; development and application of alarm root cause tracking system for Wolsung Canada deuterium-uranium reactor (CANDU) NPP; overview of human-system interface system of Mitsubishi advanced main control room; alarm prioritization system of Mitsubishi advanced main control room;

Altogether 20 participants attended the workshop. They were all coming from the China Nuclear Power Engineering Company. In addition, two Electricité de France (EDF) advisers to CNPEC were present during the entire workshop.

After the closure of the workshop on Friday, a short tour of the Daya Bay site was organized.

3.1.12. Workshop on Nuclear Reactor Protection System

Date: 10-12 October 2007

Place: Beijing, China

The purpose of this workshop was to present a general overview of the main issues involved in NPP I&C ageing and modernization projects.

A potential outcome of I&C ageing management programmes might be a decision to gradually introduce digital technologies through modernization of I&C systems at existing plants. Digital upgrade projects or the deployment of fully digital I&C systems at new plants pose unique challenges in design, implementation, licensing, operation, and maintenance. The importance of these issues has been discussed during this workshop hosted by the Institute of Nuclear Energy Technology in Tsinghua University (INET) and attended by 22 participants from six organizations in China.

The lectures covered the following technical areas:

- Diversity Approaches for Common Cause Failure Mitigation; Digital Communication Assessment for Highly Integrated Control Rooms; Licensing Process for Safety-Related Instrumentation and Controls at United States Nuclear Power Plant; Challenges for Instrumentation, Controls, and Human-Machine Interface Technologies in Current and Future Nuclear Power Plants
- Core Surveillance at the Paks NPP by Using a Modernized In-Core Monitoring System; Noise Diagnostics Measurements Performed on a VVER-440/213 Reactor; Startup Reactivity Measurements Performed by a State-of-the-Art, Mobile Data Acquisition and Evaluation System
- Applications: Detection and Analysis of Core Anomalies and Detector Failures; Functional Requirements for Reactor Protection System; Design Practices of Ex-Core Neutron Flux Monitoring with Fission Chamber for KSNP & SMART; Principles of In-Core Instrumentation using SPND (Self Powered Neutron Detector); Reliability Assessment of Digital Protection System for SMART Reactor
- Safety Systems In-Core Instrumentation Diagnostics in CANDU NPPs

3.1.13 Simulator Training Seminar

Date: 22-25 October 2007

Place: Wuhan, China

An IAEA workshop to discuss development and use of various types of simulators for NPP personnel training and for engineering purpose was held in Wuhan. Twenty-four participants from China – representing eleven nuclear power operating organizations, and research, design and operation support organizations – took part. Twelve international experts from four countries were involved to present the most up-to-date technologies and experience.

IAEA staff provided to the participants a comprehensive picture of the status and trends in the nuclear power sector and nuclear training. The international experts and participants from China addressed such important subjects as the use of simulators for NPP personnel training and authorization; in the NPP simulation-assisted engineering, commissioning and operation support; in the design and implementation of Digital Control Systems; testing of I&C; modernization of the NPPs; verification and validation of the algorithms and procedures; and

in establishment of crisis centres. Use of the engineering codes in real-time simulators; configuration management of simulators and state-of-the-art simulator development technologies were addressed too. Ten simulator software products including actual simulators and advanced development tools were demonstrated at the software exhibition.

Presentations, question and answering sessions and discussions have confirmed the importance of the workshop subjects for the enhancing the NPP safety, and for increasing efficiency of the new NPP builds or modernizations. A visit to the hosting organization (RINPO) Simulator Centre has shown that the Chinese colleagues are achieving a significant progress in simulator and digital control system development. It should be particularly mentioned that the Chinese participants were active in learning and very much motivated for acquiring and sharing knowledge.

3.1.14 Development of Safety Culture at Haiyang NPP (Safety Management System for New NPPs II)

Date: 22-25 October 2007

Place: Beijing, China

The objectives of the workshop were to expand the understanding of and good practices in safety culture development and implementation for NPP's design, construction, operation and management and to establish the first contact of a learning exchange programme between Shandong Nuclear Power Company, Ltd. (SDNPC) and Progress Energy (PE), USA.

