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PROGRESS REPORT

(November 2005 – October 2006)

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

INTERNATIONAL ATOMIC ENERGY AGENCY

CONTENTS

I. INTRODUCTION	7
II. ACTIVITIES IMPLEMENTED FROM NOV. 2005 TO OCT. 2006.....	7
II.1. PROGRAMME MANAGEMENT	7
II.1.1. <i>Technical Meeting</i>	7
II.1.2. <i>Asian Nuclear Safety Network (ANSN)</i>	7
(i) Steering Committee	7
II.1.3. <i>Database</i>	8
II.1.4. <i>Integrated Safety Evaluation (ISE)</i>	8
(i) Regional Meeting on Integrated Safety Evaluation	9
II.2. REGIONAL ACTIVITIES	9
II.2.1. <i>ANSN</i>	9
(i) Topical Group Meeting on Education & Training	9
(ii) Coordination meeting on Emergency Preparedness & Response	10
(iii) Topical Group Meeting on Emergency Preparedness and Response	10
(iv) Topical Group Meeting on Radioactive Waste Management	11
(v) Topical Group Meeting on RRs Safety Analysis	11
(vi) IT Support Group	11
(vii) ANSN Promotional Meetings	12
(viii) ANSN Newsletter	12
II.2.2. <i>Meeting to Promote the Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste</i>	12
II.2.3 <i>Training and Translation and Utilization of the Materials for Training</i> ...	13
(i) Legal and Regulatory Aspects of Decommissioning Research Reactors	13
(ii) Lessons learned from past accidents at nuclear installations – Workshop	13
(iii) Installation of New Research Reactor Seminar.....	14
(iv) Radioactive Waste Management Workshop	14
(v) Basics of Decommissioning of Research Reactors	15
(vi) Asian Tracer Experiment Workshop.....	16
(vii) Translation and utilization of the training materials	17
II.3. NATIONAL ACTIVITIES	17
II.3.1. <i>China</i>	17
(i) OSART Follow-up Mission	17
(ii) Workshop on Quality Management Systems for Nuclear Regulatory Bodies.....	18
(iii) Improvement of Conditional Based Maintenance of Safety Related Valves.....	18
(iv) Steam generator heat-exchanging tube and ligament damage during operation workshop	19
(v) Workshop on ageing management and life time assessment	20
(vi) Containment In-Service Surveillance Workshop.....	21
(vii) Integrity Assessment Technology for Nuclear Components Workshop	22

(viii)	Workshop on “Optimizing the water chemistry mode of the secondary circuit with ETA (NH ₂ CH ₂ CH ₂ OH) in VVER 1000 unit of Tianwan NPP”	22
(ix)	Improvement of Reactor Physics Tests Methods	23
(x)	Mission to Strengthening the Regulatory Functions in China	24
(xi)	Degradation mechanism of the PWR reactor coolant system	24
(xii)	Operational Safety Performance Support Processes workshop	25
(xiii)	Safety Management of Research Reactors Workshop	25
(xiv)	Root Cause Analysis Workshop	26
(xv)	Expert mission on IAEA Site Evaluation and Design Procedures and to plan a training programme	27
	<i>II.3.2. Indonesia</i>	27
(i)	Joint Expert Mission on the Water Quality Surveillance Programme of RSG-GAS, In-service Inspection for Components of Cooling System of RSG-GAS and Follow-up on SAR to GA SIWABESSY 30 MW Research Reactor Follow-up on the SAR of RSG-GAS Serpong	27
	<i>II.3.3. Malaysia</i>	28
(i)	IT Support Mission	28
	<i>II.3.4. Philippines</i>	28
(i)	Follow-up Mission on the Establishment and Implementation of the Integrated Management System for the Philippines Research Reactor Operating Organization	28
(ii)	Follow-up Mission to review the draft Atomic Law	29
	<i>II.3.5. Thailand</i>	30
(i)	Workshop on Quality Assurance Programme Establishment of a Management System for the Operating Organization	30
(ii)	Expert Mission to Strengthen the Regulatory Functions	30
(iii)	Follow-up mission to review the draft atomic law	30
	<i>II.3.6. Vietnam</i>	31
(i)	2nd National Basic Professional Training Course on Nuclear Safety	31
(ii)	IT Support Mission	31
(iii)	Follow-up INSARR Mission	32
(iv)	Expert mission to review the draft atomic law	32
(v)	3rd National Basic Training Course on Nuclear Safety	33
	III. WORK PROGRAMME FOR NOV. – DEC. 2006	33
	III.1. PROGRAMME MANAGEMENT	33
	<i>III.1.1. Technical Meeting</i>	33
	<i>III.1.2. Asian Nuclear Safety Network (ANSN)</i>	34
(i)	Steering Committee	34
	III.2. REGIONAL ACTIVITIES	34
	<i>III.2.1 International Conference on Lessons Learned from Decommissioning of Nuclear Facilities and the Safe Termination of Nuclear Activities</i>	34
	<i>III.2.2 Trainings</i>	34
(i)	Safety Assessment and Verification for Nuclear Reactors Training Courses	34
(ii)	Medical Response to Nuclear Emergencies - Regional Workshop	34
(iii)	Research Reactor Ageing Management Workshop	35
(iv)	Promotion of the Ratification of the Joint Convention Workshop	35

(v)	Expert mission on promotion of the ratification of the Joint Convention	35
III.3.	NATIONAL ACTIVITIES	35
III.3.1.	<i>China</i>	35
(i)	CANDU fuel defect investigation and fuel performance - Experience exchange.....	35
(ii)	Verification and Validation Technology for Advanced Control Room of NPPs – WS.....	36
(iii)	Defects depth sizing techniques in stainless steel and dissimilar metal welds ultrasonic testing training seminar	36
III.3.2.	<i>Indonesia</i>	36
(i)	Expert Mission on Heat Exchanger of RSG-GAS, Radiation Protection and Management of Safety.....	36
(ii)	PSA Training Course	36
III.3.3.	<i>Malaysia</i>	37
III.3.4.	<i>Philippines</i>	37
III.3.5.	<i>Thailand</i>	37
III.3.6.	<i>Vietnam</i>	37
IV.	CONTRIBUTIONS 2006	38
	TABLE OF WORK PROGRAMME FOR 2006	39
	<i>IAEA Management</i>	39
	<i>Regional</i>	40
	<i>China</i>	41
	<i>Indonesia</i>	42
	<i>Malaysia</i>	43
	<i>Philippines</i>	44
	<i>Thailand</i>	45
	<i>Vietnam</i>	46

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

PROGRESS REPORT

November 2006

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 2005 until October 2006, 52 activities including the management of the EBP, regional and national activities were implemented. Furthermore, 15 activities are planned until the end of the year 2006. The level of activities of the EBP in 2006 is the highest since its establishment.

Table: The number of activities of the EBP

	Nov 2005 – Oct 2006	Nov – Dec 2006
Management	5	2
Regional	16	6
National	31	7
China	15	4
Indonesia	1	2
Malaysia	1	
Philippines	2	
Thailand	3	
Vietnam	5	1
Total	52	15

I. INTRODUCTION

This report describes the activities implemented from November 2005 until October 2006 and those further planned for 2006. Activities implemented from November 2004 to October 2005 were presented earlier in the PROGRESS REPORT, EBP-ASIA-208, which was distributed to all participating countries in November 2005.

II. ACTIVITIES IMPLEMENTED FROM NOV. 2005 TO OCT. 2006

II.1. PROGRAMME MANAGEMENT

II.1.1. Technical Meeting

The Technical Meeting (TM) was convened by the IAEA to review progress and further activities of the EBP. The plenary meeting was held from 6 to 8 December 2005 and attended by 32 representatives from 13 countries.

Bilateral consultation meetings between the IAEA and representatives from the 6 countries in the region were held on 5 December 2005 to discuss national activities for 2006.

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

- Review of the 2005 Programme Implementation;
- Progress report on Achievement and Future Assistance Needs –Integrated Safety Evaluation (ISE);
- New Regional Activities;
- Review of ANSN Activities;
- Work Plan for 2006,

The TM:

- Generally agreed the work plan for 2006 involving national and regional activities and the Topical Groups;
- Supported the proposals by Japan for the establishment of new Topical Groups on Emergency Preparedness and Response and Radioactive Waste Management;
- Welcomed the participation of additional Asian countries in ANSN activities.

II.1.2. Asian Nuclear Safety Network (ANSN)

(i) *Steering Committee*

The third meeting of the Steering Committee of ANSN was held from 1 to 2 December 2005 at IAEA Headquarter, Vienna, Austria. The purpose of this meeting was to review the activities in 2005 and discuss the work plan for 2006. The responsibilities for future activities were shared as follows:

Job	Responsibility
Explanation on "What is ANSN"	Indonesia
List of contacts (SC members)	SC Chairman
List of contacts (TG members)	TG Coordinators
Master index	IAEA(MS), Japan(Linux)
ANSN.org site	Japan, IAEA
TG software	Korea *
ANSN Newsletter	IAEA
ANSN Caravan	IAEA
Cooperation with FNCA	Australia
Common news	IAEA
Meeting plan & schedule	IAEA

* Current development work will be completed by the end of March 2006.

