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PROGRESS REPORT

(October 2000 - March 2001)

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

International Atomic Energy Agency
Vienna, Austria

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

March 2001

I. INTRODUCTION

Activities implemented from April to September 2000 were presented earlier in the PROGRESS REPORT, EBP-ASIA-43, which was provided at the Advisory Group Meeting (AGM) held on 30 October to 1 November 2000. This report describes the activities implemented from October 2000 until March 2001 and further activities planned for 2001.

The database of the EBP, which has been developed and distributed so far to the participating countries in CD-ROMs, will be made available via internet from April 2001 to registered representatives of the countries participating in the EBP.

II. ACTIVITIES IMPLEMENTED FROM OCTOBER 2000 TO MARCH 2001

II.1. PROGRAMME MANAGEMENT

II.1.1. Advisory Group Meeting

An Advisory Group Meeting (AGM) was held on 30 October - 1 November 2000 to review progress and future activities of the EBP and attended by 25 participants from 12 countries involved in the Programme. The detailed information was made available to participants in the EBP-ASIA-65.

II.2. REGIONAL ACTIVITIES

II.2.1. Preparatory Mission for the Workshop on Safety Analysis Methodology and Computer Code Utilization

Date: 30 October - 1 November 2000

Place: Taejon, Korea

Objective and results:

The objective of this mission was to advise KINS for preparing the training material for the Workshop on Safety Analysis Methodology and Computer Code Utilization held in 5-16

February 20001, and to prepare guidance for presentation of lecturers' handouts for the workshop.

II.2.2. Workshop on Prerequisites of International Requirements for Deployment of Nuclear Power

Date: 2-3 November 2000

Place: Vienna

Objective and results:

The objective of the workshop was to provide information from the experiences of some countries in building up their nuclear safety infrastructure.

Lectures were presented on the basis of the Working Material, Deployment of Regulatory Infrastructure for a Nuclear Power Programme, which was issued as a result of consultants meetings held in September and December 1999. The question and answer session was very productive and a lively discussion between the participants and lecturers took place. The results of the workshop will be included in a TECDOC being prepared by the IAEA.

II.2.3. Training Workshop on Safety of Research Reactors (Operational Safety)

Date: 6-17 November 2000

Place: Tokai-mura, Japan

Objective and results:

The objective of this workshop, which was organized by the IAEA in co-operation with the Government of Japan through the Japan Atomic Energy Institute (JAERI), was to provide training on operational safety for research reactor (RR) for personnel involved in safety regulation.

The workshop was attended by 23 engineers/professionals from the six countries participating in the EPP. Two IAEA staff and 15 external lecturers provided 27 lectures, including: safety analysis; quality assurance program; maintenance and test program; preparation of operating procedure; simulation of operation; radiation protection; waste management. Reports on RR operational safety and emergency preparedness were presented by the participants. In addition, the participants practiced the start-up operation and power level increasing operation using the real time JRR-1 simulator.

II.2.4. Workshop on Safety Analysis Methodology and Computer Code Utilisation (1)

Date: 5-16 February 2001

Place: Taejon, Korea

Objective and results:

The objective of the workshop was to bring participants a common basic level of knowledge in reactor neutronics and thermal hydraulics, and to introduce methods and practices of safety analysis and accident analysis. The syllabus includes: review of reactor physics concepts and thermal hydraulic concepts; introduction to functional reactor system design; format and contents of Safety Analysis Reports; introduction to SAR review and safety assessment; introduction to thermal-hydraulics and accident codes.

Seventeen participants were selected on a prerequisite that the same participants would attend the four workshops and have responsibilities in the safety and accident analysis in this respective countries. Since the Fall of 2000, the participants have been engaged in a preparatory phase of self-study of reactor physics and thermal hydraulics, essential to any future work in safety and accident analysis. The self-study was based on some 30 hours of classes recorded live, class notes and a textbook acquired by the IAEA and distributed to all the participants. The videos have been made available in the form of CD-ROMs. Exercises have been assigned to the participants and solutions made available via internet using a web board. The videos and the web board set up control have been contracted with the Department of Nuclear Engineering of the University of Illinois.

The first week of the workshop was a review of the basic preparatory phase and was completed with an exam to evaluate the level of the participants. The second week was devoted to an introduction to safety and accident analysis including the IAEA relevant publications and experience from Korea and USA. The second workshop will be hosted by KINS in Korea in October 2001.