The workshop was performed in three main parts:

1. A series of presentations and discussions were held on October 22 and 23 October 2007 in plenary sessions. The participants in the meeting were managers of Shandong Nuclear Power Company, Ltd. (SDNPC), a subsidiary of CPI. In all, over 17 Chinese professionals, including representatives from CPI, CPCEC and CPIPEC participated in the presentations and discussions.
2. On the third day, 24 October, working group sessions were held. The objective was to prepare a scientific visit to Progress Energy in the United States. Three targeted groups of managers have been identified: management group, engineering and design group and operation group. A list of learning needs based on safety culture attributes defined in Safety Guide GS-G-3.1 (Application of the Management System for Facilities and Activities) and on specific needs of the three different groups, has been established.
3. The last day of the workshop was dedicated to the organization of the scientific visit to Progress Energy in the United States. The IAEA will continuously support this cooperation programme and could attend the exit meeting of one of the two scientific visits next year. Concerning the cost related to the first scientific visit, it has been agreed that Progress Energy and CPI/SDNPC will find a common agreement in the coming weeks.

3.1.15 Preparation of Safety Documents and Pre-decommissioning Activities for Research Reactors

Date: 22-26 October 2007

Place: Beijing, China

The objective of the mission was to advise the CIAE on the safety aspects of the transition period between the shutdown and decommissioning of the HWRR and on the revision of the safety documentation to conform to that period.

The main part of the mission was dedicated for the discussions of various safety aspects and considerations of the reactor during the transition period including the revision of safety documentation and the safety related activities to be performed, in particular the storage and handling of the spent fuel, systems drainage, changes to the confinement barriers and the required modifications of the reactor systems (those required to operate or need to be modified, to be taken out of service, and to be installed).

The activities of the mission resulted in identifications of several safety issues, which were discussed and clarified to the HWRR operating personnel. The team provided recommendations and guidance to solve these issues.

The mission indicated to the CIAE authorities that active participation of the HWRR in the international and regional activities and projects such as the Demonstration and Evaluation of the Safety of Decommissioning of Nuclear Facilities (DeSa) and the International Decommissioning Network (IDN), and Research Reactor Demonstration Project (R2D2) will help ensuring the safety of the reactor during the transition period and decommissioning phase through exchange of feedback experience and lessons learned from the transition and decommissioning projects.

3.1.16 *Workshop on Key Safety Issues of Modular HTGRs*

Date: 23-26 October 2006,

Place: Beijing, China

The purpose of the meeting is to provide an international forum for information exchange and discussion on safety related aspects of modular HTGRs, including past experience and ongoing activities. With five presentation sessions and two panel discussion sessions, the meeting covers, among others, the safety standards and regulatory criteria, the accident /severe accident analysis results and hypothesis, the safety analysis/assessment software development and V&V, the safety related experiments (e.g. fuel quality), the source term, the containment and confinement, the Probabilistic Safety Assessment and the Tritium issue.

The meeting was attended by 35 participants from nuclear regulatory authorities, industries and research institutions from seven countries (China, Germany, Japan, the Netherlands, South Africa, South Korea, and USA) and the IAEA.

From the exchanges and discussions during the meeting, the participants identify the further needs of the HTGR community and emphasise that the IAEA should play a key role in assisting member states in specific issues such as risk informed guidance for design basis selection and approach to the application of defense-in-depth principle.

3.2. Indonesia

3.2.1. *Workshop on Probabilistic Safety Assessment*

Date: 20-24 November 2006

Place: Jakarta, Indonesia

Thirteen Indonesian participants, in all, from the Centre for Nuclear Safety and Reactor Technology (PTRKN), the Centre for Development of Nuclear Energy (PPEN), the Centre for Multipurpose Reactor (PRSG), and the Nuclear Technology Centre for Materials and Radiometry (PTNBR), and the Nuclear Energy Regulatory Agency (BAPETEN) participated in the workshop. Lectures and presentations were given by two invited experts from the Japan Nuclear Energy Safety Organization and the Korea Electric Power Research Institute.

The purpose of the workshop was to improve participants' understanding of comprehensive PSA for nuclear reactors (research reactors and nuclear power plants).

At the workshop, fundamentals and an overview of PSA were introduced. These included an introduction to PSA, Level 1 PSA, including reliability theory and quantification, minimal cutset, risk importance, seismic PSA and shutdown PSA.