The Members also agreed on access policy, search process/taxonomy, and visual identity of the portals of the Hubs and National Centres of the ANSN.

The fourth meeting of the Steering Committee of ANSN was held from 6 to 7 June 2006 in Tokyo, Japan. The objective of this 4th meeting of the Steering Committee was to review the ANSN activities since December 2005 and to agree on a work plan for the next few months. The Steering Committee agreed that a project evaluation process should be introduced with clear definition of project goals based on need identification. A paper would be prepared for a discussion on this topic at the 5th ANSN Steering Committee meeting.

II.1.3. Database

The Asian Programme Management Database (APMD) is the EBP 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 for registered users via internet. Current numbers of users are around 180. However, this valuable knowledge is not shared through the ANSN.

II.1.4. Integrated Safety Evaluation (ISE)

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.

(i) Regional Meeting on Integrated Safety Evaluation

The Regional Meeting on Integrated Safety Evaluation was held in Manila, Philippines from 11-13 September 2006, and attended by 10 participants from 6 countries and the Coordinators of the ANSN Education and Training Topical Group, Emergency Preparedness and Response Topical Group and Safety Analysis Topical Group. China, Indonesia, Malaysia, Philippines, Thailand and Vietnam presented the result of their self evaluation. The review focused on the three main topics of the ISE: Legal and Governmental Infrastructure, Safety of Reactors, Education and Training in Nuclear Safety.

The current status of implementation of the IAEA recommendations resulting from the Agency's past safety missions in participating countries were also assessed and discussed. The results of the assessment made show that the following common issues need to be considered and solved by the member countries in the future:

- Updating of the safety documents;
- Establishing and implementing radiation protection programmes;
- Training needs for operators and regulatory body;
- Performance of periodic safety reviews.

II.2. REGIONAL ACTIVITIES

II.2.1. ANSN

(i) Topical Group Meeting on Education & Training

The Topical Group Meeting on Education and Training (E&T) was held in Vienna from 9 to 11 October 2006. The E&T Topical group was set up in 2004 and had not met ever since, therefore this meeting was considered a kick off meeting aiming at relaunching the group.

Representatives from China, Indonesia, Japan, Korea, Malaysia, Philippines, Thailand, Australia, Vietnam and IAEA staff participated to the meeting.

The current situation on education and training in each country was reported and was discussed by the participants. Japan and Indonesia chaired the meeting. The IAEA scientific secretary proposed Terms of Reference and working methods for the Group which were discussed and approved. The group agreed and published on the ANSN website the following conclusions of the meeting:

- 1) To adopt a strategy including a three steps procedure: training needs assessment, strategic study and national action plans to fulfil the education and training needs.
- 2) To conduct a quality review of ten selected courses from the APMD and perform a screening of other documents from the APMD with a view to select the best material in order to produce training courses in the future.
- 3) To put into action a work programme for the next two years in order to accomplish conclusions 2) and 3) including a detailed list of actions and deadlines for implementation.

The E&T Topical Group agreed to meet yearly. However, it was recommended that a reduced group (the Bureau) consisting of the two coordinators (Japan and Indonesia) and the IAEA scientific secretary will meet in about six months time in order to assess the implementation of the work programme and define the lines to follow for the next meeting.

(ii) Coordination meeting on Emergency Preparedness & Response

The coordination meeting was held in Vienna from 27 to 28 March 2006. The objective is to coordinate the EBP Asia activity for emergency preparedness and response, especially with regards to the implementation of the ANSN. It was proposed that the activities of the Topical Group would mainly focus on training on Emergency Preparedness and Response at nuclear power plants and other nuclear facilities, a step by step preparation of the ConvEx 2008 exercise in Asia, and more generally to sharing information on EPR through ANSN. Future activities were proposed, including the kick-off meeting of the ANSN EPR-TG (June 2006), a workshop on Lessons Learned from Past Accidents at Nuclear Installations (June 2006) and a Regional Workshop on Medical Response to Nuclear Emergencies in November 2006.

(iii) Topical Group Meeting on Emergency Preparedness and Response

The Topical Group Meeting on Emergency Preparedness and Response (EPRTG) was held in Beijing, China from 26-27 June 2006, and coordinated with the China Atomic Energy Authority (CAEA) and the Institute of Nuclear and New Energy Technology (INET), Tsinghua University. Seventeen representatives from China, France, Indonesia, Japan, Korea, Malaysia, the Philippines, Thailand, Vietnam and IAEA staff participated the meeting.

The IAEA staff made an introduction on the entire structure of the ANSN and its Topical Groups, including the associated Emergency Preparedness and Response (EBP) regional activities. The presentation provided the participants with the background information on the role of the EPRTG. After the presentation, the current situation on EPR in each country was reported and discussed by the participants. Effective and active information exchange on EPR experiences and practices took place. The role and the function of the IAEA's Incident and Emergency Centre (IEC) were introduced.

The Coordinator of the TG made a proposal on the TG's activity plan from 2006 to 2008, and possible IAEA support on EPR and incident and emergency communications, including information on ENAC, INES and NEWS. Presentations on these topics were also made by IAEA staff. The relation of the countries' assistance needs and the IAEA's proposal of assistance were discussed.

Participating countries' assistance needs from ANSN/EBP on EPR were identified, and the relevant future TG activities and EBP Asia regional activities were discussed and planned. Six future activities in the framework of ANSN/EBP were supported and agreed by the participants.

(iv) Topical Group Meeting on Radioactive Waste Management

The Topical Group (TG) on Radioactive Waste Management (RWM) was held in Tokyo, Japan from 25 to 26 September 2006, with coordination of the Japan Nuclear Energy Safety Organization (JNES).

Sixteen representatives from China, Indonesia, Japan, Korea, Malaysia, Philippines, Thailand, and Vietnam, the external experts from France and Germany, and IAEA staff participated the meeting.

The current situation on RWM in each country was reported and was discussed by the participants. Effective and active information exchange on RWM experiences and practices was done.

The possible IAEA's regional activities on RWM were proposed. The intention is to promote an understanding of concepts in radioactive waste safety; to develop awareness and understanding of IAEA Radioactive Waste Safety Standards; to assist in the development of comprehensive and coherent national radioactive waste management strategies and programmes; to assist member countries in meeting obligations under the Joint Convention.

The relation of the countries' assistance needs and the IAEA's proposal of assistance were discussed.

(v) Topical Group Meeting on RRs Safety Analysis

The third ANSN topical group meeting on safety analysis was held at KINS, Daejeon Korea from 9 to 12 May 2006. Ten participants from China, Indonesia, Malaysia, the Philippines, Thailand and Vietnam and five from KINS attended the meeting. The main objective of the meeting was to provide a forum for an 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. The meeting included:

- An exchange of experience in the field of safety analysis, including computer code calculation;
- National presentations of safety assessment assignments;
- Accident analysis for research reactors using the RELAP5 computer code (including completion of the (Malaysian) PUSPATI input deck);
- Special lectures on probabilistic safety assessment, best estimate analysis with uncertainties, siting/seismic analysis and computer code verification and validation.

(vi) IT Support Group

The meeting of the Information Technology Support Group was held in Kuala Lumpur, Malaysia from 24 to 27 April. 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. The visual identity for the project had been implemented for all ANSN sites, so the network appears as one single network with a common feel and look for all the ANSN web sites. During the meeting, it was decided that the IAEA Glossary should

be used as the guideline for all ANSN countries when entering keywords to ANSN. Participants recognised that upcoming challenges included implementation of a revised taxonomy for ANSN and standardized search interfaces.

(vii) ANSN Promotional Meetings

The main purpose of the meetings was to promote ANSN activities, including the use of ANSN when implementing EBP activities. These promotional meetings were sometimes referred as “Caravan”. The ANSN Promotional Meetings for the period covered by the report were carried as follows:

- ANSN Promotional Meetings in Paris, France on 7 November 2005.
- Caravan in Beijing, Qinshan site, and Daya Bay NPP, China from 19 to 23 June 2006
- Caravan in Quezon City, Philippines on 14 and 15 September 2006
- Promotion during the 15th PBNC in Sydney, Australia from 15 to 20 October 2006

(viii) 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 700 subscribers from the participating countries. Twenty-two issues have been published from November 2005 to October 2006.

II.2.2. Meeting to Promote the Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste

The meeting to promote the Ratification of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste was held in Hanoi, Vietnam on 15 and 16 December 2005.

The purpose of this meeting was to give detailed information about the Joint Convention as part of the activity undertaken by the Agency to promote the Convention among the member states which are not yet Contracting Parties.

The meeting was hosted by the Vietnam Atomic Energy Commission (VAEC). 26 participants from the region, namely from China, Indonesia, Malaysia, Philippines, Thailand and Vietnam attended the meeting.

All participating countries recognise that the benefits of becoming a Contracting Party are larger than the cost, and will make efforts to sign and ratify the Convention as soon as possible.

