

REPORT

Thirteenth Working Group Meeting of Representatives of RCA Member States

Ho Chi Minh City, Viet Nam, 4-7 March 1991

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The Thirteenth RCA Working Group Meeting was hosted by the Government of the Socialist Republic of Viet Nam and held in Ho Chi Minh City, 4-7 March 1991. It was attended by 35 delegates from 11 RCA Member States. Bangladesh, Singapore and Sri Lanka were not represented. The IAEA delegation was led by Professor Noramly bin Muslim, Deputy Director General, Department of Technical Co-operation. The list of delegates is presented in Annex 1 and the Agenda in Annex 2. The numbering of the paragraphs in this report corresponds with the number of the Agenda item.

INAUGURAL SESSION

The Meeting was honoured that HE General Vo Nguyen Giap, Vice Chairman of the Council of Ministers was present for the Inaugural Session.

1. Welcome Address

Delegates were welcomed to Ho Chi Minh City and Viet Nam by Professor Nguyen Dinh Tu, Chairman of the Viet Nam National Atomic Energy Commission. He was honoured that the Vice Chairman of the Council of Ministers was able to be present. He gave a warm welcome to the distinguished guests and delegates attending the Meeting. He pointed out the benefits that Viet Nam had received through the RCA projects and placed importance on the strengthening of the RCA framework. Professor Tu's address is presented in Annex 3.

2. Welcome on Behalf of IAEA

In his welcoming remarks, Mr Noramly presented the compliments of the IAEA to the Government of Viet Nam through HE General Vo Nguyen Giap, the Vice-Chairman the Council of Ministers, and he expressed the Agency's gratitude for them agreeing to host the Working Group Meeting.

Mr. Noramly spoke of the Regional spirit that the RCA had shown and outlined the crucial role that the National Nuclear Research Institutes played in the technology transfer process. He emphasized the need for effective infrastructures to ensure the self-sustainability of the technology and the efficient transfer to the appropriate end user in the country. In relation to the business of the Working Group Meeting, he noted that decisions had to be made on the need for any modifications to the current Agreement which would terminate in June 1992. He also dealt with the financial issues and options that could result from an absence of a UNDP funded project after 1991. He concluded his remarks by reminding the delegates that decisions made during the Meeting would give a clear direction for RCA for the next 5 years.

The full text of Mr. Noramly's speech is given in Annex 4.

3. Official Opening and Keynote Address

The 13th RCA Working Group Meeting was officially opened by HE General Vo Nguyen Giap, Vice-Chairman of the Council of Ministers.

His Excellency expressed his pleasure that Viet Nam was hosting the 13th RCA Working Group Meeting and expressed gratitude to the IAEA for its support and encouragement. He said that international organizations and regional cooperation could contribute to the solution of national problems. He went on to outline the achievements of the Viet Nam Atomic Energy Commission and the activities of the Nuclear Research Institute in Dalat. He emphasized the need to address the problem of public acceptance and the need to demonstrate the cost/benefit of nuclear technology. In conclusion he warmly welcomed all delegates and wished for a successful meeting. A full text of the speech is given in Annex 5.

FIRST ADMINISTRATIVE SESSION

The interim chairman was Mr Apichai Chvajareernpun, Office of Atomic Energy for Peace, Thailand. He conveyed apologies from the Secretary General OAEP who had not been able to attend the Meeting due to other engagements. The importance of the present Meeting and its implications on the future of RCA were outlined by Mr Apichai. The Secretary General OAEP thanked delegates for the support during the past year.

4. Election of Chairman

Professor Pham Duy Hien, Vice-Chairman of VINATOM and Director of the Nuclear Research Institute, Dalat, was nominated Chairman by **Japan**, seconded by **Philippines** and unanimously elected. Professor Pham thanked the delegates for the honour of being their Chairman. He stressed the need to solve the important problems facing the RCA at the present time and to develop activities in terms of the scientific, technical and economic needs. He concluded his remarks with wishes that the delegates would have a happy stay in Viet Nam.

5. Adoption of Agenda

The draft Agenda was modified to allow the Meeting the opportunity to consider the Meeting Report before the delegates returned home. The adopted Agenda is shown in Annex 2.

6. Draft RCA Annual Report 1990

The draft RCA Annual Report 1990 was circulated prior to the Meeting and the final version will be tabled at the 1991 RCA General Conference Meeting.

The RCA Co-ordinator pointed out that during 1990 there were fifteen technical projects operative, four with associated Co-ordinated Research Projects and an additional four CRP's not associated with technical projects. There were two RCA footnote a/ projects still unfunded : Control of Tropical Plant Viruses and Isotope Hydrology and Sedimentology. He went on to mention that 1990 would probably mark a peak in RCA activities for the foreseeable future. He emphasized that it was important to have quality as well as quantity in the programme. The need to have a truly cooperative programme with as transparent as possible decision making process was also stressed.

The RCA Co-ordinator went on to outline the current status of the new project proposal for submission to UNDP and the issues involved.

The full text of the comments is tabled in Annex 6.

Some discussion took place on issues arising from consideration of the Annual Report. These can be summarized as follows:

- **Malaysia** asked if it would be possible to have a breakdown of disbursements to each country. In response, it was pointed out that for many items the current method of Agency accounting did not allow ready retrieval of such information and that final accounts for the end of the year would not be available until June. Unaudited figures were only available at this stage of the year.
- **Republic of Korea** asked if information on the impact of the activities such as CRP's, Training Courses, and the Industrial Project could be included. In response, it was explained that such information came either from Member States or other Agency Departments which would be difficult to achieve with such a short time available.
- **Indonesia** and **Japan** commented on the Agency's Formula for recording 'in-kind' contributions and suggested that it did not give a true picture of the real situation. In explanation, it was pointed out that only money recorded, received and spent under Agency guidelines could be acknowledged. Countries might wish to table at future Meetings a one-page summary of their contributions to insure that their efforts have been adequately documented.
- **Republic of Korea** asked about future TACF funding for RCA activities. In response, it was said that the funds for Regional Projects come from deductions from National Projects. If more money were to go to RCA, then the National Projects would have to be reduced. It was a matter of choice for the Member States.

There were some editorial corrections suggested and the Draft Report was then endorsed.

7. Election of Chairpersons of Project Committees

The results of elections were as follows:

a) Medical and Biological Applications of Nuclear Techniques

Professor Trinh Kim Anh
Director of Cho Ray Hospital and Tropical Disease Center
Dean of Internal Medicine, Medical School
Ho Chi Minh City

Nominated : **Republic of Korea**
Seconded : **Thailand**

b) Agricultural Projects

Professor Nguyen Van Uyen
Director, Bio-technology Research Center

Nominated : **Pakistan**
Seconded : **Malaysia**

c) Research Reactor, Energy-based and General Projects

Professor Tran Ha Anh
Deputy Director, Nuclear Research Institute, Dalat

Nominated : **India**
Seconded : **China**

8. New RCA Agreement 1992-1997

The RCA Co-ordinator outlined the pros and cons of amending the current Agreement. **Australia** commented that its suggestions for modifications to the Agreement based on the AFRA Agreement were given with a desire to assist in clarifying some provisions of the existing Agreement but it would not wish to pursue the matter if the consequence would be a delay in the signing of the new Agreement. The Australian initiative was supported in principle by **Republic of Korea, Philippines, India, Thailand** and **China**, but all thought that the more practical option was to keep with the old Agreement. The DDG amplified on the RCA and AFRA situations by providing the background information on the reasons for the differences which were linked to the markedly different abilities for each region to attract extra-budgetary donors.

All Member States agreed that the present Agreement should be the basis for the document to be renewed in June 1992.

In the discussions on the RCA, it was apparent that the issue of extra-budgetary funding was intimately involved. **Australia** noted comments from China on extra-budgetary funding that had been circulated prior to the Meeting but suggested that historically, strings are always attached to extra-budgetary donations from other countries. **India** said that caution should be exercised so that the regional character of the programme was not lost and that the strength came from the regional management and decision making. It was acknowledged that not every project could be funded with the available resources and that extra funds need to be sought. It was suggested that, when there was the possibility of extra-budgetary donations from outside of RCA Member States, it should be considered on a case-by-case basis. **Australia** agreed with India on the need to maintain the regional character of RCA and also with their case-by-case approach. **Australia** also asked the Secretariat to make recommendations on alternative multilateral sources of funding. **China** reiterated its view that contributions from non-RCA Member States would be beneficial if no strings were attached. This view was supported by **Viet Nam, Pakistan, Republic of Korea and Malaysia**. **Japan** commented that the successful implementation of the RCA activities had been due to the mutual regional interest and it was important not to lose this regional spirit.

FIRST TECHNICAL SESSION REGIONAL INDUSTRIAL PROJECT

9. Progress Report by UNDP Project Co-ordinator

The full text of the UNDP Project Co-ordinator's Progress Report is given in Annex 7. The Project Co-ordinator noted that 193 people had participated in the regional project training activities and around 800 had benefitted from the national activities. In his analysis of the effects of the project activities, he showed that, of the commercial activities, NCS for the paper industries had the biggest investments.

India referred to the table of estimated 'in-kind' contribution in the report and asked for the basis of the calculation. In response, the Project Co-ordinator explained that at the start of the Industrial Project, a formula had been established for putting a value on regional and national training (Annex 11 of the Project Document RAS/86/073/01/18, 1 May 1987) but there had not been any consideration on the provision of expert services. The table only reflected the 'in-kind' contribution from training activities at this time and for future projects, the value of the expert component would need to be assessed.

The Project Co-ordinator said that UNDP was closely looking at the sustainability of technology and the linkages with national programmes and priorities. **India** requested clarification on the demonstration of sustainability. The Project Co-ordinator went on to say that indicators of sustainability could be inferred from investments in full-time personnel, equipment, laboratories, etc.

China provided examples of additional equipment investment not mentioned in the report. These included 40 gamma facilities, 7 electron beam accelerators for radiation processing, 75 NCS for paper industry, 60 NCS systems in just one iron and steel complex, 600 nuclear weighing scales and about 2000 NCS systems in general. The DDG asked for more information on this development from all Member States since these figures would be vital in presenting a case to UNDP for further support. **Republic of Korea** commented that they had one 500 KCi irradiation plant but this had public acceptance problems. 9 electron beam accelerators were part of new investments, 4 were running and 5 were under construction. **Malaysia** reported it had recently invested in one gamma irradiator and 2 electron beam accelerators. The two electron beam accelerators were donated by the Japanese International Co-operation Agency (JICA) under the Japanese technical assistance.

The DDG mentioned that the Mid-Term Evaluation had brought up the issues of safety in its recommendations on the Industrial Project and UNDP might have a problem in accepting a project that does not contain a safety segment. **India** supported the need for the emphasis on radiation protection.

10. New UNDP/RCA Project Proposal

The RCA Co-ordinator reminded delegates that at the 1990 General Conference Meeting a decision had been made to terminate the Industrial Project at the end of 1991. The new procedures for project submissions to UNDP are not suited to the preparation of a 1992 pre-project mission case because the Agency will not know whether they will be invited to submit a proposal until the second half of 1991. In order to avoid a vacuum in the activities in 1992, it has been proposed, with the agreement of the extra-budgetary donors, that some of their activities scheduled for 1991 be allowed to slip to 1992. In order to begin to implement this, two decisions were necessary:

- . the delegates had to agree to the proposal.
- . the delegates had to recommend to the 1991 General Conference Meeting that the decision of the 1990 GCM should be modified to allow the transition activities to occur in 1992.

The dovetailing of the activities was necessary otherwise there could be a significant loss of momentum and dilution of the effort.

The delegates unanimously agreed to the two proposals.

The RCA Co-ordinator surveyed the events that had led to the decision to prepare a new project proposal to go to UNDP for funding in the 5th Inter-Country Programme Cycle from 1992 to 1996. He also stressed that the requests for project activities that had come from the meetings of co-ordinators, experts, technical officers and the like, could not be sustained from any likely funding obtainable from UNDP. Major cuts would have to be made in order to achieve a workable situation. He went on to ask whether the Member States would agree that the following criteria should be used to assist in the formulation of the final project proposal. These were:

- . the programme should concentrate on high quality in-depth projects rather than a shallow, broad coverage. This would result in more efforts being placed in training, for example, to provide comprehensive resource packages to assist in supporting and sustaining the technology once transferred.
- . the programme should be the best investment of the available funds both in terms of getting the advantages and benefits of current technology into industry and associated areas as well as providing an investment in new skills needed for the future of the industries and associated enterprises.
- . the programme should have high quality technical management and have increased use of long-term technical experts stationed in the region.

Australia supported the guidelines and said that maximum impact was necessary. 'Distance Learning' techniques were important and were being integrated into ANSTO's training programmes for such areas as Radiation Protection and Nuclear Medicine. It was also thought necessary to have regional based certification to establish this type of training and Training Boards could be a key element. **Malaysia** expressed support for this approach. There was unanimous support of the criteria.

Philippines said that the selection of activities should follow the recommendations of the UNDP mid-term review. **Korea** expressed the need to address the public acceptance problem. **Malaysia** agreed that health and safety was a primary issue.

Viet Nam supported the new orientation and objectives of the new UNDP/RCA Project Proposals and proposed that priority areas should be identified.

All Member States commented on their priority areas for the new project proposal and the consensus view was that the following areas were of the highest priority and because of practical financial constraints, only these should form the basis of the final proposal* :

- . the use of radiation technology for the treatment of flue gases, sewage sludge, municipal waste water and airport waste.
- . the use of nuclear analytical techniques on a co-ordinated regional basis.
- . the use of tracer technology to study the dispersion of effluents in water.
- . the use of nucleonic control systems in industry.
- . the use of isotope techniques in process optimization.
- . the use of NDE technology in non-metallic construction materials.
- . the use of NDE technology for metallic materials in new industries.
- . the use of advanced applications of radiation technology.
- . the preparation of harmonized national regulations on industrial sterilization.
- . the preparation of harmonized NDE standards through Regional Model Qualifying Examinations.
- . the preparation of harmonized recommendations for the operation of radiation facilities.

It was agreed that even with this reduced programme, it would be unlikely that any funds from UNDP would be sufficient to sustain all activities. It was the unanimous decision that the new project proposal should include an extra-budgetary figure in addition to the 'in-kind' contributions. This would then enable a realistic programme of activities to be carried out in each of the areas.

The DDG stated that this expression of the Member States priorities will need to be transmitted to their Ministries of Foreign Affairs. In turn, this should be fed to their Missions in New York so that support can be declared at UN fora and to UNDP. This can be done as groups or

* N.B. The order of listing does not represent any order of relative priority.

individuals. He informed the Meeting that he had already talked with some Ambassadors and Missions in Vienna on this need to register support for the project. It needed to be emphasized that there would be strong competition for this UNDP regional finance.

Japan enquired whether it would be helpful if the technical experts made comments on activities to be carried out in the various areas. The RCA Co-ordinator welcomed such comments and asked all Member States to provide their experts comments to him by 5th April so that the final project document could be prepared (Annex 8).

SECOND TECHNICAL SESSION MEDICAL AND BIOLOGICAL APPLICATIONS OF NUCLEAR TECHNIQUES

11. Constitution of the Project Committee

The Project Committee was constituted with Prof. Trinh Kim Anh in the Chair.

12. Technical Cooperation Projects

12.1. "Use of Computers in Technetium-99m Imaging" (Annex 9)

Japan expressed satisfaction with the achievements of the project and asked whether there would be any further courses. **Australia** responded that the two regional training courses held had been recognized as good courses and further Australian support was being considered.

The DDG commented on the high quality of the videos produced for this project and requested them to be circulated to Member States as they were particularly useful. **Australia** noted the comments and said this was another part of the 'Distance Learning' approach that had been discussed earlier.

12.2. "Radio-immunoassay of Thyroid Related Hormones" (Annex 10)

Malaysia commented that excellent progress had been achieved in this project in the five laboratories taking part and self sufficiency had now been achieved. **Pakistan** agreed that it had been a good project and there had been significant reduction in the cost of kits. Kits had been supplied to Burma, Sri Lanka and Philippines. **Thailand** reported good progress and that the 3rd National Co-ordinators Meeting had been held in Chiang Mai 12-16 March 1990. **Viet Nam** said that three laboratories had participated. There was good reliability with the materials and the technique now had widespread use. **China** reported active participation in the project and wanted to arrange a training course held in Shanghai on diagnosis using the technique. **India** reported active participation. 150 laboratories were carrying out RIA work of which 80% related to thyroid problems. Self-sufficiency in reagents had been achieved and a local training programme was underway.

The DDG congratulated everyone on the very successful outcome of the work with the capabilities and know-how being very effectively transferred. He was also pleased to hear of the help given by Pakistan to other Member States. The project was now moving to ARCAL and AFRA and he hoped that the experiences gained here could assist them. He asked whether it would be possible for the region to supply bulk reagents to Africa rather than have them purchased from Europe or USA.

In his summing up, the Chairman expressed his pleasure that the project had achieved its aims of quality control, increased reliability and lower cost. He added that Viet Nam was to receive a computerized gamma camera through IAEA Technical Assistance Project for diagnosis and training purposes.

13. Co-ordinated Research Programme (CRP)

13.1. "Imaging Procedures for the Diagnosis of Liver Diseases" - Phase II (Annex 11)

Japan thanked the Malaysian Government for hosting the Regional Co-ordination Meeting for this Japanese funded CRP. The Agency was asked to provide the hardware for this programme, i.e. the gamma camera and the ultrasonic imaging equipment.

Viet Nam commented that they had participated in Phase I of the programme but could not join Phase II since they did not have a gamma camera of the minimum required standard. **Pakistan** reported that 20 nuclear physicians have evaluated the gamma camera images and a workshop had taken place at which the results of the ultrasonic images were analysed.

The Chairman commented that this was a major quality control activity for focussing on diagnosis. The need to couple gamma camera and ultrasonic images for effective diagnosis was important.

13.2. "Improvement of Cancer Therapy" - Phase II (Annex 12)

Viet Nam requested support to join this programme. Two hospitals were interested but information on the CRP had been late arriving. **Japan** commented that in this second Japanese funded programme, their contribution was coming via the software development. The hardware was the personal computer. The participation of more countries was invited.

The Chairman stated that this project should result in better dosimetry and better control of the procedure. Viet Nam was interested in participating.

13.3. "Radioaerosol Imaging for the Diagnosis of Respiratory Diseases" (Annex 13)

The Chairman commented that imaging of the lung was difficult and that aerosols had made such investigations possible.

13.4. "Nuclear Techniques for Toxic Elements in Foodstuffs" (Annex 14)

Malaysia reported all foods tested were within the acceptable limits for toxic elements.

14. Projects with TC and CRP Components

14.1. "Strengthening of Radiation Protection Infrastructures" (Annex 15)

Australia stated that this was an important area of priority for them. At the Meeting in Australia in September 1990, it had been emphasized that the training manual was a most important document and would be prepared so it could enhance any "Distance Learning" activities. They stressed the importance of the Expert Advisory Group Meeting recommendations. It was possible that Australia might fund an additional training course in 1992-1993.

Viet Nam and **China** reported good progress in the project and with the CRP on Asian Reference Man. **India** announced that it would be supporting the Regional Training Course on "Safety Aspects of Industrial Applications of Radioisotopes". They were also participating in the CRP.

Japan informed delegates that there had been an Expert Advisory Group Meeting held in Tokyo in December 1990. Those wishing to have the report could obtain copies from the Agency. **Japan** circulated background documents on the activities for 1991. **Philippines** noted that the outcome of the CRP on Asian Reference Man would have significant radiation protection implications. The Chairman suggested that there was a need for Training Courses directed at radiation protection for medical staff.

14.2. "Radiation Sterilization of Biological Tissue Grafts" (Annex 16)

Thailand announced that it dealt with 10,000 tissue grafts and 24 hospitals were involved. They have a tissue banking centre which has given assistance to Indonesia, Pakistan and Myanmar. **Philippines** said that they had a tissue bank which was involved in the distribution of material. **China** commented that they have been actively participating and had been carrying out studies on pig skin. **Republic of Korea** said it was participating actively and would like to make a tissue bank available in Korea. **Pakistan** also informed of its active participation and proposals for a TC project had been submitted. **Viet Nam** informed that 2 hospitals were participating and had established quality control on the tissues. **Indonesia** reported good results. **India** said that they have had a tissue bank operating in Bombay for 3 years. Promotion to other hospitals was dependent on having an irradiation source close to the hospital.

The Chairman concluded that this was an important area of work which needed to be continued.

14.3. "Care and Maintenance of Nuclear Medical Instruments" (Annex 17)

Australia commented that this project was a natural candidate for benefiting from the 'Distance Learning' techniques. **Thailand** said they had organized one national training course. They felt more collaboration was required between Member States especially with instrument manuals and quality control. **Viet Nam** emphasized the importance of this project to their work and the Dalat laboratory was assisting others in the country. **India** reported that their experience was that local agents did not have adequate backup and expertise was needed at the local level. **Pakistan** stressed the importance of the project and commented that they routinely integrate training into purchase contracts for new equipment.

15. "Application of Immunoassay and Related Techniques" Training Course (Annex 18)

The RCA Co-ordinator commented that the course had been very successful and had focussed on introducing young scientists to this technology.

16. New Project Proposals (Annex 19)

Three synopses for new projects were distributed for information. It was agreed these would be considered to see whether there was sufficient interest from Member States and if supported, fuller project proposals would be tabled at the next Working Group Meeting.

The DDG said he was pleased with the outputs achieved. He said that there were Agency publications in this area of interest to Member States and they should request it. He explained that equipment for a CRP cannot be requested under TC since it is part of the Agency's regular budget programme. Inexpensive, used gamma cameras are being made available through the Agency and these can assist in getting work started. As part of the interregional programme, an Advisory Group Meeting on Nuclear Instrumentation Maintenance was held in Viet Nam in January 1991. The Agency can supply copies of the Meeting Report as well as a Report on the spare-parts programme that was carried out in Latin America.

17. Concluding Comments

The Chairman thanked the Delegates for their active participation in this session and expressed his enthusiasm for the progress being achieved.

THIRD TECHNICAL SESSION AGRICULTURAL PROJECTS

18. Constitution of the Project Committee

The Project Committee was constituted with Professor Nguyen Van Uyen in the Chair.

19. Technical Co-operation Projects

19.1. "Food Irradiation Process Control and Acceptance" (RPFI III) (Annex 20)

China commented that they had actively participated in this project. Public acceptance is an important issue. Marketing testing has been carried out in China and the public reaction has been good. A detailed report will be sent to the Agency. An offer was made to organize either a regional or a national training course on public acceptance and commercialization. **Philippines** remarked that they do not have the necessary food and drug regulation in place to allow sale of irradiated foods but are now discussing with competent authorities on this matter. **Pakistan** reported keen interest in food irradiation and informed that efforts are being made to initially start commercialization of potatoes and onions. **Thailand** said that a process control study of rice and Mung bean was carried out at the Thai Irradiation Center.

Republic of Korea gave details that it would like to strengthen the infrastructure for commercialization of irradiated food. Currently transport performance of some foods was being studied. **Malaysia** reported that a National Food Irradiation Committee had now been formed. Public acceptance was still a problem. **India** said it was carrying out transport trials and participating in the promotion of the products. **Viet Nam** reported that its new facility in Hanoi was going to be for food irradiation but the shortage of Cobalt-60 was holding up work at the moment. The Agency was requested to help if at all possible. Trials on spices and sea foods were underway. **Philippines** said that irradiated items for export raised a problem because of the demands by some countries for proof of whether irradiation has taken place. **Indonesia** reported that a market study on irradiated dried fish had been conducted. The Ministry of Health has issued clearance for three irradiated food items: grains, spices and tubers.

The DDG responded to some of the questions raised in the Session. He pointed out that the current food irradiation project has taken over from the previous project which was aimed at reducing post-harvest losses. This will be progressed in the Agency's Medium Term Plan. The issue on the proof of irradiation is being investigated. There is worldwide acceptance of the irradiation of spices.

19.2. "Improvement of Grain-Legume Rhizobium Symbiosis to Fix Atmospheric Nitrogen" (Annex 21)

Republic of Korea questioned how they could participate in the project. One Korean had applied but has had no reply. Agency assistance was requested. **Malaysia** reported that the project is expected to be very successful, largely because they managed to incorporate the farmers into the project work. **Viet Nam, China** and **Indonesia** all expressed desires to join the project. **Pakistan** said that the work was going ahead very satisfactorily and some beneficial species of micro-organisms are being isolated.

The DDG reported that this UNDP project had been formulated by the Department of Research and Isotopes. He was pleased to report that Pakistan would like to offer bilateral co-operation on this topic. He also recognized that India had a good standard in this technology.

The RCA Co-ordinator expressed regret that the footnote a/ project on "Tropical Plant Viruses" was still unfunded. **Japan** said that it has taken note of the interest and recognized the importance of the project. More funds are being requested.

In response to discussions on past new project proposals that had not been accepted, the DDG commented that agricultural projects were not a large feature of RCA, only amounting to some 6% of total resources. Some projects fitted better to regional approaches while others could be handled better as national projects.

In his summing up, the Chairman said that public acceptance would be the major problem to be overcome for food irradiation. As far as the Nitrogen Fixation Project was concerned, progress was good and he expected little problem of acceptance.

FOURTH TECHNICAL SESSION RESEARCH REACTOR, ENERGY-BASED AND GENERAL PROJECTS

21. Constitution of the Project Committee

The Committee was constituted with Prof. Tran Ha Anh in the Chair.

22. Research Reactor Projects

22.1. "Research Reactor Utilization" (Annex 22)

22.2. "Basic Science Using Research Reactors"

These Projects were discussed together.

India said that it put much emphasis on the importance of research reactors as had been shown by its interest and practical support over the past years. They were hoping to receive more money to support further activities. **China** announced that it was planning to hold a Regional Training Course on "Neutron Transmutation Doping". **Malaysia** said that it was using its reactor to assist in the validation of two computer simulation software developments. **Philippines** informed that it was already participating in the CRP on the use of PC's to interface reactor operations and was eager to participate more, once its reactor was back in operation. **Republic of Korea** observed that most RCA Members have a strong interest in research reactors and that more effort could be put into the project. **Australia** said that it recently held an Interregional Core Conversion (LEU) Training Course in Sydney. **Republic of Korea** thought this was such an important topic for the region that Japan might consider whether it could assist more, especially in view of RCA being a Co-operative Agreement. **Japan** said that it would continue to extend possible support through, for instance, sending experts and accepting scientists and other trainees. Although they had not contributed anything to this area in 1990, some experts had been provided in the previous year. Japan was asked if it could clarify the difference between its RCA interests and those it has in the International Conference for Nuclear Co-operation in Asia. **Japan** replied that, for RCA, it contributes both to the activities and to the finance. On the other hand, the Conference, which is organized by the Atomic Energy Commission of Japan, is a vehicle for exchange of opinions and information.

Indonesia referred to a statement made at the previous Meeting that it is willing to host a 3-week training course on the use of PC's in research reactor operations and utilization under the framework of RCA and has allocated US\$10,000 towards local expenses.

Pakistan suggested that experiments for materials structure examination (such as high Tc super-conducting ceramics) and investigation of micro-structure defects in reactor materials should be emphasized. The programme of materials study entailing the potential industrial concerns with the determination of stress and texture of materials should also be exploited.

The DDG commented on the interest in the utilisation of research reactors and said the programme should be looked into to see if some additional resources are required especially with the high concentration of research reactors in the Region. Research Contracts are being encouraged but some Member States have not yet put up proposals. Both safety and operation are big issues. He also outlined the future prospects for power reactors in the region.