The lectures covered the following topics:

- IAEA guidance on safety analysis, PSA and related activities;
- Introduction to PSA;
- Level 1 and 2 PSA;
- Reliability theory;
- Common cause analysis, human error;
- Quantification, minimal cutset, and risk importance; and
- Shutdown PSA and Seismic PSA.

The workshop provided a comprehensive, systematic overview of PSA for nuclear reactors and, as such, was of great benefit to those participants who are, or will in future, be involved in the design and operation of nuclear reactors as well as to those from the regulatory body. Indonesia has recently been investigating and developing data analysis methods for its research reactors. This workshop described the basic concept of PSA and provided insights on how to develop and perform PSA.

The following was agreed:

- Indonesia would request the second training course on PSA in 2007;
- The IAEA would provide lectures on nuclear power plant design (i.e. system design, thermal-hydraulic safety analysis and severe accident phenomena);
- The IAEA would prepare practical exercises on the use of a particular PSA code as well as lectures on external events such as seismic, fire and floods; and
- Indonesia would also provide lecturers on the fundamentals of PSA.

3.2.2. In-service Inspection of Heat Exchangers and Radiation Protection Programme of RSG-GAS

Date: 11-15 December 2006

Place: Serpong, Indonesia

IAEA provided technical assistance to Indonesia through a National Training Course on Water Chemistry of Nuclear Reactor System, held in Serpong, Indonesia from 30 August to 9 September 2004. As a follow-up action of the training course, an IAEA expert mission was conducted in November 2005 on the in-service inspection for the cooling system components

and on the water surveillance programme of the RSG-GAS Research Reactor operated by BATAN. The assistance on the evaluation of the radiation protection programme has been offered by the IAEA and accepted by the Indonesian counterpart during the 2005 co-ordination meeting.

The main purpose of this mission was to:

- Evaluate the Eddy Current Inspection of the heat exchanger tubes;
- Discuss water chemistry issues;
- Make a follow-up on the recommendations of the previous missions; and
- Evaluate the radiation protection programme of BATAN.

The mission was conducted by one staff member and two external experts from Hungary and Australia. During the mission, the following activities were performed:

- Facility walk-down;
- Attending presentations made by BATAN personnel;
- Providing presentations for BATAN personnel;
- Interviews and technical discussions with BATAN personnel; and
- Presentation of the main conclusions and recommendations on the exit meeting.

The facility walk-down included the reactor hall, the control room and the rooms for the cooling systems including the water purification systems and units. Main goal of the facility visit was to check the implementation of the recommendations raised by the previous missions. The following was evaluated: the content of the report on the eddy-current testing and the inspection results of the tested heat exchanger tubes condition. The test of the second heat exchanger should be performed according to the recommendations of the present mission. Recommendations addressed also the procedure of sampling, analysis and adding of the chemicals is far from adequate. The entire process for the secondary water treatment should be revised and modified appropriately.

A unified approach with well defined policy, objectives, criteria and arrangements for radiation protection was recommended, including training and retraining of staff members in the area of radiation protection.

3.2.3. Expert Mission to evaluate the Safety Analysis Report (SAR) and Follow-up on Core Bubbling Issue

Date: 5-9 March 2007

Place: Bandung, Indonesia

The mission to review the Safety Analysis Report was combined with the follow-up on the recommendations from previous mission on investigation of core bubbling phenomena and discussions on the management of water surveillance programme.

The mission was conducted by one IAEA staff and two external experts from Argentina and Romania. During the mission the following activities were performed:

- Reactor facility walk down;

- Revision of each chapter (20) of the SAR and other facility documents presented by the counterpart and discussions with technical counterparts, and specialists from BATAN on the comments and recommendations for SAR improvement;
- Discussion and follow-up on the recommendations of previous mission on investigation of core bubbling phenomena and possible technical solution to improve the situation; and
- Discussion on Management of Water Surveillance Programme.

The mission report was provided to the counterpart. All the comments and recommendations made by the experts on each chapter of the SAR were discussed with technical counterparts. Taking into account all the specific technical insights, there is an urgent need to establish an action plan to improve the current status of safety of Bandung research reactor, the maintenance, periodic testing and inspection programme, the radiation protection programme, the emergency preparedness and safety culture.