II.2.3. Training and Translation and Utilization of the Materials for Training

(i) Legal and Regulatory Aspects of Decommissioning Research Reactors

The first technical meeting (TM) on Research Reactor Decommissioning Demonstration Project (R2D2P) which aims to provide operators and regulators with experience on planning, implementation and regulation of decommissioning activities of an existing reactor; to facilitate the exchange of information and experience, education and training was held from 26 to 30 June 2006 in Manila. It had the following objectives:

- To present and discuss the main elements of the legal and regulatory framework on decommissioning;
- To present and discuss the international safety requirements and recommendations;
- To discuss the establishment of the necessary systems and the importance of audits and inspections during the decommissioning process;
- To present and discuss good practices and lessons learned, and experience of countries;
- To provide assistance on establishment of legal and regulatory framework on decommissioning of the PRR-1 reactor.

The TM was conducted in the following sessions; (i) opening, (ii) presentations of IAEA safety standards and recommendations on legal and regulatory aspects of decommissioning; (iii) national presentations; (iv) a visit to the PRR-1 reactor and waste storage facility; (v) a practical exercise based on the PRR-1 and Philippines legal and regulatory framework; and (vi) evaluation and closing of the meeting.

The participants considered the R2D2P project as a very important Agency initiative and a very important mechanism for assisting MSs in establishing a legal and regulatory framework on decommissioning in accordance with the international safety standards; for providing hands-on experience and for disseminating good practice and lessons learned.

(ii) Lessons learned from past accidents at nuclear installations – Workshop

The Regional Workshop on Emergency Preparedness and Response: Lessons Learned from Past Accident was held in Beijing, China from 27-30 June. More than 30 experts including the members of Topical Group on Emergency Preparedness and Response and Chinese experts from NPPs, institutes, and national or local government joined the workshop.

The workshop consisted of:

- general presentations on the safety standards on EPR;
- lecture on the Agency's role in incident and emergency communication, existing mechanisms for notification, reporting and sharing key information, and identification of events for early warning and response. The objectives and goals of the International Action Plan for Strengthening the International Preparedness

and Response System for Nuclear and Radiological Emergencies in the area of information exchange;

- experiences and lessons learned from accidents in Japan and Vietnam;
- presentation on the Convex 3 (2005) exercise and their experiences;
- lecture on selected case studies and lessons learned;
- overview of lessons learned from past accidents at nuclear facilities and lecture on the IAEA Generic Procedures and Guidance for Response to Facility Emergencies.

All presentations and lectures at the workshop were very much appreciated.

(iii) Installation of New Research Reactor Seminar

The seminar on the Installation of New Research Reactor Seminar was conducted from 14 to 18 August 2006 and hosted by the Vietnam Atomic Energy Commission (VAEC), Hanoi, Vietnam.

The purpose of the seminar was to provide decision-makers and managers, from operating organizations and regulatory bodies within the regional group, with information on practical elements of technical and safety issues associated with the installation of a new (or introducing modifications to an existing) research reactor.

The seminar covered a wide range of technical and safety aspects associated with various phases of a new research reactor project, modifications to an existing research reactor, and the experience feedback and lessons learned from recently installed research reactors. The seminar consisted of presentations and technical discussions by the IAEA team members and by the participants.

The participants considered the seminar effective and very useful, and were of the opinion that there was a strong need for the seminar not only for the countries who are currently planning or executing new research reactor projects but also for those who are introducing modifications to their existing research reactors.

(iv) Radioactive Waste Management Workshop

The Regional Workshop on National Strategies for the Safety and Licensing of Waste Management Facilities and was held in Tokyo, Japan on 26-29 September. More than 40 experts including the members of Topical Group Meeting on Radioactive Waste Management and observers attended the workshop.

IAEA staffs and two experts from France and Germany gave presentations on the safety of the radioactive waste management and the safety case concept for demonstrating the safety and licensing of waste management facilities and activities, including:

- The Global Regime for the safety of radioactive waste management;
- International standards for radioactive waste safety;
- The Joint Convention;

- A common framework for the management and disposal of radioactive waste;
- Waste Safety fundamentals;
- The Basic Safety Standards for Radiation Protection and the Safety of Radiation Sources;
- Safety Requirements for Predisposal Management of Radioactive Waste; and
- Safety Requirements for Disposal of Radioactive Waste.

The experience of waste management policy and strategy in Canada, France, Germany, Japan and South Africa were also presented.

All presentations and discussions at the workshop were very much appreciated.

(v) *Basics of Decommissioning of Research Reactors*

The Research Reactor Decommissioning Demonstration Project (R²D²P) was established to assist the Philippines in the decommissioning of their research reactor (PRR-1) and to help other countries with similar situations by “learning on the job”. The meeting on the “Basics of Decommissioning of Research Reactors” was held in Manila, Philippines on 16-20 October 2006. It is following the first meeting on “legal and regulatory aspects” held also in Manila on 26-30 June 2006. In addition to the local participants, 11 experts from 8 countries participated.

Two IAEA staff members and two experts from the USA gave presentations that covered the broad range of decommissioning activities, including a visit of the PRR-1 reactor, a practical exercise on the preparation of a “decommissioning plan” and presentation / discussions on:

- Regulatory requirements;
- Decommissioning process;
- Decommissioning planning;
- Management of decommissioning;
- Safety related documentation;
- Transition phase;
- Cost estimate and financial mechanisms;
- Radiological monitoring;
- Decommissioning technologies;
- Health and safety;
- Record keeping;
- Dismantling technologies;
- Waste and spent fuel management; and
- Release from regulatory control.

The actual situation in the participating countries was also presented by the respective national experts.

It was agreed to continue with the work in March 2007 and focus on the progress made in the Philippines on the “characterisation plan” and the “decommissioning plan”.

(vi) Asian Tracer Experiment Workshop

The Asian Tracer Experiment Workshop was held in Pleasanton, California, USA, from 23 to 26 October 2006, hosted by the Lawrence Livermore National Laboratory (LLNL) of the US Department of Energy. The Workshop was attended by 25 experts from 12 countries, (Japan, Republic of Korea, Thailand, Vietnam, Denmark, Russia, Canada, Australia, Austria, Italy, Belgium, USA), representing several international organizations (e.g. EC, WMO, IAEA).

The first day of the Workshop (Oct 23) the participants discussed the details of a cooperative China-US atmospheric tracer experiment that was conducted at the Qinshan nuclear power complex near Haiyan, China in July 2005. An overview of the experiment, presentations on data analysis, presentations of modelling results, comparison of model results with air concentration measurements, and a discussion of the results were given and lessons-learned that are relevant for the long-range Asian tracer experiment were identified.

On the second and third day (Oct 24 and 25) of the workshop the Workshop continued the planning for an international, long-range Asian atmospheric tracer experiment that is tentatively scheduled for October 2007. A harmless tracer gas will be released from China and monitored in China, Republic of Korea, and Japan. The topics for discussion and planning included the followings:

- Background and conceptual overview;
- Scientific goals;
- Tracer release location(s), timing, and procedures;
- Detection procedures, instruments and their locations;
- Air sample analysis procedures;
- Communications procedures during the experiment;
- Standardized data and documentation procedures;
- Role of dispersion models and modelling procedures;
- Exchange of model results;
- Commercial source of tracer gas; and
- Specie(s) of tracer gas to be used.

On the last day of the workshop (Oct 26), a visit was organized to the National Atmospheric Release Advisory Centre (NARAC) at LLNL for a tour and real-time demonstration of the capabilities.

(vii) Translation and utilization of the training materials

The participating countries, which organize the national training activities, can be supported to translate and distribute the relevant materials at the training activities.

The 3rd National Basic Professional Training Course on Nuclear Safety was implemented from 8-12 Oct. 2006 by VAEC, Vietnam. Six IAEA safety documents related to the course topics were translated into Vietnamese language by the national trainers in Vietnam and distributed to the course participants. The translated materials in electronic file format will be uploaded on ANSN web page of Vietnam for further utilization in Vietnam.

II.3. NATIONAL ACTIVITIES

Activities are presented for each country chronologically for each activity type

II.3.1. China

(i) OSART Follow-up Mission

Date: 7–11 November 2005

Place: Tianwan Nuclear Power Station (TNPS)

On 17 October 2005, the regulatory authority (NNSA) issued the Initial Fuel Loading Approval for Unit 1, after a delay of approximately 1.5 years compared to the original schedule. The delay was caused mainly by stress corrosion cracks of the steam generators heat exchanger tubes. At present, initial fuel loading of Unit 1 has been completed successfully. Unit 2 is now undergoing individual commissioning test and flushing for some systems, and the Cold Functional Test of Unit 2 could be started on November 30 2005. The Pre-OSART and the Follow-up visit focused on Unit 1.

The team reviewed the status of the recommendations and suggestions identified during the Pre-OSART mission conducted from 26 January to 12 February 2004. The areas reviewed were Management, Organization and Administration; Training and Qualification; Operations; Maintenance; Technical Support; Radiation Protection; Chemistry, Emergency Planning and Preparedness and Commissioning.