23. Energy-based Projects

23.1. "Nuclear Power Pre-Project Activities and Manpower Development Planning" (Annex 23)

Republic of Korea announced that the number of participants would be increased from 15 to 20.

Pakistan announced that the Regional Training Course on Electric Systems Expansion Planning to be held in Lahore had had to be deferred from 1991 to 1992.

24. General Projects

China announced that it would be holding a Conference on Nuclear Fission Track Detectors in September 1992 in Beijing. It was going to request the Agency to organize a training activity on the preparation and quality control of radiopharmaceuticals.

India proposed that its special contribution to RCA for 1992 may be utilized for the organisation of a 2-week regional training course on advanced mutation breeding of tropical crop plants.

24.1. "Isotope Techniques in Hydrology" (Annex 24)

India reported that this Indian-funded Course was run jointly between BARC and the National Geophysics Institute at Hyderabad. Field demonstrations also took place.

25. New Project Proposal (Annex 25)

Prior to the Meeting, documents had been circulated to delegates on a proposal for a project on Nuclear Related Analytical Techniques. Since the Draft Project for UNDP contains similar proposals, it was not considered appropriate to carry on with its consideration.

26. Concluding Comments

The Chairman said that nuclear techniques can contribute to a country's development. Safe and efficient reactor operation are indispensable parts of nuclear technology. There was a great need to extend reactor utilization. Nuclear power is beginning to be a real need for many countries and, because of worries concerned with the environmental problems associated with fossil fuels, there seems to be the beginning of a second phase of nuclear power utilization. Additional extra-budgetary assistance would be useful.

COUNTRY STATEMENTS

27. Receipt of Country Statements (Annexes 26-36)

By general agreement, the individual Country Statements were not read out although provision was made for short presentation of important issues. The copies of the Country Statements were circulated to delegates and were then open for comments.

SECOND ADMINISTRATIVE SESSION

28. RCA Action Plan 1991 - 1992 (Annex 37)

The RCA Co-ordinator presented the Action Plan. Detailed work plan for 1992 of the UNDP/IAEA Regional Industrial Project is in Annex 1 of the Progress Report of the Project Co-ordinator (Annex 7).

The Meeting noted that Viet Nam requested the assistance of experts to assist in two NDT National Training Courses in 1991, one UT2, the other RT2.

29. RCA Cost Projections 1991 (Annex 38)

The RCA Co-ordinator outlined the cost projections for 1991 which were slightly lower than those of 1990. This figure will now fall because of the decision to roll over some of the extra-budgetary activities in the Industrial Project to fill the gap left in 1992.

Malaysia stated that RCA should now concentrate on having fewer projects so that each can be carried out in depth. The DDG said the Board of the Agency had recommended that the Secretariat reduce the number of small projects. Over the last 10 years there had been a seventeen fold increase in projects, while staff numbers were frozen because of zero real growth demands. Currently, TC has 1008 projects, and each year recruits 1400 experts and places 1600 fellows.

30. Other business

The DDG said that approaches had been made to him from other regions to see if a limited number of trainees could attend RCA activities at no cost to RCA and with the approval of the host country. The delegates were asked to consider this as a group so that there was an agreed position. **India** supported a **Malaysian** suggestion that the RCA region had matured so that it was now time to take on some of the responsibilities for the less advanced regions. **Japan** commented that they had already been participating in such ventures for a few years through JICA-assisted group training courses on medical and biological applications of radiation and isotopes.

Japan announced it would be inviting Member States to hold the 14th Working Group Meeting in Japan. The venue and date would be announced later. **Pakistan, Malaysia** and **Indonesia** welcomed the proposal and asked whether it would be possible to avoid holding the Meeting in the month of March. Japan said it took note of the request but added that there might not be much flexibility because of the constraints imposed by their financial year starting in April.

CLOSING SESSION

31. Acceptance of Draft Document

The Draft Document was accepted subject to a number of editorial corrections.

32. Closing Remarks by IAEA

The DDG on behalf of the IAEA and the delegates thanked the Chairman for his untiring efforts which had produced a successful and enjoyable meeting. Tribute was also paid to the hardwork and hospitality of the staff of Vinatom who had played such a valuable role in supporting the WGM.

The DDG asked the Chairman to convey grateful thanks to H.E. General Vo Nguyen Giap and to the Minister. The visit to Dalat Nuclear Research Institute had been a good opportunity to visit the Reactor and other facilities such as the waste management plant, isotope production unit and the instrument maintenance facility. He noted that Thailand was going to need support for its nuclear medicine programme in 1991, while its reactor was undergoing a year long maintenance programme, and there was a possibility for Viet Nam to assist in the supply of technetium-99m.

In connection with the UNDP new project proposal, the DDG said that the decisions made on the content of the proposal at this meeting had been crucial and he emphasized the need for UNDP to be informed at the national level. He hoped that the various national planning bodies would be convinced of the high priority of the project and would send the right signals to UNDP. He also stressed the importance of providing bridging activities in the UNDP Industrial Project area for 1992.

Finally the DDG wished all the participants pleasant trips home and was sure that they would take home many good memories of the Ho Chi Minh City and Viet Nam.

33. Official Closing

In his closing remarks Professor Pham Duy Hien said that the success of RCA was due to three factors: a need for the nuclear technologies which were also part of national priorities; an underlying desire for co-operation within the region; and, efficient organization and management. He outlined three needs for the future and these were: transfer of the technology to commercial areas; overcoming the problems of public acceptance of nuclear technology; and, increasing co-operation and interchange between member states.

In conclusion he said it had been a privilege for Viet Nam to host the 13th WGM and he hoped that the delegates would take home pleasant memories of their stay in the country.

The full text of Professor Pham Duy Hien's Closing Remarks is in Annex 39.

Thirteenth RCA Working Group Meeting of Representatives
of RCA Member States

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AGENDA

THIRTEENTH RCA WORKING GROUP MEETING

Ho Chi Minh City, Viet Nam, 4-7 March 1991

Monday, 4 March 1991

08:30 Registration

09:00 **INAUGURAL SESSION**

1. Welcome Address by the Chairman of National Atomic Energy Commission of Viet Nam
2. Welcome on behalf of IAEA by the Deputy Director General - Department of Technical Co-operation
3. Official Opening and Keynote Address by the Vice Chairman, Council of Ministers

10:15 Coffee Break

10:30 **FIRST ADMINISTRATIVE SESSION**

4. Election of Chairman and comments by Chairman-elect
5. Adoption of Agenda
6. Draft RCA Annual Report, 1990
7. Election of Chairpersons of Project Committees (Article VI of RCA Agreement refers)
 - a) Medical
 - b) Agricultural
 - c) Nuclear Science and Energy Based Projects

12:30 Lunch

14:00 **ADMINISTRATIVE SESSION (Cont.)**

8. New RCA Agreement 1992 - 1997

15:00 Coffee Break

15:15 **FIRST TECHNICAL SESSION**

REGIONAL INDUSTRIAL PROJECT

9. Report by UNDP Project Co-ordinator
10. New UNDP/RCA Project Proposal - Expert Advisory Group Meeting

Tuesday, 5 March 1991

09:00 SECOND TECHNICAL SESSION

MEDICAL AND BIOLOGICAL APPLICATIONS OF NUCLEAR TECHNIQUES

11. Constitution of Project Committee
12. Technical Co-operation (TC) Projects
 - 12.1 "Use of Computers in Technetium - 99m Imaging"
 - 12.2 "Radioimmunoassay of Thyroid Related Hormones"
13. Co-ordinated Research Programme (CRP)
 - 13.1 "Imaging Procedures for the Diagnosis of Liver Diseases" - Phase II
 - 13.2 "Improvement of Cancer Therapy" Phase II
 - 13.3 "Radioaerosol Imaging for the Diagnosis of Respiratory Diseases"
 - 13.4 "Toxic Elements"
14. Projects with TC and CRP Components.
 - 14.1 "Strengthening of Radiation Protection Infrastructure"
 - 14.2 "Radiation Sterilization of Biological Tissue Grafts"
 - 14.3 "Care and Maintenance of Nuclear Medical Instruments"
15. "Application of Immunoassay and Related Techniques" Training Course
16. New Project Proposals (if any)
17. Concluding comments by Chairperson

10:45 Coffee Break

11:00 THIRD TECHNICAL SESSION

AGRICULTURAL PROJECTS

18. Constitution of the Project Committee
19. Technical Co-operation Project
 - 19.1 "Food Irradiation Process Control and Acceptance" (RPFI III)
 - 19.2 "Improvement of Grain-Legume Rhizobium Symbiosis to Fix Atmospheric Nitrogen"
20. Concluding Comments by Chairperson

12:30 Lunch

13:30 FOURTH TECHNICAL SESSION

RESEARCH REACTOR, ENERGY BASED AND GENERAL PROJECTS

21. Constitution of the Project Committee

22. Research Reactor Projects

22.1 "Research Reactor Utilization"

22.2 "Basic Science Using Research Reactors"

23. Energy Based Projects

23.1 "Nuclear Power Project Planning" (KAERI Workshop)

24. General Projects

24.1 "Isotope Techniques in Hydrology" (BARC Training Course)

25. New Project Proposal (if any)

26. Concluding comments by Chairperson

14:45 Coffee Break

15:00 COUNTRY STATEMENTS

27. Receipt of Country Statements

SECOND ADMINISTRATIVE SESSION

28. RCA Action Plan 1991-1992

29. RCA Cost Projections 1991

30. Other Business

Wednesday, 6 March 1991

FIELD VISIT TO NUCLEAR RESEARCH INSTITUTE, DALAT

(Programme of visit on separate sheet. Interested delegates are requested to register for the trip.)

07:00 Departure from Hotel

Thursday, 7 March 1991

15:00

CLOSING SESSION

31. Acceptance of Draft Documents
32. Closing Remarks by IAEA
33. Official Closing

WELCOME ADDRESS BY PROF. NGUYEN DINH TU, CHAIRMAN, VIETNAM
NATIONAL ATOMIC ENERGY COMMISSION, AT THE 13-TH RCA WORKING
GROUP MEETING, HOCHIMINH CITY, 4-7 MARCH 1991.

=====

Your Excellency Vo Nguyen Giap, Vice-President of
the Council of Ministers of the Socialist Republic of
Vietnam,

Your Excellency Noramly Bin Muslim, Deputy Director
General of the International Atomic Energy Agency,

Distinguished delegates,

Ladies and Gentlemen,

On behalf of the Vietnam National Atomic Energy
Commission, I would like to extend my warmest welcome to
distinguished guests and to delegates from RCA member
countries attending this 13th RCA Working Group Meeting. I
warmly welcome His Excellency Noramly Bin Muslim, IAEA Deputy
Director General in our midst at this meeting. Our meeting is
particularly honoured by the presence of His Excellency Vo
Nguyen Giap, Vice-President of the Council of Ministers of
the Socialist Republic of Vietnam.

Vietnam became RCA country member since 1979 and
officially participated to the Regional UNDP/IAEA Project on
industrial applications of isotopes and radiation technology
for Asia and Pacific Region since 1989. However, it is only
in this year that we have the privilege and honour to host
the RCA Working Group Meeting in Vietnam and to welcome
distinguished guests and delegates from IAEA and RCA member
countries coming to our country for attending this meeting.
It was not so long since we started the development of
nuclear science and technology in our country. Our
participation to the activities of IAEA and RCA has been

most beneficial for us and with the precious assistance of IAEA under technical assistance projects, training and expert services, we have been able to achieve progresses in the application of nuclear technique in medicine, agriculture, industry and other fields of the national economy. It is a problem of great importance for us to strengthen the cooperation with RCA countries. Most of RCA projects and the Regional UNDP/IAEA project on industrial applications are suitable for the needs of Vietnam. Through the cooperation in the framework of RCA we are able to learn from and to exchange experiences with colleagues from other countries, to train our scientists and to participate in joint research projects. RCA activities are creating favourable conditions for the contact and understanding between scientists of the countries within the region and contribute to the development of overall cooperation. There is no doubt about the importance of this RCA Working Group Meeting. Our meeting has not only to make an appreciation of the achievements during the past year, but its more important task is to discuss and make decisions on many major problems, including the new RCA project proposal for possible UNDP funding in their 5th Programming Cycle 1992 - 1996.

We are holding this meeting shortly after the Lunar Year Festival, a traditional Festival of our vietnamese people. This Festival is also called Spring Festival, as it marks the beginning of Spring. We hope that although a quite tight schedule, our overseas guests will have the opportunity to visit some scientific institutions and some interesting and enjoyable places. We hope that you will have a very pleasant stay in our country.

In closing, I wish good health to all distinguished guests and delegates and wish full success to this 13th RCA Working Group Meeting.

Thank you.

THIRTEENTH RCA WORKING GROUP MEETING, HO CHI MINH CITY, VIET NAM

4 - 7 MARCH 1991

ADDRESS OF WELCOME

By

NORAMLY BIN MUSLIM, DEPUTY DIRECTOR GENERAL
DEPARTMENT OF TECHNICAL CO-OPERATION

Distinguished Delegates, Colleagues, Ladies and Gentlemen,

On behalf of the Director General, Dr. Hans Blix, it gives me great pleasure to welcome you to the Thirteenth Working Group Meeting of RCA Member States.

The Agency is privileged and honoured to have General Vo Nguyen Giap, Vice Chairman, Council of Ministers open this Thirteenth Working Group Meeting of RCA Member States. The IAEA presents its compliments to the Government of Viet Nam and expresses its gratitude to them for agreeing to host the Working Group Meeting. Although Viet Nam has only joined RCA relatively recently, its entry in 1979 was seen as a very positive move. We have had ample evidence of Viet Nam's eagerness to play a full role in RCA affairs and its generous decision to offer to host the Working Group Meeting is an obvious manifestation of a desire to be part of the RCA "family".

Although Viet Nam may have only been in RCA a little more than 11 years, it can trace a connection back to the earliest research on nuclear phenomena. It was Vietnamese uranium ore that was used by Madame Curie in 1898 for her classic separation of the element radium. My special thanks go to Professor Nguyen Dinh Tu, Chairman, National Atomic Energy Commission and his staff for the enormous efforts they have put into the organization of this meeting. It is an honour for us to have this meeting in the Palace of Independence and I am certain this will be a lasting memory for us all.

As I mentioned in September last year at the time of the RCA General Conference Meeting, we are entering a period of change when we could be faced with making difficult decisions and where our resolve on various issues may be tested. RCA has established an

enviable reputation for itself in the area of regional co-operation and while we expect all National Co-ordinators to look after their countries interests, I hope they will also have the cohesion of the regional activities in their minds and temper their stances with considerations of what could be for the better regional good as well as the responsibilities towards these countries whose level of development is still relatively low. Over the past 10 years there has been significant development of the economies of some of our Member States. Some are now at the point where they could make significant contributions both financial and technical to RCA programmes. In the next 5 years we should look to a strengthening and an acceleration in TCDC activities in our region. By most standards we have both the financial and the technical capabilities to readily achieve this, what is now needed is the resolve to bring it to fruition.

When I speak about the cohesion of regional activities and the needs to look to the better regional good we must always think primarily of people because they can make or break our efforts. Effective regional technology transfer and co-operation hinges on the ready movement of scientists, technologists and engineers to attend a variety of meetings in all Member States. This is so fundamental to RCA that Article V specifically addresses the obligation, to let us not lose sight of this principle.

The RCA's nuclear research institutes all carry a privilege and a burden in their role in our endeavours. They are usually the initial repository for the transferred Nuclear technology. They have to acquire the familiarity and the technical competence with this technology so that they can then transfer it to the appropriate sector within their own country. In this latter task they have to make and sustain contacts with other organizations who may have little or no formal relationships to them. The whole process of technology transfer hinges on the effectiveness of a small band of national co-ordinators. The establishment of networks of these national co-ordinators for the various projects has been a very effective part of the structure of RCA and the pooling of experiences at the various national co-ordinator meetings has also been very valuable.

The Agency's Board is frequently voicing worries about the effectiveness of the technology transfer process and whether self-sustainability of the technology is going to take place. Certainly there are examples in some regions where the National Nuclear Research Institutes do not have and have not tried to have effective links to the ultimate end uses of technology. In a number of cases there has been no matching of the projects with the national development plans and

objectives. There is no doubt that a high level of programme support will depend on the presentation of well structured proposals integrated into high priority areas, nationally and regionally.

In many parts of the world it is increasingly important for nuclear research institutes to be outward looking, interacting with other organizations particularly industry and showing that nuclear science and technology is both relevant and needed in the wide community. In the advanced countries questions have been and are being asked on the cost effectiveness of nuclear research and development. Government funded institutes around the world are being asked to earn money and make significant financial contributions to their own budgets. Research and technology is now being subjected to the rigours of financial accountability and project management philosophies.

It is a fortunate quirk of fate that the range of technology transferred and being transferred to the region, coupled with the positive philosophy and practice of contact beyond the confines of the national nuclear research institute, has the potential to assist and enhance the reputation of your institutes as sound investments for national development as well as providing the required technological skills and knowledge to allow you to adapt to an environment where commercialization of technology is required. In comparison with many other area of the world, we should be able to look forward to a positive future.

In this week we have to prepare the ground for the next 5 years and the decisions at this Working Group Meeting will significantly affect our future. As you are all aware the present agreement will terminate in June 1992 and we must decide whether or not the current agreement has to be modified so that it can adequately cope with the needs of the 1990's.

One of the biggest items affecting us at the moment is the question of the future funding of RCA which is intimately bound up with the probability of securing UNDP funding for the next five years, 1992 to 1996. The termination of the UNDP Industrial Project at the end of this year will make a significant dent in the RCA budget where it contributes an average of around \$700,000 each year. Through an exhaustive process of consultations with representatives of Member States, project national co-ordinators, technical officers and experts, a proposal has been formulated which combines the region's technical needs with UNDP's priority areas for funding. At this meeting we must fine tune the project by assigning National priorities to the range of

technical activities proposed. Only by doing this can a realistic project document be finalized that could be financed by a reasonably achievable budget from UNDP.

Because of all the uncertainties with regard to assured future funding for RCA, we have to prepare contingency plans, the basic dilemma being whether to reduce the programme or to attract additional financial support to maintain the programme at its present size. As many delegates will remember this issue of additional funding has been discussed before but always in the context of an expanding programme with expanding resources. I know that this financing issue is a sensitive one and Members States are concerned about any possible restrictions that might accompany offers of finance from non-RCA Member States. The need to have "untied" money has been expressed but we should not delude ourselves that this will be readily achievable. In fact if we look at the extra-budgetary support coming from our own Member States, most of this "tied" and in one way or another is used mainly to finance goods and services from their own country. We are already living with a "tied" finance situation and no-one has raised any objection about it. If we look beyond these principles to the issue of technology, it would be foolish to think that our region had all the technology that was required to satisfy every Member's interest and that technology from outside our region was inappropriate or inferior. If the strength of RCA is going to be the spirit of technical co-operation and mutual assistance for the common good, then it could be argued that the region should have access to the best technologies for its needs and not just those that the more developed Member States wish to promote.

Over the next few days, we will have a thorough airing of a wide range of views on various issues. It is one of the great strengths of RCA that you can have full and frank discussions and then arrive at an agreed course of action that you all adhere to. I hope that we can further strengthen RCA by providing recommendations and decisions that will enable us to have a clear direction for the next 5 years.

In conclusion I would like to hope that my observations and thoughts will act as a catalyst for your deliberations on the range of RCA issues you have to address. I look forward to a stimulating meeting over the next three days and I am certain that at the end of our time here we will have an efficient and effective course of action for the future.

Thank you!

**FULL TEXT OF THE ADDRESS BY GENERAL VO NGUYEN GIAP,
VICE-CHAIRMAN OF THE COUNCIL OF MINISTERS OF VIET NAM
(Delivered at the 13th RCA Working Group Meeting, 4 March 1991)**

* * *

His Excellency The Deputy Director General of The
International Atomic Energy Agency, Dr. Noramly Bin Muslim,

Distinguished Leaders and Delegates representing Atomic
Energy Establishments of Asia-Pacific Region Countries,

Ladies and Gentlemen,
Comrades and Friends,

Mutual respect and understanding as well as the in-depth and multifaceted co-operative relations between our nations constitute a new factor of great significance of our times in the Asia-Pacific region, a region where near-magic developments are taking place, a region of the world being described as attractive, energetic and ever more prosperous...

As you might be aware of, the Government and people of Vietnam have tried every way possible to develop co-operative relations with nations in our region, as a policy of high priority.

In this context, I am very pleased to learn that the National Atomic Energy Commission of Vietnam has been proposed by the IAEA, with support from Member States, to host the 13th RCA Working Group Meeting on the use of atomic energy and nuclear techniques. In such a special and modern scientific field as nuclear science, the scientists in our region have organized a co-operative scheme which proved to be good and effective and, I might say, of appreciable interest.

On this occasion, on behalf of the Government of Vietnam, I appraise very highly the efforts of the International Atomic Energy Agency and express my deep sympathy in regards to the leadership of the Agency for their bright accomplishments in line with the motto "Atom for life, atom for peace".

And in line with this ideal in truthful belief, the Government of Vietnam, despite a multitude of difficulties caused by an unceasing war for decades in the past, has made a particular effort to invest in creating suitable infrastructure for development of atomic energy, and on many occasions, has affirmed its policy for peaceful use of atomic energy. The assistance as provided by the IAEA to our country has been of the utmost importance, and permit me once more, on behalf of the Vietnamese Government, to express our gratitude to the Agency for its constant support and encouragement.

Atomic science, with the discovery half a century ago of practical ways to release and make use of the immense energy stored in the atomic nucleus, has proved to be the greatest achievement of mankind. We have observed the many successful applications of nuclear techniques playing a decisive role in the development of advanced industrial nations during the past decades. Could we do the same for poor and developing countries of the world? My belief is that we could, and in reality all concentrated efforts of the Agency as well as of the nations in our region in the past have proved that we really could. Preliminary achievements as realized in Vietnam also proved that we could. As a matter of fact, in this particular field as well as in other modern techno-scientific disciplines, developing nations like ours are confronting with multiple difficulties, are looking for suitable models, looking for the right paths of development which can answer to our motivation and confidence, which can push forward economic progress, liberate us from poverty and under-development, and gradually shorten the gap with advanced countries. And this is the primordial problem that the Communist Party and the Government of Vietnam is paying special attention during the present process of radical changes. I believe that the activities of international organizations and various forms of regional co-operations as being carried out, will certainly contribute, theoretically and practically, to bring forward national solutions to such important problems of our times.

Distinguished delegates,
Ladies and gentlemen,
Comrades and Friends,

Concerning atomic energy activities in Viet nam, I feel encouraged with the fact that within a relatively short time, the Vietnam National Atomic Energy Commission for which Professor Nguyen Dinh Tu is responsible has succeeded in establishing a satisfactory basic infrastructure, assembling a task force of manpower and providing them with suitable training and formation, in promoting scientific research activities and in achieving various applications of nuclear techniques which proved either to be of high practical usefulness or very promising. The nuclear research reactor of Dalat proved to be not a pure ornament for prestige as some people might have thought before. In reality, the Dalat NRI has become one of the most serious and modern scientific institutions of Vietnam, having developed with efficacy a relatively large number of multifaceted practical applications, from the production of radiopharmaceuticals for medical diagnosis and treatment, to application in geology, gas and oil, industry, agriculture, ...and even in banking. A national programme for technological progress in the use of atomic energy, called "National Programme for Peaceful Use of Atomic Energy",

with the code name 50A Programme, which supervised and coordinated all national research and development activities in this field, has been active for 10 years now, under the direction of Prof. Pham Duy Hien, both Vice-Chairman of VINATOM and Director of the NRI in Dalat. I am pleased to note that the objectives and content of this Programme are as well as a set of other activities carried out under the guidance of the Vietnam National Atomic Energy Commission in most ways compatible with RCA activities, which constitutes a sound basis for active participation of Vietnam to this so important regional co-operation. The Vietnamese Government will certainly continue to promote and build up Nuclear Science and Technology and, within the limits of permissible conditions, continue to widen and intensify the scope and substance of research and development in this field. But in some ways, official recognition by the Government might not be sufficient to ensure appropriate development of the nuclear field. More important are recognition and acceptance by the public, the society as a whole, by production and specialized units and organizations. In fact, these organizations are apt to be called upon to provide some funding for nuclear activities, through research and development contracts. Through this mechanism, the society would be in a better position to appreciate, in a more knowledgeable and accurate way, the results of application of nuclear techniques, on the basis of cost/benefit evaluation. Therefore, nuclear scientists, especially those in the leadership, should know the art of selecting the right sets of nuclear technologies for development in a given period of time, evaluating their marketing predominance, and their competitive abilities in regards to other non-nuclear technologies. I believe that the Asia-Pacific region countries have many similar characteristics in terms of geographical, natural and socio-economic conditions, so that a well-established and well-managed regional co-operation programme could be of realistic benefit for Vietnam in the development of befitted nuclear technologies. Nuclear power is one of the most important application components of nuclear science and technology. We in Vietnam are considering the pros and cons of adopting nuclear power within the scope of national power resource development programme, and preparatory steps on nuclear power technology and manpower are being put forward. Despite present difficulties, partly of a psychological nature related to safety considerations that are indeed very important for us, as confronted by worldwide nuclear power development programmes, my belief is that these temporary difficulties could be overcome, permitting feasible solutions answering to the needs in energy of mankind.

Distinguished delegates,
Ladies and Gentlemen,
Comrades and Friends,

On behalf of the Government of Vietnam, I warmly welcome all international and national delegates taking active part in this

13th RCA Regional Group Meeting on the use of atomic energy, in this city bearing the name of our beloved president HoChiMinh , who had been struggling all his life for the best of our country, and for the best of human fraternity. You have come right after our Tet, our traditional new year's celebrations, which mark the beginning of spring in our country. Furthermore, we are now embarking on the last decade of the 20th century, on the threshold of the new 21st century. In these feelings and spirit, and since spring is the best time for realizable wishes, may I offer my sincere wishes

- for Peace and Prosperity in our Asia-Pacific region,
- for closer and closer co-operation among our nations not only in atomic energy but also in other important spheres of activity,
- for the success of this meeting,
- and for good health and happiness of all.

Now I have the pleasure to announce the opening of the Thirteenth RCA Working Group Meeting.

Thank you.

Draft RCA Annual Report 1990 - Comments by RCA Co-ordinator

Distinguished Delegates,

It is a great pleasure for me to be here in Viet Nam for my first Working Group Meeting on the otherside of proceedings as the RCA Co-ordinator. We have much to do in this 13th Working Group Meeting and I do not propose to speak at length but rather I will attempt to make as much time available for the urgent and important items coming later.

I circulated the draft Annual Report 1990 to all National Co-ordinators before this Working Group Meeting. I welcome comments on the document. As you are all well aware the final version of it will be tabled at the 1991 RCA General Conference Meeting. I do not propose to deal in any depth with the specific details contained in it. There were 11 Technical Co-operation Projects, 4 with associated Co-ordinated Research Projects and an additional 4 CRP's not associated with a TC project. There were two RCA, TC footnote a/ projects without funding: Control of Tropical Plant Viruses; and, Isotope Hydrology and Sedimentology. This is unfortunate because both have a lot of relevance for the Member States.

In the 1990 Training Course programme 30 Regional activities and 16 National activities took place. The implementation rates for the various groups being: 100% for the UNDP/RCA Agricultural projects, 86% for the RCA and Regional Asia projects, 83% for the UNDP Industrial Projects Regional Courses and 75% for the associated National Courses.