3.2.4. Workshop on the Assessment and Validation of Personnel Competency in Nuclear Safety

Date: 23-25 July 2007

Place: Jakarta, Indonesia

The purpose of this mission was to assist the Education & Training Center (ETC) of the National Nuclear Energy Agency (BATAN) in the validation of results and explore the future use of these training needs in planning, developing and implementing their training programs by both the ETC and the operating organisations.

The IAEA team consisted of one IAEA staff member and one external expert. Discussions were held with the senior management and staff of ETC and the operating organisations of the three research reactors. The mission was based on the IAEA guidance and questionnaires for systematic Training Needs Assessment (TNA) as well as on relevant IAEA Safety Standards.

The BATAN/ ETC training centre has long experience in providing training to the three Indonesian reactors. The operating organisations however are facing serious ageing of their workforce and appropriate planning of training for a new generation of operators should be better defined.

The mission analysed the detailed results of some of the questionnaires and concluded that the results are valid and useful for defining an action training plan by both ETC and the operating organisations.

Concerning the uses of the TNA results, it was concluded that they will be highly useful in prioritising of the training for the operating organisations. The evaluation and budget allocation as well planning of the annual training program will greatly benefit from the results of TNA as efforts can be directed to the specific areas where higher training gaps were identified. TNA results will also be a useful tool to revise the training policy of the organisations and to ensure the necessary competence in the operating organisations. Fluid and good communication as well establishment of a working mechanism between the operating organisations and BATAN-ETC should be in place in order to ensure adequate profit of these results.

3.2.5. Training Course on Probabilistic Safety Assessment (2)

Date: 6-10 August 2007

Place: Jakarta, Indonesia

The purpose of the training course was aimed at expanding the capabilities of Indonesia for performing PSAs.

The training course was attended by 16 participants from different nuclear organizations of Indonesia, namely the Centre for Nuclear Safety and Reactor Technology (PTRKN), the Centre for Development of Nuclear Energy (PPEN), the Centre for Multipurpose Reactor (PRSG), the Nuclear Technology Centre for Materials and Radiometry (PTNBR), and the Nuclear Energy Regulatory Agency (BAPETEN).

The 2006 training course focused more on the necessary technical and mathematical background for performing PSA, whereas the 2007 training course concentrated more on the practical aspects of developing PSA for nuclear installations, addressing the use of computational tools and included also the analysis of the more important internal and external plant hazards for a possible nuclear power plant site in Indonesia. The training course also addressed the development of a graded approach for the Application of PSA to research reactors and attending an explicit demand not related with the PSA, the safety architecture of nuclear power plants and some insight into current and future generations of NPPs.

The IAEA team consisted of one IAEA staff member and two external experts from USA and RF and conducted practical exercises and software demonstrations on the following topics:

- Definition and grouping of Initiating Events;
- Analysis of accident sequences;
- System Analysis and Human Reliability Analysis;
- Analysis of statistical and reliability data;
- Analysis of dependent failures;
- Integration and quantification of PSA models. Software codes;
- Analysis and interpretation of results;
- Level 2 and 3 PSA;
- Analysis of internal fires;
- Analysis of internal floods;
- Probabilistic seismic analysis;
- Analysis of other plant external hazards;
- PSA for research reactors; and
- Insights on NPP designs and relevant safety aspects.

The training course has contributed to the development of safety assessment capabilities of nuclear organizations in Indonesia. Indonesia is very interested in progressing in the deployment of nuclear power and needs to develop the necessary infrastructures and competences in regulatory bodies, operating organizations, and research institutes and universities to meet the needs for licensing, constructing, operating and overseeing nuclear power plants. In this context PSA is just one of the areas of knowledge required.

The training course caught the interest of most of the trainees, who contributed with many questions and participated actively, particularly when it came to practical aspects of the PSA development. In the evaluation conducted at the end of the course, the participants indicated that the training course had been of great benefit for their future involvement in the safety assessment of the future plants of their regulatory review.

3.3. Malaysia

3.3.1. *Expert Mission to review the Guideline for Certification of Research Reactor Operators*

Date: 26-30 March 2007

Place: Kuala Lumpur, Malaysia

The purpose of the mission was to review the Guideline on Certification of Research Reactor Operators.

The mission was undertaken by one IAEA Staff Member and one external expert from the Canadian Nuclear Safety Commission.