The Pre-OSART mission and Follow up visit were conducted in accordance with the IAEA Safety Standards. The Chinese regulatory authority uses the IAEA Safety Standards as a basis for their regulations. This significantly contributed to the success of the mission in improving the safety of the plants under commissioning.

The positive attitude of the management and staff in addressing the issues identified during the Pre-OSART mission is a good indication of the commitment of Tianwan NPS and the Chinese authorities to enhancing operational safety at their nuclear plants.

As concluded in the Pre-OSART mission of 2004, the follow-up team also concluded that the managers of TNPS have adopted the safety messages “Safety First, Quality First” as a tool to continuously improve the operational safety at the plant. The TNPS staff is very motivated and has shown a tremendous willingness to learn from discussions with the experts on this mission. The cooperation from senior management and the plant counterparts was also excellent throughout the mission.

(ii) Workshop on Quality Management Systems for Nuclear Regulatory Bodies

Date: 21-25 November 2005

Place: National Nuclear Safety Administration (NNSA)

The purpose of this mission was to provide a forum for the exchange of information on current practices and experience on the establishment of quality management systems in nuclear regulatory bodies. The workshop provided an opportunity to discuss and identify common challenges, issues, difficulties or problems, and possible solutions or good practices for implementing management systems to improve overall regulatory performance. The main outcome sought was to help strengthen and improve the regulatory performance of the NNSA.

Senior managerial staff and other staff of NNSA participated in the workshop. The NNSA participants were from NNSA Headquarters, four NNSA Regional Offices and NNSA Technical Support Centres.

Three external experts and the IAEA Scientific Officer for the mission gave presentations to and conducted discussions with management and staff of the NNSA on:

The establishment and implementation of management systems in nuclear regulatory bodies;

- Recent international developments relating to improving regulatory efficiency and effectiveness;
- International standards and state of the art practice regarding quality management systems and business excellence models;
- Current standards and new developments regarding IAEA documents on management systems and quality management;
- Typical key documents of a quality management system;
- Recent experience of nuclear regulatory authorities in Hungary and the United Kingdom on establishing quality management systems, regulatory self-assessment and improving regulatory performance and,
- Using performance indicators and self-assessment for monitoring and improving regulatory performance.

In discussions with the NNSA staff and management, the IAEA experts explained to the NNSA representatives the huge effort required to implement management systems, particularly at the beginning and during the implementation phase. The implementation phase always takes longer than expected, but the effort pays off if the organisation maintains its course.

(iii) Improvement of Conditional Based Maintenance of Safety Related Valves

Date: 28 November–2 December 2005

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

The purpose of this workshop was to provide information on experience and analysis techniques of safety related valves diagnostics in European countries, the USA, Republic of Korea and Japan as well as recent new developments in experience and techniques of Conditional Based Maintenance (CBM) of valves.

The workshop was attended by fourteen Chinese engineers from the Research Institute of Nuclear Power Operation (RINPO), Qinshan Phase I, II, III NPPs and Tianwan NPP. A staff member of the IAEA made presentations on IAEA activities related to CBM and on the utility's point of view in introducing CBM for motor operated valves (MOVs). The main lectures were provided by four external experts, who were from France, Japan, Republic of Korea and the USA. They made presentations on the following topics:

- Requirements and practices regarding valve maintenance and current status of CBM for safety valves;
- Design basis review (DBR) and CBM of MOVs;
- DBR and CBM of air operated valves (AOVs);
- CBM of check valves;
- Problems with power operated gate valves (POGVs); and
- R&D and future direction of CBM.

Both NPPs and supportive organizations want to have further opportunities to exchange information with and receive guidance instructions from more experienced countries. The experts suggested that the participants develop forums or groups to facilitate information sharing among Chinese nuclear power companies on valve maintenance practices and CBM application and increase awareness of valve CBM practices by monitoring or attending international meetings.

(iv) Steam generator heat-exchanging tube and ligament damage during operation workshop

Date: 8–12 May 2006

Place: Tianwan NPP, China

The steam generators at the plant had a large number of heat exchanger tubes plugged before the start of the operation. The steam generator integrity and ageing management have a high attention already at this stage.

Two external experts from Temelín NPP, ČEZ, Czech Republic and from Rosenergoatom, Russian Federation, (experience from WWER-1000 operating plants) participated as lecturers in the Workshop along with Chinese experts from Tianwan NPP, NNSA, RINPO, and SNERDI. The majority of the participants were from the plant and included experts on ISI, water chemistry, maintenance, I&C, etc. as well as senior plant managers.

The presentations and discussions during the Workshop addressed the following topics:

- IAEA activities on long term operation and ageing management of NPPs;

- SG feedwater and blowdown modification (inside SG);
- SG feedwater system and SG blowdown system regimes;
- Secondary water chemistry during operation and outage;
- The heat exchanging tubes and ligament eddy current testing;
- The heat exchange tube plugging criteria, plugs, technology and experience;
- Cleaning and chemical cleaning on secondary side of SG;
- SG level measurement, experience from plants commissioning;
- SG steam separation systems, SG steam moisture;
- Experience from plants commissioning; and
- Additional modifications of SG (collector flange sealing).

The discussions during the Workshop provided the plant with experience obtained at other WWER-1000 plants, pointed out important aspects that need to be carefully addressed, and highlighted potential issues that may emerge at Tianwan plant in the future.

(v) *Workshop on ageing management and life time assessment*

Date: 12–15 June 2006

Place: Wuhan, China

The workshop aimed to provide good practices in other IAEA Member States to manage ageing of major PWR primary components (including steam generator) and CANDU steam generator and on assessment of ageing and estimation of remaining life of these components.

Lectures were provided by IAEA and four international experts. 19 personnel from different organizations in China (mainly from RINPO, i.e. design, inspection and engineering service company in China, and Chinese nuclear power plants and other supportive organizations/ institutes) attended the workshop.

Along with the objective, the experts and IAEA staff made presentations about the following subjects:

- IAEA Activities related to long term operation and ageing management;
- Management of primary components all along the life of the plant;
- Experiences in Korean Aging Management Activities;
- Trouble Experience/ Failure Mechanisms of SG in Japanese Plants;
- CANDU steam generator aging management guidelines;
- A Study on the SG Integrity;
- Maintenance Technology of SG;
- Present ECT system for SG tube in Japan;

- Primary loop examples, thermal fatigue, thermal ageing and dissimilar metal welds;
- Flow Accelerated Corrosion Analysis;
- Ageing Management in Japan;
- Ageing management of Steam Generator and TLAA organisation and major contents;
- Assessment of CANDU steam generator degradation: heat transfer degradation, tube bundle integrity, and degradation of non-tubing secondary side components; and
- Technology and R&D in support of CANDU steam generator aging management and remaining life achievement.

On the second and third days, experts from Chinese organizations also made presentations about their ageing evaluation/ management activities for Steam Generator and other key SSCs. The experts and participants discussed the current status and future challenges on the third and fourth day.

(vi) Containment In-Service Surveillance Workshop

Date: 21–25 August 2006

Place: Tianwan NPP, China

The purpose of the workshop was to provide advice to Tianwan NPP on methodology of the in-service inspection programme and leak rate test of the containment systems of the plant. The containment of Tianwan NPP was designed by SEAP (Russia) following ASME standard, but the process and instrumentation system was designed according to Russian standards GOST 90 and ПИХАЭГ-10-021-90. The Russian supplier proposed to carry out the in-service containment leakage test according to the old regulation ПИХАЭГ-10-021-90, but the nuclear safety authority of China did not agree with this opinion. Therefore the plant requested advice from IAEA through organizing this workshop with lecturers.

The workshop presentations were given by 4 lecturers from Czech Republic, Russia, US and IAEA having relevant experience.

Eight participants from JNPC (Tianwan NPP), 2 participants from NPQJVC (Qinshan Phase II), 1 participant from Beijing YEHE Tech. (TSO for leak rate test), 1 participant from Central Research Institute of Building and Construction (TSO for structural integrity test) and 2 participants from ATE (Russian supplier) attended the workshop.

In the first part of the workshop the lecturers presented their national experience on containment in service inspection with special focus on the questions raised by Tianwan NPP. In the second part of the workshop the questions of the plant were discussed one by one.

The output from this workshop is sharing of experience and international good practices related to containment in-service inspection.

(vii) Integrity Assessment Technology for Nuclear Components Workshop

Date: 22–25 August 2006

Place: Wuhan, China

The objective of the Workshop was to exchange experience on assessment of nuclear components with cracks and application of various codes in analysis as well as evaluation of remaining lifetime of the components. An IAEA staff and four experts from USA, Sweden, and Japan shared their knowledge and addressed their lesson learned on these specific topics. 34 participants including Chinese host organization RINPO and other institutes (SNERDI, NPI, NSC) and NPPs (Qinshan I, II and III; Daya Bay; Tianwan and Sanmen project) attended the Workshop.