II.3. NATIONAL ACTIVITIES

II.3.1 China

(i) IRRT Mission to the Regulatory Body

Date: 9-20 October 2000

Place: Beijing, China

Objective and results:

At the request of the Chinese Government authorities, an IAEA team of international experts visited the National Nuclear Safety Administration (NNSA) to conduct an International Regulatory Review Team (IRRT) mission. The purpose of the mission was to review the effectiveness of the Chinese regulatory body and to exchange information and experience on the regulation of nuclear, radiation, radioactive waste, and transport safety in the following specific predetermined areas: legislative and governmental responsibilities; authority, responsibilities and functions of the regulatory body; organization of the regulatory body; authorization process; review and assessment; inspection and enforcement; development of regulations and guides; and emergency preparedness.

While most of the IRRT activities took place at the NNSA offices in Beijing during the mission, some members visited other offices and sites including the Qinshan NPP, the research reactor at the China Institute of Atomic Energy, Beijing, to observe inspection practices. The same group of experts visited the Nuclear Emergency Technical Centre to review the emergency preparedness of NNSA and the national and provincial response in China. The team provided recommendations on some areas including: the legal basis of the regulatory body; human and financial resources; co-ordination among authorities; baseline of inspections.

(ii) Workshop on PSA Applications at China Atomic Energy Authority (CAEA)

Date: 30 October-3 November, 2000

Place: Beijing, China

Objective and results:

The objective of this workshop was to provide comprehensive and detailed information on the perspectives for use of probabilistic safety assessment (PSA) applications and risk-informed regulations and inspections for NPPs safety enhancement.

The workshop was attended by NNSA senior management and professional staff members, design and engineering consultant organizations, NPP operator and utility organizations who are or will be involved in the near future in the implementation, review and/or approval of different PSA applications in China. Four experts from US NRC and one IAEA staff member provided lectures focusing on the following topics: new US regulatory reactor oversight programme; risk informed inspections; determination of events safety significance; use of PSA to evaluate and rate operational events; risk monitoring tools; risk-informed IST and ISI; risk-informed modifications to AOTs and STIs; graded QA; living PSA concept. Extensive panel discussions between the experts and Chinese counterparts were held on the last day of the workshop. The seminar was attended by more than 30 participants from 12 Chinese organizations.

(iii) Second Review of level 1 PSA Revised Report for Tianwan NPP

Date: 13-17 November 2000

Place: Moscow, Russia

Objective and results:

The objective of this mission was to review the adequacy of assumptions, analysis methods, input data, the credibility of analysis outcomes, and implementation of IAEA's recommendations and comments raised by the Review Mission of November 1999.

The mission was composed of three external experts and one IAEA staff. The meeting was attended by 9 Russian and 13 Chinese experts. The Russian PSA team had prepared a report summarising the responses to the recommendations which resulted from the peer review of the preliminary PSA, which was conducted by the previous mission in 1999. The

meeting was conducted in three parallel groups with regular plenary meetings to review progress. The mission concluded that at this stage the PSA still has the potential to influence the final design of the plant. It recommended upgrading the PSA model as soon as possible in order to derive a reliable set of dominant cutsets to allow drawing conclusions from the analysis, and completing the model by using realistic best estimate and generic assumptions, which should be updated as more reliable specific information.

(iv) Pre-INSARR mission

Date: 19-23 February 2001

Place: Beijing, China

Objective and results:

The objective of this mission was to discuss and agree the target facilities and the terms of reference of an INSARR mission concerning the requested assistance to improve the management of old research reactors in China.

During the first 2 days, the mission and Chinese side provided presentations each other and discussed on them. From the third day, the mission visited Institute of Nuclear Energy and Technology (INET) of Tsinghua University and China Institute of Atomic Energy (CIAE), which are responsible for the operation of the several research reactors including old ones, to obtain necessary information on the current status of operational safety of the facilities. The exit meetings were held with China Atomic Energy Authority (CAEA) and National Nuclear Safety Administration (NNSA) separately.

On the basis of the discussion, the mission agreed that a national seminar or workshop on management of research reactor ageing should be organized in this year, and the INSARR mission should be postponed to the next year, because it will need time and long effort from the Chinese side to prepare the English versions of the documents to be reviewed and train the staff.

II.3.2. Thailand

(i) IRRT mission

Date: 11-16 February 2001

Place: Bangkok, Thailand

Objective and results:

The objective of this mission was to review selected items of regulatory body practices, comparing them with existing international consensus guidelines and equivalent good practices elsewhere, to strengthen and enhance the effectiveness of the regulatory body.