At the request of the counterpart, in addition to the discussion and revision of the Guideline for Certification of Research Reactor Operators, the following topics were included in the programme of this mission in relation to Certification process implementation:

- An example of the Certification of Research Reactor Operators documents in practice in other Member State, e.g. Canada;
- Guidance on regulatory judgment for positions which are subject to certification; and
- Guidance on criteria to audit the training programme of the operating organization.

The Final Draft of the Certification and Recertification Standard for Reactor Operators and Supervisors, which includes all the modifications based on the discussions done during this mission, was included in the mission report.

At the request of the counterpart, the IAEA staff provided comments concerning chapter 17 presenting the Operating Limits and Conditions of the Safety Analysis Report (SAR), submitted by MNA to AELB in February 2007.

The analysis of the roles and responsibilities of operating positions at the research reactor should be the basis to determine which operating position has the primary responsibility for the safety of the reactor, health, safety and security of staff, public and the environment. This analysis should serve as the basis for regulatory body decision as to which positions will be certified at the research reactor.

3.3.2. *Expert Mission to draft Regulations to License Research Reactors*

Date: 20-24 August 2007

Place: Kuala Lumpur, Malaysia

The purpose of the mission was to draft the national regulation dealing with the licensing process for research reactors and also anticipating the licensing process for nuclear power plants. The AELB requested also to obtain some worldwide experience and practice from

advanced nuclear countries regarding licensing fees, financial security and decommissioning funds.

An IAEA report by consultants on the licensing process for nuclear installations in Finland, France, the Republic of Korea, UK and USA, was also used to help the AELB establishing a consistent and comprehensive route for their licensing process regulation including: siting, design, construction, commissioning, operation, decommissioning and conditions to release a nuclear site from regulatory control. Graded approach was also part of discussions since Malaysia may license different types of installations in the future.

As requested by the AELB, a state of the art compilation was carried out before this mission to collect good practices from different countries regarding:

- How and what to charge to the Licensee or to the Licence Applicant; and
- How to determine the decommissioning fund and under which payment scheme.

The Malaysian Nuclear Agency and the Royal Malaysian Police were also involved in our work because Security and Safeguards are also under the AELB regulatory duties hence, need to be taken into account in the licensing process. The AELB was pleased to get a good draft regulation similar to most advanced nuclear countries and compliant with IAEA standards.

3.3.3. Expert Mission to review and verify the Results of Training Need Assessment (TNA) Analysis

Date: 2-5 October 2007

Place: Malaysia

The objective of the workshop was to review the training need assessment conducted by AELB for its regulatory staff and give hands-on training on methodology and application of the IAEA systematic training need assessment for regulatory bodies based on TECDOC 1254.

This mission assisted AELB in the revision of their previous studies for training needs assessment and human resources and gave practical training on the application of the IAEA systematic analysis of their training needs. The discussion of results and the hands-on training helped to clarify the competencies needed by the regulator in terms of knowledge, skills and aptitudes as stated in TECDOC 1254. It permitted a fruitful discussion of the IAEA safety standards and how to comply with them by developing policies and training programs within a well defined, comprehensive framework of competencies. It therefore contributed to the implementation of NSNI training strategy in support of the Members States to developing a suitable and sustainable training program that would ensure nuclear safety in line to the IAEA Safety Standards.

AELB had made a commendable effort to apply the IAEA systematic analysis of training needs within SAT methodology. This revision of their work and the hands on seminar has contributed to consolidate their knowledge and tools for defining the necessary training to build a stronger and more competent regulator in the future and a better compliance with the IAEA safety Standards.

Most of the ANSN countries are engaged in the evaluation of their training needs according to the IAEA guidelines. This work is coherent with the work program of the Education and Training Topical Group of the ANSN and is helping to develop a harmonised approach in the region.

3.4. Philippines

3.4.1. Training Needs Assessment (TNA)

Date: 9-12 July 2007

Place: Manila, Philippines

The objectives are to review the results of their previous study; to give a seminar including a hands on training on the use of the IAEA methodology for systematic TNA and IAEA supporting training activities and materials; and to make recommendations on the revision of results, the plans to fulfil the gaps and how to support further development of training.