The workshop was organized and structured on the basis of the following specific topics:

- IAEA safety standard structure and activities on the long term operation and ageing management of NPPs relevant to structural integrity issue;
- Application of various codes in assessment of components with cracks;
- Fitness for service of the nuclear components;
- Design basis and material conditions necessary for safety assessment;
- Stress analysis and its evaluation in connection to fracture mechanics exercise;
- Fatigue as a damage mechanism and thermal fatigue in particular;
- Experience from Leak Before Break concept application as a part of safety concept;
- Practical examples of LBB applications; and
- Practical examples of evaluation of components with defects such as RPV safe-end nozzle, CRDM nozzle, and other PWR components with flaws, etc.

The workshop was concluded by a question and answer session that demonstrated the participants' understanding of the material presented during the week and highlighted a questioning attitude, the desire to learn and a high motivation for improvement of their own technology, measures and the way to conduct analyses when issues arise.

(viii) Workshop on “Optimizing the water chemistry mode of the secondary circuit with ETA (NH₂CH₂CH₂OH) in VVER 1000 unit of Tianwan NPP”

Date: 4–7 September 2006

Place: Tianwan NPP, Lianyungang City, China

The purpose of the workshop was to enhance the operational safety focus and present information on best practices in ensuring safety during construction, commissioning and initial operation.

Two experts from the Czech Republic – Temelín and France – EDF, shared their knowledge and addressed their lesson learned on this specific topic. A total of 13 participants including Chinese host organization and other NPPs (Qinshan I, II and III; Daya Bay; Ling Ao and Sanmen project) attended the meetings.

The workshop was organized and structured on the basis of the following specific topics:

- Overview of the Agency Safety Standards as support documents during the OSART missions;
- Presentation of secondary side water chemistry mode at NPPs in China;
- Presentation of the theoretical aspect and laboratory tests on stress corrosion cracking in the steam generators;
- Details on chemistry treatments during commissioning and start up phase;
- Criteria for treatment selection according to the advantages and disadvantages of morpholine, ammonia and ethanolamine – EPRI lesson learned – VVER specificity; and
- National and international experience on the management of the Steam Generator (SG) blowdown system and condensate polishing plant.

The workshop was successful in exchanging training documents, scientific publications, information and experience, identification of challenges and discussions of chemistry modes during the different phases of commissioning, start-up, initial operation and operation.

(ix) Improvement of Reactor Physics Tests Methods

Date: 10–12 October 2006,

Place: Qinshan Phase II Nuclear Power Plant, China

The purpose of the Workshop was to provide information and good practice on latest Reactor Physics Test Methods for Qinshan II. 28 participants were attended the workshop, mainly from Qinshan II. This was the first time for them to have a workshop on the reactor physics test as well as the core management.

The workshop presentations were given by 4 lecturers from Japan, France, United States of America and IAEA having relevant experience.

The workshop was organized and structured on the basis of the following specific topics:

- Overview of IAEA safety standards relating to reactor physics test;
- What is reactivity? – Point model versus Spatial model;
- DRWM – Dynamic Rod Worth Measurement Method;
- Start-up physics tests optimization in Qinshan 2;
- DRWM experience in KANSAI plants;
- Reactivity measurements on French NPPs – current status and possible improvement;
- SRWM – Sub-critical Rod Worth Measurement;
- Improvement and optimization of QNPP's Physics Start-up Test;

- Analytical method for calibration of in-core ex-core Nuclear Instrumentation System; and
- Simplified calibration method for Ex-core Nuclear Instrumentation System.

(x) *Mission to Strengthening the Regulatory Functions in China*

Date: 12–14 October 2006

Place: Beijing, China

The purpose of the mission was to assist the regulatory authority of China to strengthen regulatory functions by means of discussions based on the findings of the IRRT follow-up mission 2004. Also discussed was the governmental status of NNSA and its relationship with other nuclear organizations and future regulatory assistance in terms of inspection programmes for NPPs.

Discussions were also held with the regulatory body NNSA on the NS programme. The NNSA strongly require IAEA support. An action plan needs to be established before any further action is taken from the Agency

(xi) *Degradation mechanism of the PWR reactor coolant system*

Date: 16–19 October 2006,

Place: Haiyan, China

The objective of the workshop is to provide information of other IAEA Member States on 1) corrosion phenomenon which takes place at the dead end portion of the PWR reactor coolant system branch lines, and its solution, and 2) other potential ageing degradation mechanisms for the PWR reactor coolant system such as thermal fatigue (including thermal stratification) and vibration fatigue.

The experts from EDF (France), Mitsubishi Heavy Industry (MHI, Japan), and Korean Power Engineering Company (KOPEC, Korea) made presentations. 30 engineers from different organizations in China (14 from QNPC, i.e. the operating organization of Qinshan Phase 1 NPP, and 16 from other Chinese nuclear power plants and other supportive organizations/ institutes) attended the workshop.

The workshop consisted of the following subjects:

- IAEA Activities related to long term operation and ageing management;
- EDF field experience related to ageing degradations of Reactor Coolant Piping (RCP) and its branch lines;
- Korean experience of the pipe dead end corrosion problem and its root causes;
- MHI activity to Total Planning of PWR Primary Piping Maintenance;
- Solution of the pipe dead end corrosion problem;
- The Pipe Dead End Corrosion Problem in Japanese PWRs;
- Past - new design rules and residual life evaluation for RCP and its branch lines;

- Fatigue problems of RCP and its branch lines in Japanese PWRs (Topics of high-cycle thermal fatigue);
- Thermal stratification problems in Korea;
- EDF, European Commission (EC) R&D and Electric Power Research Institute (EPRI) activities related to ageing of RCP and its branch lines;
- Piping ageing evaluation under the Plant Life Management study in Japan;
- evaluation and management activities for the particular corrosion phenomenon and thermal stratification of the surge line system in China; and
- maintenance practices and operational experience related to primary system components in China.

(xii) Operational Safety Performance Support Processes workshop

Date: 17–21 April 2006,

Place: Qinshan Phase III Nuclear Power Plant, China

The purpose of this workshop was to deliver presentations on some critical operational safety support processes of an operating nuclear power plant attending specific requests from Qinshan phase III project.

One external expert from Brazil and two IAEA officers conducted the workshop. The workshop consisted in demonstrating last and updated processes related to temporary modifications, long term outstanding problems (work-arounds), limiting condition for operations and design change control.

The workshop was attended by twenty seven participants, the vast majority being from Qinshan III and only three from phases I and II.

The experts gave several examples of their own experience in that plant and also lessons learned from recent OSART and PROSPER missions. Related IAEA documentation was provided to the trainees as well as copies of some uncontrolled related procedures from EDF (France) and from the Brazilian nuclear power plants.

The most important events/incidents of the past four years were presented in detail with the root causes and lessons learned. As Qinshan III is a CANDU plant, a topic related to the forced shutdown of the units of the former Ontario Hydro in 1997, and the consequent root cause analysis results were presented, emphasizing that the causes were directly related to the complacency with past results and with the insular culture presented in the company.

On Thursday and Friday, as an outcome of the workshop, the participants developed a self assessment on their own procedures and produced several recommended actions to revise the existing Qinshan III temporary modification procedures.

(xiii) Safety Management of Research Reactors Workshop

Date: 26–29 June 2006

Place: National Nuclear Safety Administration (NNSA), China.

The purpose of the workshop was to provide the research reactors personnel of China, from regulatory body and operating organizations, with practical information and technical support on the basis of IAEA recommendations and international good practices to manage ageing of research reactors, to maintain their safety, and to conduct a periodic safety review.

An IAEA team of four experts (an IAEA staff member and three IAEA external experts from France and Japan) conducted the Workshop. The Workshop was attended by 28 participants from 8 Institutes of China, including NNSA. The Workshop was held at the Headquarter of the NNSA in Beijing.

The Workshop concentrated mainly on demonstrating practical examples and providing the lessons learned from experience rather than on the theoretical background of the subjects. The Workshop consisted of presentations and technical discussions by the IAEA team members, the Chinese experts and the participants. The following areas were covered during the Workshop:

- IAEA Safety Standards related to research reactors;
- Periodic safety review of research reactors and INSARR methodology;
- Practical examples on ageing management and periodic safety review for different types of research reactors and lessons learned from experience;
- Current status of ageing management of research reactors in China;
- Safety management for research reactors in extended shutdown;
- Safety assessment for fast reactors; and
- Current status and results of the safety analysis of the China Experimental Fast Reactor (CEFR).

The Workshop provided a forum for sharing views and exchanging experience on the research reactor ageing management, periodic safety review, and safety assessment of fast reactors as well as on lessons learned from performing these activities at several research reactors. The Workshop also discussed possible improvements in implementing ageing management programmes and in conducting periodic safety reviews at the Chinese research reactors.

(xiv) Root Cause Analysis Workshop

Date: 27–30 June 2006

Place: Qinshan III NPP, Haiyan, China

The objective of the workshop was to provide insight and practical experience in Root Cause Analysis of significant events to technical specialists of the plant. Thirty-two participants attended the workshop, mainly from Qinshan III NPP, however specialists from both Qinshan I and II and RINPO also attended. The workshop was presented by one Agency staff member and an International expert in Root Cause Analysis Training.