In 1991 both the total number of projects and the number of training course events will fall slightly. 1990 was the peak of our RCA activities and it seems certain that all indicators will show decreasing activities over the next few years. This should not be viewed as necessarily a bad thing. We must look to quality as well as quantity in our programme assessment. I also look towards continued increased use of regional experts and regional institutes over the next years.

Following on one of the themes from Mr. Noramly's address, I think it is important that RCA is both seen to be and demonstrates that it is co-operative by nature, agreeing by consensus on issues for the common good of the region. It is, without any qualifications, the Member States programme. It is essential that all Member States both have and take the opportunity to express their opinions and make comments on the full range of issues and that the process of decision making is as transparent as possible. If Member States have objections or reservations then these issues should be aired during the meeting so that the total spectrum of views can be considered and recorded.

One of the dominant issues for us at this Meeting is the preparation of a final project proposal to go to UNDP for funding in the 5th Inter-Country Programme Cycle. The major change in the ground rules governing the preparation, submission and acceptance of these proposals and the very short notice to respond to such changes has placed a considerable burden on the RCA office, especially with two novices there.

The essential nature of our new proposals is to extend the technological investment made in the first two phases of the UNDP Industrial Project and develop the technology into other appropriate areas. I note that within the proposal there are two initiatives that could allow the developing countries to become involved with emerging technology which could have significant commercial spin-offs in the future. These are the areas of material science and biomedical materials. It has long been the complaint that the developed countries do not pass on technology to the developing countries that will enable them to reduce the technological gap. The adoption of work in these areas could well be a test of how willing the developed countries are to share the advanced technology and how serious the developing countries are at taking up the challenge of exploiting it.

Another area that is almost of equal importance is that of introducing and imbedding the culture of Quality Control and Good Manufacturing Practice into the industries of the developing countries. Without such an underpinning the products and services from developing countries will always be second best. This quality philosophy extends through all the technology ranging from analytical procedures to manufactured goods.

I will not deal further with the new project proposal since I know we will be having a full discussion later in this meeting.

We will need to make firm decisions at this meeting and it is my hope that the principles of co-operation and common good will guide us to a successful conclusion.

Thank you.

ANNUAL REPORT 1990

REGIONAL UNDP/IAEA PROJECT ON INDUSTRIAL APPLICATIONS
OF
ISOTOPES AND RADIATION TECHNOLOGY
FOR ASIA AND THE PACIFIC REGION (RAS/86/073)

Activities implemented in 1990 is summarized in Annex 1. The latest estimated total expenditure of the UNDP budget and the extra-budgets in 1990 is US \$ 1,090,545 of which US\$ 777,545 were from UNDP fund. An estimated in-kind contributions of the participating countries during 1987 to 1990 was about *1 million US dollars*.

There were totally 193 persons trained from and participated in regional activities of the Project, and about 800 persons trained from and participated in national events. There has been indicative private investments in 1990 amounting approximately US\$ 3,300,000.

Apart from the above achievements, the Project has made the following progress:

1. Tracer Technology: The main emphasis were to strengthen the National Tracer Groups through the regional training course, field demonstrations and fellowships.
2. Non-Destructive Testing (NDT): Emphasis on developing national training capability on NDT was continued, and development towards assisting national qualifying examination in accordance with the ISO DIS 9712 guidelines was initiated.
3. Radiation Technology: Development on regulations to enhance standard practices of industrial sterilization in the region was initiated, and progress of technology development programme in Indonesia, Japan, Malaysia, Sri Lanka, and Thailand were reported.
4. Nucleonic Control systems (NCS): Impact of the project on the use of NCS to paper industry in the region continued, and investments on NCS from paper mills in China, Thailand, Indonesia and Malaysia were reported.

The year round coordination has led to fruitful discussions among national counterparts and national coordinators on a new regional UNDP project. An executive decision of the last meeting of the RCA Representatives to terminate the Project by the end of 1991 led to formulation of a new project proposal for UNDP funding which will be discussed at this meeting.

WORK PLAN FOR 1990

Annex 1

As of : 31 December 1990

TRACER TECHNOLOGY

RAS/86/073 - (WP-90)

REF	CODE	ACTIVITY	VENUE	DATES	EXPERT
2.3	NCM	Third Meeting of NC Tracer/NCS <i><u>REGIONAL</u></i>	Baguio (PHI)	19-20 Feb	J. Davis
11.5	RTC	Tracer Application in Industry <i><u>EXPERT MISSION</u></i>	Lahore (PAK)	25 Nov - 13 Dec.	W.A. Wiblin (3-15 Nov) A. Davison (3-15 Nov) J. Thyn (27 Oct-4 Nov)
3.3	EXP	Tracer Application in Industry	HCM+HAN (VIE)	26-30 Mar	J. Easey
E 7.1	EXP	Tracer Application in Industry	Seoul (ROK)	23-27 Jul	J. Easey A. Davison
E 2.2	EXP	Tracer Application in Industry	Jakarta (INS)	14-16 Feb	W. Wiblin
10.2	EXP	Tracer Application in Industry <i><u>NATIONAL</u></i>	Dhaka (BGD)	4-14 Oct	J. Sodeau
E 6.1	NEMS	Tracer Application in Industry	Bangkok (THA)	} 11-12 Jun } 13-15 Jun	W. Wiblin T. Kluss
	DEMO	Tracer Application in Industry	Rayong (THA)		
E 2.1	DEMO/NEMS	Tracer Application in Industry	Baguio (PHI)	26 Feb - 6 March	W. Wiblin T. Kluss

NOTE : Ref. E 2.1 denotes the first(1) activity in February(2),
from an (E)xttra-budgetary contribution.

WORK PLAN FOR 1990

As of : 31 December 1990

NON-DESTRUCTIVE TESTING

RAS/86/073 - (WP-90)

REF	CODE	ACTIVITY	VENUE	DATES	EXPERT
4.1	NCM	Sixth Meeting of NC-NDT <i><u>REGIONAL</u></i>	Shanghai (CPR)	9-12 Apr.	R. Gilmour B. Zatolokin
2.1	RBM	Meeting of Ad-hoc Reg.Board of Exam. Review	K.Lumpur (MAL)	5-9 Feb.	R.G. + J.R. R.R.W.+ N.O.
6.1	RTC	RT-3	Manila (PHI)	4-22 June	R.R.Wamorkar K. Nakamura (11-22 June) R. Gilmour
7.1	RTC	UT-3	Bandung (INS)	9-27 July	K. Terada R. Gilmour
9.4	RTC	ET-2	Islamabad (PAK)	16 Sep - 4 Oct	K. Coad Sabado
E 9.1	RW	Fabrication of NDT Test Pieces	Kobe (JPN)	10-22 Sep	R. Gilmour, Mr. Ogata, Mr. Sato, Mr. Ooka
11.1	RTC	SM-2 <i><u>EXPERT</u></i>	K.Lumpur (MAL)	5-23 Nov	R. Everett
2.5	EXP	Expert mission on Neutron Radiography	(BGD,THA, VIE,MAL, INS)	26 Feb. - 16 Mar.	N. Wada H. J. Kim
10.1	EXP	Eddy Current Technique <i><u>NATIONAL</u></i>	Dhaka (BGD)	7-18 Oct.	K. Coad
3.1	NTC	SM-2	Islamabad (PAK)	3-22 Mar	R. Everett
4.2	NTC	UT-3	Hyderabad (IND)	18 Apr - 11 May	R. Gilmour (23 Apr-11 May)
8.1	NTC	UT-2	HoChiMinh (VIE)	13-29 Aug	R. Gilmour
9.1	NTC	SM-2 (aircraft)	Jakarta (INS)	5-28 Sept	R. Everett
9.3	NTC	UT-2	K.Lumpur (MAL)	17 Sept - 3 Oct	R. Gilmour (24 Sep-3 Oct)

NOTE : Ref. E 2.1 denotes the first(1) activity in February(2),
from an (E)xttra-budgetary contribution.

REF	CODE	ACTIVITY	VENUE	DATES	EXPERT
		<u><i>NATIONAL (cont.)</i></u>			
10.3	NTC	UT-2	Bangkok (THA)	4-19 Oct	R. Gilmour
10.4	NSM	NDT for NPP	Shanghai (CPR)	8-12 Oct.	S.N. Liu
10.5	NTC	SM-2	K.Lumpur (MAL)	22 Oct - 3 Nov.	R. Everett (29 Oct-3 Nov)
10.10	NTC	SM-2	Manila (PHI)	22 Oct - 9 Nov	J. Rodda
10.11	NTC	UT-2	Colombo (SRL)	29 Oct - 14 Nov	R. Gilmour
11.2	NTC	RT-2	Hanoi (VIE)	5-17 Nov	G. Singh
11.3	NSM	NDT Appreciation for Managers	Islamabad (PAK)	11-22 Nov	J. Zirnhelt (17-22 Nov)
11.4	NSM	NDT Appreciation for Managers	K.Lumpur (MAL)	26-27 Nov	J. Zirnhelt
11.7	NTC	ET-2	Serpong (INS)	28 Nov - 21 Dec.	A. Sobri (3-21 Dec)

NOTE : Ref. E 2.1 denotes the first(1) activity in February(2),
from an (E)xttra-budgetary contribution.

WORK PLAN FOR 1990

As of : 31 December 1990

RADIATION TECHNOLOGY

RAS/86/073 - (WP-90)

REF	CODE	ACTIVITY	VENUE	DATES	EXPERT
E 4.2	NCM	Forth Meeting of NC - Rad. Tech. <i><u>REGIONAL</u></i>	Takasaki (JPN)	5-7 April	V. Markovic
E 3.1	REMS	Radiation Curing	Jakarta (INS)	19-21 Mar	V. Markovic J. Garnett Y. Tabata M. Maruyama D. French T. Sasaki
3.4	EAG	Radiation Curing	Jakarta (INS)	22-23 Mar	(same as E 3.1)
E 4.1	EAG	Reg. Cooperation and UNDP Project in 1992-1996	Takasaki (JPN)	3-5 April	V. Markovic J. Garnett Ma Zue Teh K.Krishnamurthy R.G. Deshpande A. Shamshad
5.1	RTC	Industrial Rad. Sterilization - QC & SA	Bangkok (THA)	14-25 May	V. Markovic A. Tallentire N. Hall G. West
5.2	RW	Regulations in Industrial Sterilization	K.Lumpur (MAL)	28-30 May	V. Markovic M. Takehisa M. Saunders P.T. Doolan C. Herring
6.4	RTC	Radiation Curing	Jakarta (INS)	4-22 June	J. Garnett T. Tomosue D. French A.A. Neamat T. Sasaki
9.2	RTC	Radiation Steril. - Material	Bombay (IND)	17-28 Sept	Indians
E 9.5	RTC	Radiation Cross- linking Technology <i><u>EXPERT MISSION</u></i>	ChangChun (CPR)	3-14 Sep	Hun-Jae Bae Locals
E 3.2	EXP	RVNRL	Seoul (ROK)	26-30 Mar	K. Makuuchi

NOTE : Ref. E 2.1 denotes the first(1) activity in February(2),
from an (E)xttra-budgetary contribution.

REF	CODE	ACTIVITY	VENUE	DATES	EXPERT
		<u>EXPERT MISSION</u> (cont.)			
10.6	EXP	Stack Gas Treatment by EB	Shanghai Beijing (CPR) Manila (PHI)	15-16 Oct 18-19 Oct 22-23 Oct	N. Frank A. Aoki
E11.3	EXP	Radiation Curing (UV)	Laguna (PHI)	27 Nov - 1 Dec.	G. Coburn
11.6	EXP	Sludge Treatment	Beijing, Shanghai (CPR) Bangkok (THA) Jakarta (INS)	5-6 Nov 8-9 Nov 12-13 Nov 15-16 Nov	S. Hashimoto K. Krishnamurthy
		<u>NATIONAL</u>			
3.5	NEMS	Radiation Curing	Jakarta (INS)	15 March	T. Sasaki (12-18 Mar)
E 9.2	NEMS	RVNRL	Jakarta (INS)	3-4 Sep.	K. Makuuchi Chyagrit Wan
E 9.3	NWS	RVNRL	K. Lumpur (MAL)	6-8 Sep.	K. Makuuchi Chyagrit Marga
E 9.4	NTC	RVNRL	Bangkok (THA)	10-14 Sep.	K. Makuuchi Wan Marga
10.7	NEMS	Radiation X-Linking Applications	(IND) (CPR)	4-5 Oct 8-10 Oct	B. Lyons N. Studer M. Suzuki Washio Chinese
10.8	NTC	Radiation X-Linking Applications	Shanghai (CPR)	11-19 Oct	(same as 10.7)
10.9	NTC	Industrial Rad. Sterilization	Manila (PHI)	8-12 Oct	V. Markovic N.G.S. Gopal G. Jacobs

NOTE : Ref. E 2.1 denotes the first(1) activity in February(2), from an (E)xttra-budgetary contribution.

WORK PLAN FOR 1990

As of : 31 December 1990 **NUCLEONIC CONTROL SYSTEM** RAS/86/073 - (WP-90)

REF	CODE	ACTIVITY	VENUE	DATES	EXPERT
		<u>REGIONAL</u>			
2.4	REMS	NCS Minerals	Baguio (PHI)	21-23 Feb	A. Lynch M. Kurr M.R. Jakhu
		<u>EXPERT MISSION</u>			
E 4.3	EXP	NCS Manufacturing for Small Paper Mills	Beijing (CPR)	13-14 Apr	C. Honma T. Kita
E11.1	EXP	NCS Steel	BKR/JSP (IND)	5-19 Nov	H. Amano K. Mazanobu
E 7.2	EXP	NCS Steel	Shanghai (CPR)	26-28 July	H. Amano
		<u>NATIONAL</u>			
2.2	NSM	NCS Application in Industry	Manila (PHI)	15-16 Feb	J. Davis H. Saeki
8.2	NSM	Maintenance of NCS in Paper Industry	Jiamusi (CPR)	6-10 Aug	Rosli A.Jamil J. Nuttall H. Kitano T. Kita
E11.2	NEMS	NCS Civil Engineering	(MAL) (CPR)	7-8 Nov. 12-15 Nov.	H. Tominaga K.Nishibayashi M. Toyama
		<u>NEW PROJECT</u>			
7.2	RW	Characterization Methods for new Materials	Beijing (CPR)	30 July - 3 Aug.	I. Lewkowicz 8 Lecturers

NOTE : Ref. E 2.1 denotes the first(1) activity in February(2),
from an (E)xttra-budgetary contribution.

WORK PLAN FOR 1990

As of : 31 December 1990

PROJECT COORDINATION

RAS/86/073 - (WP-90)

REF	CODE	ACTIVITY	VENUE	DATES	REMARKS
1.1	MEM	Evaluation Mission	(ROK,JPN, CPR,INS, MAL,THA)	6-31 Jan.	
---	TFM	Task Force Meeting and Consultation	Vienna (AUT)	13 March	
3.2	WGM	RCA Working Group Meeting	ChiangMai (THA)	19-22 Mar	
6.2	MTG	Meeting of National Counterparts	K. Lumpur (MAL)	25-27 Jun	
6.3	TPR	Tripartite Review Meeting	K. Lumpur (MAL)	28 June	
---	TFM,GCM	Task Force Meeting,	Vienna (AUT)	17 Sep	
---	RCAM	General Conference, RCA Rep. Meeting	Vienna (AUT)	19 Sep.	Room C 7V 10.00-12.00 AM
12.1	EAG	Expert Advisory Group Meeting on New Regional Project	Vienna (AUT)	17-21 Dec.	I. Ishigaki R.G. Deshpande Zhu Jiang Pham Zui Hien

Draft Project Formulation Framework for proposed UNDP support 1992-96

**THE USE OF ISOTOPES AND RADIATION TO STRENGTHEN
TECHNOLOGY AND SUPPORT ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT**

(Asia-Pacific Region)

This project proposes to take advantage of the significant national and international investments in nuclear science and technology in the Asian Pacific Region and, through this project, increase the regional scientific and technical capability and capacity to enable the 12 participating RCA countries to address the specific issues of combating the degradation of the environment, strengthening industrial development and improving aspects of public health care.

Section A: Development Problems

A.1. Development Problems at the sectoral or sub-sectoral level (the "macro" level)

<u>Problems</u>	<u>Causes</u>	<u>Evidence</u>
Increased technological gap between the developed and the developing countries.	Government Budgetary and Investment limitations. Traditional reliance on imported technology. Absence of well established collaboration between government and industry in science and technology.	UNDP priorities.

A.2. Development problems at the level subject to solution by the proposed project (the "micro" level):

<u>Problems</u>	<u>Causes</u>	<u>Evidence</u>
Limited use of well established and cost effective applied technology based on isotopes and radiation.	Limited number of skilled personnel. Limited promotion of technology to industry. Limited availability of technology suitable for direct transfer to regional industry. Limited National facilities. Limited Public acceptance of nuclear technology.	UNDP mid-term review of Project RAS/86/073. Reports of National Co-ordinators and National Counterparts meetings request for assistance.

Section B. Target Beneficiaries

B. Concerned parties/target beneficiaries:

1. The Governments in the Region are the concerned parties and, through the Regional Industrial Project (RAS/86/073) network of National Counterparts, and National Co-ordinators, recommendations and the specific needs of the region were raised at a range of RCA Working Groups and General Conference Meetings. National Co-ordinators Meetings, Country Statements and Expert Advisory Group Meetings.

2. The target beneficiaries in the participating countries will be the general public in the public health and environment related activities, regional industries in the environment and industry related projects and environmental protection agencies for the environmental activities.

Section C. Pre- and Post-Project Situation

C.1 The Pre-Project Situation

The Asian Pacific Region has undergone unprecedented economic expansion over the past two decades. UNDP and the IAEA have recognized the pressing needs to address the technological challenges implicit in this rapid regional growth. Through the UNDP assisted projects RAS/79/061 and RAS/86/073 and the various regional and bilateral programmes undertaken by the IAEA and the Inter-Government programmes, there has been concerted effort to train staff at the National Nuclear Research Institutes (NNRI) in the peaceful uses of Atomic Energy and specifically in applications of nuclear science and technology to food and agriculture, medicine and biological sciences, industry, radiation protection and basic science.

Through RAS/79/061 and RAS/86/073 specifically, there has been a concentration on establishing certain technologies that can be used to assist industry such as: tracer technology, non-destructive testing (NDT), radiation technology and nucleonic control systems (NCS). These projects have also been successful in creating strong regional networks of National Co-ordinators who are responsible for co-ordination of the project work national and are able to assist in the Regional co-ordination and management of the project work and future planning. Although some nuclear technology has been adopted by industries in a few countries, in most of the region these technologies have been transferred to the NNRI and specialist groups have been established but the technology is still not in a position to be self-sustained. The sustainability of the technology will largely depend on the efforts made to harness it to practical rather than academic problems and also on the success at presenting the technology not as an end in itself but as a tool to be used to solve problems. This proposal will assist in these processes because it is focussed on specific industrial and environmental needs rather than the technologies.

In January 1990 there was a mid-term review of RAS/86/073 and recommendations were made concerning project future activities. The mission recommended that due emphasis should be given to:

- . the need for assistance to small and medium-sized industries
- . the need to address environmental problems
- . the need to improve transportation infrastructure.

It also noted that problems of public acceptance were inhibiting the spread of the technology and that the issues of radiation protection and safety should be integrated in the training programmes. There was strong support from RCA Member States on the conclusions of this report.

In December 1990 an expert advisory group meeting on the project identified four major elements that should be supported and defined broad objectives within each elements as follows:

A. Public Health and Environment

1. Standards of public health not yet adequate in many areas. Specifically assistance can be given by promoting indigenous capacity for manufacture of medical products through radiation sterilization technology.
2. Radiation technology for preservation of the environment has not yet been applied.
3. Only limited use of nuclear techniques has been made in environmental pollution studies.

B. Industrial Production

1. Regional capability for industrial process control through application of NCS Technology is not sufficient.
2. Natural resources could be more efficiently and safely exploited through the use of appropriate nuclear technology.

C. Industrial Quality Control

1. Insufficient use of non-destructive evaluation techniques to increase, productivity and quality control in specific industries.
2. No comparison available on a regional basis of the skill levels of NDT personnel trained in accordance with national training programmes.

D. Material Research and Development

1. Limited regional capability in the field of advanced ceramic materials on materials characterization and surface treatment technologies.

On the basis of these recommendations, a draft project framework was drawn up and discussed at the RCA Working Group Meeting held in Viet Nam in March 1991 during which the technical programme for the RCA activities was reviewed and defined. The Member States considered the draft PFF and then identified the highest priority objectives which would be the basis of the final document and could be supported from the requested funds. The agreed criteria to assist in the development of the final PFF were:

the programme should concentrate on high quality in-depth projects rather than a shallow, broad coverage. This would result in more efforts being placed in training, for example, to provide comprehensive resource packages to assist in supporting and sustaining the technology once transferred.

the programme should be the best investment of the available funds both in terms of getting the advantages and benefits of current technology into industry and associated areas as well as providing an investment in new skills needed for the future of the industries and associated enterprises.

the programme should have high quality technical management and have increased use of long-term technical experts stationed in the region.

C2. The Post-Project Situation

At the end of the project there will be a substantial increase in the knowledge and skills levels within the various RCA countries. The technologies transferred in previous activities will have been made more sustainable through their increased use in this project and the widening of the application base will assist not only with the development of the skills and confidence of the personnel but also with the development of increased links with industry and utilities.

Each participating Government will have in place an established national co-ordination network linking the users of specific technology with the national centres. This will facilitate technology and information transfer so that not only the analysis and identification of appropriate technologies and techniques can take place but also there will be opened up a valuable additional channel to assist in policy and regulatory issues.

In those sectors covered by this programme of activities, there will be a better appreciation of radiation safety and radiation protection at the technical level. For the non-technical and general public the provision of informed articles and seminars during the course of this work will provide the necessary balance of information to address the issue of public acceptance and provide a rational basis for assessing the benefits of the technology.

The regional harmonization of the technological experiences as well as the regulations and procedures will provide an effective environment for the encouragement of increased TCDC activities. Specifically most participating governments will have adopted the standards and guidelines on Qualifying and Certification of NDT personnel which are based on international recommendations.

Section D: Special Considerations

- D.1 The project will result in greater collaboration at a national level between government, semi-government and industry organizations and at a regional level, it will make a substantial contribution to regional co-operation and TCDC. The contributions of this project in the area of environmental activities will impact on the pre-investment and investment potential of the regional industries. The activities in the industrial areas will directly impact on both pre-and post-investment potential for the industries.
- D.2 There are no negative impacts from this project on either the environment or particular groups.

Section E: Other Donor and Programme

1. Under the RCA Agreement the participating Governments make available the necessary scientific and technical facilities and personnel for implementation of co-operative project. They make large in-kind contributions to the project through this arrangement.
2. The Governments of Japan and Australia have indicated that they are considering extra-budgetary support to allow the full range of activities to be implemented.
3. Various bilateral assistance projects on the application of nuclear techniques are being supported by the IAEA in the region. There are also a variety of bilateral arrangements between the RCA countries and countries outside the RCA. These projects are not in the specific areas being addressed by this project.

Section F: Development Objective

The common development objective of all the RCA countries participating in this project is maximize the transfer of technology from developed countries so that they have a suitable indigenous capacity to address the problems associated with their national development. An essential part of this transfer process is the establishment of the technology with the appropriate industries, utilities and other 'end users'. It is also essential for the technology to be implanted with competent national institutes to ensure that exploitation can be backed and sustained with trained and experienced technologists.

There are a large number of techniques using isotopes and radiation that are routinely used in developed countries and which could be beneficially transferred. These techniques can make significant contributions in line with the objectives of the UNDP Fifth Inter-country Programme for Asia and the Pacific in the areas of the environment and natural resource management, technology development and technical development among developing countries. These additional skills will strengthen the technological investments already made in these countries through, in most cases, the establishment of their national nuclear research centres over the past two to three decades and will build additional technological capacity into this structure.

Section G: Major Elements

Immediate Objective 1

Upgrade the capabilities of key personnel in science and industry on the technology and techniques using isotopes and radiation suitable for addressing problems of environmentally sustainable development.

Success Criteria

The establishment of an indigenous capacity to sustain and develop the acquired technology and techniques.

Output 1.1

At least one key scientist or engineer from each participating Member State trained in the use of nucleonic control systems nuclear gauges and similar devices in industry and industrialists informed on the technology.

Activities for Output 1.1

- 1.1.1 Expert missions to assist with technical and with economic aspects of NCS technology
- 1.1.2 Regional seminars on the application of NCS in specific industries - paper and sheet products.
- 1.1.3 National seminars for industrialists on NCS applications and benefits
- 1.1.4 Regional workshop/demonstration on NCS in small and medium size paper industry
- 1.1.5 Fellowship training in NCS at regional centres of excellence
- 1.1.6 Meeting of National Co-ordinators to establish priorities and co-ordinate activities.

Output 1.2

At least one scientist from each participating Member State trained in the use of isotope techniques in process optimization and industrialists informed on the technology.

Activities for Output 1.2

- 1.2.1 Meetings of National Co-ordinators to establish priorities, co-ordinate activities and prepare implementation strategy for National programmes
- 1.2.2 Regional training courses on plant optimization in the processing of natural resources using isotope technology
- 1.2.3 Regional demonstrations on the practical use of isotopes industrial process control applied to natural resources
- 1.2.4 Fellowship training on process control using tracers at regional centres of excellence
- 1.2.5 Expert missions
- 1.2.6 National seminars to promote the adoption of the technology by industry.

Output 1.3

At least one person from each participating Member State trained on the use of tracer technology to study the dispersion of effluents in water and relevant agencies informed on the technology.

Activities for Output 1.3

- 1.3.1 Regional training courses on the use of tracers to study the dispersion and fate of aqueous effluents in surface waters
- 1.3.2 Regional training courses in the use of tracers to study the dispersion, movement and fate of aqueous effluents in groundwaters.
- 1.3.3 Field demonstrations of dispersion studies being carried out in the region
- 1.3.4 Fellowship training at Regional centers of excellence
- 1.3.5 Expert missions assist in the planning preparation, execution and analysis of effluent studies
- 1.3.6 National seminars to promote the technology to industry, environmental agencies and other related groups
- 1.3.7 Meetings of National Co-ordinators to establish priorities and co-ordinate activities.

Output 1.4

Internationally accepted procedures on Nuclear Analytical Techniques for environmental studies harmonized regionally with at least one representative from each participating Member State trained to the required standards.

Activities for Output 1.4

- 1.4.1 Set up National Co-ordinator Network for Nuclear Analytical Techniques for environmental studies by establishment of national co-ordination committees
- 1.4.2 Regional Training Course on Nuclear Analytical Techniques for Environmental Studies
- 1.4.3 Regional workshops on sample preparation techniques for trace analysis of environmentally significant materials in aqueous media and in aerosols
- 1.4.4 Regional workshop on quality control in trace element analysis
- 1.4.5 Regional workshop on trace metal speciation in environmental studies
- 1.4.6 National seminars for analytical laboratories on quality control and nuclear analytical techniques
- 1.4.7 Regional inter-comparison of standard materials
- 1.4.8 Expert assistance to laboratories
- 1.4.9 Fellowships to regional centers of excellence
- 1.4.10 Meetings of National Co-ordinators to establish priorities and co-ordinate activities.

Output 1.5

A core of trained personnel from each participating Member State able to introduce NDE technology for metallic materials into new industries or those industries where it is underutilised and also for non-metallic construction materials.