There was a meeting with senior representatives of PNRI in order to discuss the needs and expected outputs of meeting as well as how this fit within previous EBP Asia missions and current ANSN E&T Topical group activities. Additionally, the IAEA representative presented the main lines of NSNI training activities and discussed the objectives of the mission. PNRI presented the results of the TNA followed by a group discussion. Next three days were devoted to hands on exercises and presentation of the IAEA systematic training needs assessment. Three groups of 4 trainees were set up from different departments of PNRI.

This mission assisted PNRI in the revision of their previous studies for training needs assessment and human resources and gave practical training on the application of the IAEA systematic analysis of their training needs. The discussion of results and the hands-on training helped to clarify the competencies needed by the regulator in terms of knowledge, skills and aptitudes as stated in IAEA-TECDOC-1254. It permitted a fruitful discussion of the IAEA safety standards and how to comply with them by developing policies and training programmes within a well defined, comprehensive framework of competencies. It therefore contributed to the implementation of NSNI training strategy in support of the Members States to developing a suitable and sustainable training programme that would ensure nuclear safety in line with the IAEA Safety Standards.

It was found that the methodology for TNA as defined in IAEA-TECDOC-1254 was not fully applied. There seems to be a discrepancy in determining the “needed” and “existing” competency of all staff members. It was observed that the needed competency was also assessed by the same set of people who were determining the “existing” competency. This discrepancy is probably because PNRI unlike other organizations within the ANSN network has not received any training on the application of IAEA-TECDOC-1254 so far and has applied this on its own. It is therefore recommended that PNRI should revise the study as soon as possible, so that PNRI can identify the real gaps. The revised study then can be used to develop a training policy, strategy and training programme. It is also recommended that PNRI should make use of all the training materials available on the IAEA web site, as well as on the ANSN web site after mapping the gaps with these available training materials.

3.5. Thailand

3.5.1. Expert Mission to Review the Radiation Protection Programme of the TRR-1/M1 and INSARR Follow-up

Date: 16-20 July 2007

Place: Bangkok, Thailand

The main objectives of the mission were to review the radiation protection programme of the reactor and to conduct a follow-up on the implementation of the recommendations provided by the INSARR mission conducted at the TRR-1/M1 in 2003.

Before the mission, the IAEA requested from the counterpart to submit a report on the actions taken to implement the recommendations of the main INSARR mission and the current status of the implementation of each recommendation. The main part of the mission was dedicated to the verification of the contents of this report, including review of the reactor safety documentation and operational records and logs, field review, and discussions with the operating personnel.

The team visited the reactor facility which was in shutdown state. Another technical visit was made to the reactor which was in operation at 1.2 MW. These visits allowed the mission to verify, in the field, the implementation level of the recommendations and updated the mission on the safety status of the reactor facility. During these visits, the mission discussed with the operating personnel the different aspects of the safe operation of the reactor.

The mission reviewed and discussed with the TRR-1/M1 specialists the radiation protection programme of the reactor and concluded mainly that intensive improvements to its contents and effective implementation are needed. The mission provided assistance in developing this programme according to the IAEA safety standards and provided recommendations for its effective implementation.

The follow-up process, including the review of the SAR and the other safety documentation (radiation protection programme and emergency plan), showed that there is a need to:

- Finalize the updating of the SAR, OLCs, and emergency plan;
- Define clearly the responsibilities and duties of the reactor operating personnel;
- Revise the terms of reference of the reactor safety committee expanding the list of items to be reviewed by the committee to cover all the topics included in the IAEA Safety Requirements for research reactors (NS-R-4);
- Establish a periodic testing programme, with the associated operating procedures, that satisfies the surveillance requirements of the OLCs;
- Complete the elaboration of the radiation protection programme and ensure its effective implementation;
- Demonstrate through adequate and proper evaluation the operational safety at power levels higher than 1.2 MW;
- Improve the operational safety of the reactor by adjusting/reviewing the safety system settings, in particular on high power and high radiation level at the pool top, and by establishing operating procedures; and
- Establish a system for the management of the reactor safety documentation.

3.6. Vietnam

3.6.1. Expert Mission on the Licensing of the New Instrumentation and Control System and Core Conversion Projects of Dalat Research Reactor

Date: 30 October - 3 November 2006

Place: Hanoi, Vietnam

The objective of the mission was to assist VARANSAC in review and assessment of the safety documentation related to the new I&C system and core conversion projects of the DNRR.