The Training Workshop was designed to provide Technical Specialists with training on how to conduct Root Cause Analysis on Significant Events that may occur in their specialist area. However, lectures based on the IAEA Safety Standards were also

given on the fundamental objectives of utilising Operating Experience to prevent significant events from occurring. The international invited expert from the USA provided training in Root Cause Analysis. This training was provided in two distinct sections.

First, theoretical presentations were given in Task Analysis, Change Analysis, Barrier Analysis, Event and Causal Factor Charting, and the development of Corrective Actions. At each stage of the training, practical exercises, based on a maintenance event, were conducted to ensure participant understanding.

Secondly, following the theoretical presentations the workshop was divided into several groups and exercises were conducted to re-analyse actual events that had occurred in the past at Qinshan III NPP. These exercises were conducted in Chinese with just the salient points translated. On completion of the exercise each group gave presentations on their results. The participants were invited to comment and ask questions on each report. The expert provided concluding remarks and advice following each report. In total, ten local events were re-analysed and full root cause analysis conducted.

(xv) Expert mission on IAEA Site Evaluation and Design Procedures and to plan a training programme

Date: 22–23 June 2006

Place: Beijing, China

The purpose of the mission was to discuss the proposed training program on design review with NNSA.

A training program focussing on review of safety analysis reports for the new NPPs to be constructed in China was discussed.

II.3.2. Indonesia

(i) Joint Expert Mission on the Water Quality Surveillance Programme of RSG-GAS, In-service Inspection for Components of Cooling System of RSG-GAS and Follow-up on SAR to GA SIWABESSY 30 MW Research Reactor Follow-up on the SAR of RSG-GAS Serpong

Date: 20-25 November 2005

Place: Serpong, Indonesia

This mission had three purposes, which were to perform a follow-up on the review of the Safety Analysis Report to GA SIWABESSY 30 MW Research Reactor, to provide technical advice on In-Service Inspection (ISI) for components of cooling system of RSG-GAS Serpong; and to provide technical advice to develop surveillance programme for water chemistry of research reactor and spent fuel storage.

The mission team was composed of a team leader from the IAEA and four external experts, who are from Argentina, Australia, Brazil and Japan.

A plenary entry meeting including a presentation by the team leader on the IAEA Programme on the Safety of Research Reactors as well as introduction of the Code of Conduct and the Safety Requirements on the Safety of Research Reactors was held in the morning of 21 November.

After the plenary meeting, the team split into working groups for the three subjects. The team and the local counterparts, as a whole, conducted a walkthrough to the entire reactor associated facilities.

The discussions between the team experts and the technical counterpart of the operating organization, the explanation of the possible safety implication of the safety issues identified and the recommendations made during the mission, and the comparison between the Agency safety standards and activities done by the operating organization staff at Siwabessy Research Reactors, provide technical advice to BATAN staff to improve the safety of their facility.

II.3.3. Malaysia

(i) IT Support Mission

Date: 27 and 28 April

Place: Kuala Lumpur, Malaysia

The purpose of the mission was to provide specific technical and advisory assistance to the IT staff at the Atomic Energy Licensing Board (AELB).

A specialist team from US, China and IAEA assisted the IT staff from AELB in solving technical problems with the ANSN installation in Malaysia. Moreover, the modifications agreed upon the ITSG meeting were implemented at the Malaysian ANSN web site. The IT staff at AELB received technical training in some of the new IT technologies which have been introduced to ANSN.

II.3.4. Philippines

(i) Follow-up Mission on the Establishment and Implementation of the Integrated Management System for the Philippines Research Reactor Operating Organization

Date: 24–28 July 2006

Place: Manila, Philippines

The objective of this mission was to review the progress made for the establishment of the Integrated Management System (IMS) and the implementation of the recommendations provided by the previous mission performed from 27 September to 8 October 2004.

The review was based on documents provided to the experts before and during the mission, on presentations made by the IMS Committee, on discussions with senior management staff and visits to various PNRI installations (Co-60 irradiation facility, applied physics laboratory, research reactor and radioactive waste facility).

The review covered the organisational structure of PNRI, the general functional statements of PNRI divisions, the inventory of the IMS as it should be established with identification of the gaps, the flowcharts for a number of elements of the management system and the accomplishments of the IMS committee. The IMS will be integrated into new projects to establish accreditation of certain units to ISO Quality Management System.

The follow-up was made on the implementation of the recommendations provided during the previous mission which covered mainly the development of the IMS and the tools to communicate the IMS goals and milestones to the staff.

In a global manner, the implementation level of the recommendations as well as the consideration of the various remarks and comments of the previous mission is satisfactory. This result is due mainly to the strong commitment and active participation of the PNRI top management.

(ii) Follow-up Mission to review the draft Atomic Law

Date: 5–8 September 2006

Place: Manila, Philippines

The purpose of the mission was to assist authorities of the Philippine Nuclear Research Institute (PNRI) and the Department of Health (DoH) in reviewing the legislative framework for the present and future programme for the peaceful uses of nuclear energy in the Philippines. The specific objective of the mission was to conduct a review of the draft Philippine Comprehensive Nuclear Energy Act of 2006, towards making it consistent with international best practice and IAEA safety standards. This draft was developed by the PNRI and the DoH and provided to the IAEA prior to the mission. This mission was a follow-up to the Expert Mission in October 2005.

The IAEA team consisted of one external expert and one IAEA staff member. Fifty one persons representing PNRI, the Department of Health, the Department of Energy, the Department of Justice, and the Department of Science and Technology, various Committees of the House of Representatives participated.

The programme consisted of presentations and a section by section discussion of the draft Philippine Comprehensive Nuclear Energy Act of 2006.

The IAEA team concluded that since the first legislative assistance mission in October 2005, the Republic of the Philippines has made significant progress toward the development of comprehensive and unified legislation to cover all aspects of the peaceful uses of nuclear energy and ionizing radiation in the country. As in the case of the follow-up mission to Vietnam, the fact that the Republic of the Philippines has produced a draft text for the legislation is definitely a step forward and a verifiable performance indicator. In addition, the Republic of the Philippines has achieved this in a relatively short time frame of about one year.

II.3.5. Thailand

(i) Workshop on Quality Assurance Programme Establishment of a Management System for the Operating Organization

Date: 14–18 November 2005

Place: Bangkok, Thailand

The purpose of this workshop was to establish and implement the Quality Assurance Program for research reactor operating organization.

The IAEA team of two external experts from the Netherlands and Republic of Korea, and one Agency staff member participated in this activity for the establishment of the Management Systems in the Office of Atoms for Peace (OAP).

At the first day of the workshop, the IAEA staff member made presentations on the Code of Conduct for the Safety of Research Reactors, and activities on research reactors conducted by the IAEA. At their turn, the external experts presented their national experiences. From the second day, detailed programme of interviews with all the divisions of the organization, to facilitate the assessment of the OAP and to develop a work plan for the implementation of the Management System, were prepared.

(ii) Expert Mission to Strengthen the Regulatory Functions

Date: 31 July–4 August 2006

Place: Bangkok, Thailand

The purpose of the travel was to assist the regulatory authority of Thailand to strengthen regulatory functions by means of delivering presentations on the Agency's requirements for the regulation of research reactors and by conducting a peer review on the recent regulatory activities implemented by the regulatory body of Thailand.

In all 10 presentations were delivered from the Agency's side. The implementation of results in accordance with the recommendations and suggestions raised by the IRRT team in February 2001 were reviewed and a report on the status of the regulatory body's achievements and an action plan has been prepared on further implementation and improvement of the Thai Regulatory Authority.

(iii) Follow-up mission to review the draft atomic law

Date: 10–13 October 2006

Place: Bangkok, Thailand

The purpose of the mission was to assist authorities of the Ministry of Science and Technology (MOST), and the Office of Atoms for Peace (OAP) in developing a new legislative framework governing the peaceful uses of nuclear energy in Thailand. The specific objective of the mission was to conduct a review of the new Draft Atomic Energy for Peace Act, which was provided to the IAEA prior to the mission, towards making it consistent with international best practice and IAEA safety standards. This mission was a follow-up to the Expert Mission in August 2002.

The programme consisted of presentations and a chapter by chapter discussion of the draft Atomic Energy for Peace Act. The mission report first gives an overview of the conduct of the mission, then does a chapter by chapter discussion of the draft Atomic Energy for Peace Act, and ends with a set of conclusions and recommendations.

II.3.6. Vietnam

(i) 2nd National Basic Professional Training Course on Nuclear Safety

Date: 21–23 November 2005

Place: Hanoi, Vietnam

The purpose of this course was to strengthen fundamental knowledge and to enhance technical capability and competency for Regulatory Body and Managers on Nuclear Safety. This course was a follow-up to the first such course given at the Nuclear Research Institute, Dalat, in November 2004.