Discussions covered the existing regulatory arrangements and future planning in respect to new research reactor project (construction of a new 10 MW research reactor), the whole

scope of the legal and governmental infrastructure, inspection and enforcement, authorization, development of regulations and guides, emergency preparedness and the further development of an effective regulatory body. On the basis of the discussion, the team advised on the status of regulatory organizations and functions, development of the legislative frame, and establishment of the emergency arrangements for the research reactor.

II.3.6. Viet Nam

(i) Workshop on Safety Assessment and Regulatory Control for Research Reactors

Date: 3-6 October 2000

Place: Hanoi, Viet Nam

Objective and results:

The objective of this workshop was to provide to the Vietnamese Regulatory authority staff comprehensive and detailed information on different national practices and experience with the licensing and regulatory inspections of research reactors and relevant IAEA safety standards.

The workshop was attended by 24 participants from five Viet Nam organizations. It was designed for professional staff members of the regulatory authorities, nuclear scientific institutes and Dalat Research Reactor, with knowledge of nuclear safety review and assessment and who are or will be involved in the near future in the safety review and assessment, licensing and inspections activities for research reactor at Dalat.

Three external experts from Belgium, Czech Republic and the USA and one IAEA staff presented lectures on the following main topics: role and responsibility of a regulatory body; licensing process for RRs; safety assessment techniques and methods; deterministic analysis - basic methods and techniques; use of accident analysis to support design modifications, upgrades, backfitting; computer codes for accident analysis; PSA basic methods and techniques; regulatory body decision making; assessment of RR modifications; regulatory control of RR operation - discussions on the regulatory control for RR at Dalat; RR Inspections.

III. WORK PROGRAMME FOR 2001 (APRIL - DECEMBER 2001)

III.1. PROGRAMME MANAGEMENT

III.1.1. Advisory Group Meeting

The next Advisory Group Meeting (AGM) will take place on 26-28 November 2001 in Vienna.

III.1.2. Database

The database of the EBP has been developed to manage the implementation of the programme activities and distributed to participants in the AGM by a CD-ROM so far. The internet-version of the database is being released to registered representatives in the participating countries in March 2001. It presents information on each activity, including basic information on dates, location, status, technical officers, counterparts, etc. In addition, the objective, results achieved, summary and full reports, the Country Nuclear Safety Profiles (CNSPs) and the Nuclear Safety Action Plans (NSAPs), are also displayed. Interrogation capabilities are available using various criteria: searching by country, by type of activities, by year. For training activities, the database contains the actual material presented by the lecturers. Information about other relevant IAEA Technical Co-operation projects, and bilateral agreements and projects related to the countries participating in the EBP can also be retrieved. The database is being updated continuously.

III.1.3. Indicators of Programme Achievements

During the last AGM in November 2000, the following recommendation has been made:

Work should be initiated by the Secretariat to define indicators to measure achievements in participating countries to enhance their nuclear safety infrastructure and the safety of research and power reactors.

A methodology of how to develop the indicators of achievements will be prepared by the Secretariat and should be discussed with participating countries during technical visits or IAEA missions before the next AGM.

III.2. REGIONAL ACTIVITIES

III.2.1. Basic Professional Training Course on Nuclear Safety

Date: 5 March - 13 April 2001

Place: ANL, USA

Objective:

The objective of this training course, which is hosted by the Argonne National Laboratory (ANL), USA, is to provide basic nuclear safety knowledge to professionals involved in the nuclear safety regulation and operators of RRs and NPPs in the participating countries. Twenty four participants are attending the training course.

The syllabus includes: IAEA nuclear safety programme; basic principles of nuclear safety (safety fundamentals); nuclear power plant design; regulatory control; siting considerations; safety classification; deterministic accident analysis; in-plant accident management; probabilistic safety analysis; operational safety; limiting conditions for operation (technical specifications); human performance; surveillance programmes; maintenance; plant renewals, modifications and upgrades-configuration management; quality

assurance; radiation protection and environmental control in NPPs; emergency preparedness and response; decommissioning; waste management; safety culture; public communication.

III.2.2. Workshop on Safety Analysis Methodology and Computer Code Utilisation (2)

Date: 29 October - 9 November 2001

Place: Taejon, Korea

Objective:

The objective of this is to provide in-depth training on the use of computer codes for accident analysis. This workshop will be followed by two others in 2002 and together with the previous workshop constitute a programme to prepare professionals in participating countries to review Safety Analysis Reports of NPPs and RR using state of the art accident analysis methodology and computer codes.

The detailed workshop programme was agreed with the Korean counterparts during the first workshop in February 2001. Focus will be on modelling research reactors.