The mission was conducted by an IAEA team of an IAEA staff member and an external expert. Deputy Director of Nuclear Research Institute (NRI) has participated in the mission activities.

The safety documentation related to both modification projects (DNRR new I&C system and core conversion) have been reviewed and assessed by the team. The findings and the comments of the team have been discussed with the VARANSAC staff and with the NRI representative. The team gave recommendations regarding safe implementation of both projects.

Within the frame of the mission, the team assisted VARANSAC in developing an “Action Plan” for regulatory activities concerning the licensing process of the new I&C project. The team provided VARANSAC with practical guidelines on the execution of the actions planned under this “Action Plan”. The team also assisted VARANSAC in developing a tentative “Action Plan” for the licensing process of the DNRR core conversion project. Practical guidelines on the execution of the actions planned were provided by the team.

During the mission, the following presentations for additional clarifications were provided:

- Code of Conduct on the Safety of Research Reactors and IAEA Safety Standards related to research reactors;
- Information requirements during different stages of licensing process of research reactors; and
- Performance of review and assessment and systematic inspection and enforcement programmes for research reactors.

Upon request from VARANSAC staff, an example of inspection checklist for research reactors has been presented. On the light of these presentations and the clarifications given, the results of the self-assessment have been updated. The recommendations made by the mission have been discussed with the VARANSAC staff and the NRI representative. In the exit meeting, a draft mission report including the conclusions and recommendations have been given to VARANSAC for further actions.

CONTRIBUTIONS 2007

Country	Contributions
China	2 Information Technology experts (*)
France	1 cost-free expert
Germany	1 cost-free expert
Japan	1 346 481 USD (**)
Republic of Korea	1 cost-free expert and in kind (***)
USA	70 000 USD

* 1 IT expert from China served for 6 weeks.

** includes 2 cost-free experts from Japan

*** hosting training events in Republic of Korea

Work Programme for 2007

ANSN Management

Activity	Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ANSN													
4843 Database Maintenance	Vienna	01-											-31
4848 Development of education and training materials	Vienna	01-											-31
4849 Translation and utilization of the training materials		01-											-31
4844 CM on ISE guidelines	Vienna			05-09									
4915 IT Support Group and Hub meetings	Tokyo				16-20								
4845 ANSN SC (Steering Committee) 6th	Beijing						05-06						
4847 Workshop on IT security	Beijing											13-15	
4846 ANSN SC (Steering Committee) 7th	Hanoi											19-21	
4850 ANSN Promotinal Meeting (Caravan) in Vietnam	Dalat											22	
4842 Technical Meeting to Review Progress and Future Activities of the EBP on the Safety of Nuclear Installations in the South East Asia, Pacific and Far East Countries.	Vienna												10-13

Work Programme for 2007

Regional

Activity	Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ANSN													
4858	Pre-IRRS mission		05-08										
4918	CS on Planification of Training Needs Assessment		19-23										
4882	ANSN Operational Safety TG			26-28									
4866	Training Course on Safety Assessment for Radioactive Waste Disposal Facilities				02-06								
4851	Global Challenges for the Future of Nuclear Energy				11-12								
4878	ANSN Safety Analysis TG				17-20								
4880	ANSN Education and Training TG Bureau meeting				26-27								
4874	Regional Meeting on Application of the Code of Conduct on the Safety of Research Reactors for Asia Region Countries				30-	-11							
4872	Training Course on Safety Assessment and Verification for Nuclear Reactors (II)					14-18							
4861	Workshop on Exercise and Emergency Preparedness and Response Topical Group (EPRTG)						11-15						
4871	Workshop on the Joint Convention and RWMTG								03-07				
4761	Workshop on application of Deterministic Safety Analysis								10-14				
4926	Effective Management of Safety of Reactivity Control during Power Change and Shutdown in NPPs										03-05		
4881	3rd ANSN Education and Training TG and 2nd Bureau Meeting										15-18		
4930	Coordination meeting of TG Operational Safety on 29-30 October										29-30		
4928	Workshop on Incident Reporting System (IRS) / International Nuclear Event Scale (INES) Criteria and Reporting										29-	-02	
4875	Workshop on Promotion of Safety Culture in Research Reactor Operation										29-	-02	
4879	ANSN RRs Safety Management TG Bureau meeting											12	
4923	R2D2 Workshop on the transition from operation to decommissioning											12-16	
4873	Emergency Preparedness and Response Regional Workshop on Early Reporting of Events and Information Sharing for Event and Exercise Management											19-23	
4922	R2D2 workshop on characterisation survey												03-07