The second course was held in Hanoi. There were 23 participants in the second Basic Professional Training (BPT) Course. Fifteen of the participants represented the Vietnam Atomic Energy Commission (6) and its sub-ordinate scientific institutes (the Institute for Technology of Radioactive and Rare Elements (3), the Institute for Nuclear Science and Technology (2), the Energy Institute (2), Sub-Institute for NBC (2)). Five participants were from the Vietnam Agency for Radiation and Nuclear Safety and Control and three were from the Institute for Engineering Physics of the Hanoi University of Technology. Of the 23 participants, 16 were in their 20s, one in the 30s and 6 in their 40s.

After the opening ceremony for the course, a staff member of the IAEA provided six hours of lectures, which covered following areas:

- the Agency's nuclear safety programme with emphasis on the Safety Standards;
- the Code of Conduct on the Safety of Research Reactors;
- Safety Standards and other documents that support the Code of Conduct;
- Agency assistance programmes that support the Code of Conduct ;and
- the Basic Principles of Nuclear Safety and some aspects of nuclear reactor design.

An excellent lecture on reactor physics and thermal hydraulics by a Vietnamese lecturer followed.

(ii) IT Support Mission

Date: 8–11 May 2006

Place: Hanoi, Vietnam

The mission's main objectives were to assist in the preparation and development of a National Centre in Vietnam, which will serve as the national portal for the Asian Nuclear Safety Network (ANSN) and repository for the national nuclear safety knowledge.

The ANSN software and database were installed and configured at the Vietnam Atomic Energy Agency (VAEC). The IT staff were trained and guided in how to further develop the ANSN web site. Web site modifications were made to meet some of the specific requirements of the VAEC.

Following the installation, staff from Vietnam was trained in entering data to the ANSN database and commenced doing so during the mission. Amongst the documents was a Vietnamese translation of the IAEA Basic Professional Training Course.

Closing discussions were held with management and IT staff to assess the work required to complete the National Centre and to provide advice and guidance for the future activities and possible assistance. Furthermore, discussions were held with the IT management at VAEC focusing on IT security and a list of general recommendations was presented.

(iii) Follow-up INSARR Mission

Date: 27 February – 3 March 2006

Place: Dalat Nuclear Research Reactor, Vietnam

The main purpose of this mission was to carry out a follow-up on the implementation of the Recommendations and Suggestions raised by the review team during the main INSARR mission, which was conducted from 23 to 27 June 2003 at the Dalat Nuclear Research Reactor (DNRR).

On the first morning of the mission the Director of Dalat Nuclear Research Institute (DNRI) made a presentation on the realization of the INSARR recommendations and suggestions. This presentation and the accompanying discussions gave the mission team a good basis for the evaluation of the implementation results. In the afternoon the team walked down the research reactor facility.

On the following days the implementation of the recommendations and suggestions outlined by the main INSARR mission was evaluated in a detailed manner.

Based on this evaluation, the mission concluded that many recommendations provided by the main INSARR mission to improve the level of operational safety, radiation, fire protection, and housekeeping in many areas remain valid and should be implemented by the counterpart.

(iv) Expert mission to review the draft atomic law

Date: 8–11 August 2006

Place: Hanoi, Vietnam

The purpose of the mission was to assist authorities of the Ministry of Science and Technology (MOST), the Vietnam Atomic Energy Commission (VAEC) and the Vietnam Agency for Radiation and Nuclear Safety and Control (VARANSAC) in developing an adequate legislative framework for the present and future programme for the peaceful uses of nuclear energy in Vietnam. The specific objective of the mission was to conduct a review of the Vietnam Atomic Energy Law, Draft 1.8,

towards making it consistent with international best practice and IAEA safety standards prior to it being introduced into the further legislative process in Vietnam.

The IAEA team consisted of one external expert and one IAEA staff member. Twenty-eight participants representing the various parts of the Government involved in the law-making process in Vietnam participated in the discussions.

The programme consisted of presentations and a chapter by chapter discussion of the Vietnam Atomic Energy Law, Draft 1.8.

The IAEA team concluded that Vietnam has made significant progress toward development of comprehensive and unified legislation to cover all relevant aspects of the peaceful uses of nuclear energy and ionizing radiation in the country. It is also clear that the current draft takes advantage of recommendations made during the previous IAEA legislative assistance mission in March 2002. The fact that Vietnam has produced a draft text for the legislation is definitely a step forward and a verifiable performance indicator. Recommendations are related to regulatory independence including a clear separation of functions between the designated regulatory body for nuclear safety and security and other bodies.

(v) 3rd National Basic Training Course on Nuclear Safety

Date: 8–12 October 2006

Place: Institute of Nuclear Science and Technology (INST), Hanoi, Vietnam

The purpose of this course was to provide instruction in the basic topics of nuclear safety and research reactors. The IAEA provided an external lecturer from 8-12 October covering the following subjects: the IAEA Safety Programme, Code of Conduct on the Safety of Research Reactors, Basic Principles for NS, Site evaluation and Management Systems. The training material developed in the IAEA, including the text book for the BPTC was extensively used and appreciated. This course proves to be a very good tool for training on the relevant aspects of nuclear safety at a basic level of knowledge.

III. WORK PROGRAMME FOR NOV. – DEC. 2006

III.1. PROGRAMME MANAGEMENT

III.1.1. Technical Meeting

The next Technical Meeting (TM) will take place in Vienna on 04–07 December 2006. The objective of the meeting is to evaluate EBP achievements to date and to agree on the strategy and scope of work for 2007 and beyond. ANSN activities will be also evaluated.

Each recipient country is to present a progress report on the Integrated Safety Evaluation (ISE) and future assistance needs.

III.1.2. Asian Nuclear Safety Network (ANSN)

(i) Steering Committee

The fifth meeting of the Steering Committee on ANSN is scheduled from 30 November to 1 December 2006 in Vienna, in the week preceding the EBP Technical Meeting.

The objective of the meeting is to ensure efficient and effective planning and implementation of the ANSN activities and the sustainability of the ANSN system, in particular to co-ordinate the full utilization of the ANSN.

SC member will be invited to discuss about several practical and strategic issues such as contents of Hubs and National Centres, Access Policy, Search Process, Visual Identity and expected activities of future Topical Groups.

III.2. REGIONAL ACTIVITIES

III.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

The objective of the conference is to foster information exchange on the safe and efficient termination of practices that involve the use of radioactive substances and to promote improved coherence internationally on strategies and criteria.

III.2.2 Trainings

(i) Safety Assessment and Verification for Nuclear Reactors Training Courses

Date: 6–11 November 2006

Place: Daejeon, Korea

The objective of this activity is to improve an understanding of the comprehensive safety assessment and independent verification of the safety assessment for nuclear reactors (research reactors and nuclear power plants).

(ii) Medical Response to Nuclear Emergencies - Regional Workshop

Date: 13–17 November 2006

Place: Tokyo, Japan

The purpose of the workshop and symposium is to establish a forum for exchange of experience, development of capacity and knowledge improvement in radiation emergency medical preparedness within the context of the ANSN. In particular, the purposes are (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 treatment of radiation injuries; (2)

to discuss the future cooperation among ANSN countries in the field of medical preparedness and response; and (3) to enhance awareness and build confidence on emergency medical preparedness and response among ANSN countries.

(iii) Research Reactor Ageing Management Workshop

Date: 4–8 December 2006

Place: Beijing, China

The objective is to provide the research reactors personnel in the region with practical information on the safety and technical issues related to the management of research reactor ageing.

(iv) Promotion of the Ratification of the Joint Convention Workshop

Date: 18–19 December 2006

Place: Vienna, Austria

The objective is to promote the ratification to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management by the supported countries, assist these countries fulfil the obligations of the Joint Convention after they have become Contracting Parties, enhance the safety of radioactive waste management in those countries, and ultimately enhance the nuclear safety in the Asian region.

(v) Expert mission on promotion of the ratification of the Joint Convention

Date: 13–17 November 2006

Place: Jakarta, Manila and Tokyo

The objective of this mission is to explain the decision makers the objective and the scope of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, and the benefits, the duties and the process of becoming a Contracting Parties to the Joint Convention to encourage them to ratify the Joint Convention, as soon as possible.

III.3. NATIONAL ACTIVITIES

III.3.1. China

(i) CANDU fuel defect investigation and fuel performance - Experience exchange

Date: 6–8 November 2006

Place: Qinshan III NPP, China

The objective is to study the good practices and advanced methods of CANDU fuel defect investigation and fuel performance in other countries, and understand the current applications.

(ii) Verification and Validation Technology for Advanced Control Room of NPPs – WS

Date: 20–24 November 2006

Place: Daya Bay NPP, China

The objective is to enable the newly DCS to comply with related national safety authority regulations, and enable design of MCR to follow human factor engineering (HFE) principles.

(iii) Defects depth sizing techniques in stainless steel and dissimilar metal welds ultrasonic testing training seminar

Date: 12–17 November 2006

Place: Wuhan, China

The objective is to perform a theoretical and practical training for RINPO professionals on Non Destructive Examination techniques for reactor pressure vessels of nuclear power plants; to understand, practice, and handle multi-UT sizing techniques on stainless steel welds and bi-metal welds manual and automatic UT; to fully understand the tools, transducers and blocks employed; to understand and practice the specific procedures; and to qualify RINPO's UT examiners.