III.2.3. Workshop on the IAEA Nuclear Safety Standards (Safety Requirements)

Date: 11-13 December 2001

Place: Tokyo, Japan

Objective:

The objective of this workshop, to be implemented in co-operation with the Government of Japan through the Nuclear Power Engineering Corporation (NUPEC), is to provide an overview on the IAEA safety requirements published in the areas of Site Evaluation, Design, Operation, and Legal and Governmental Infrastructure. As appropriate the workshop will discuss the relevant safety guides in preparation.

III.3. NATIONAL ACTIVITIES

III.3.1 China

(i) Severe Accident Mitigation of Tianwan NPP

Date: 23-27 April 2001

Place: St. Petersburg, Russia

Objective:

The objective of this mission is to advise on Selection of Containment Hydrogen Recombiner Systems, Core Melt Localizing facility and possibility of the cancellation of the containment filtered venting.

(ii) Workshop on Tianwan NPP Reactor Protection System and V&V of the Safety Software

Date: 14-18 May 2001

Place: Erlangen, Germany

Objective:

The objective of this workshop is to present and discuss all the safety relevant tasks connected with reactor protection system (RPS), and verification and validation of the safety software for TNPP. The activity of the workshop will be based on the documentation submitted prior to the meeting: RPS-description of overall concept; application software design requirements for digital I&C; software configuration management plan for safety relevant I&C functions; verification and validation of safety I&C.

(iii) Technical Visit to China

Date: 16-21 May 2001

Place: Beijing, China

Objective:

The objective of this visit is to update the Country Nuclear Safety Profile (CNSP) and the Nuclear Safety Action Plan (NSAP), to validate the definition of indicators of programme achievements and to launch the process at the national level.

(iv) Workshop on Criteria for Classification of Design Basis Accidents for the CEFR

Date: 11-15 June 2001

Place: Beijing, China

Objective:

The objective is to formulate the CEFR acceptance criteria on accident classification and classification of unit operating situations. The contents will be to review the CEFR and to introduce the practice in developed countries on accident classification of unit operating situations on fast reactor, in connection with acceptance criteria and occurrence frequency of events.

(v) Workshop on Research Reactor Ageing Safety

Date: September 2001

Place: Beijing, China

Objective:

There are several old research reactors constructed in 1950s and 1960s in China, and NNSA has to implement ageing safety assessment for these research reactors. The objective of this workshop is to provide information about regulatory requirements for safety of research reactor ageing based on the IAEA technical documents and experiences in the world.

(vi) Review Mission on Control Room Design of Tianwan NPP

Date: 15-19 October 2001

Place: Erlangen, Germany

Objective:

The objective of this mission is to review the basic design of the main and standby control rooms. The mock-up (dummy) panels will be used for demonstration of operator's actions as a part of functional analysis of MCR and human-machine interface.

(vii) Review Mission on PSA level 1 of DBNPP (follow-up of 1998)

Date: October 2001

Place: Daya Bay, China

Objective:

An IPERS review was carried out in 1998 for the Daya Bay NPP Level 1 PSA including internal initiating events during full power and shutdown operational states. The objective of this IPSART mission is to review entire level 1 PSA of Daya Bay NPP, including follow-up of the previous IPERS mission and another subjects which were not addressed at the previous review.

(viii) PSR Implementation of QNPP (Follow-up) Including PSA

Date: 29 October - 2 November 2001

Place: Qinshan, China

Objective:

Qinshan NPP is the first plant to perform the periodic safety review (PSR) in China. The objective of this workshop is to provide more detailed information on implementation of PSR,

including PSA, and to review action taken since the previous workshop on PSR conducted in May 2000.

(ix) Workshop on Requirements for Level 2 PSA

Date: 19-22 November 2001

Place: Beijing, China

Objective:

The objective of this workshop is to provide to the Chinese counterparts comprehensive information on state-of-the-art methods, techniques and software used for performance of PSA Level 2 analysis world wide. The workshop is also intended to provide guidance to the regulatory authority staff on how to set about reviewing a PSA level 2 and on the technical issues that need to be addressed.

(x) Workshop on Licensing Requirements for RCS Integrity

Detailed programme of this activity including the terms of reference and date will be discussed with the IAEA experts and Chinese counterparts.

III.3.2. Indonesia

(i) Technical Visit to Indonesia

Date: 14-15 May 2001

Place: Jakarta, Indonesia

Objective:

The objective of this visit is to update the Country Nuclear Safety Profile (CNSP) and the Nuclear Safety Action Plan (NSAP), and to validate the definition of indicators of programme achievements and to launch the process at the national level.