Work Programme for 2007 Regional

Activity	Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
4927 TM on Safety management and Verification for RRs Safety Committees	Vienna												03-07
4877 Workshop on Integrated Management Systems	Kuala Lumpur												03-07
4867 Workshop on Safety Assessment for Predisposal Radioactive Waste Management Facilities	Kuala Lumpur												03-07

Conferences

4852 International Conference on the Challenges faced by Technical and Scientific Support Organizations in Enhancing Nuclear Safety	Aix-en-Provence				23-27								
4924 The Meeting of Co-ordinators for the Incident Reporting System for Research Reactors (IRSRR)	Vienna					28-	-01						
4854 International Conference on Knowledge Management in Nuclear Facilities	Vienna						18-21						
4860 Technical Meeting on Best Practices in Organisation, Management and Conduct of Event Investigations	Vienna							09-13					
4856 Annual IAEA /NEA IRS Meeting for National IRS Co-ordinators	Issy-les-Moulineaux										02-05		
4775 International Conference on Research Reactors: Safe Management and Effective Utilization	Sydney											05-09	
4857 Technical Meeting on Effectiveness of Operational Safety Services and their Future Evolution	Vienna											20-23	
4853 Training for regulatory bodies of member states with NPPs	Vienna												17-19

Work Programme for 2007 China

Activity	Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ANSN													
4765	WS on Safety Support Processes (Safety Culture for NPP)	QNPP	22-26										
4891	Training Course in Nuclear Safety	Vienna	29-	-09									
4887	Workshop for Modification Management and Control	Quinshan			05-09								
4883	How to do streamlined reliability centred maintenance analyses	Qinshan			23-27								
4888	Workshop on degradation mechanism of the PWR reactor coolant system, TNPP	Lian Yun Gang				21-23							
4773	Eddy Current Testing of Steam Generator	Wuhan							20-24				
4917	Safety Culture for NPP #2 (including Human Performance Support)	TQNPC								24-28			
4892	Dynamic Alarm Priority Management Technology of Nuclear Power Plant	Daya Bay									08-12		
4884	Workshop on Nuclear Reactor Protection System	Beijing									10-12		
4894	Development of Safety Culture at Haiyang NPP (Safety Management System for New NPPs II)	Beijing									22-25		
4897	Preparation of Safety Documents and Pre-decommissioning Activities for HWRR	Beijing									22-26		
4889	Simulator Training Seminar	Wuhan									22-25		
4896	Workshop on Key Safety Issues of Modular HTGRs	Beijing									23-26		
4919	WS on Independent Safety Assessment and Verification (Safety Management System for New NPPs III)	Yantai										20-22	
4929	Regional Training Course on Operational Safety Evaluation of Fuel Cycle Facilities (FCFS)	CAEA, Beijing											10-14

Work Programme for 2007 Indonesia

Activity	Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ANSN													
4802 SAR of Bandung Research Reactor including follow-up for Core Bubbling Investigation Review Mission	Bandung			05-09									
4899 Workshop on the Assessment and Validation of Personnel Competency in Nuclear Safety	Jakarta							23-26					
4898 Training Course on Probabilistic Safety Analysis (2)	Jakarta								06-10				

Work Programme for 2007 Malaysia

Activity	Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ANSN													
4806 Certification of Senior Reactor Operators - Expert Mission and Workshop	Kuala Lumpur			26-30									
4905 Development of Licensing Guideline for Research Reactor	Kuala Lumpur								20-24				
4906 Review and Verify the Results of Training Need Assessment (TNA) Analysis	Kuala Lumpur										02-05		
4904 Expert Mission to Assist Establishment of National Guidelines for Development and Assessment of SAR Document	Kuala Lumpur											19-23	
4907 National Field Exercise for Research Reactor	Selangor												03-05

Work Programme for 2007

Philippines

Activity	Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ANSN													
4908 Training Needs Assessment (TNA)	Manila							09-12					

Work Programme for 2007

Thailand

Activity	Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ANSN													
4911 Expert Mission to Review the Radiation Protection of Research Reactor & INSARR follow-up	Bangkok							16-20					