III.3.2. Indonesia

(i) Expert Mission on Heat Exchanger of RSG-GAS, Radiation Protection and Management of Safety

Date: December

Place: Serpong

The objective is to understand more about the performance of our RRs important components, to assess the ISI data of Heat Exchanger that has never been inspected during its operating time up to 18 years, and radiation protection.

(ii) PSA Training Course

Date: 20 – 24 November 2006

Place: Jakarta

The objective is to provide useful information on fundamentals and overview (requirements, scope, methods, etc.) of the PSA and its application to the staff in BATAN.

III.3.3. Malaysia

There are no work programmes scheduled in November and December 2006.

III.3.4. Philippines

There are no work programmes scheduled in November and December 2006.

III.3.5. Thailand

There are no work programmes scheduled in November and December 2006.

III.3.6. Vietnam

(i) Strengthening Regulatory Functions, including the Infrastructure Needed for the New RR

Date: 30 October–3 November 2006

Place: Hanoi, Vietnam

The objective is to investigate the infrastructure needed for a new research reactor and to discuss issues related to the various stages of a construction Project.

IV. CONTRIBUTIONS 2006

Country	Contributions
Australia	22 540 USD
China	1 information technology expert
France	1 cost-free expert
Germany	1 cost-free expert
Japan	1 346 481 USD (*)
Republic of Korea	in kind (**)
USA	170 000 USD

* includes 2 cost-free experts from Japan

** hosting training events in Republic of Korea

TABLE OF WORK PROGRAMME FOR 2006

IAEA Management

Activity	Location	Officer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ANSN														
Final Project Review Meeting RAS/9/028	Beijing	Lemoine/Lederman			20-24									
IT Support Group (ITSG)	Kuala Lumpur	Ulfkjær/Lemoine				24-26								
RRs Safety Analysis Topical Group (TG)	Daejeon	S. Lee					09-12							
Steering Committee 4th	Tokyo	Lemoine						06-07						
Caravan in China	3 locations	Lemoine						19-23						
Emergency Preparedness and Response Topical Group (TG)	Beijing	Spiegelberg-Planer/Tsumoda						26-27						
Caravan in Philippines	Quezon City	Tsumoda									14-15			
Radioactive Waste Management TG meeting	Tokyo	Metcalf/Tsumoda									25-26			
Education & Training Topical Group (TG) Meeting	Vienna	Moracho/Lemoine										09-11		
Promotion of ANSN during the 15th PBNC	Sydney	Lemoine										15-20		
Steering Committee 5th	Vienna	Lemoine											30-	-01
Coordination														
Technical Meeting	Vienna	Lederman/Lemoine												04-07
Database														
Database maintenance	Vienna	Lemoine	01-											-31
ISE														
Regional Meeting on ISE	Manila, Philippines	Tsumoda/Abou Yehia									11-14			
Training														
Development of education and training materials	Vienna		01-											-31
Translation and utilization of the training materials		Tsumoda	01-											-31

Work Programme for 2006

Regional

Activity	Location	Officer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Coordination														
Coordination meeting on Emergency Preparedness & Response	Vienna	Tsumoda/McKenna			27-28									
Expert Missions														
Decommissioning Demonstration of Research Reactor Expert Mission		Warnecke												
Promotion of the Joint Convention (Review Mission 1)	Jakarta, Manila, Tokyo	Hioki/Louvat											13-17	
Technical visits														
International Conference on Lessons Learned from Decommissioning of Nuclear Facilities and the Safe Termination of Nuclear Activities	Athens	Reisenweaver												11-15
Training														
Legal and Regulatory Aspects of Decommissioning Research Reactors	Philippines	Batandjewa						26-30						
Lessons learned from past accidents at nuclear installations - Workshop	Beijing	Spiegelberg-Planer/McKenna						27-30						
Installation of New Research Reactor Seminar	Hanoi	Shokr								14-18				
Radioactive Waste Management Workshop	Tokyo	Metcalf/Tsumoda									27-29			
Technical meeting on the Research Reactor Decommissioning Demonstration Project (R2D2P)	Manila	Warnecke										16-20		
Asian Tracer Experiment Workshop	LLNL, USA	Tsumoda/Zombori										23-26		
Safety Assessment and Verification for Nuclear Reactors Training Courses	Daejon, Korea	Lee/Shokr											06-10	
Medical Response to Nuclear Emergencies - Regional Workshop	Japan	Buglova											13-17	
Research Reactor Ageing Management Workshop	Beijing	Shokr												04-08
Promotion of the Ratification of the Joint Convention Workshop	Vienna	Hioki												18-19

Work Programme for 2006

China

Activity	Location	Officer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Expert Missions														
Eddy Current Testing of Steam Generator	RINPO	Havel/NENP												
Full Scope Simulator	Tianwan NPP	NENP												
Quality assurance of near pre-operational NPP	TNPP	Viktorsson/NENP												
Steam generator heat-exchanging tube and ligament damage during operation workshop	Tianwan NPP	Havel					07-12							
Workshop on ageing management and life time assessment	Wuhan	Inagaki					12-15							
Containment In-Service Surveillance Workshop	Tianwan NPP	Vamos/Liszka								21-25				
Integrity Assessment Technology for Nuclear Components WS	Wuhan	Liszka/NENP								22-25				
Water Chemistry in WWER	Tianwan NPP	Dubois/Liszka									04-07			
Improvement of Reactor Physics Tests	Q2 NPP	Sengoku/El-Shanawany										10-12		
Mission to Strengthening the Regulatory Functions in China	Beijing	Caruso										12-14		
Degradation mechanism of the PWR reactor coolant system	Qinshan-III NPP	Inagaki										16-19		
CANDU fuel defect investigation and fuel performance - Experience exchange	Qinshan III NPP	Makihara/El-Shanawany											06-08	
Verification and Validation Technology for Advanced Control Room of NPPs - WS	Daya Bay NPP	Dusic/Lipar / NENP											20-24	
Review Mission														
Pre INSARR and INSARR to two research reactors		Abou Yehia												
Operational Safety Performance Support Processes workshop	Qinshan-III NPP	Werdine/Dubois				17-21								
Safety Management of Research Reactors Workshop	Beijing	Shokr						26-29						
Root Cause Analysis Workshop	Qinshan-III NPP	Nichols/Dusic						27-30						
Training														
To provide information on IAEA Site Evaluation and Design Procedures and to plan a training programme for NSNI	Beijing	Guerpinar						22-23						
Defects depth sizing techniques in stainless steel and dissimilar metal welds ultrasonic testing training seminar	Wuhan	Limin Wang/NENP											12-17	

Work Programme for 2006

Indonesia

Activity	Location	Officer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Expert Missions														
Improvement of Safety Management and Operation of Kartini	Kartini	Abou Yehia/NENP												
Establish Management System, BATAN	Serpong	Hargitai												xx
Heat Exchanger of RSG-GAS, Radiation Protection and Management of Safety	Serpong	Hargitai												xx
Review Mission														
Radiation Protection in Serpong	Serpong	Hargitai												xx
Training														
Assessment and Validation of Personnel Competency in Nuclear Safety Workshop		Viktorsson/NENP												
Training BAPETEN staffs to familiarize of NPP, especially for siting		Godoy												
PSA Training Course	Jakarta	Lee S. H.											20-24	

Work Programme for 2006

Malaysia

Activity	Location	Officer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ANSN														
IT Support Mission	Kuala Lumpur	Ulfkjaer				27-28								

Work Programme for 2006

Philippines

Activity	Location	Officer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Review Mission														
Review of the Integrated Management Systems of PNRI	Quezon City	Abou Yehia/Viktorsson / NENP							24-28					
Follow-up Mission to review the draft Atomic Law (EBP together with OLA under TC Project RAS/9/023)	Manila	Philip									04-08			

Work Programme for 2006

Thailand

Activity	Location	Officer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Expert Missions														
Expert Mission to Strengthen the Regulatory Functions	Bangkok	J. H. Song/Hagitai								31-	-04			
Review Mission														
Follow-up mission to review the draft atomic law (EBP together with OLA under TC Project RAS/9/023)	Bangkok	Philip										10-13		

Work Programme for 2006

Vietnam

Activity	Location	Officer	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ANSN														
IT Support Mission	Hanoi	Ulfkjær					08-11							
Expert Missions														
Expert mission to review the draft atomic law (EBP together with OLA under TC Project RAS/9/023)	Hanoi	Philip								08-11				
Strengthening Regulatory Functions, including the Infrastructure Needed for the New RR	Hanoi	Shokr										30-	-03	
Review Mission														
Follow-up INSARR	Dalat RR	Abou Yehia/Hargitai		27-	-03									
Training														
3rd National Basic Training Course on Nuclear Safety	Hanoi	Viktorsson										08-12		