Activities for output 1.5

- 1.5.1 Expert missions to identify the specific needs in the country
- 1.5.2 Meetings of National Co-ordinators to optimize regional and national efforts
- 1.5.3 Regional seminar and workshop on NDE for specific industry applications such as petrochemical, power generation (including nuclear, transportation, oil refineries and aviation)
- 1.5.4 Regional workshops to provide experience in the techniques of non-metallic materials for NDE technologists

- 1.5.5 National seminars for specific national industries and on specific non-metallic materials.

Output 1.6

At least one people from each participating Member State trained on the use of radiation technology for the treatment of flue gases, sewage sludge and municipal waste water and technoeconomic benefit analyses for each country. Seminars on the technology the relevant authorities and industries.

Activities for Output 1.6

- 1.6.1 Regional training courses on the radiation processing of sewage sludge and municipal waste water
- 1.6.2 National management seminars on the radiation processing of sewage sludge and municipal waste water
- 1.6.3 Expert assistance to prepare technoeconomic benefit of sewage sludge and municipal waste water processing using radiation technology
- 1.6.4 Regional training courses on the radiation processing of flue gases
- 1.6.5 National management seminars on the radiation processing of flue gases
- 1.6.6 Expert assistance to prepare technoeconomic benefit analysis of radiation processing of flue gases
- 1.6.7 Fellowship training in radiation processing.

Output 1.7

At least one scientists from each participating Member State to be trained and key industrialists informed on advanced applications of radiation technology of importance to Regional industries.

Activities for Output 1.7

- 1.7.1 Regional training/demonstration courses on techno-economic feasibility studies of radiation processing in printing and packaging industry
- 1.7.2 National training courses/workshops on techno-economic feasibility studies of radiation processing in printing and packaging industry
- 1.7.3 Regional training courses on fundamental aspects of radiation technology
- 1.7.4 Expert missions
- 1.7.5 Meetings of National Co-ordinators to establish regional priorities and co-ordinate activities

- 1.7.6 Regional seminars on advanced applications of radiation technology
- 1.7.7 National seminars on advanced applications of radiation technology
- 1.7.8 Regional workshops on safe operation of radiation facilities
- 1.7.9 International symposium on radiation vulcanization of natural rubber latex (RVNRL)
- 1.7.10 National training course/workshops on RVNRL.

Immediate Objective 2

Success Criteria

Preparation for National Governments of recommendations on specific industrial applications utilizing isotope and radiation technology which will be harmonized on Regional basis and also with International standards where possible.

The adoption of the recommendations by the responsible Government Agency.

Output 2.1

For each country a set of recommended national standards for industrial sterilization of medical products and devices that would be harmonized within the region as well as with other internationally accepted standards such as ISO.

Activities for Output 2.1

- 2.1.1 Establishment of National Co-ordinators network
- 2.1.2 Expert Group meetings to review international and national standards
- 2.1.3 Regional training courses for regulators and Government Agencies responsible for reinforcement of national regulations
- 2.1.4 Regional training courses for operators of industrial sterilization facilities used for medical products
- 2.1.5 National training courses in each of the RCA countries for regulators and operators of industrial sterilization facilities
- 2.1.6 National seminars to promote the use of the standards.

Output 2.2

Harmonized NDE standards in the region through Regional Model Qualifying Examinations Proficiency Testing Programmes and the regional production of standard test pieces.

Activities for Output 2.2

- 2.2.1 Regional seminar to instruct on NDE test piece utilization for training and qualification examination

- 2.2.2 Through participation in the ISO technical committee on NDE test pieces to produce recommendations for the region
- 2.2.3 Regional workshops to give training on the fabrication of test pieces and the validation of their performance
- 2.2.4 An assessment of the proficiency of NDE persons trained and certified in accordance with national training and certification schemes
- 2.2.5 The production of sample Level 2 examination papers for all 5 basic NDE methods
- 2.2.6 Pre examination revision supervision of examinations and marking of examination papers.
- 2.2.7 To hold meetings of the Regional Board of Examinations Review to assess and co-ordinate the regional activities.
- 2.2.8 To produce regional model Qualifying Examinations in each of the 5 main NDE methods for Level 3 personnel in 8 countries.
- 2.2.9 To produce Regional Proficiency Testing Programmes for Level 2 ultrasonic and radiography personnel.

Output 2.3

Harmonized recommendations to assist and support the development and maintenance of high standards of operation of radiation facilities.

Activities for Output 2.3

- 2.3.1 To organize workshops and seminars on a regional and national basis to promote GMP and GRP.
- 2.3.2 To organize regional workshops on safe operation of industrial radiation facilities
- 2.3.3 To produce written guidelines and operating procedures for radiation facilities to assist operators and for national regulating authorities.

Section H: Project Strategy

1. Staff of the National Nuclear Research Centres in the participating countries and staff of some specific industries or utilities. The regional and national networking approach is expected to yield benefits in both technical and management skills.
2. The training and technology transfer that results from this project will flow into industrial and utility sector through the National Co-ordinator structures which are set up as part of the project. This will be aided by the national seminars alerting these sectors to the new technologies and techniques. The RCA structure has a well developed delivery programme that has been operating effectively for many years.

3. The project will be implemented directly by the International Atomic Energy Agency. A project manager will co-ordinate and supervise the project activities and maintain close co-ordination with the National Counterparts and the National Co-ordinators for the various sub-project areas.
4. The project strategy and implementing arrangements chosen stem from the previous 10 years experience with projects RAS/79/061 and RAS/86/073. Over this time the management has been well tested and fine tuned to give very effective delivery.

Section I: Host Government Commitment

1.1 The National Governments are all signatories to the RCA which is an Inter-Governmental Agreement. The question of the provision of full counterpart support is covered in Article V(1) of the Agreement:

"Each Government participating in a co-operative project in accordance with Article IV (hereinafter referred to as "Participating Government") shall implement the portion of the co-operative project assigned to it in accordance with paragraph 3 (b) of Article VI. In particular, each participating Government, subject to its domestic laws and regulations, shall:

- make available the necessary scientific and technical facilities and personnel for the implementation of the co-operative project; and
- take all reasonable and appropriate steps for the acceptance of scientists, engineers or technical experts designated by the other participating Governments or by the Agency to work at designated installations, and for the assignment of scientists, engineers or technical experts to work at installations designated by the other participating Governments for the purpose of implementing the co-operative project".

1.2 None

Section J: Risks

<u>Potential Risk</u>	<u>Estimated Likelihood</u>
1. At the outset of the project none are foreseen.	
2. During the project contractions in the economies could limit the rate of uptake of the technologies by the industrial and utilities.	Low
A lack of resolve by National Governments to address pollution problems could limit the uptake of some aspects of the project.	Low

Section K: Inputs

K.1 Skeleton Budget

	National Inputs* (US\$)	External Inputs (US\$)
Personnel	500,000	1,880,000
Training	1,000,000	4,447,000
Equipment		348,000
Miscellaneous		75,000
<u>Total</u>	<u>1,500,000</u>	<u>6,750,000</u>

*in kind inputs consolidated for all participating countries and valued in US dollar.

Anticipated fund sources:	UNDP US\$	4,250,000
	Government of Japan	1,500,000
	Government of Australia	1,000,000
	<u>Total</u>	<u>6,750,000</u>

K.2 None

Use of Computers In Tc-99m Imaging

Project RAS/06/016

**Report on Second RCA Training Course
Royal Prince Alfred Hospital, Sydney, February - April 1990**

Course Director: Brian Hutton

This second course on the use of computers in Tc-99m Imaging was held along similar lines to the first course held in 1989. The course was attended by twelve participants nominated by the IAEA and a further six participants from the SE Asian region who were undertaking training at Royal Prince Alfred Hospital. These were three of four persons from Malaysia visiting under an Australian/ Malaysian bilateral agreement, an IAEA fellow from Indonesia, a recipient of a Kodak fellowship from Thailand and an AIDAB funded person from the Philippines. There were a range of participants as in the first course with five medics, five technologists and the remainder either physicists or engineers.

The course prospectus was essentially the same as for the 1989 course however, there were modifications to the course based on feedback during the first course and further suggestions made during follow-up visits in November by three experts to nine of the RCA countries. The expert visits were particularly useful in identifying some of the participants for the second course. The major changes to the course included some changes to lectures including additional statistics and filtering. Practical sessions were restructured so that each individual participated in nine three-hour practicals, seven on the same system. This resulted in a much better continuity of work compared to the previous course. Practical sessions were held on the three Philips/DEC systems, two GE, two Siemens, one Elscint and PCs. We are indebted to the companies concerned who provided support for the course including loan of equipment and system specific tutorials. Equipment loans extended to the period of hospital attachment.

Students were assessed by multiple choice questions (four related to each lecture), by their performance during practicals and by their presentation of project work undertaken during attachment for the second half of the course. In general the group were very enthusiastic and conscientious and appeared to progress well throughout the course. The preliminary week again proved popular with those who attended providing a much less intensive introduction to computing. The course reviews provided very positive comments on both formal lecturers and practicals with suggestions for subject inclusion which were, on the whole, not directly related to the subject of the course. There was mixed feelings about the statistics which was felt to be too intensive for the two hours available. Students considered the course very useful and informative.

During attachment a half day workshop was held to permit discussions of the problems facing Nuclear Medicine, particularly related to computing, throughout the SE Asian region. All

students participated giving short presentations on their own countries. Several issues raised reinforce the conclusions drawn by the experts who followed up after the first course. In particular the lack of specialist training in Nuclear Medicine for both medical staff and technologists was highlighted. Efforts to rectify this should take a high priority. General problems related to service of equipment and camera/computer selection were discussed.

Overall the course was considered very successful and, with the changes implemented since the first course, could be considered to have reached maturity. There was general feeling that there would be a definite demand for a further similar course if funding were available.

Radioimmunoassay of Thyroid Related Hormones

Project RAS/6/011

Project Officer: R.D. Piyasena

Operational since 1987, the project has participation from 14 countries in the Asia and Pacific region. Within the general objectives of reducing costs and improving analytical reliability in the RIA of thyroid related hormones, activities have been directed towards improving sources of reagent supply, introduction of good RIA practice including internal quality control, the establishment of a regional external quality assessment scheme (EQAS), and the local production of primary reagents.

The introduction of bulk reagent based methodology to over 100 participant laboratories in 1987 and 1988 together with establishment of sound RIA practice resulted not only in a marked reduction in costs but also in the creation of an expanded RIA service of improved quality. Computer based data processing, encouraged by supply of equipment and a specially prepared program, also contributed towards these ends. A number of regional training courses, followed by national ones in most cases, served to provide instruction on the relevant techniques.

Major achievements in 1989 and 1990 were the organisation of a regional EQAS and the stimulation of local reagent production. The EQAS, planned with the assistance of international experts, and operated from 3 centres in Lahore, Bangkok, and Seoul, is completely self contained and has proved, within it's first year, even more acceptable than the bulk reagent distribution scheme with which the project was initiated. It is an ongoing scheme and is expected to continue as the final arbitrator of assay quality and performance. Regional self sufficiency has also been achieved, by 1990, in all primary reagents to include monoclonal anti TSH antibodies and TSH standard. On this basis, a regional reagent distribution scheme has been organised under which all primary requirements for the assays of T3, T4, and TSH, with the single exception of ¹²⁵Iodine for labelling, are now available at least from regional, if not always from national sources. This has resulted in further reduction in costs to a level insignificant as compared to that when imported commercial kits were depended upon.

As a peripheral activity, the project has also organised a clinical trial of a strategy of in vitro thyroid function testing recommended from a previous IAEA CRP. This trial is ongoing and is yielding promising results. It involves the measurement of "Free" T4 and T3 as well in selected patients. The reduction in costs and the increased availability of reagents has also stimulated individual research, in many countries, particularly into endemic goitre and neonatal hypothyroidism.

With it's objectives achieved as scheduled, the project will be terminated in 1991. The final co-ordinators' meeting, planned for later this year, will review the activities and impact of the project with emphasis on the EQAS, regional reagent production and distribution, and the clinical trial. It is expected that the human resource base and other infrastructural strengths that have been created will serve towards the further expansion of RIA activities in general and a service more commensurate with the large clinical demand. As many as possible of the participant laboratories will be included in a new RCA project on "Diagnosis of Hepatitis B Infection by RIA", commencing in 1991.

Project Title: Evaluation of Imaging procedures for the diagnosis of liver diseases - Phase II

Project Officer: G. Nair, Nuclear Medicine Section

Participating Member States: Austria, Bangladesh, China, India, Indonesia, Japan, Rep. of Korea, Pakistan, Philippines, Singapore and Thailand (11).

Project Objectives:

The main objective is to establish the roles of radionuclide imaging and ultrasound imaging in the diagnosis of different liver diseases.

Major activities in 1990:

1. Evaluation of the interpreting skills of a large number of nuclear medicine physicians and ultrasound specialists representing the specialists from the participating countries. This was carried out by sending a large number of paired liver images with known diagnosis to these specialists for their interpretation.

2. Evaluation of the quality of equipment used in the project. This was carried out by quality control studies including ultrasound phantom studies.

Proposed activities in 1991:

1. Collection of paired images of liver from patients suffering from different diseases of the liver - representative of the common conditions in the participating countries.

2. Interpretation of these images, and evaluation of these interpretations in terms of the accuracy of diagnosis.

Current approval period of the project:

A period of 3 years from March 1989.

Publications: None

**CRP ON COMPUTER ASSISTED PLANNING AND DOSIMETRY IN
RADIOTHERAPY OF CARCINOMA OF THE CERVIX
IN ASIAN COUNTRIES (RCA)**

- Project Officer:** F.A. Durosinmi-Etti
- Participating Member States:** 8 Member States namely India, Republic of Korea, Philippines, Sri Lanka, Pakistan, Malaysia, Indonesia, Japan, (the participant from Thailand withdrew from the project for personal reasons.)
- Project Objectives:** To improve the overall accuracy and quality of treatment planning for radiotherapy of carcinoma of the cervix through the introduction of personal computer based treatment planning system. The software include programmes for teletherapy, brachytherapy, combination of both, and cancer registry. The successful implementation of this project will result in improved treatment plans, dosimetry, tumour control and patient survival data.
- Major Activities in 1990:**
- (a) Selection and award of research contracts and agreements to nine participants from eight Member States.
 - (b) First RCM in Bangkok, Thailand, 30 October - 2 November 1990, at which various proposals were reviewed and project implementation streamlined as provided for in the protocol which was adopted at the RCM.
 - (c) Adoption of recommendations from the RCM on the criteria for choosing a suitable PC based treatment planning system for the CRP including details of hard and software requirements.
- Major Problems with Project Implementation in 1990:**
- (a) Funding: It has not been possible to obtain approval for funds for the purchase of equipment, which includes the software for all participants, and additional hardware for four other participants. The justification for the purchase of the software and some hardware for the CRP are shown in the attached proceedings from the first RCM in Thailand (Annex I).
- Proposed Activities 1991:**
- (a) Provide software to all participants.
 - (b) Provide hardware to the four institutions as requested.
 - (c) Co-ordinate implementation of CRP among all participants.
- Current Approved Period for the Project:** November 1989 - November 1993
- Publications/Major Reports**
- a) Proceedings of First RCM, Thailand, 30 October - 2 November 1990

Project Title: Radioaerosol inhalation imaging for the diagnosis of respiratory diseases in developing countries.

Project Officer: G. Nair, Nuclear Medicine Section

Participating Member States: Countries in RCA programme. Bangladesh, China, India, Indonesia, Japan, Republic of Korea, Pakistan, Philippines, Singapore and Thailand (10).

Project Objectives:

The main objective of the project is to popularise radioaerosol lung studies in the developing countries by substituting easily available radioaerosol for the radiogases which are difficult to obtain in developing countries, and to use the radioaerosol lung imaging to study chronic obstructive airway disease which have a very high prevalence in developing countries. It is also aimed to monitor non-respiratory lung functions such as mucociliary clearances and lung parenchymal permeability in health and disease, using the same method.

Major activities in 1990:

The realisation of the above mentioned objectives involved the transfer of aerosol production technology to the member states participating in the project. This was achieved by taking the nebulisor fabricated and used by the Bhabha Atomic Research Centre (BARC), India, as a model and distributing them to the participants after demonstrating its capabilities at a workshop in 1987. Major activities in 1990 consisted in applying this radioaerosol lung imaging exclusively in patients of chronic obstructive airway disease and in validating the characteristics of the BARC nebulisor against other available aerosol delivery systems available in the western market.

Proposed activities in 1991:

The discussion on the results of the 1990 activities and the consolidation of data from it would be the theme of the Research Co-ordination Meeting to be held in Singapore between 11 and 13 February 1991. The foundation for publication of an atlas of Radioaerosol Lung Scintigraphy will also be firmly laid during the Editorial Committee Meeting after the Research Coordiantion Meeting.

Current approval period of the project:

The current approval is for a period of three years from June 1987.

Publications:

A chapter on "Diagnosing Diseases of the Lung", T. Isawa, R. Ganatra, M. Nofal under Applications of Nuclear Techniques and Research. IAEA Yearbook 1990, published by IAEA Vienna, page B-39.

**CO-ORDINATED RESEARCH PROGRAMME ON
NUCLEAR TECHNIQUES FOR TOXIC ELEMENTS IN FOODSTUFFS**

Project Officer:

Eduardo Cortes Toro, Division of Life Sciences.

Participating Member States:

Australia, Bangladesh, China, India, Indonesia, Japan, Malaysia, Pakistan, Thailand.

Member States from outside the region which contributed to the programme as "associate participants" were: Argentina, Brazil, The Netherlands.

Project Objectives:

The purpose of this CRP was to obtain comparative data on existing elemental concentrations of potentially toxic elements in foodstuffs in various Asian countries. The samples collected and analysed were foodstuffs representative of the food most commonly consumed by each of the population groups selected for this study. The elements studied included the potentially most toxic trace elements (As, Cd, Hg, Pb, Se). Other elements of local importance or relevant to national monitoring programmes, such as Br, Cr, Cu, Fe, I, Mn, Sb, and Zn, were also determined. The participants used nuclear analytical techniques, such as neutron activation analysis (NAA), for the determination of these elements. These techniques were supplemented by non-nuclear techniques when necessary. Emphasis was placed on analytical quality assurance.

The data collected has been used by the participants to compare actual concentrations of toxic elements in individual foodstuffs with maximum permissible concentrations, and actual dietary intakes with provisional tolerable intakes, as specified in national legislation and/or international guidelines.

An important supplementary purpose of the programme was to help establish analytical expertise for work of this kind in the individual countries. Several of the laboratories which took part in this CRP are now able to offer analytical quality control services, and to provide validation support, for their own national food monitoring programmes.

Major Activities in 1990:

This CRP was phased out in July 1990. The participating institutes finalized their individual projects and are reporting their final findings and conclusions to the Agency.

Proposed Activities for 1991:

A final report on the CRP is in preparation. It will be published as an Agency Technical Document (TECDOC). This report will comprise all final reports submitted by the participants as well as information concerning international and national, if available, recommendations on minimum and maximum permissible intake for the elements of interest. A review of the existing literature on the subject, obtained through the INIS database is also planned to be included.

Approved period for the project:

The project was approved for the period 1985-1990. All research contracts/agreements were terminated by the end of June 1990.

Publications/Major reports:

A report on the third and final Research Co-ordination Meeting (RCM) for the programme, which took place from 20-24 November 1989 in Jakarta, Indonesia, under the sponsorship of the National Atomic Energy Agency of Indonesia, was prepared and distributed to all participants. This report include the working papers, workshops presentations, a summary of the topics discussed and the conclusions of the meeting. Some participants have published relevant papers in international scientific journals on the research carried out within the framework of this CRP. A list of such publications will be available in the future.

Project Title: Strengthening of Radiation Protection Infrastructures (RAS/9/006).

Project Officer: P. Strohal, NENS

Participating Member States Australia, Bangladesh, P.R. China, India, Indonesia, Japan, R.Korea, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Viet Nam.

Project Objectives:

The project was designed to contribute to the strengthening of radiation protection capabilities within the Region with particular emphasis on the development of infrastructures. The main thrust of the project was recommended by a Formulation Meeting, in which experts from Australia, Bangladesh, P.R. China, India, Indonesia, Japan, R.Korea, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Viet Nam and the IAEA participated. The main topics for inclusion into the project were selected after discussions and the assessment made following national presentations of the radiation protection situation and on-going activities in all participating Member States.

In response to strengthen the radiation protection infrastructure in the region, the RCA project RAS/9/006 and the topical RCA CRP, have set the objectives and assisted the participating Member States from Asia and the Pacific Region in improving some areas of radiation protection, such as personnel dosimetry, environmental monitoring, instrumentative and man-power development. Since the radiation protection situation in the region would be described as being very heterogenetic, many of the undertaken activities were adjusted to the particular needs and priorities of the majority of participating countries. However, the worst situation seems to be in Bangladesh and Sri Lanka, where there still lacks a general radiation protection law; therefore formally, ionizing sources are not under control. By all means, the promulgation of these regulations in these two countries should be given the highest priority in the area of radiation protection.

Major Achievements in 1990:

A successful training course on Development of Infrastructure for Ensuring Radiation Protection was organized in Sydney, Australia. This training course was primarily aimed at those who are responsible for regulating the use of ionizing sources in various fields such as industry, medicine, hydrology, science and agriculture. The objective was to assist in creating manpower for national radiation protection infrastructure. This course was also linked with the annual meeting of the Australian Health Physics Society allowing the participants the opportunity to attend the scientific meeting. Also, it was very useful for the participants to have the time for presentation and discussions about the situation of radiation protection in each of their countries.

As part of the project, an intercomparison exercise on Personal Dosimeters was carried out between April and August 1990. Fourteen different organizations from 13 countries participated. A Japanese funded Regional Workshop on this intercomparison study was held at Tokai, Japan between 22 and 26 October 1990. This was a valuable exercise and has had valuable input in rechecking and improving personal dosimetry systems in the region.

A co-ordinated research programme on the "Anatomical Metabolic and Physiological Characteristics of a Reference Asian Man" is progressing well. A number of collected data were already reported. The ICRP is showing considerable interest in this project which will complement the current reference standards which refer to Caucasian Man.

Work Programmes Planned for 1991

The IAEA-RCA Expert Advisory Group Meeting on the project was convened in Tokyo and was attended by 21 experts, the RCA co-ordinator and the technical officer of the project. After reviewing the programme activities carried out in 1989-90 the programmes to be implemented in 1991-92 were discussed and assessed. The proposed plans, some are new and some are follow-up activities of previous years, are identified and detailed with regard to the timing of meetings and the target category and level of participants.

It was recognized from the Meeting that there are many more subject areas of importance which need to be dealt with but have been left for future action due to financial and technical support limitations. These include, for example, emergency preparedness, medical aspects of over-exposure, radiation protection in medical practice, radiation protection in industrial fields such as non-destructive testing (NDT) and personal dosimetry at accidental situations. These are expected to be considered in the second phase of this Project starting in 1993.

Plans for 1991-92

- (a) A Workshop on Development of Training Techniques and Methods of Instruction in Radiation Protection in 1991 in Australia.

The scope and objectives of the Workshop of a two-week duration, which will be held during September-October 1991, are tailored to meet the requirements of RCA Member States to harmonize national strategies for radiation protection training.

- (b) "Training Course on the Basic Technique of Radiation Protection".

Japan will conduct a two week course at Tokai-mura in 1991. The proposed course involves lectures on a wide variety of radiation protection methodologies and exercises on basic techniques for personnel and environmental monitoring. The course is designed for middle-level scientists/technologists with more than 5 years of experience, who will be familiarized with new developments in this area.

- (c) Co-ordinated Research Programme: Compilation of Anatomical, Physiological and Metabolic Characteristics for a Reference Asian Man.

Collection, evaluation and compilation of data will be made, as previously agreed upon on measurements of physique and mass of organs and consumption of food. Intakes of elements and other physiological data may also be collected.

The second research co-ordinated meeting will be organized mainly by India and the IAEA in Bombay in 1991.

The results of the co-ordinated research will be published as an IAEA technical document as currently planned.

(d) Personnel Dosimetry Intercomparison and Workshop

A second phase activity on the "Personnel Dosimetry Intercomparison and Workshop" will be conducted through 1991 to 1992. The intercomparison exercises will be made during 1991 to 1992, which are designed to compare the reference value of calibration sources for each laboratory and to check the performance of dosimetry systems. In 1992, a second Workshop will be held to analyse overall intercomparison results.

(e) "Training Course on Development of Infrastructures for Ensuring Radiation Protection", Australia, 1992.

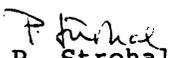
Australia will conduct a five week course at Lucas Heights in September-October 1992. The course involves class teaching and problem solving seminars on radiation protection administration and practice. The course is designed for senior and middle level management responsible for national radiation protection facilities.

(f) Training course on Environmental Monitoring and Dose Assessment of Nuclear Facilities, China, 1991.

The training course will be held at the Training-Center of Radiation Protection and Nuclear Safety of the China Institute for Radiation Protection (CIRP) in Taiyuan, for 2 weeks from 14 to 25 October 1991. The course involves lectures on principles of environmental monitoring, sampling and measurement techniques and environmental assessment methodologies and exercises on environmental monitoring practices. The course is designed for middle level scientists and technologists who have had experience in the above fields.

(g) 2nd Phase Project Formulation Meeting

It was proposed that the second 'Project Formulating Meeting' for Phase II of 'Strengthening Radiation Protection Projects' should be held in late 1991 or early 1992 to discuss and decide the framework for the upcoming five-year activities.


P. Strohal
1991-02-20

Project title: CRP on radiation sterilization practices for tissue grafts in clinical use for Asia and the Pacific region (RCA) (E.3.10.04) (RAS/7/003)

Project officer: R.N. Mukherjee, RILS

Participating Member States: Australia, Bangladesh, China, India, Indonesia, Japan, Republic of Korea, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Vietnam have participated. The relevant on-going TC projects are BGD/7/005, CPR/7/002, MAL/7/002, PAK RP 91-92/03, PHI/7/004, SRL/6/017, THA/8/009 and VIE/RAS/7/003 .

Project objectives: Health-care service delivery sectors in the developing RCA countries are often confronted with major problems due to non-availability and/or a grossly inadequate supply, if any at all, of low-cost (i.e. within the patients' economic means) clinical-quality sterile tissue allo- or xeno-graft implants (e.g. bone, skin, chorion amnion, fascia, dura, nerve, tendon, and others), which are essential to sustain the life-saving rehabilitative surgical repair of tissue damage in specific disability and/or disease. Accidents involving severe burns (i.e. needing chorion, skin and other burn-wound dressings); fracture of bone shafts in limbs (i.e. needing various specifications of cortical and cancellous bone grafts, along with other grafts such as fascia, dura membranes); and damaged or diseased nerves (i.e. needing nerve grafts); among others, have a very high incidence rate leading to morbidity and even to fatality if they remain clinically unattended. Similar disability associated with tissue loss may also occur due to frequent cancer and tubercular diseases. Tissue grafts are also needed to correct congenital malformations.

In response to this background health-care need, the RCA project RAS/7/003, and the topical RCA CRP, have set the objectives and helped the countries in the Asia and Pacific region in acquiring, as practicable, indigenous skills and capabilities:

(i) in the local safe procurement of tissues (in accordance with the guidelines of advanced tissue banks for graft donor selection and procurement hygiene to ensure the essential health safety of the recipients of such grafts);

(ii) in the ⁶⁰Co-gamma radiation sterilization process and dose criteria (perfected for sterilization of medical disposables) to be applied to specified tissue grafts for attainment of sterility (minimum of 10⁻⁶);

(iii) in sterile tissue grafts, retaining concomitantly the biogenic graft factors essential for success in clinical utility, and in undertaking follow-up evaluation of graft quality; and

(iv) in preservation in tissue banking facilities of sterile ready-to-use grafts for clinical use on occasions of health-care need.