(ii) Workshop on Regulatory Aspects and Inspector Qualification and Certification Programme

Date: 4-16 June 2001

Place: Jakarta, Indonesia

Objective:

The objective of this workshop is to provide technical and institutional information on regulatory aspects for licensing and inspection of research reactors and to advise on establishing inspector qualification and certification programme in the regulatory body.

(iii) Follow-up Review Mission on Upgrading SAR of the RRs (30 MW and 2 MW)

Date: 27-31 August 2001

Place: Indonesia

Objective:

The objective of this mission is to review the updated safety analysis reports (SARs) of research reactors, RSG-GAS in Serpong and TRIGA Mark II Bandung Reactor, and to follow-up the implementation of recommendations of the IAEA review missions conducted in 1999 and 2000.

(iv) Review Mission on Site Licensing Review of NPP

Date: 10-14 September 2001

Place: Jakarta, Indonesia

Objective:

The objective of this mission is to review the licensing procedure of site evaluation by the regulatory body and to provide related technical information to set up specific regulatory requirements for siting. Future assistance for establishing competent regulatory infrastructure of site evaluation can be discussed at the meetings.

III.3.3. Malaysia

(i) Workshop on Development of Regulatory Requirements for Licensing I&E RR

Date: 15-19 October 2001

Place: Kuala Lumpur, Malaysia

Objective:

The objective of this workshop is to provide information on regulatory requirements for licensing inspection and enforcement of research reactors to enhance and strengthen the capability of the regulatory body.

III.3.4. Philippines

(i) Design Review of the New PRR-1 Core Container

Date: 23-27 April 2001

Place: Quezon City, Philippines

Objective:

The objective of this mission is to provide an independent review and assessment of the adequacy of the design of the new PRR-1 core container and N-16 delay tank prepared by the Reactor Group of the PRR-1, and to advise on relevant modification/repair of the PRR-1 related to the new PRR-1 container and N-16 delay tank.

III.3.5. Thailand

(i) Technical Visit to Thailand

Date: 13-14 August 2001

Place: Bangkok, Thailand

Objective:

The objective of this visit is to update the Country Nuclear Safety Profile (CNSP) and the Nuclear Safety Action Plan (NSAP), and to validate the definition of indicators of programme achievements and to launch the process at the national level.

III.3.6. Viet Nam

(i) Workshop on Requisites for Establishment of Regulatory Body, Licensing, I&E

Date: 25-29 June 2001

Place: Hanoi, Viet Nam

Objective:

The objective of this workshop is to provide information on requisites for establishment of regulatory body, including licensing procedure and inspection & enforcement, mainly for regulating the research reactor.

(ii) Expert Mission to Improve the Safety Analysis of the Dalat RR

Date: First semester of 2001

Place: Dalat, Viet Nam

Objective:

The objective of this mission is to evaluate possible credible accidents not considered in the SAR and to create an input data for the PARET code.

(iii) Technical Visit to Viet Nam

Date: 16-17 August 2001

Place: Hanoi, Viet Nam

Objective:

The objective of this visit is to update the Country Nuclear Safety Profile (CNSP) and the Nuclear Safety Action Plan (NSAP), and to validate the definition of indicators of programme achievements and to launch the process at the national level.

(iv) Follow-up Mission on Upgrading SAR of Dalat RR

Date: 22-26 October 2001

Place: Dalat, Viet Nam

Objective:

The objective of this mission is to follow up the implementation of the recommendations and suggestions on the SAR upgrading given on the last mission conducted to the Dalat reactor in August 2000.

III. 4. TRAINING ABROAD

At the AGM held on 30 October to 1 November 2000, requests from the participating countries for training abroad have been presented and included in the report, EBP-ASIA-65. The objective of training abroad is to assist staff of the countries to learn specific skills and to exchange information on nuclear safety matter in foreign safety institutes. The requests will be implemented if a host country agrees to accept it and required funds are made available.

IV. CONTRIBUTIONS

The following contributions have been provided as cash and/or in-kind for activities in 2001

Country	Contributions
France	1 cost-free expert
Germany	1 cost-free expert
Japan	1,381,000 US$ (*)
Korea	in kind (**)
Spain	10,000,000 ESP (***)
USA	200,000 US$ (****)

* includes 2 cost-free experts from Japan
** includes hosting training events and 1 expert supported by the EBP Funds
*** contribution made in 2000
**** includes 1 cost-free expert from USA