Major achievements in 1990: In the field of tissue irradiation for sterilization, research work under the RCA CRP has been successfully carried out by the CSI's from twelve RCA Member States. The results of research and development, according to the directives stipulated by the RCA project objectives, have been reviewed and co-ordinated during the RCM held in Seoul, Republic of Korea, from 3 to 7 December 1990. Some sterile grafts produced by the CSI's have been subjected to clinical trials, as practicable. Further promotion of technical and technological infrastructure in nuclear applications, including the ^{60}Co -gamma radiation sterilization of tissue grafts and quality control (QC) for safe clinical use in reconstructive surgery, has been undertaken through the holding of an RCA regional training course in Seoul, Republic of Korea, from 3 to 14 December 1990, which was attended by seventeen participants from eleven RCA Member States. The status of RCA programme activities in terms of indigenous production of radiation-sterilized grafts and their use in research and development and clinical practice thus shows a progressive trend. The successful dissemination and sustained integration of the RCA project data, and information on advancement of the follow-up health sector, is illustrated by the fact that the majority of the countries concerned are now engaged in relevant TC projects to further widen the national scope.

Work programmes planned for 1991: In the context of the achievements and assessed further need to provide the national health-care sectors of the RCA Member States with superior-quality tissue grafts for clinical use, the following action programme is deemed necessary:

I. (a) Insights into the reparative roles of some processed radiosterilized grafts (e.g. bone, chorion amnion dressings, skin, etc.) in healing of the wounds, seem to suggest that current tissue-processing protocol could be further upgraded to moderate the collateral detriment and thus prevent undue damage to the integrity and thus some essential graft-associated biomolecules (e.g. biogenic principles or factors of grafts; bone morphagenic protein or BMP; collagen status; etc.).

(b) Partial decalcification of bone seems to improve osteoinductibility as compared to bone without decalcification.

(c) With further improved GMP and GRP practices, the sterilizing radiation dose could be justifiably reduced (without compromising patients' health safety).

(d) The above research and development steps are essential to ensure upgrading of the clinical quality of tissue grafts; this further illustrates substitution of persistent empiricism in tissue protocol in the light of current scientific advances, with particular regard to molecular biology techniques.

II. With the balance sheet of tissue sterilization work in the RCA countries, along with their limited clinical experience so far, and also having received parallel TC country project support, the RCA Member States are in urgent need of optimizing and standardizing the process parameters as a regional matrix, as well as the record-keeping systems followed in order to ease a reliable intercomparison and co-ordination. A workshop on status review and standardization of tissue banking practices for radiation-sterilized grafts for Asia and the Pacific region should help meet the above goals.

Approved period for the project: The sustenance of the locally-produced radiation-sterilized grafts for the established reparative health-care programmes for disabled patients in the RCA Member States and the further improvement in clinical qualities of the tissue grafts (bone, skin, nerve, chorion, amnion, fascia, dura) through research and development, as elucidated, as well as the acquiring of national tissue banking by the respective countries, are subject to the continuation of this project (phase I completed in 1990). Necessary considerations and any possible actions by you are therefore requested.

Publications and major reports in 1990-1991:

1. "Freeze-dried microarterial allografts", by Jai Raman and J.C. Hargrave, Darlinghurst, Australia, in Plastic and Reconstructive Surgery, Vol. 85, No. 2, 248-251 (1990). RCA CRP research agreement No. 4385/CF.
2. "Susceptibility of connective tissue biomaterials to radiation", by G.O. Phillips, Clwyd Research Tissue Bank, United Kingdom, in Proceedings of Oswestry Symposium on "Use of bone grafts and bone graft substitutes", 29 to 31 March 1990, Butterworth Publishers, United Kingdom (in press). RCA CRP research agreement No. 4377/CF.

RMukherjee/dw
1991-02-08

Nuclear Instrument Maintenance

Project RAS/4/008

Project Officer: Peter P. Ambro

Participating Member States:

Australia, Bangladesh, PR of China, India, Indonesia, Japan, R of Korea, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Viet Nam.

Project Objectives:

To strengthen infrastructures in nuclear instrument maintenance and repair through national and regional training efforts and to establish a modality for responding urgent requests in connection with maintenance support which can not be met from local budgets. The Project RAS/4/008 was planned to collaborate with the CRP on "Care and Maintenance of Nuclear Medicine Equipment in Asia" from the beginning.

Major Activities in 1990:

Between 90-1-15 and 90-2-02 a Regional Workshop on "Maintenance of Nuclear Medicine Instruments" was held in the facilities of BARC, Trombay with 11 foreign and 8 local participants. It was funded by the Government of India from its contribution to RCA (Gift-in-kind). No foreign lecturers were recruited by the IAEA. According to the participants the workshop was informative and useful. They observed that the QC and repair aspects of gamma camera/computer systems should be emphasized in future training programs.

The second edition of the TECDOC-317 on "Quality Control of Nuclear Medicine Instruments" has been prepared for publication with two new chapters. It was accepted by the Publishing Committee.

Proposed Activities:

This, mainly technology transfer oriented project will enter into its Third Phase in 1991. During the First Phase, the main task was to overcome the environmental and mains carried hazards in the nuclear medicine centers. The Second Phase helped the introduction of the Preventive Maintenance and Quality Control Procedures.

The Third Phase is aiming on the transfer of instrument diagnostics and tuning know how for specific nuclear imaging systems, which will reduce the necessity of outside service calls and by this it will contribute to the reduction of the up-keeping costs of the equipment.

Background. According to our latest information, 274 gamma cameras with 51 computers operate in the Region. More than 90% of the instrument value in the nuclear medicine units are concentrated in the imaging systems. Only 81 systems are covered by contracted services and for 132 units the repairs must be ordered from the representative of the manufacturer. The average repair cost of a camera is US\$ 1.950 /year plus travel expense. We have no similar data on the cost of the computer repairs.

By providing diagnostic and tuning know how on the most popular brands in each country, the number of service calls can be reduced, bringing a reduction in expenses and a higher level of independence in repair and maintenance for the local technical staff.

**Regional Training Course on "Application of Immunoassay
and Related Techniques in Studies on Animal Production
and Disease Control in Asia"**

Project RAS/5/019

Project Officer: B.M.A.O. Perera

This training course was organised under the framework of the Regional Cooperative Agreement for Asia and the Pacific (RCA) and was held from 24 September to 19 October 1990 at the Centre for Application of Isotopes and Radiation (CAIR) in Jakarta, which is an Institute under the National Atomic Energy Commission of Indonesia (BATAN).

The objectives of the course were to train young scientists in the region in two specific fields: (A) the use of radioimmunoassay (RIA) techniques for measurement of reproductive hormones, and their application together with related physiological and clinical methods for studies on improving reproductive efficiency of livestock, and (B) the use of enzyme-linked immunosorbent assay (ELISA) techniques for diagnosis of animal diseases, and their application together with conventional techniques for studies on epidemiology and disease control. The course therefore consisted of two parallel streams of training: Course A - Animal Reproduction; Course B - Animal Disease Diagnosis.

The course was attended by 20 participants from 11 countries:

Course A - Animal Reproduction

Mr. Jalal Uddin Ahmed	- Bangladesh
Dr. Ketut Utama	- Indonesia
Dr. Abdul Latief Toleng	- Indonesia
Mr. Won Kyong Chang	- Korea, Rep. of
Mr. Tariq Mahmood Chaudhry	- Pakistan
Mr. Antonio Obsioma	- Philippines
Mr. H.B.S. Ariyaratne	- Sri Lanka
Mr. Luu Van Tan	- Vietnam
Mr. Nguyen Duy Hang	- Vietnam

Course B - Animal Disease Diagnosis

Mr. J.B. Gurung	- Bhutan
Ms. Tantri Proboraras	- Indonesia
Mr. Agus Sudibyo	- Indonesia
Ms. Boky Jeanne Tuasikal	- Indonesia
Ms. Chandra Panchadcharam	- Malaysia
Ms. Purnima Manandhar	- Nepal
Ms. Karuna Sharma	- Nepal
Ms. Immaculada Torres	- Philippines
Dr. Neil Horadagoda	- Sri Lanka
Ms. Usa Naksakul	- Thailand
Mr. Nguyen Ngoc Nhien	- Vietnam

The Course Director was Dr. Cornelia Hendratno. CAIR-BATAN provided facilities for lectures and laboratory work, while facilities for practical work on farm animals were provided by the Director of Livestock Services for West Java and the Director of the Artificial Insemination Centre in Lembang.

The following expatriate lecturers assisted in conducting the course: Dr. Klaus Nielsen (Canada), Prof. M.R. Jainudeen (Malaysia), Dr. Anthony Luckins (UK), Dr. Raymond Nachreiner (USA), Dr. Peter Ball (UK), Mr. Donald Berrie (Australia), Dr. John Allen (Australia) and Dr. Vijitha Kuruwita (Sri Lanka). In addition, Drs. Peter Daniels, Barry Patten and Richard Payne who are currently attached to the Research Institute for Veterinary Science in Bogor conducted lectures in their specialities.

An evaluation conducted at the end of the course indicated that all objectives were achieved.

NEW PROJECT PROPOSALS

Proposals on Radiation Protection Under Regional Cooperation in Asia (RCA)

1. Control of Exposures in High Natural Radiation Areas

There are many areas in Asia and the Pacific where radiation levels are much higher than normal. The radiation exposures in such areas resulting from external radiation and from radon and radon daughters indoors are significantly high. There are also many natural springs, such as in Vietnam, where radium concentrations are high and these can cause significant radiation exposures to the population. Such high natural radiation exposures can be associated with significant health risks.

The subject of natural radiation exposure has been receiving attention in recent years. Assessments made in some countries indicated incidence of lung cancer resulting from the exposures to radon and radon daughters in dwellings. Many countries in Europe and America have already taken up both regulatory and technical measures to reduce radon exposures in existing dwellings and to limit the radon concentrations in future buildings.

Some countries in Asia and the Pacific have already initiated programmes of surveys in high level natural radiation areas in order to assess the radiation exposures and the resulting health risks and some of such studies also include epidemiological investigations. It is felt strongly that coordination among the countries in the region would be extremely valuable in devising standardized systems of survey and assessments. In this respect a coordinated research programme is considered necessary. The CRP will include award of research contracts, organization of research coordination meetings as well as intercalibration programmes. For intercalibration of radon monitoring instruments Australia and China have the necessary facilities. Such intercalibration programme in the region may be supervised under the Intercalibration and Intercomparison Programme of the CRP on radon in the Human Environment.

The total cost of the CRP for a period of three years would be approximately US \$ 80,000.

2. Radon Exposures in Occupational Work other than in Uranium Mining

The subject of exposure to radon and/or external radiation during work in places other than in underground uranium mines have not received adequate attention so far. There are places, such as, underground hotels and facilities in China, subways and underground non uranium mines where exposure to external radiation, radon and radon daughters may be significant from the view point of health risks. Since this is a new subject area a coordinated research project will be highly desirable in Asia and the Pacific region. Such studies will enable thorough survey to identify groups of population receiving exposure during their occupational work and to assess the radiation doses. All countries in the region are expected to be interested in such a CRP. The approximate cost would be US \$ 70,000.

3. Training in Radiation Protection in the Mining and Milling of Radioactive Ores

Some countries namely, Australia, China, India, Indonesia and Pakistan, have operational mining and milling activities while some other countries in the region are carrying out exploration for uranium. The uranium mining industries in Australia and China are quite extensive. In China and India many workers are involved. Regular training of the radiation protection personnel as well as workers on radiation protection is necessary. There has been no regional training course in Asia and Pacific Region organized by any national or international organization. There has been a strong desire by countries like China and Australia to organize training courses. Training courses under RCA would involve expences for the travel and subsistence allowances of the lecturers and trainees. Also the host organization may need some financial assistance.

The first training course proposed for late 1991 or early 1992 may be hosted in Australia. The total expense would be approximately US \$ 50,000.

1. Programme Title

Asian Regional Cooperative Project on Food Irradiation with Emphasis on Process Control and Acceptance (RPMI Phase III)

2. Project Officer

Mainuddin Ahmed

3. Participating Member States

Australia, Bangladesh, China People's Republic of, India, Indonesia, Japan, Korea Republic of, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam.

4. Background and Objectives

The results obtained in the first phase of the Asian Regional Co-operative Project on Food Irradiation (RPMI - Phase I) 1980-1984, encouraged to initiate Phase II of this programme with the objective of transferring this technology to commercial applications. Phase II achieved its objectives. The RPMI Phase III was initiated with the funding of UNDP in order to assist national authorities in developing Member States party to the RCA to ensure an effective technology transfer on food irradiation to industry. A direct involvement of the food industry in pilot-scale R&D to demonstrate the efficacy of food irradiation technology, is a prerequisite. Assistance will also be provided to these national authorities in training operators/supervisors of irradiation facilities and food inspectors on proper process control of food irradiation on practical scale and facilitating acceptance of this process in the trade. Special emphasis will also be made on harmonizing regulations/legislations on food irradiation based on the Codex General Standard for Irradiated Foods.

5. Major Activities 1990

i. Research Co-ordination Meeting (RCM):

The First Research Co-ordination Meeting (RCM) of the Co-ordinated Research Programme on the Asian Regional Cooperative Project on Food Irradiation with Emphasis on Process Control and Acceptance was held in Bombay, India 16 - 20 April 1990. It was attended by participants from Bangladesh, China People's Republic of, India, Indonesia, Japan, Korea Republic of, Malaysia, Sri Lanka, Thailand and Vietnam. The participants discussed on the programmes of the project and made a plan of activities for the next four years of the project (1990 - 1993)

ii. Workshop on Techno-economic Feasibility of Using Electron vs Isotopic Sources:

A workshop was held in Takasaki, Japan, from 22 October to 2 November 1990. It was attended by twelve participants from Australia, Bangladesh, China, India, Indonesia, Malaysia, Thailand, and Vietnam.

iii. Expert Mission:

An expert mission was sent to Sri Lanka from 11 - 17 November 1990 in order to assist the Sri Lanka Atomic Energy Authority in drafting a Food Irradiation Regulation.

6. Proposed Activities 1991

i. Research Co-ordination Meeting (RCM):

The RCM has been scheduled for 15-19 July 1991 in Jakarta, Indonesia. This meeting will discuss the results achieved during the last two years of the project under the CRP on RPFII-Phase III. All the participants of the Member States mentioned in item 3 will be invited after receipt of the agreement of the Government of Indonesia for hosting the meeting.

ii. Tripartite Meeting:

A tripartite review meeting has been scheduled with UNDP on 19 July in conjunction with the RCM in Jakarta.

iii. Workshop on Public Information on Food Irradiation:

A workshop has been scheduled in Bangkok, Thailand from 27-31 May 1991. The purpose of this Workshop is to provide factual information on food irradiation to the members of national press corps and consumer organizations of the RCA member States in order to enable them to disseminate the accurate information on food irradiation to the public. Some 20 participants from Australia, Bangladesh, China, India, Indonesia, Japan, Korea Rep. of, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand and Viet Nam have been invited to attend the Workshop.

iv. Expert Mission:

Expert missions in Bangladesh, China, Indonesia, Korea, Malaysia, Pakistan, Philippines, Thailand and Viet Nam have been scheduled for 1991.

7. Current approval Period: 1990 - 1993

Work Plan and Budget

	<u>1991</u>	<u>1992</u>	<u>1993</u>
1. Coordinated Research Programme on Food Irradiation with Emphasis on Process Control and Acceptance	60,000	60,000	60,000
2. Research Coordination Meeting	35,000	36,000	40,000
3. Training Workshop (two weeks)	40,000	40,000	40,000
4. Experts	46,000	32,000	10,500
5. Mission Costs			20,000
6. Miscellaneous	<u>4,500</u>	<u>4,500</u>	<u>4,500</u>
TOTAL	185,500	172,500	175,000

8. Publications/Major Reports 1990/91

First RCM Report of CRP was prepared and distributed to all the participants of this project and the UNDP.

Co-ordinated Research Programme on "The use of isotopes in studies to improve yield and N₂ fixation of grain legumes with the aim of increasing food production in saving N-fertilizer in the tropics and sub-tropics in Asia" (D1-40.01)

Project RAS/5/021

Project Officer: S.K.A. Danso

Meetings: A Research Co-ordination Meeting (RCM) was held in Faisalabad, Pakistan, from 2-11 May 1990. Ten participants attended. Results obtained by the participants were discussed. The results demonstrated a very wide genotypic variation in yield and nitrogen fixation parameters in mungbean, soybean, chickpea, lentil and groundnut, and further screening of these and newer germplasm to identify very promising cultivars was advocated. A RCM is planned to be held in Chiang Mai from 27-31 May 1991 to discuss progress made by participants and to discuss further work needed.

Workshop: A workshop to instruct participants on Rhizobium selection, identification, inoculant preparation, inoculant quality control, etc., is planned to be held in Bangkok from 3-14 June 1991.

Fellowship training: Mrs. B.N. Gunawardena (SRL/5/9003) from Sri Lanka is undergoing fellowship training in the IAEA's laboratory in Seibersdorf as IAEA's contribution to the programme. Another fellow (probably from Pakistan) may start the training programme in Seibersdorf towards the end of 1991 or early 1992.

Research: Commonbean has been added to the legumes listed already. The Seibersdorf laboratory has so far analysed about 4,000 samples for the programme, and a technician has been recruited to assist in carrying out supporting research for the programme. She is based in the Seibersdorf laboratory. A consultant (from Pakistan) has visited Malaysia, and is going to Bangladesh in March to assist the local participants.

Preliminary results of the programme are encouraging. The need for Rhizobium inoculation for increased yield has been demonstrated by many participants, and in Bangladesh, mixed rather than single Rhizobium strain inoculation resulted in over 50% increases in yield and nitrogen fixed in chickpeas and lentils. Through mutation, super nodulating soybean and commonbean lines, whose nitrogen fixation capability is not strongly inhibited by soil nitrogen have been obtained, and the role/need for phosphorus for high nitrogen fixation is under investigation.

STATUS OF RESEARCH REACTOR PROJECT - RCA

RAS-4-011

Project Officer: R.G. Muranaka

Participating Member States (10): Bangladesh; China; India; Indonesia; Korea, R.O.; Malaysia; Pakistan; Philippines; Thailand; Viet Nam

Project Objectives: To facilitate the collaboration among research reactor institutes in the region to assure continuing production of irradiated target materials and of irradiation services in cooperating Member States.

Major Activities in 1990:

1. An Indian-supported training course on Research Reactor Safety Principles was held at the Bhabha Atomic Research Center during 8-20 April 1990. The course was supported through Indian extra-budgetary contribution. Eleven participants from 8 RCA Member States benefited from the course. The course covered safety principles associated with design, construction, commissioning, operation, use and maintenance of research reactors. Lecturers were all from BARC except Dr. D.A. Menneley from Canada.
2. A Chinese-supported training course, through extra-budgetary contribution, was held at the China Institute of Atomic Energy, Beijing during 19-23 November 1990. The course, Technology and Use of Low Power Research Reactors, was attended by 11 participants from 8 RCA countries and 4 from outside the region at the invitation from China. The lectures mainly used the MNSR as the reference reactor although the lectures were more generalized.

The MNSR (Miniature Neutron Source Reactor) is a 27 kW tank-in-pool type reactor which was developed at the CIAE and is similar to the Canadian Slowpoke. The reactor was designed mainly as a source of neutrons for activation analysis. The reactor is "inherently" safe since complete withdrawal of its control rod would put the reactor on a reasonable period with no boiling or adverse effects in the core.

3. The initial meeting of the Coordinated Research Programme on Use of Personal Computers to Enhance Research Reactor Operation and Management was hosted by the Philippine Nuclear Research Institute during 12-16 November 1990. Seven principal investigators from RCA countries with research contracts attended the meeting.

The purpose of the CRP is to develop applications of PCs to enhance operations and management of research reactors. While the recent advances in semiconductor (chip) technology has resulted in a very rapid growth and availability of low cost PCs, the development of software to use in research reactor O&M

related activities has not resulted in programmes available internationally through code centres. The proposed programme would result in the availability of tested computer programmes, properly documented, for not only facilities in the RCA region but also worldwide.

The list of active research contracts are as follows:

India, "Application of Personal Computer as an Operator Aid", S.K. Sharma, BARC.

Indonesia, "Use of Personal Computer for Digital Reactivity Meter and Calibration of Control Rods", I.P. Yazid, RCNI.

Korea, R.O., "Development of Research Reactor Parameter Measuring System Based on PC", B.J. Jun, KAERI.

Malaysia, "Software to Simulate Operation of a Research Reactor", M.S. Kassim, UTN.

Pakistan, "Development of a Central PC-Based Radiation Level Monitoring and Display System", A. Karim, PINSTECH.

Philippines, "Integrating Personal Computers with the PRR-1 Instrumentation System", L. Leopando, PNRI.

Viet Nam, "Reactor Physical Calculations on PC", N.T. Nguyen, VINATOM.

Since the meeting, an additional research contract was approved for Bangladesh on Development of a Data Acquisition System. With this contract, 8 of the eligible 10 RCA Member States are participating in the programme.

Proposed Activities for 1991:

1. Annual meeting of national coordinators. TC supported.
2. Training course on Use of Personal Computers in Research Reactor Operations and Experiments (3 weeks). TC supported.
3. Training course on Neutron Transmutation Doping of Silicon. Extra-budgetary contribution from China.
4. Training course on Research Reactor Operator Requalification (3 weeks).
5. Training course on some aspect of research reactors supported by Indian extra-budgetary contribution.
6. Computer Application on Reactor Control and Calculations.

Current approval period for the project: 1991-1992

Publications: NONE

Energy and Nuclear Power Planning

Project RAS/0/013 and RAS/0/012

Technical Officer: P.E. Molina

RAS/0/013.005:

Following the three Workshops already held in different RCA countries (Jakarta, Indonesia in 1987, Kuala Lumpur, Malaysia in 1988 and Beijing, P.R. of China in 1989), the Fourth Regional (RCA) Workshop on Energy, Electricity and Nuclear Power Planning was held in Daejeon, Republic of Korea, from 27 to 31 August 1990. The Workshop was hosted by the Government of the Republic of Korea and locally organized by the Korea Atomic Energy Research Institute (KAERI), in collaboration and with assistance of the IAEA.

Similarly as in previous meetings, the objectives established for the 4th Workshop were:

(a) To promote regional co-operation among RCA countries in energy, electricity and nuclear power planning; (b) To provide a forum for the regional exchange of information and experience in the use of long-term planning methodologies for energy/electricity demand forecasting and electricity supply planning, and, in particular, in the use of the IAEA's MAED and WASP computer models; and (c) To recommend improvements to the IAEA planning methodologies in order to adapt them to the conditions of countries in the region.

The Workshop was attended by 15 participants from 10 RCA Member States, namely: Bangladesh (1), China (1), Indonesia (1), Republic of Korea (5), Malaysia (2), Pakistan (1), Philippines (1), Sri Lanka (1), Thailand (1) and Vietnam (1). The IAEA was represented by the scientific secretary for the Workshop. Each participant gave an oral presentation of a respective paper specially prepared for the event. These were followed by extended debates and periods of discussion in order to allow clarification of some of the items mentioned in the presentations.

In all respects, the Workshop was a success as all objectives initially set up were achieved during the meeting, and in particular a fruitful exchange of information was observed throughout the presentations and discussions, and potential "horizontal" co-operation among some of the countries were initiated on an informal basis. To a large extent, the success of the Workshop was due to the excellent organization provided by the host country and particularly KAERI, and this fact was recognized by all participants.

Several conclusions and recommendations were put forward by the panel, among them that it would be desirable to continue with this type of Workshops in the future. This would require extension of the Project, which originally contemplated the organization of four Workshops only. Another recommendation was to publish the papers and proceedings of the Workshop as an Agency Document (TECDOC), and this is being finalized at present. Finally, several recommendations were given in relation to improvements of the MAED and WASP codes, and they would be considered with the general programme of updating these models at the IAEA.

RAS/0/013.006:

Following the experience of the First Regional (RCA) Training Course on Electric Systems Expansion Planning (ESEP), Kuala Lumpur, May-June 1989, a second course was planned to be held in Lahore, Pakistan, from 4 February to 15 March. This course was to be hosted by the Government of Pakistan and locally organized by the Water and Power Development Authority (WAPDA) in co-operation with the Pakistan Atomic Energy Commission (PAEC). External funding for the course was being sought from other international organizations with interests in the Region, and principally, the Asian Development Bank, which was to provide an important contribution to the course.

The course had been open to 25 participants in national teams of 2-3 individuals and had as the principal objective to provide training in the techniques of power system planning and in the use of the IAEA's WASP computer model.

Arrangements for the course were well in advance, as many candidates had been proposed by various RCA countries, and the process of hiring all lectures was also in line with the dates proposed for the course. However, the host country was unable to meet the deadlines required by the IAEA, as acceptance for hosting the course had not been received by end-1990. In principle, it was suggested by the Course Director to have the course postponed until October-November 1991, but this was in confrontation with previous commitments by the IAEA staff and many of the required lectures. As a consequence, the course had to be postponed until 1992, and it would be necessary to determine whether the venue is to be maintained and what would be the most appropriate dates for holding the course.

**Regional (RCA) Training Course on Nuclear Power
Planning and Implementation, Daejon, Republic of Korea**

Project RAS/0/015

Project Officer: F. Calori

The above training course is being conducted annually during the months of October and November since the year 1988. The overall objective of the course is to share the experience of the countries in the region in the subject area. The course is funded by the Government of Republic of Korea from its special contribution to the Regional Co-operation Agreement. Whereby it is fulfilling a special role as a newly industrializing country to act as a bridge between developed and developing countries in promoting technology transfer.

The lead role in organizing and conducting the course is taken by Korea Advanced Research Institute (KAERI) located at Daejon, Republic of Korea. So far three courses have been successfully conducted and have provided an excellent opportunity to share the accumulated experiences of Korea in nuclear power programme planning and implementation with other developing countries not only from the region but also from the rest of the world. The role of the Agency is limited to deputing a few lecturers from the Agency as well as from other countries to the course. The travel report of Mr. K.V. Mahadeva Rao, one of the lecturers from NENP at the most recent course is attached for information regarding the topics covered and the countries from which participants were drawn.

Development of TCDC in Asia and the Pacific

Project RAS/0/015

Technical Officer: R.S. Mani

Operational since 1989, the principal objective of this project is to promote and strengthen collective self-reliance among the RCA Member States through the pooling of technical resources and the development of complementary capacities. Three of the RCA developing countries, China, India and the Republic of Korea, are contributing extra-budgetary resources to the RCA which are being used for hosting workshops and training courses, some four activities being undertaken each year.

The activities carried out under this project in the year 1990 were as under:

(1) Regional training course on isotope techniques in hydrology (Technical Officer - Fröhlich, Klaus)

This RTC held at BARC, Bombay, India provided a review of the principles and applications of the broad range of isotope methods available for hydrologists, hydrogeologists, geochemists and other geoscientists in addition to isotope specialists. Twelve (12) participants from the RCA Member States participated in this RTC.

(2) Regional training course on research reactor safety principles (Technical Officer - Muranaka, Richard)

This RTC held at BARC, Bombay, India presented information on research reactor safety, design, operation and maintenance and was attended by ten (10) participants from the RCA countries.

(3) Regional training course on nuclear power project planning and implementation (Technical Officer - Calori, Fausto)

This RTC held at Tae Jeon, Chung-Nam, Republic of Korea provided an overview of practical elements in planning and implementation of a nuclear power project. Seventeen (17) participants from the RCA Member States participated in this RTC.

(4) Regional workshop on technology and utilization of low power research reactors (Technical Officer - Muranaka, Richard)

This RWS held at the IAE, Beijing, China, was attended by sixteen (16) participants. The RWS provided theoretical knowledge, practical training and guidelines on the technology and utilization of low power research reactors.

In addition to the above, the project is used to facilitate technical co-operation in the nuclear field between institutes in Asian countries. The establishment of bilateral associations between "resource" institutions and "recipient" institutions in less developed countries is an important component of this project - the "resource institute providing expert services, lecturers for national training activities organized by the "recipient" institute and training opportunities for scientists from the "recipient" institute.

The project aims, during the next two years to emphasize these objectives, and the activities proposed for implementation in 1991 are indicated in the attached copy of my IOM dated 22 November 1990.

The current approval of this project is for 1991 and 1992.

*New RCA Project Proposal**APPLIED RESEARCH ON AIR POLLUTION
USING NUCLEAR-RELATED ANALYTICAL TECHNIQUES***Background:**

The Agency's programme for 1991/92 includes an applied research project (E.4.06) on environmental pollution using nuclear and isotopic techniques. Its purpose is to assess and demonstrate the role of neutron activation analysis (NAA), X-ray fluorescence (XRF) and particle-induced X-ray emission (PIXE) in studying *non-radioactive* environmental pollution.

One of the topics to be supported within this project is a new global co-ordinated research programme (CRP) on applications of nuclear-related techniques in the study of air pollution. This CRP, which is due to run from 1991-95, will build upon the experience gained by the Agency from the laboratory support that it has been providing for several years to BAPMoN - the Background Air Pollution Monitoring Network programme organized under the auspices of the World Meteorological Organization (WMO). Other ways in which the Agency has already supported work in this field include (i) a CRP on the Use of Nuclear and Nuclear-Related Techniques in the Study of Environmental Pollution Associated with Solid Wastes (1987-1992) and (ii) an Interregional Training Course on Applications of Nuclear Analytical Techniques in Air Pollution, held in Argonne and Urbana, USA, in January/February 1991.

The present proposal is to develop a new *regional (RCA) sub-programme* of the above mentioned CRP, together with other regional activities as needed (e.g. technical cooperation projects, training courses, analytical quality control services).

Objectives:

- to promote the appropriate use of nuclear-related analytical techniques in air pollution studies, i.e. NAA, XRF, and PIXE for the analysis of toxic and other trace elements in aerosols (air filter samples), and TR-XRF for similar analyses of rainwater and fog-water samples;
- to develop appropriate reference materials and quality control procedures;
- to provide support for air pollution studies in individual member states, including relevant research and monitoring programmes of WMO and WHO; and
- also to provide support for studies using complementary non-nuclear techniques.

Expected Benefits:

- improved capability to make high quality measurements of specific air pollutants;
- information on pollution levels in areas of high and low pollution, and trends over time;

- information pertaining to pollution source identification and apportionment (based on statistical analysis of multi-parametric data) including identification of anthropogenic sources (e.g. coal and oil combustion, industry), biogenic sources (e.g. forests) and other natural sources (e.g. soil, marine);
- information on the long-range trans-boundary movement of air pollutants;
- supplementary information relating to specific aspects of the problems of acid rain pollution and global climatic change.

Agency support:

The Agency's support for this project will, in the first place, be provided within the framework of the above-mentioned CRP, and will include limited funding for individual research projects, the development of common research protocols, guidelines on methodology (sampling, sample collection and analysis), information exchange, research co-ordination meetings, analytical quality control services and other back-up support from the Agency's Laboratory in Seibersdorf, etc.

In addition, it is already foreseen that there will be a *regional RCA training course* on applications of nuclear techniques in air pollution studies to be held somewhere within the region during 1993.

Other forms of support may become available later under the technical co-operation programme (in 1993/94) and - possibly - also in other ways, depending on the interest of Member States and on the availability of additional funding.

CIRCULAR FOR STEERING COMMITTEE MEMBERS (OKAMOTO, PARK, PARR)

1. Since the announcement appeared in Food and Lab News, there have been enquiries from China, India, Malaysia, Philippines, Thailand (on behalf of ASEAN countries), Vietnam, Israel, Nigeria, Chile and Sudan. As and when time permits, letters will be sent to institutions in other countries in the Asian region to draw their attention to ASREM.

In the above context, Dr. Parr's initiative to include a short paragraph on ASREM in the IAEA Reference Materials Report published very recently is gratefully acknowledged

2. Four countries namely: India, Philippines, Thailand and Vietnam have expressed great interest to prepare at least one secondary reference material each. Letters have been sent to them requesting them to submit an outline of their plans. On hearing from them the steering committee will be consulted for further action.
3. Besides the user members, a number of individual scientists from developed countries who have experience with analysis of reference materials for certification were contacted. Many of the analysts have expressed their desire to help the cause by extending analytical help if and when the secondary reference materials are prepared. A list of these analysts is being prepared and will be circulated among the steering committee members.
4. On request by the editor of Food Lab News, a progress letter about ASREM activities until now will be prepared and sent to Professor Hofsten for publication.
5. It is proposed to attempt calling a two day workshop of the ASREM user group during the 6th Asian Congress of Nutrition in Kuala Lumpur, Malaysia (September 1991). An announcement to this effect will be included in the FLN.
6. The participants from Nigeria and Chile are very enthusiastic and have undertaken the task of bringing together a network of activities among their regional participants. They would be reporting on their activities by the end of this year.
7. Of interest is the fact that Dr. Wayne Wolf (BERM) sees lot of sense in the aims and scopes of ASREM like clusters, and has offered to provide assistance to get one representative from each region or so, to attend BERM-5 at Juelich, 1992!
8. I have also mentioned the usefulness of ASREM-LIKE activities in my chapter to the WHO book on Recommended Dietary Allowances presently in progress. My contribution on analytical techniques has a section on setting up trace element laboratories in developing countries, with special reference to RM needs, problems and the necessity for self-reliance in this matter. I have stressed the role of secondary reference materials and

have suggested that lead laboratory in each country should encouraged to produce secondary RMS and guide the remaining laboratories.

9. It would be encouraging for me to get your comments and any other input possible. It is going to be a slow process. We are of course not looking for speed here!
10. In an endeavour like this, I am reminded of the following joke: In a dogs race, one of them was seen to be running rather slow. There were comments on its performance. One comment accusingly branded the slow running dog- inefficient. Back came another comment- the question is not whether that particular dog is fast or slow, that it was still running. It had only three legs!

Best regards

IYENGAR

fax! 301-921-9847

Laboratory News

Analytical Quality Control Reference Materials for Developing Countries

A New Initiative

The role of Reference Materials (RM) for Analytical Quality Assurance (AQA) is well recognized. As more analytical problems are identified, the need for new RMs representing diverse matrices will increase. For example, in the biomedical and environmental area alone, there is a vast opportunity to develop new AQA standards.

Basically, AQA materials can be classified as primary and secondary RMs. The primary RMs are issued by established agencies under rigid conditions of certification. Thus many standards belonging to this class have been released by the International Atomic Energy Agency of the United Nations, Community Bureau of Reference of the Commission of the European Communities, the National Institute of Environmental Studies of the Japan Environment Agency, the National Institute of Standards and Technology of the U.S. Department of Commerce and the National Research Council of Canada, among others. The secondary RMs are those which are usually prepared on an exploratory basis and the existing primary RMs serve as AQA materials in characterizing them. Subsequently, some of these secondary RMs act as precursors for developing new type of primary RMs. An example of a secondary RM is a carefully prepared pool of a particular matrix (also termed as candidate RM, or even an in-house pool). It should be recognized that the preparation and certification of primary RMs is very expensive, hence they should be used with discretion if intended for use as routine AQA materials. For example, ideal use of a primary RM would be when establishing a new analytical method, when changes are introduced to an existing method and for periodic check of the analytical performance in a laboratory. Whereas, well characterized secondary RMs can satisfactorily fulfill the day to day requirements of quality control of an analytical scheme.

In developing countries, establishment of AQA procedures is beset with some limitations. For example, even acquiring a primary RM (let

alone enough quantities of it) is a common problem for many of these laboratories, and they also do not have the expertise to prepare secondary RMs. Further, in cases where preparation of secondary RMs is feasible, the analytical expertise required for an adequate chemical characterization may not be available. These and a few other considerations have motivated a few of us to explore the possibility of setting up a voluntary organization. The aim is to help the developing countries to the extent possible to overcome some of the scientific and technical aspects of preparing secondary RMs. A steering committee consisting of Dr. R.M. Parr (Austria), Dr. K.S. Park (South Korea), Dr. K. Okamoto (Japan) and Dr. G.V. Iyengar (United States) has been exploring this idea.

As a first step, the Asian region has been chosen as an example. It is proposed to identify suitable representatives from each of the Asian countries desiring to join this endeavour (identified as the user group). These representatives will constitute the core committee of the proposed Asian Society for Reference Materials (ASREM). A second group consisting of analytical scientists from different countries experienced with the problems of RMs from both the developed and the developing countries, and is willing to volunteer for this cause is being assembled (identified as the expertise assistance group). The user group will be responsible for identifying the crucial RMs needed. Initially, it is envisaged to work in the area of foods and each country will be encouraged to suggest one high priority RM. After pooling the information received, one or two commonly desired matrices will be identified. At this stage, if any particular country is willing to take the lead in preparing a designated RM in its laboratory, ASREM will assist by seeking scientific and technical help from the expert group to facilitate preparation and characterization of the AQA material. If the RM is homogeneous and qualifies for recommendation of reference concentration levels for some analytes, it is envisaged that this material will then be available for distribution (at minimal cost payable with local currency, if it cannot be made available free of cost) among members of the user group. Similarly, the burden of preparing a second material would fall on another member of the user group, thus making a second material available among the participating countries. Thus, duplication is avoided and a broad based user circle is developed for each RM.

Comments and suggestions to this concept are requested from the readers. Qualified persons representing suitable institutions interested in joining the user group may contact **Dr. Okamoto, National Institute of Environmental Studies, Division of Chemistry and Physics, Yatabe-Machi, Tsukuba, Ibaraki, 305, Japan**, who has kindly con-

sented to provide a temporary home for ASREM until a better location is identified. Suggestions are welcome from the Asian region for providing a formal home for ASREM. Since the basic concern of ASREM is a general reflection of the problems faced by several developing countries, if there is an integrated response from different global regions (e.g. Africa), it is possible to widen the base of ASREM as an AFRO-ASIAN concept, eventually leading to a broad based society encompassing all the developing countries.

Dr. G. V. Iyengar Chairman, Steering Committee

ASREM

Asian Society for Reference Materials

Steering Committee G.V. Iyengar (U.S.A.), K. Okamoto (Japan)
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AUSTRALIAN COUNTRY STATEMENT
13TH RCA WORKING GROUP MEETING
HO CHI MINH CITY, 4-7 MARCH 1991

Australia notes with pleasure the continuing progress made by the RCA during the past year. We consider that the value of the RCA as a means of nuclear technical cooperation in the Asia and Pacific region continues to be illustrated by the range of projects of benefit to the region being undertaken within its framework. The four major fields of activities, i.e.

- . medical and biological applications of nuclear techniques
- . food and agriculture
- . research reactor and energy based projects, and
- . the UNDP Regional Industrial Project

are meeting the main current needs of member countries.

Australia has maintained its involvement in and support of RCA/UNDP activities over the past year, as outlined below.

UNDP Regional Industrial Project

Australia was pleased to participate in the Expert Advisory Group Meeting held from 17 to 21 December 1990 which reviewed the current status of the UNDP Industrial Project and discussed guidelines for the development of a new proposal to UNDP for 1992-96. As we indicated earlier at this meeting, the Australian authorities have not yet had the opportunity to review fully the proposed new project formulation framework, but it appears generally satisfactory to us. We note that the project framework is based on four headings which reflect the new criteria set down by the UNDP i.e.

- . public health and the environment
- . industrial production
- . industrial quality control
- . materials research and development

Over the past year, Australia has maintained its interest in the four current UNDP project areas:

(a) Tracer Technology

This subproject funded by Australia has the dual aim of infrastructure development and industrial support. The first aim of the project is to support the formation and maintenance of viable tracer groups within national atomic energy agencies.

Implementation is achieved through the training of key personnel at our Lucas Heights centre near Sydney, the arranging of training and demonstration projects in developing countries and the provision of experts to support related IAEA training activities. By completion of the project, a total of 10 long term fellowships would have been hosted (Thailand, Republic of Korea, Pakistan, Philippines (2), China (3, 2 IAEA funded), Indonesia), full scale industrial demonstrations would have been conducted in Thailand, Philippines and Bangladesh (to be confirmed), and support provided to IAEA Regional Training Courses in Malaysia, Pakistan and Indonesia.

(b) Non-destructive Testing (NDT)

An Australian NDT expert based in Kuala Lumpur continued to assist the Regional Industrial Project.

(c) Radiation Technology

ANSTO and the University of New South Wales held a regional training course on radiation curing of surface coating in Sydney from 18 February to 1 March 1991. The course was designed to take advantage of Australian expertise developed from the interaction of government, university and private industry R&D and follows the attachment of three regional IAEA fellows to Sydney laboratories in 1989. Australia has also supplied and installed a ultra-violet coating system at the Forest Products Research Institute in Manila.

(d) Nucleonic Control Systems

Coal is an important source of energy in the RCA region.

Under this subproject, Australian-developed isotopic coal-ash measurement technology is being transferred to the region through the establishment of a large scale training/demonstration facility at the Mae Moh mine of the Electricity Generation Authority of Thailand (EGAT). The project is being arranged by the Julius Kruttschnitt Mineral Research Centre (JKMRC) in Brisbane, Australia. We acknowledge the competent and professional support of EGAT and the OAEP.

The technology to be demonstrated represents one of the most important advances in the applications of nucleonic control systems to the minerals industry over the past decade. Sensors have been developed to determine on-line the mineral (ash) content of coal in processing and blending plants, and the moisture and ash content of coal entering power stations. As of 1991, over 100 Coalscan units have been installed worldwide in a range of operations. Coal producers gain by using ash gauges for quality control in mines, preparation plants and blending systems attached to power plants, coal importers could gain by improved quality control through the use of ash gauges on blending systems. The more effective coal utilisation resulting from the improved control has direct economic benefits and also reduces the adverse environmental effects resulting from coal contaminating the rejects storage area.

Since the commencement of project implementation in early 1989, the following has been achieved:

- (i) the installation and commissioning of a Coalscan 3500 unit at Mae Moh
- (ii) the conducting of a Regional Executive Management Seminar, a Regional Workshop (for production managers) and a Regional Training Course (for engineers).

Much of 1990 was spent addressing a significant, though subtle, calibration problem affecting the project installation and EGAT's other gauges. The training program is scheduled to recommence in 1991.

Medical and Biological Applications of Nuclear Techniques

Australian interest in this area of the RCA centres on two projects: the Use of Computers in Technetium-99m Imaging and the Strengthening of Radiation Protection Infrastructure.

Our objective in funding a subproject in the Use of Computers in Technetium-99m Imaging is to provide training in nuclear medicine computing to persons with previous knowledge of the subject in order to increase their level of knowledge and experience so that they can actively participate in local training programs. Two highly successful training courses have been held in April/May 1989 and February/April 1990 under the direction of the Royal Prince Alfred Hospital (RPAH). The two courses attracted 26 participants from 11 RCA countries who attended lectures and practical sessions and were then attached to hospitals in the Sydney region.

A follow-up expert mission was undertaken to the hospitals which had sent participants to the first course. The missions were particularly useful in identifying certain problems with computers in the region and, most importantly, in monitoring a communication link between participants and the relevant hospitals in Sydney.

The expanding applications of nuclear techniques to industry, agriculture and medicine has led to the recognition that more attention needs to be paid to the building up of an appropriate radiation protection infrastructure. This need became a matter of public concern following the Chernobyl accident. As a consequence, the Japanese government initiated - and Japan, India and Australia have contributed to - a major RCA project on the Development of Radiation Protection Infrastructure.

Australia agreed to make a major contribution to the project by funding a series of training courses on "The Development of Infrastructure for Ensuring Radiation Protection". The courses were held in April 1988 and October 1990 respectively. The 1988 course was held in conjunction with the Seventh Congress of the International Radiation Protection Association and the IAEA Conference on Radiation Protection in Nuclear Energy; the 1990 course was held in association with the annual meeting of the Australian Radiation Protection Society. Australia is also contributing to project planning by attending Expert Advisory Group Meetings and is also involved in the Japanese funded activity on Personal and Environmental Dosimetry Intercomparison.

Agricultural Projects

The Regional (RCA) Project on Food Irradiation has been operating for over a decade and has now entered a third phase. Australia funded Phase II of this project and is making a modest contribution under Phase III by implementing an IAEA Research Agreement, "Establishment of Standard Operating Conditions for Research and Commercial Gamma Irradiation Plants; Dose Mapping and Detection Mechanisms for Irradiated Foodstuffs".

Research Reactor and Energy Based Projects

Our country is participating in the project on Research Reactor Utilisation. In line with the recommendations of the Project Formulation Meeting, ANSTO made a contribution to this project by hosting an Interregional Training Course on Research Reactor Core Conversion to Low Enriched Uranium Fuels in February/March 1990. We will look for opportunities to make expert advice available within the scope of the project.

Australia believes that a particular strength of the RCA is the encouragement of technical cooperation between developing countries. In this regard I would like to take this opportunity to recognise the most important and valuable contribution that Indonesia continues to make through its support of the office of the UNDP Project Coordinator in Jakarta.

It is gratifying to note that RCA activities consistent with cooperation under Article IV of the NPT were acknowledged by the Fourth NPT Review Conference held in Geneva last August and September. The Third Committee of the Conference encouraged "greater support for regional cooperative arrangements, promoting regionally agreed projects and mobilising inputs from countries in the region".

At the same Conference, RCA members party to the NPT took the useful initiative of preparing and tabling as a conference document an information paper on the RCA. The initiative was coordinated by Malaysia. The paper, which has the support of non-NPT members of the RCA, explains and demonstrates to a wide international readership that nuclear technical cooperation in our region takes place in a practical, efficient and cost-effective manner.

Australia looks forward to continued participation in RCA/UNDP activities. Much has been achieved to date and we are confident even more will be achieved in the future.

Country Statement of the People's Republic of China
13th Working Group Meeting of RCA Member States
Ho Chi Minh City, Viet Nam 4-7 March 1991

Mr. Chairman, distinguished delegates,

It is my great pleasure to participate in this 13th Working Group Meeting of RCA Member States. On behalf of the Chinese delegation, I would like to express my congratulations on your election as Chairman of this meeting and our gratitude to the Government of Viet Nam for hosting this important meeting with such excellent arrangements, and wishes to join other delegates to congratulate the success of the meeting.

As you are aware, China has been associated with RCA activities since its inception in 1985 and has maintained active participation in different training course (RTC, NTC) as well as in regional and national seminars, workshops and research co-ordinated activities.

China supports the overall assessment for the UNDP/IAEA/RCA industrial project of Phase II and the recommendation on the future work made by the mid-term evaluation mission and also strongly supports the extension of the project to Phase III. The new regional UNDP project, the use of isotope and radiation to strengthen technology (for development) and support environmentally sustainable development is a very important project, it will be strengthen the regional development based on the needs of public health and environment, industrial production, industrial quality control and material development. China will actively support this new regional UNDP project.

Now I would like to present very briefly the project activities in China undertaken since the 12th Working Group Meeting in Chiang Mai.

I. UNDP/IAEA/RCA Regional Industrial Projects

1. Tracer Technology in Industry

The project on inter-well monitoring using radiotracers in Dagang Oil Field have been completed and demonstrated.

The project on sediment transport investigation with radioactive tracer is under implemented.

Two fellows have been and being sent to Australia for study tracer application, one in 1990, another in 1991.

On October, 1991, we welcome the Agency Tracer Expert Mission to visit China, the Mission will discuss the Chinese experts on tracer application in petroleum, petrochemical, hydrology, iron-steel and mineral industries, will visit institutes and other units in Beijing, Shanghai and Renqiu.

2. Non-Destructive Testing (NDT)

The 6th National Co-ordinator's Meeting on NDT sub-project was held in Shanghai, China from 9-12 April, 1990.

A National Seminar on NDT new techniques specially for Nuclear Power Plant was held in Shanghai from 8-12 October 1990.

In 1991, we suggest 2 activities related to NTC will be convened in China, RTC on NDT Eddy Current Level II, NDT on Advanced UT Technique and National Symposium on NDT for Nuclear Materials and Fuel Elements.

3. Radiation Technology

Radiation Vulcanization of Natural Rubber Latex (RVNRL)

A National Research Group Meeting on RVNRL do much work on R & D of radiation vulcanization of latex, they will give report on the work at Jakarta course/meeting in 1991.

Radiation Crosslinking

The RTC on Radiation Crosslinking Applications was held in Changchun from 3-14 September 1990. 15 participants from nine RCA countries have been attended. The course discussed the Recent Advanced in Radiation Processing, fundamental theory of radiation chemistry, polymer Rad. Chem. RLX Polymer formulation study, heat shrinkable materials, EB and Gamma Application, techno-economic analysis and others.

In 8-18 October, 1990, both a NTC and a NEMS on Radiation Crosslinking Application were convened in Shanghai, 80 participants attended the seminar. Up to now, the annual output of radiation crosslinked products (including wires and cables, shrinkable materials) has been valued about 60 million RMB Yuan.

In 26 August to 6 September 1991, another RTC on EB (Electron Beam) Processing Technology will be held in Shanghai, including radiation crosslinking and other technologies.

Radiation Curing

One National Training Course on Radiation Curing will be held in Chengdu, Southwest part of China, now the NTC postponed to May 1992.

Radiation Sterilization

The National Training Course on Industrial Radiation Sterilization will be held in Suzhou, 15-24 April 1991. The Suzhou Medical College (SMC) will be the host institution,

A National Symposium in Industrial Sterilization will be held in Beijing, Beijing Radiation Centre (BRC). China Sterilization Society will be the host institution.

Radiation Engineering

Now in China there are forty CO-60 Gamma Irradiation Facilities (design capacity more than 100 Kci each) and ten Electron Accelerators in operation for industrial purposes, both used for radiation chemical processing, radiation sterilization, and radiation preservation of foods. The operation safety and radiation protection of industrial radiation facilities are very important, so from 2-6 September 1991, a National Workshop on Safety and Radiation Protection of Operating Industrial Irradiation Facilities will be held in Beijing, the China Institute for Radiation Protection (CIRP) and China Nuclear Society (CNS) will be the host institution. About one hundred participants from every radiation centre will attend.

Now, I would like to take this opportunity to make a formal announcement that the 8th International Meeting on Radiation Processing (IMRP8) will be held on 14-19 September 1992 in Beijing. IAEA will be a co-sponsor for this IMRP8. At that time, maybe some RCA activities related radiation processing will be held in Beijing. We, as a host, welcome all of you to send delegates to Beijing.

In October and November 1990, two RCA expert mission on flue gas radiation treatment and sewage sludge radiation treatment have been arranged to visit Beijing and Shanghai, China. We support the project on radiation processing application for environmental protection.

We hope to organize a national seminar on Radiation Processing Application in biology and medicine fields in 1992, the venue may be in Shanghai or Beijing.

4. Nuclear Control Systems (NCS) Application

A. NCS -Paper

A National Seminar Maintenance of NCS-paper Industry was held in Jiamusi from 6-10 August 1990. The seminar was attended by some 110 persons from paper mills and other institutions. Maintenance principle and practice of NCS in paper mills in Japan, USA, China and Malaysia were discussed.

A Expert Mission on NCS manufacturing for Small Paper Mills has been sent to Beijing, China from 13-14 April 1990, discussed low cost NCS System.

There are more than two low cost NCS Systems for small and medium paper mills in China have been developed and demonstrated, we hope to offer these low cost system to serve the region industry.

A NEMS on NCS-Paper Industry Management was suggested, it will be held May 1992.

B. NCS-Civil Engineering

NEMS on the use of Nuclear Control System in Civil Engineering was held in Beijing from 11-15 Nov. 1990. Forty participants and 4 Japanese experts attended the seminar. In total gave 17 reports, including Application Status of NCS and NI in Civil Engineering, in compaction control in road construction, in Dam construction, Surface Nuclear Moisture Density Gauge Application and others.

Another NEMS on NCS-Civil Engineering was proposed in 1992 in China.

C. NCS-Steel

A Expert Mission on NCS-Steel was sent to Shanghai, from 26-28 July 1990. Good impression on Baoshan Steel Complex have been got by the experts. They agree a NEMS on NCS-Steel will be held in Shanghai from 7-12 October 1991. Now Baoshan Steel has been put into production for over 5 years and in which there are 9 types of NCS with 60 sets operated successfully. Baoshan Steel has gained a lot of experience in application, maintenance and management of NCS, from 1992, RTC, Regional Workshop on NCS-Steel can be arranged at Baoshan Steel Complex, Shanghai.

We are also actively participating other RCA NCS activities, application in coal, mineral and other industries.

5. **New Project, New Materials**

A Regional Workshop Characterization Methods for New Materials, was held in Beijing from 30 July to 3 August 1990, the China Institute of Atomic Energy (CIAE) hosted this workshop, Eleven lecturers were presented, workshop discussed on various nuclear and nuclear-related characterization techniques such as neutron diffraction, synchrotron radiation, electron microscopy, and the state-of-the-art of some new materials, such as high temperature superconductors, photovoltaic materials, advanced composites, modern structural and functional ceramics.

We strongly support the inclusion of new materials project to RCA programme.

II. Food Irradiation Preservation

From 8-12 January 1990, a Workshop on Commercialization of Food Irradiation was convened in Shanghai. The workshop made recommendations on how to promote the commercialization and international trade on food irradiation.

A NTC on Food Irradiation was held in Nanjing, from 1-14 November 1990, Nanjing Radiation Center was the host institution, 38 participants attended. IAEA sent two expert to give lectures at the course.

China has been actively participating in many IAEA and RCA activities on Food Irradiation. Recent year, the Commercialization, Market testing, and Public Acceptance are very important problems for Food Irradiation. Up to now, the total quantities of irradiated foods in China is over 40,000 T included more than 20,000 T irradiated garlies in Henan Province, 16,000 T irradiated (sweet potato) wine, seasonings and sausages in Sichuan Province, over 4,000 T irradiated apples, garlies potatoes, and onions in Shanghai, Taiyuan, and others.

Last year, in Shanghai, Nanjing and Chengdu, Marketing test of irradiated foods have been arranged in special store, all have got positive results. Last November, in Chengdu, we did a public acceptance briefing to the news media (TV, radio newspaper), the news media have reported it for many times.

It is our suggestion to organized a National Workshop in 1991 and a Regional Workshop in 1992 for commercialization, market testing and public acceptance of irradiated foods in China.

III. Nuclear Agriculture

Nuclear Techniques applied in Agriculture in China are some advanced. We hope more communication among countries in Asian-Pacific Region can be done on following items. If there are some needs, China can offer related techniques, experts and receive some fellowships and scientific visits.

Radiation Mutation Breeding of crops, combined with in-vitro culture and other techniques, rice, wheats, soybean, maize citrus and others.

Low dose stimulation of growth and development, fishes, shrimps and prawns, and silkworms.

Sterile Insects Techniques, peach fruit borer, Chinese citrus flies, and corn borer.

Labelled compounds for agriculture, insecticides, fungicides, acaricides, biological agents, herbicides and others.

Radioimmunoassay for animal disease and health

Food Irradiation Preservation

Pesticide residues and environmental protection

Last year the second FAO/IAEA Res. Coord. Meeting (RCM) on Improvement of Root and Tuber Crops in Tropical countries of Asia by Induced Mutations was held in Shanghai Academy of Agricultural Sciences was the host institution.

We suggest in next year, a RTC on Isotope Tracer Technique in the Research of Agrochemicals in environment will be arranged in Hangzhou.

We support the project on improvement of grain-legume rhizobium symbiosis to fix atmospheric nitrogen and the project on control of tropical plant virus in Asia.

IV. Medical and Biological Applications

. A RTC on Diagnosis of Viral Hepatitis Infection by Radioimmunoassay will be held in Shanghai, 13-29 March 1991, at this course, some Chinese made RIA kits will be shown.

. A NTC on Radionuclides in Food and Environmental Samples will be held in Beijing from 26 August to 13 September 1991.

. We support all the following projects and hope actively participation.

Research and Development in the methods for Basic Care, Preventive Maintenance and Operative Control of Nuclear Medicine Equipment.

Radioaerosol inhalation imaging for the diagnosis of respiratory diseases.

Quality Control of Advanced Nuclear Medicine Equipment.

RIA of Thyroid Related Hormones, (This project will be terminated in 1991, but we hope arranging a RTC on this title in China).

Use of Computers in TC-99 Imaging.

Evaluation of Imaging Procedures for the Diagnosis of Liver Disease Phase II.

Radiation Sterilization of Tissue Grafts.

Computer Assisted Planning and Dosimetry in Radiotherapy of Carcinoma of the Cervix in Asian Countries.

Development of TC-99 Generators using Low Power Research Reactors.

We suggest some new projects incorporated to RCA projects. Radiommuoimaging and Nuclear Cardiology.

We hope a RTC or Interregional TC on Clinical Nuclear Medicine will be held in China in 1992.

V. Radiation Protection

China actively participated the following projects and activities,

- . Development of Infrastructures for Ensuring Radiation Protection.
- . Personnel Dosimeter Intercomparison
- . Compilation of Anatomical, Physiological and Metabolic Characteristics for a Reference Asian Man
- . Radiation Protection in Industrial Applications (Radiation Processing, NDT, NCS Appl.) and in Medical Practice.

The National Workshop on Safety of operating radiation facilities will be held in Beijing from 2-6 September 1991. The China Institute for Radiation Protection (CIRP) and China Nuclear Society (CNS) will be the host institutions. The general situation of radiation protection and safety of Co-60 gamma facilities and EB accelerators will be discussed.

The RTC on Environmental Monitoring and Assessment of Nuclear Facilities will be held from 14-25 October 1991, in Taiyuan, Shanxi Province.

We hope a RTC on Application of biological dosimeter-Chromosome Aberration Analysis will be arranged in Suzhou, late this year or next year, Suzhou Medical College (SMC) will be the host institution.

VI. Research Reactor, Basic Science and Energy Planning

China now possess six research reactors, from zero power reactor to Material Testing Reactor. We can do more R & D works on these Reactors for the benefits of Asian-Pacific Region.

A Regional Workshop on Technology and Utilization of Low Power Research Reactors was held in Beijing, from 19-23 November 1990. This was sponsored and contributed by China. The Chinese developed 27 Kw Miniature Neutron Source Reactor (MNSR) has been shown in this course.

Neutron Transmutation Doping (NTD) for Silicon Semiconductor is a very useful technique, now in China, there are 3-4 reactors to do this work. We hope next year, in Chengdu, Sichuan Province, a RTC on NDT for Silicon Semiconductor will be held.

From 7-11 September 1992, the 16th International Conference on Particle Tracks in Solids (formerly Solid State Nuclear Track Detectors) will be held in Beijing. In order to arrange more participants from developing countries, we suggest IAEA/RCA organizing following course in China.

- . RTC on Production and Application of Nuclear Track Filters.
- . RTC on Fission Track Dating and its application.
- . RTC on Performance and Application of Radon Measurements with Nuclear Track Detectors.

A RTC on the Preparation and Control of Radiopharmaceutical was held in Beijing and Shanghai, from 8 Oct. - 2 November 1990. We suggest that, in 1992, the same title course (RTC) also held in China.

In conclusion, we would like to reiterate our faith in RCA for promoting regional co-operation in this area, and also reiterate that China will continue its technical and financial support to the RCA activities, continue its extra-budgetary support to RCA.

China reiterate its offer of sharing the experience of R & D with other in such fields as nuclear agriculture (mutation breeding and others), food irradiation preservation, nuclear medicine, NDT, Radiation Crosslinking, Nucleonic Control System application, Radiation Protection, and many others. There are many research institutes and university in China can be used as Regional Centers.

Regarding to RCA financial resources, in our opinion, contributions from non-RCA Member States or appropriate Regional or International Organizations are beneficial to the expansion of RCA activities, therefore they could be accepted provided such contributions are offered without political conditions, without limitations as to use and without adverse influence on the efficient implementation of projects or activities of this region.

Lastly, I would like to join other delegates to express our thanks to the host, Viet Nam government and Viet Nam Atomic Energy Commission, for the kind hospitality and the excellent arrangements made for this important meeting.

Thank you, Mr. Chairman.

Some suggested Activities in China, 1992

As of, 20 Feb. 1991

Code	Date	Venue	Activity
RWS		Beijing	Food Irradiation-Public Acceptance
RTC		Beijing	Radiation Sterilization
NTC	May	Chengdu	Radiation Curing
	Sept.	Beijing	8th Intern. Meeting on Rad. Processing (IMRP 8)
RTC		Beijing	Production and Control of Radiopharmaceuticals
REMS		Shanghai	NCS-Steel
NEMS		Beijing	Nuclear Weight Scale-Industrial Application
NEMS	May	—	NCS-Paper Industry Management
NEMS		—	NCS-Civil Engineering
RTC		Beijing	Nuclear Application Radwaste Management
RTC		Chengdu	Neutron Transmutation Doping (NTD)
RTC		Suzhou	Application of Biological Dosimeter-Chromosome Aberration
RTC		Beijing	Diagnosis of Thyroid Diseases by RIA Thyroid Hormones
RTC	20 April - 20 May	Hangzhou	Isotope Tracer Technique in the Research of Agrochemicals in Environment
RTC			Clinic Nuclear Medicine
NTC-RTC		Beijing	16th Intern. Conf. on Particle Tracks in Solids The Management of Radiation Sources

RAS/86/073-(WP-91) China

As of, 20 Feb. 1991

Code	Date	Venue	Activity	Host Institution
Exp	October	Beijing, Shanghai Renqiu	Tracer Application in Industry	CIAE
* RTC	26 Aug-6 Sept	Shanghai	EB Rad. Processing Tech.	SARI-SUST
NTC	15-24 April	Suzhou	Ind. Rad. Sterilization	SMC (Suzhou Medical College)
NWS	2-6 Sept	Beijing	Safety of Operating Irradiation Facilities	CIRP (China Institute for Radiation Protection)
NSM	3-6 Sept	Beijing	Ind. Rad. Sterilization	BRC (Beijing Radiation Center)
NEMS	7-12 Oct.	Shanghai	NCS-Steel	Baoshan Steel Complex
* RTC	14-25 Oct.	Taiyuan	Environment Monitoring and Evaluation	CIRP
RTC	18-29 March	Shanghai	RIA Hepatitis B	SMU (Shanghai Medical University)
NWS	Nov.	Chengdu	Public Acceptance- Irradiated Foods	SINTA (Sichuan Inst. of Nucl. Tech. Appt.)
NTC	26 Aug-13 Sept	Beijing	Radionuclides in Food & Environmental Samples	INET-QIU (Inst. of Nucl. Energy Tech./Qinhuo Univ.)
NTC	6-20 March	Hangzhou	Mutation Breeding	ZAU (Zhejiang Agri. Univ.)

WORKING GROUP MEETING OF RCA MEMBER STATES

COUNTRY STATEMENT - INDIA

Ho Chi Minh City, Vietnam, March 4-7, 1991

(R.G. Deshpande, Chief Executive, Board of Radiation & Isotope Technology
Bombay, India)

INTRODUCTION

India is very happy to participate in the 13th Working Group Meeting of RCA member states. We are very happy that this meeting is being held in Vietnam, a country which despite its late entry into RCA, has been very active in this programme. We are grateful to the Government of Vietnam for hosting the meeting in this historic city. India and Vietnam have a long history of bilateral co-operation in various areas of nuclear sciences & technology and I personally welcome this opportunity to renew contacts with the scientists of the host country.

India attaches great importance to the role nuclear technology applications can play in national development. Accordingly, work on all aspects of the nuclear fuel cycle is being pursued vigorously in India to ensure that nuclear power plays an increasingly important role in the energy planning of the country. Simultaneously work on production and application of radioisotopes in various fields is being actively supported so that the benefits of isotope and radiation technology can permeate to all sections of the society.

2. MEDICAL AND BIOLOGICAL APPLICATIONS OF NUCLEAR TECHNIQUES

Nuclear medicine is actively practiced in many medical hospitals in the country. With the increased awareness of the benefits of

nuclear medicine procedures, more nuclear medicine centres are being set up in the country. For sustaining this programme, the development of radiopharmaceuticals and electronic instrumentation related to the needs of the country is being given high priority. India has taken active part in the project "Aerosol imaging for diagnosis of respiratory diseases in developing countries". The technique developed at the Radiation Medicine Centre, BARC for mucociliary clearance studies has been recommended, with some modifications, for adoption by all the 10 participating laboratories in this project. The work on various aspects of this technique is being continued at the Radiation Medicine Centre, BARC.

India successfully completed the programme envisaged in the project on 'Nuclear techniques for toxic elements in foodstuffs' which is now concluded.

In the area of radiation protection, India will host a Regional Training Course on Safety Aspects in Industrial Application of Radiation Sources at BARC, Bombay during December 2-13 1991. This course will be funded from India's special contribution to the RCA. The two week's course aims at training technical personnel from industries using radiation sources, on radiation safety aspects through a programme of lectures, demonstrations and plant visits.

India is participating in the CRP on Compilation of Anatomical, Physiological and Metabolic Characteristics of the Reference Man. The data on average organ weights, representative of adult Indian

male and female population, has been collected. Data has also been collected to arrive at the physical parameters for MIRD type of phantom for Indian adult. Data on the daily intake of macro and micro nutrients in Indian population for different age groups is in progress.

3. NUCLEAR TECHNIQUES IN FOOD AND AGRICULTURE

India is participating in the RPF (Phase III) project on food irradiation and process control. India hosted the first RCM on Acceptance and Control of Food Irradiation in Asian countries under RPF (Phase III) at BARC, Bombay, during 16-20 April, 1990. As agreed at this meeting India is participating in the inter-country transportation trials of irradiated spices with Japan & Srilanka. The samples of irradiated spices received from Japan are being analysed for microbial levels and organoleptic quality. India is also participating in two research agreements, one dealing with hygienisation of spices by gamma radiation and the other on comparative studies of the efficacy of gamma radiation and vapour heat and refrigeration as a quarantine treatment of mango fruit.

4. RESEARCH REACTOR AND ENERGY RELATED PROJECTS

India is regularly funding activities under 'Basic Sciences using Research Reactors' with emphasis on man-power development and for creating better appreciation of utilisation of research reactors by the scientists in this region. India strongly believes that experience in research reactor operation and utilisation can provide a sound base for undertaking advance programmes in the

field of nuclear technology in developing countries. In the past, India has suggested the establishment of a Regional Training Centre for training of scientists and engineers in the RCA countries. India will be happy to assist in drawing up plans for the establishment of such a centre in one of the existing nuclear centres of the region.

During 1990 India conducted two training courses which were funded from India's special contribution to RCA. The Regional Training Course on Research Reactor Safety Principles was held at BARC, Bombay during April 9-20, 1990. Apart from lectures and plant visits, the course had seminars on safety principles and regulatory practices, maintenance practices and commissioning experience of 100 MW research reactor Dhruva. The Regional Training Course on Isotope Techniques in Hydrology was organised by BARC during September 17 - October 5, 1990. The course was attended by 12 participants from RCA countries and 3 from India. The course covered the use of environmental and injected isotope techniques in surface and sub-surface hydrology. As part of the training course, field demonstrations and visits to facilities were arranged at BARC, Bombay and the National Geophysical Research Institute, Hyderabad.

During 1991 India will conduct a Regional Workshop on Image Processing in NDT, which aims at familiarising scientists and engineers engaged in materials evaluation with image processing and analysis systems for NDT evaluation.

It is proposed that India's special contribution to the RCA for 1992 may be utilised for organising a 2 weeks Regional Training Course on Advanced Mutation Breeding of Tropical Crop Plants. The course would cover subjects such as physical & biochemical characterisation of induced mutants, growth analysis of induced mutants and their derivatives, in-vitro methods for mutation induction & selection, transformation methods and transgenic gene expression and screening with nucleic acid probes. The participants are expected to have basic knowledge and experience in mutation induction and plant genetics breeding.

5. UNDP INDUSTRIAL PROJECT ON APPLICATION OF RADIOISOTOPES AND RADIATION

India participated in the activities of all sub-projects of the UNDP Industrial project during the last year. In the radiation technology sub-project, India conducted Regional Training Course on 'Industrial Radiation Sterilisation-Material Compatibility and Quality Control Aspects'. The course was attended by 12 participants from RCA countries. India will host a Regional Workshop on Radiation Sterilisation of Pharmaceuticals at Bombay during November 25-29, 1991. This activity will be funded from India's special contribution to the UNDP industrial project.

India conducted a National Executive Management Seminar on Electronic Beam Application for Cross-linking in Cables and Wires at Bombay on October 3, 1990 which was attended by 75 participants. India also participated in the Regional Workshop on Industrial Sterilisation of Medical Products - Regulatory Aspects held at Kuala Lumpur during May 1990.

6. NEW RCA PROJECT PROPOSAL FOR UNDP FUNDING

The phase II of the IAEA/UNDP/RCA Industrial Project will be completed by end 1991 and the proposal for a new project with UNDP funding is under active consideration. India recognises that the first two phases of the Industrial Project have been useful in creating awareness amongst industries in the region about the potentiality of isotopes and radiation techniques. The project has also, to an extent, helped in training man-power and creating infrastructure at the national atomic energy centres for undertaking the work of promoting these applications. India has, however, felt that any future activities in this area should focuss attention on the specific needs of the countries of the region. India participated in the Expert Advisory Group meeting held at Vienna during December 17-21, 1990 for preparatory work for the formulation of the new project proposal for UNDP funding and put forth the view that the new project proposal should be based on the needs of the region in broad areas of Public Health, Industrial Production, Industrial Quality Control and New Materials. India also recognises that the momentum generated by the work already done in the four sub-projects of the present phase of the Industrial Project is not lost and that the infrastructure and network already created in the region should be effectively utilised for implementing the new project. We note that the draft PFF for the new project is based on this general approach.

7. REVIEW OF THE RCA AGREEMENT

The current RCA agreement will expire in 1992 and RCA coordinator

had invited suggestions for modifications if any, in the existing RCA agreement, particularly taking into account the provisions made in the recently concluded AFRA agreement for the African region. In regard to the funding from countries outside the region for RCA activities, we feel that the Meeting of Representatives may take a view on this matter on the merits of each case. Accordingly we suggest Article 8.1 may be retained as at present and that Article 8.2 be worded as in AFRA Agreement. The acceptance of contributions from non-RCA member states for implementing RCA activities should be viewed very carefully as it should not dilute the spirit of regional cooperation. One of the strengths of the existing RCA working arrangement is that the management and decision-making rests largely within the region. It is desirable to continue to adopt this working practice in future also. Hence while accepting contributions from outside the region this factor should be borne in mind.

In the conclusion we wish to reiterate the view that RCA has proved to be a viable and highly beneficial activity for promoting regional cooperation in the application of nuclear technology in the region. India pledges its continued support to the RCA by sharing its facilities and experience with the scientists of this region.

Before concluding I would like to express our gratitude to the host country, Vietnam, for the kind hospitality extended to us and the excellent arrangements made for this meeting.

Country Statement of Indonesian Delegation

Mr. Chairman,
Distinguished Delegates,

First of all my Delegation wishes to express its gratitude to the Government of Vietnam for hosting this important RCA Working Group Meeting and for the excellent arrangement made by the local Committee. It is a great pleasure for me indeed to be able attending this Thirteenth RCA Working Group Meeting here in the beautiful Ho Chi Minh City.

In this occasion my Delegation would like to present its brief report on the activities conducted in Indonesia in the frame work of RCA programmes. May I commence first with a general view on the UNDP/IAEA/RCA Industrial Project.

UNDP/IAEA/RCA Industrial Project

The year 1991 will be an important year for the project, because at the end of this year the second phase of the project will be terminated. It will have the meaning that the total period of the project will be ten years since the initial of the project in 1981. Once again, Indonesia will express its satisfaction regarding the implementation and achievements gained by the project, as the majority of the technologies covered by the project have been accepted and even been transferred to the

relevant industries such as NDT, radiation sterilization and NCS. This achievement is of course due to the combined effort of the implementation of the project and the government through its national development programmes. It became an important issue in the Tripartite Meeting held last year, the need of the governments to commit toward steps which would lead to a self-sustainable development of technology transfer in industries. Such a development would ensure that the respective countries can continue on their own when the project is terminated. Commitment of the Government of Indonesia to the promotion of nuclear technology, particularly in the application of isotopes and radiation, is clearly reflected in its systematical programmes and implementations. Efforts have been made in the build-up of scientific capabilities and skilled personnel through its manpower development programmes as well as through its infrastructures to anticipate the advancement of nuclear science and technology, including in the field of industry. We are fully conscious that development in the application of isotopes and radiation technology requires collaborations with other relevant government institutions as well as with private sectors in the country to maintain an effective promotion of science and technology. That is why the programmes in the application of nuclear techniques formulated by BATAN not only covered the basic and applied research, but also in the promotion of nuclear technology to the end users. On the other hand collaborative activities have been created with other countries on bilateral basis in the field of common interests. Complementary programmes to support the existing programmes are being conducted through technical assistance of international as

well as regional cooperation. It is definitely true that Indonesia has benefited much from the UNDP/IAEA/RCA Industrial project in supporting the national nuclear programmes.

Indonesia strongly supports the new programmes related with public health and environment, industrial production, industrial quality control and material research and development. I am pleased to notice that the new programmes are in compliance with the overall programmes of BATAN.

Radiation Processing

Two National Executive Seminars were conducted during 1990 namely :

1. On the Application of Radiation Curing Technology in Industry which was attended by sixty participants, mostly from wood panel and furniture industries. Based on the experience from the previous NEMS this seminar was designed to use a great deal of the lectures in local language and has given better understanding to the participants.

2. On Radiation Vulcanization of Natural Rubber Latex. This seminar was attended by fifty participants and about twenty among them came from the industry sector. The materials given at the seminar were scientific as well as technical aspects to market potential of technology. The question of economic aspect seems to be most interested for the industrial participants. It is hard to make a competitive economy compared to the existing conventional method using the available pilot plant.

One Regional Executive Management Seminar was held on Industrial Radiation Curing Technology, which was attended by

fourteen participants from RCA member states including three from Indonesia. There were ten participants from the industry. It seems that most of the participants from the industry had difficulties to absorb the lectures, due to different background of education and language difficulty.

A Regional Training Course on Radiation Curing of Surface Coating on Wood Products was conducted which was attended by fifteen participants from member states in the region including two from Indonesia. It was concluded that the technology itself is superior compared to conventional one, but some difficulties were faced by many participating countries, namely investment and market. In most developing countries market for wood secondary products such as coated wood panel was relatively low due to low income per capita. While wood and wood product importing countries prefer to import unfinished product rather than finished one.

An Expert Group Meeting on the same topics was held after the termination of the Seminar.

A National Seminar on Radiation of Sewage Sludge for Safe Disposal was held in Jakarta, participated by thirty people from different government agencies and research institutions. It was observed that much interests were emerged in this regard for agriculture and fishery uses. Further steps should be taken for the safe implementation.

Another National Course on Radiation Chemistry and its Application was held and participated by thirty six people from different research institutions.

Tracer industries and NCS

Some activities in tracer industry were conducted at Cibinong Cement Factory to determine the Residence Time Distribution and inventory in natural isotopes at the sites of Dieng (Central Jawa) and Lahendong (North Sulawesi) geothermal plants. The main activities done by BATAN are to assist the private sectors in solving their problems with the existing nuclear techniques.

More than hundred private industries already used NCS in their factories. The main problems faced by most industries are in the operational and maintenance of the instruments. BATAN is not only dealing with the licencing to the industries but also assists them in the operational and maintenance.

Two National Courses on Radiation Protection for Operators have been conducted during 1990 and were attended by seventy three participants and another National Training Course on oil distribution was conducted on request of the State Oil Company and was attended by twenty four staff of the company.

NDT

Activities on NDT were conducted in accordance with the existing programme formulated at the Shanghai National Coordinators Meeting.

Japanese Country Statement
at
The 13th RCA Working Group Meeting

Ho Chi Minh City

March 1991

Mr. Chairman, Distinguished delegates, Ladies and Gentlemen,

Japanese delegation is very happy to participate in the 13th RCA Working Group Meeting, and wishes to express its deepest gratitude to the Government of Viet Nam for having hosted this important meeting with its excellent arrangement and its hospitality extended to us all.

We are pleased to note the continued progress of the RCA activities. Considering the expansion of uses and applications of nuclear techniques in RCA countries which so far brought enormous advantages especially in the fields of industry, medicine and agriculture, we cannot disregard the importance of peaceful applications of nuclear energy so as to develop economies in and bring social benefits to this region. The Japanese Government will therefore continue to support not only technically but financially the RCA activities, as ever, as most important vehicle for cooperation of this kind, in the hope of continuously seeing the spirit of mutual cooperation, self-reliance, and understanding which has indeed distinguished the RCA as a guiding light for other regional cooperative undertakings, the very fact of which we are so very proud of.

Since its establishment in 1972, the RCA has been very active with its respective 5 year agreements, and in June next year current 1987 Agreement will

expire. Finding preferable significance in and putting much importance on the peaceful performance of the RCA to date, Japan would of course like to see the survival of the RCA after the expiration of the current Agreement.

But " how " in terms of the text of an agreement is the question. To come straight to the point, we prefer the extention for 5 years of the current Agreement as it is. Although the original text of the 1972 Agreement survived 2 consecutive extentions, the member states did much work around 1987 to up-to-date that original text. The product is current 1987 Agreement, which is equipped with clearer, more practical and detailed articles in view of that in the 1972 Agreement, or perhaps the AFRA Agreement still in the process of proving its workability. The current Agreement of ours has indeed proved its efficiency so far, and has not shown any trouble at all in executing our activities. To put it simply, the 1987 Agreement works so well.

As our UNDP/IAEA Project Coordinator mentioned at the last Meeting of Representatives, the RCA is now facing the possible reduction by half of the UNDP contribution to the RCA, which has led the member states again to consider the question of financing the RCA projects from outside the region.

The member states of course understand that the possible reduction affects the Industrial Project and Agricultural Project of the RCA Programme, and would certainly share, including of course Japan, the opinion that we must do something to secure those 2 projects. In doing that, we believe that the RCA, if it wishes to be in good shape, at the same time need to give due consideration as much as possible to a spirit of a regional cooperation being self-reliant within the framework in terms of budget, man power, technology and direction so as to produce good results in executing projects and sub-projects with mutual interest and priority. In this regard it seems that opening up the Industrial and Agricultural Projects as a whole to embrace budgets and consequently other elements from outside the region might probably risk not only

the spirit but the expected results of the RCA Programme.

The RCA does not need to be desperate yet. We do appreciate that our RCA Coordinator has been doing his best to at least secure the current amount of the UNDP contribution, and hope sincerely that his endeavour backed by own efforts of each member states to persuade the UNDP will bear fruits on behalf of the RCA. Even if it failed, sub-projects of the two Projects could still be secured by putting those with lower priority on the foot note a project list in that it is believed that the acknowledged achievements of the RCA over the years have been their own advertisement as far as potential donors have been concerned.

With regard to the draft proposal of so called Environmental Project which is to succeed the current Industrial Project from next year, Japan would like to make some remarks especially in the light of relative priorities among proposed sub-projects.

It would perhaps a bit too early to start Biomedical Applications sub-project. Designing Low Cost Radiation Facilities sub-project would have better effects if it is incorporated into related sub-projects, and has therefore lower priority. Radiation Sterilisation in Pharmaceutical Industry sub-project would be useful for the member states, and a question of how to relate it with the purpose of the Environmental Project now remains to be answered. Sub-project on the Treatment of Flue Gases, Sewage, Sludge, Municipal Waste Water and Airport Waste is of course given higher priority, and in executing it existing facilities could be utilised. Nuclear Analytical Technique Procedures sub-project would be given high priority, and the results attained so far in this field should be utilised. Tracer Technology sub-project could perhaps be absorbed in the Nuclear Analytical Technique Procedures sub-project, and therefore be given perhaps somewhere between middle and low priority. Nucleonic Control Systems sub-project is worth high priority with the possibility of

ceasing NCS in civil engineering. Local Design Capacity sub-project seems useful for transfer of technology but in terms of existing capability and infrastructure perhaps could be a bit too early. NDT for Metallic Materials sub-project is worth high priority, and NDT for Non-Metallic Construction Materials sub-project could be incorporated into it. Techniques for Characterising Materials sub-project would have lower priority in that it is very basic and thus has little possibility of putting it to practical use. Advanced Application of Radiation Technology sub-project which is good for environment should be worth higher priority. Harmonised NDT Standards in the Region sub-project is worth high priority, and so is High Standards of Operation of Radiation Facilities.

Last year witnessed yet another set of progress in the current projects supported by Japan, and brief outline in the light of our contribution to the activities, together with our plan for this year, is as follows.

First is the UNDP/RCA Industrial Project.

This year will mark the 10th anniversary of this Project to complete its 2nd phase, during which much has surely been done in the field of research and development.

With regard to Radiation Processing, Japan sent, in 1990, 4 experts to 6 member countries, and hosted 3 meetings. Capital investments by the developing member countries have been witnessed in this field, together with promotion of human resources and gradual but steady transfer of technology. We will this year extend continuous support to further this promotion and transfer by sending approximately 5 Japanese experts to 7 countries, and hosting about 3 meetings.

As to Non Destructive Testing, 5 Japanese experts were despatched to 7 member countries, and 1 workshop was hosted in 1990. The number of foreign

experts who had so far attended various courses steadily increased. I regret to mention, however, that not a small number of those experts for some reasons left this field, which seems to cut the number of still active experts to about 40 %. This leads bodies concerned to the necessity of giving more careful consideration in selecting candidates for these courses. On our part we will this year continue to support this sub-project with emphasis on examination and evaluation of the past attainment. To this end we will send about 14 Japanese experts to 12 countries, and hosting approximately 1 meeting.

With respect to Nucleonic Control System, Japan sent, in 1990, 7 experts to 4 countries. Introduction of equipments by large-scale industries has been, if not sufficient, observed. As for the human resources, we have members from the developing countries who could perform as lecturers at courses. Yet, the necessity of giving more careful consideration in selecting candidates for courses also applies to this sub-project. This year we will extend continuous support to further the progress in steel, paper and civil engineering by sending approximately 2 Japanese experts to 2 countries, and hosting about 3 meetings.

Second is the Medical and Biological Application Project.

We sent last year 2 experts to Thailand, and hosted 2 courses. This year we will continue to support the CRP on Imaging Procedures for the Diagnosis of Liver Diseases. Our preparation effort will be undertaken for the CRP on Improvement of Cancer Therapy. We will send 7 experts to 2 countries, and will as usual host a JICA Group Training Course in Medical and Biological Application of Radiation and Radioisotopes.

Third Project supported by Japan is Radiation Protection.

In 1990 we sent 2 experts to Australia, and hosted 2 meetings. We will this year continuously support this project, and send 3 experts to 1

country, host a TC on the Basic Techniques, undertake preparation works for a 1992 Workshop on Personal Dosimetry, and collect necessary data for a Reference Asian Man for which RCM will be held in April in India.

Last is very brief account upon two other projects of the RCA activities. With regard to Research Reactor Utilisation Project, Japan will continue to extend possible support through, for instance, sending experts, and accepting researchers and trainees etc. With respect to Phase III Food Irradiation Project, we sent, in 1990, 2 experts and hosted 1 meeting. Although we ceased, due to our domestic reasons towards food irradiation, our financial support at the completion of Phase I, we have thus remained interested in cooperating and contributing in kind to R & D in this field.

STATEMENT OF THE REPUBLIC OF KOREA
THE 13TH WORKING GROUP MEETING OF RCA
MEMBER STATES

Mr. Chairman, distinguished delegates, ladies and gentlemen,

My delegation wishes to express its warm gratitude to the Socialist Republic of Vietnam for hosting the RCA Working Group Meeting.

Mr. Chairman,

We are now entering a new phase of the RCA activities with the renewal of RCA Agreement and the new proposal of UNDP Industrial Project.

Under the auspices of the IAEA, the RCA has been growing for 20 years and will continue to grow, becoming the best regional community for nuclear co-operation in Asia and the Pacific Region. Although the RCA programmes had only a few co-ordinated research projects at the beginning, limited funds and great differences between the IAEA Regular Technical Co-operation Programmes in their formulation, administration and execution, the tremendous co-operation of all the Member States and ceaseless endeavors of the Secretary have made RCA what it is today.

Concerning the RCA/UNDP Industrial Project, Korea would like to note with pleasure that it will drop into the advanced state. The project has proved an effective vehicle thus far technology transfer to local industries through the successful completion of Phase I and II, which had made great contribution to expediting industrial application of nuclear technology in the Region. Radiation Technology Project is a very successful example for technology transfer to industries. At Gold Star Cable Co., Ltd., 3 electron accelerators are in commercial operation to produce crosslinked wire and shrinkable tube. Other 6 private companies are setting up new 6 electron beam accelerators.

Korea desires the UNDP Industrial Project will be further expanded and accelerated for the mutual benefit of the region in the future. Korea will continue to actively participate in and endeavor to our fullest to support the RCA/UNDP Industrial Project. Especially, Korea is considering the support of project concerned with NDT.

Mr. Chairman,

Korea had hosted three times "the RCA Regional Training Course on Nuclear Power Planning Implementation " for three weeks under our full financial support to share with RCA Member States our experience and technology in nuclear power accumulated over the past 20 years.

In addition, I am happy to report that Korea will also host and financially support again "Nuclear Power Pre-Project Activities and Manpower Development" financially October this year, providing about 20 participants with an overview of practical elements, problems and constraints involved in planning and implementation of nuclear power projects from pre-project activities to plant operation.

Concerning the RCA budget, we are satisfied that there has been and will continue to be a gradual growth of total RCA funds. Of the total amount budgeted for the RCA activities, more than half has been financed by Government contributions. Especially Japan and Australia have made a great contribution for the RCA activities since they joined the RCA in 1978. However, it is regrettable that it is not easy for the RCA to get extra finances. Korea is confident that contributions from non-RCA Member States or appropriate regional or International Organizations are beneficial to the expansion of the RCA activities.

In conclusion, Korea wishes to express its desire that this Working Group Meeting will bring about fruitful results for enhancing our regional co-operation. We are confident that the combined wisdom and efforts of all Member States will make it possible to find efficient ways for the successful operation of the RCA.

We would like to see the best use of the opportunity provided by this Working Group Meeting to identify with other participants possible areas of mutually beneficial co-operation. I also would like to express my heartfelt appreciation to the Deputy Director General, RCA Co-ordinator and UNDP Project Co-ordinator for the further enhancement of the RCA.

Thank you very much.

COUNTRY STATEMENT - MALAYSIA 13TH RCA
WORKING GROUP MEETING HO CHI MINH CITY,
VIET NAM 4-7 MAR 1991

Mr. Chairman and Distinguished Delegates,

The Malaysian delegation attends its greetings and good wishes to the Government of Viet Nam for hosting this important meeting in an excellent manner, along with the warm hospitality.

We recognize the Regional Cooperation Agreement (RCA) as one of the useful vehicles for nuclear technical cooperation in the Asia and Pacific Region, in that it has played an important role in promoting the peaceful uses of nuclear energy and isotope applications in the medical and agricultural fields as well as industry over the past two decades.

The Malaysian delegation appreciates the roles played by the IAEA representatives concerned, RCA Coordinator and Project Coordinator for UNDP Industrial Projects for their devotion in implementing the RCA programmes.

The Government of Malaysia through the active coordination of the Nuclear Energy Unit (UTN) has actively participated in various activities under the RCA Programmes. Malaysia has benefited greatly from these activities and

looks forward to closer cooperation, viz in the fourth extension of the RCA agreement.

The progress made in the various activities in Malaysia during 1990 under the RCA programme is summarized as follows:-

1. The UNDP/RCA Industrial Project.

1.1 Tracer Technology:

Malaysia established a pool of nuclear scientists specialised in the management of the applications of tracer/sealed source of radioisotopes, as well as for planning and executing tracer/sealed source research. The Malaysian industry responded positively towards the applications of these techniques particularly in the area of trouble shooting and environment. To meet the demand of the industry the NEU set up a promotional programme with emphasis on-site demonstration.

1.2 Non-Destructive Testing:

This project which received full support from the RCA/UNDP/IAEA played a major role in upgrading the quality of NDT in the country. Under the auspicious of the National Qualification and

Certification Scheme (NQCS), four National Trade Standards for NDT personnel were approved and implemented, the last being the standard for liquid Penetrant Tester which was approved in 1989. The standard for eddy current tester which is mainly used in the aviation industry and already bound by the International Regulation will be realised in 1992.

Since the implementation of the NQCS, a total of 36 National Training Courses have been conducted in accordance with the National Trade Standard and supported by the IAEA/RCA/UNDP in the form of experts/lecturers.

Malaysia hosted the Regional NDT examination Board Meeting from 5-9 Feb. 1990 and Regional Training Course on Surface Method Level 2 from 5-23 Nov. 1990.

The size of the current NDT activities and the expected demand in the future prompts the government to establish a National NDT Centre of Excellence. The centre is to be fully operational by the end of the sixth Malaysian Plan (1991-1996). This will ensure the improvement, control and monitoring of the quality of local industrial products.

The Malaysian Society of Non-Destructive Testing was approved in December 1989 and the first Annual General Meeting of the Society was held in March 1990. The response from the various parties such as servicing companies, users and the government sector was very encouraging towards the establishment of the society was well received. This will, hopefully enhance the standard of professionalism in NDT in Malaysia.

1.3 Radiation Technology:

Research in the area of radiation vulcanization of natural rubber latex (RVNRL) is being actively undertaken. A national research group comprising of researchers from the Rubber Research Institute of Malaysia (RRIM), the National University of Malaysia (UKM) and the Nuclear Energy Unit (UTN) has been formed. Initiatives to formulate regional cooperation on the subject will be an added advantage. A national workshop on RVNRL was held from 6-7 Sept. 1990.

Since the commissioning of the gamma irradiation facility in early 1989 until Dec. 1990, more than 5000 cubic metres of medical products such as surgical and examination gloves and containers (for eye solution) have been sterilized using the facility. Expansion

programme for sterilization of medical products is being planned in anticipation of the installation of an electron beam machine (EBM) at the Unit under the bilateral cooperation with the Government of Japan.

Malaysia hosted the RCA/UNDP Regional Workshop on Regulation in Industrial Sterilization from the 28-30 June 1990.

Radiation curing of surface coating is one of the areas which has great potential to be applied in our industry. UTN acquired two EB machines through the bilateral cooperation arrangement between UTN and JICA. UTN will intensify R&D in this field once the EB machines are commissioned in June 1991. The field of research to be emphasised is radiation curing of surfaces.

Radiation crosslinking of plastic is one of the technology which is attracting serious consideration at UTN in view of the polypropylene and polyethylene production that is being planned in 1992 and 1994 respectively by the Malaysian petroleum authority. A number of scientists from UTN are being trained in this field under the bilateral cooperation with the Government of Japan.

Nucleonic Control System (NCS)

The application for NCS in industry is still at an early stage. However, through the promotional programmes conducted at the Nuclear Energy Unit in cooperation with the IAEA under the RCA/UNDP Industrial Application project and to some extent due to the economic recovery, the number of NCS and nucleonic instruments being used in the country has increased. Five nucleonic control systems have been installed in the paper and pulp industry. Six more systems, one of which is a density gauge have been installed in the mineral industry. Nuclear gauge for measuring density and moisture content of soil and soil aggregates have been used by several government agencies and civil engineering companies.

2. Medical and Biological Applications of Nuclear Techniques.

The project on the Radiation Sterilization of tissue grafts. is conducted by the Nuclear Energy Unit (UTN) in collaboration with the University of Science Malaysia (USM). Steady progress has been made whereby amnion from human placenta is produced for the treatment of burn patients. Under the 1991/92 IAEA Technical Assistance, the capability to produce amnion, artificial/animal

skin and bone will be further developed. High quality radiation sterilized grafts will be produced routinely for use by various hospitals on a wider scale. Malaysia participated in the Regional (RCA) Training Course on Radiation of Tissue Graft for safe clinical use from 3-14 Dec. 1990 which was held in the Republic of Korea.

With regard to the project on Radioimmunoassay (RIA) of Thyroid Related Hormones, excellent progress has been achieved and the 5 laboratories participating in the project are now self-sufficient in the supply of all primary reagents. Malaysia hosted the Research Co-ordinated Meeting on Optimization of Nuclear Techniques for the survey of Thyroid Function of Newborn in Endemic Goiter Areas from 27-30 Aug. 1990.

Malaysia is also participating in the CRP on Computer-Assisted Planning and Dosimetry in Radiotherapy of Carcinoma of the Cervix in Asia and Pacific. This project started in 1990, and has made some significant progress in the development of the PC-system, especially after participation in the first Regional Coordination Meeting which was held in Thailand (30 Oct. - 2 Nov. 1990). Further development should be intensified among the RCA countries to coordinate PC-Based system using common software, for the planning and

dosimetry of carcinoma of the cervix treated by radiotherapy.

The project on the Use of Computers in Technitium-99 Imaging, is progressing steadily.

There are 6 laboratories/institutions in Malaysia participating in the project on Basic Care, Preventive Maintenance of Nuclear Medicine Instruments, which began in 1989. Under this project, the laboratory at UTN has developed a software for instrument inventory in small laboratories. This software will be introduced to the participating institutions to be implemented. A National Training Course on Preventive Maintenance and Quality Control of Nuclear Medicine Instruments was held from 30 July - 4 Aug. 1990 at UTN.

3.0 Agriculture and Food

Malaysia is participating in 3 projects in this area. The first project is Nuclear Technique for Toxic Element in Food-stuffs. Under this project, methods for sampling and analysis have been established. It was found that the concentrations of toxic-element except arsenic are within the permissible level as specified in the National Food Legislation and International Guidelines.

The second project in agriculture is on the Use of Isotopes in the Studies to Improve Yield and Nitrogen Fixation of Common Grain Legumes. Under this project, an IAEA expert, Dr. Kauser A. Malik visited Malaysia in November 1990 to assist the selection of the site and in the setting-up ¹⁵N labelled plants for future experiments and to discuss experiments related to the screening of Rhizobium and groundnut genotypes for increased yield and nitrogen fixation.

The 3rd project is on Food Irradiation (RPFI - Phase III). A Food Irradiation Working Committee comprising of various government agencies, research institutes and universities was formed to identify food and agriculture commodities that should be given priority and to coordinate R&D in food irradiation. Presently, two gamma sources are available at the Nuclear Energy Unit namely Gammacell with activity 10kCi as of Nov. 1985 and ⁶⁰Co JS-8900 ¹⁷⁴Ir with activity 1.5 MCi as of 1st December 1990. Our participation in the RPFI - phase III includes the commercial irradiation of pepper and transportation trial and irradiation of tropical fruits to meet quarantine regulations. A pilot scale study of pepper irradiation using ⁶⁰Co on cost evaluation and marketing trial is nearing

completion. Malaysia hosted the RCM on the use of irradiation as a Quarantine Treatment for food and agricultural commodities from 27-31 August 1990.

4. Radiation Protection.

In the field of radiation protection, Malaysia participated in the IAEA/RCA inter-comparison on personal dosimeter. A total of 21 film badge systems have been sent to JACR7 for irradiation from X-ray from ¹³⁷CS and ⁶⁰Co. Malaysia participated in the Regional Training Course on the Development of Radiation Protection Infrastructure for Ensuring Radiation Protection held in Australia between 10 Sept. and 5 Oct. 1990 and the Regional Workshop on Personal and Environmental Dosimetry held in Japan between 22 and 26 October 1990.

5. Research Reactor Utilization.

Malaysia participates in a CRP on The Use of Personal Computers to Enhance Research Reactor Operation and Management. The PUSPATI TRIGA Reactor is used as a model for simulation. Two modules have been developed as bases for simulation software. The first module involves video display structure and the use of keyboards

to input data required in the simulation. This module needs to be further developed to include real-time handling of different reactor parameters.

The second module is on the mechanisms of reactivity changes during actual reactor operation.

6. Other Activities - Marine Contaminant and Sediment Transport.

A research committee consisting of five research laboratories was set up to implement this project. An IAEA expert, Prof. R. Carpenter, conducted 2 missions for the identification of the sampling stations and to conduct sample collection. In his 3rd mission which will be in March 1991, Mr. Carpenter will assist in the computer processing and modelling of the data collected.

7. New Project Proposals.

At the 12th RCA Working Group Meeting in Chiang Mai, 3 new projects was proposed. Malaysia wishes to support and participate in all of the projects viz:

- i) Integrated Control of Tropical Plants viruses with Nuclear Techniques.

ii) The use of radiation technologies to address pollution problems (gas and sewage) (Malaysian will be able to participate only from 1993).

iii) The control and eradication of termites.

COUNTRY STATEMENT - PAKISTAN
FOR
13TH RCA WORKING GROUP MEETING,
HO CHI MINH CITY, VIETNAM,
MARCH 4-7 , 1991

Pakistan is very happy to participate in the 13th Working Group Meeting of RCA Member States being held at Ho Chi Minh City, Vietnam. As a member of RCA, Pakistan is keenly participating in almost all its activities and has greatly benefited in terms of training, workshops, seminars, Working Group Meetings, etc. A number of research contracts are in progress in Pakistan under RCA programme.

Looking at the performance of RCA, we believe that it will continue to play a very useful role in promoting peaceful uses of nuclear techniques in industry, agriculture, biology and medicine. Pakistan wishes to express its warm appreciation to the Agency and all the RCA Member States for their cooperation and assistance in RCA activities.

I would like to discuss the activities carried out during 1990 under the RCA:

A. UNDP/RCA REGIONAL PROJECT ON INDUSTRIAL APPLICATIONS
OF ISOTOPES AND RADIATION TECHNOLOGY

In the phase-II of this project, Pakistan made following progress in different Sub-projects:

1. Non-Destructive Testing (NDT).

One Regional Training Course on Eddy Current Level-2 was held from 16 Sep-4 Oct, 1990 at NORI, Islamabad. There were 13 participants while Australia and the Philippines provided experts to help the National Coordinator.

Persons from various private and government industrial organizations attended 6 national training courses organized under the sub-project as below.

Two Level-1 Radiographic Testing Courses were held from 3-15 Feb and 1-13 Dec, 1990 and 23 participants were awarded certificates. In the two Level-1 Ultrasonic Testing Courses held from 18-30 Aug and 1-15 Sept, 1990, 22 participants were awarded certificates. One Level-1 Eddy Current Testing Course was held from 5-17 May, 1990 in which 11 participants were awarded certificates. One Level-2 Surface Methods Course was held from 3-22 March, 1990 where 11 personnel were awarded certificates. An NDT Appreciation Course For Managers was held from 11-22 Nov, 1990 which was attended by 15 participants. All these Courses were held in accordance with the syllabi given in IAEA TECDOC-407 and examination was conducted in accordance with the guidelines of the ISO document ISO DIS 9712.

During 1991 Pakistan plans to hold 6 Courses under the same headings. The National Coordinator for NDT Sub-project participated in the 6th National Coordinators Meeting held from 9-12 April, 1990 at Shanghai, Peoples Republic of China. Three

participants from Pakistan attended different Regional Training Courses held in Indonesia, Philippines and Japan.

Since this programme is of great importance, it is suggested that these activities may be continued in future under the RCA programme.

2. Tracer Technology.

A Regional Training Course on the use of Tracer Technology in Industry was held from 25 Nov-13 Dec 1990, at INMOL, Lahore. The activities under this Sub-project included survey of industries to explore the possibilities of radiotracer applications.

3. Radiation Technology.

The Principal Investigator of the project on Radiation Technology attended Expert Advisory Group Meeting held at Takasaki, Japan, in April, 1990. The Sub-project coordinator alongwith one other scientist attended the Coordinators Meeting held at Takasaki, Japan, in April, 1990.

One person from the Chipboard Industry attended EMS on Industrial Radiation Curing Technology in March, 1990 at Jakarta, Indonesia. One scientist from Pakistan attended Regional Training Course on Radiation Crosslinking Technology Application to Wire and Cable, held in Peoples Republic of China in September, 1990. One senior scientist attended RTC on Industrial Radiation Sterilization - Quality Control and

Compatibility of Materials held at Bombay, India in September, 1990.

4. New UNDP/RCA Project Proposal

The project on the "Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development" with specified elements such as Public Health and Environment, Industrial Production, Industrial Quality Control, and Materials Research and Development are all of interest to Pakistan. We support all these activities.

B. MEDICAL AND BIOLOGICAL APPLICATIONS OF
NUCLEAR TECHNIQUES.

1. Radioimmunoassay (RIA) of Thyroid Related Hormones

INMOL Lahore, which is the Coordinating Medical Centre from Pakistan, has done a lot of good work on the production of RIA reagents. During last year 60,000 tubes of T4, 50,000 tubes of T3 and 31,000 tubes of S.S. TSH reagents were prepared and supplied within the country. Similarly, complete range of reagents for T4, T3 and TSH, each of 6000 tubes, were supplied to Burma. In addition radiolabelled tracers prepared at INMOL were supplied to Sri Lanka and the Philippines.

About 2000 vials of EQAS pools were prepared at INMOL and exchanged with other two regional coordinating countries namely Thailand and Republic of Korea. Distribution of EQAS pools was also made to the associated national labs and regional country coordinators in Bangladesh, Indonesia and Singapore.

The National Coordinator participated in the meeting held at Chiang Mai, Thailand in March, 1990.

Pakistan has submitted a new project proposal on "RIA for Hepatitis B Diagnosis" to the Agency for consideration. This project is of great importance and Pakistan will participate in all its activities.

It is suggested that following new proposals may be considered:

- i) To develop tissue culture facilities for raising monoclonal antibodies from relevant cell lines (TSH, LH, FSH, PRL) with aims to develop hybridoma technology at a later stage.
 - ii) Estrogen receptor assays technique and their diagnostic applications in screening and management of breast cancer.
2. Imaging Procedures for the Diagnosis of Liver Diseases (Phase-II)

About 45 patients were selected for objective evaluation by scintigraphy and ultrasonography imaging techniques. The liver images provided by the Japanese counterpart were interpreted and evaluated by 20 nuclear physicians and sonologists in the country and were sent back to Japan. The Agency had provided an ATS 539 Phantom for quality control of ultrasound equipment.

A workshop was arranged in October, 1990 at Atomic Energy Medical Centre, Jamshoro for interpretation of Japanese sonograms and scintigrams. The Principal Investigator attended the First Research Coordination Meeting held at Bandung, Indonesia in February, 1991.

3. Improvement of Cancer Therapy (Phase-II).

Research proposals have been submitted to the Agency for the award of research contracts.

4. Radioaerosol Imaging for the Diagnosis of Respiratory Diseases.

During the final phase of the project, the radioaerosol imaging of lungs in the chronic obstructive pulmonary disease was put to routine clinical use alongwith the perfusion imaging for the diagnosis of overall lung function. About 100 patients suffering from asthma, emphysema, chronic bronchitis, bronchiectasis and various combinations of these clinical conditions were studied. The procedure is, therefore, now being practiced at the Institute regularly like other radionuclide imaging procedures.

The Principal Investigator of the project participated in the Research Coordination Meeting held at Singapore in February, 1991.

5. Strengthening of Radiation Protection Infrastructure

One scientist from Pakistan participated in the IAEA/RCA Workshop on Intercomparison of Personnel Dosimeters, held at

Tokai - Mura, Japan, in October, 1990. The Workshop was very useful for the participants and it is suggested that such activities should be continued.

6. Radiation Sterilization of Biological Tissue Grafts.

Two Doctors from nuclear medicine attended the Regional Training Course on "Radiation Sterilization of Tissue Grafts for Safe Clinical Use in Health Care" held at Chinion, Republic of Korea in December, 1990. Pakistan would like to start a project on tissue banking.

7. Care and Maintenance of Nuclear Medicine Instruments.

All Nuclear Medical Centres in Pakistan are participating in this project with INMOL Lahore as the National Coordinating Institute. The participating Centres have been asked to adopt the standard procedures for preparing the inventory and some suggestions for improvement in the existing situation regarding repair and maintenance have been given. The National Coordinator participated in the first RCM on this project held at Indonesia in November, 1989, in which it was decided that each participant will hold workshop training course in his country to train the technologists and related persons. In the light of this decision, a one week National Workshop (Level-II) on Care and Maintenance of Nuclear Medicine Instruments was conducted in September, 1990 at INMOL Lahore.

C. AGRICULTURAL PROJECTS

1. Food Irradiation Process Control and Acceptance
 (RPFI - III).

Work on this project was carried out successfully from April to December, 1990. Bulk quantities of potatoes, onion and garlic were irradiated at 0.1 kGy. No sprouting was reported upto 6 months of storage. In spices, red chillies and black pepper were selected as these are widely consumed in Pakistan. Irradiation of these spices at a dose of 8.0 kGy totally decontaminated them from fungi upto 6 months storage. Consumer acceptability of irradiated potatoes and onions was carried out. For consumer education, 2 films have been produced with the help of Pakistan Television Corporation. Regular exhibitions are held by NIFA Peshawar and national seminars and training courses are held to educate the scientists and the public.

2. Improvement of Grain-legume Rhizobium Symbiosis to
 Fix Atmospheric Nitrogen

During last year 10 chickpea and 13 lentil cultivars/advanced mutants were screened for effective nodulation. A better nodulation and dry biomass yield were observed in some genotypes of chickpea in response to effective indigeneous strains. The overall response of inoculation on nodulation of lentil cultivars was non-significant. Nodules were absent on uninoculated plants of lentil indicating lack of native population.

About 70 local cowpea bradyrhizobial/rhizobial strains have been isolated from mungbean, blackgram, siratro and cowpea. Forty strains of R. leguminosarum biovar viceae were isolated from lentil. All the strains were effective on their respective host with various degree of effectiveness. About 30 strains of R. leguminosarum biovar viceae and 18 strains of cowpea Rhizobium/Bradyrhizobium were characterized on the basis of intrinsic antibiotic resistance pattern and utilization of different carbohydrates as energy source.

A joint FAO/IAEA/UNDP Workshop and Research Coordination Meeting of the Coordinated Research Programme on the "Use of Isotopes in Studies to Improve Yield and Nitrogen Fixation of Grain Legumes in the Tropics and Sub-tropics of Asia" was held at NIAB Faisalabad from May 2-10, 1990 in which 7 participants from different countries attended.

3. Integrated Control of Tropical Plant Viruses
with Nuclear Techniques.

Pakistan is interested to participate in this project. NIAB Faisalabad is working on different aspects of legumes and will be interested to work on the control of yellow mosaic virus in legumes.

NEW PROJECT PROPOSALS

1. Regional Programme to strengthen Research on Animal
Reproduction and Disease Diagnosis in Asia through
Application of Immunoassay Techniques.

NIAB Faisalabad has a programme on health and

reproduction of farm animals particularly the goat and has great interest in participating in this programme particularly on animal reproduction.

2. Regional Asian Project on Nitrogen Fixing Trees for increasing Soil Fertility, Crop and Fuel Wood Production.

A research project under the Agency's CRP on the "Management of Nitrogen Fixation Trees for Restoring and Managing Soil Fertility" was submitted by AEARC Tandojam to the Agency for consideration but no action has yet been taken on this project.

A research contract on Nitrogen Fixation in Fast Growing Trees in Saline Environment has been awarded to NIAB Faisalabad. During last year, indigenous population of cowpea Bradyrhizobium, Rhizobium leguminosarum biovar paseoli, vicae and trifolii, R. meliloti, Bradyrhizobium japonicum and Bradyrhizobium associated with Acacia auriculiformis was determined from two saline soils by using plant infectivity test. Screening of five local and three exotic Bradyrhizobium strains for effective nodulation on Acacia spp. were studied in glass pots containing sterilized sand. All local and exotic strains were effective on A. saligna, A. ampliceps, A. sterophylla, and A. auriculiformis except on A. aneura.

3. Use of Nuclear Techniques to Improve Forest Tree Species.

NIAB Faisalabad is interested to carry out work on this project under the RCA programme.

4. Applications of RFLP Technology in Fundamental Genetics and Breeding programmes in Crops.

In this project also NIAB Faisalabad is interested to participate under the RCA programme.

D. RESEARCH REACTOR BASED PROJECT

1. Research Reactor Utilization

Several research reactors are in operation in many Member States, as such the Research Reactor Utilization programme under RCA should be strengthened. The use of research reactors for materials research is of fundamental importance. Certain important investigations of structure of materials can only be reliably investigated using reactor neutrons. Thus the use of research reactors for high technology materials investigation will be an essential part of current and future requirements.

It is suggested that experiments for materials structure examinations (such as high Tc super-conducting ceramics) and investigation of micro-structure defects in reactor materials should be emphasized. The programme of materials study entailing the industrial potential concerns with the determination of stress and texture of materials should also be exploited.

Two scientists from Pakistan participated in the Regional Workshop on Research Reactors held in Beijing, Peoples Republic of China, in Nov., 1990.

E. ENERGY BASED PROJECTS

1. Nuclear Power Project Planning and Implementation
(KAERI Training Courses).

One senior engineer from Pakistan participated in the Regional Training Course held at KAERI, Daejon, Republic of Korea from 22 October to 9 November, 1990. This course provided participants with an overview on the technical, economical and organizational problems which are central to the formulation of nuclear power programme strategies.

2. Energy and Nuclear Power Planning

One scientist from Pakistan participated in the Fourth Regional Workshop on Energy, Electricity and Nuclear Power Planning held at Daejon, Republic of Korea in August, 1990. He presented a paper on "A WASP-3 Based Electric System Expansion and Variable Load Duration curves". These workshops are very useful in providing an opportunity to share experience and information. It is suggested that this activity may be continued in future.

A Regional Training Course on Electricity Expansion Planning (WASP course) was planned to be held in Pakistan in February/March, 1991. However, on the request of the local co-sponsoring agency, WAPDA, the Course has now been deferred to 1992.

F. OTHER COMMENTS

1. RCA Seminar - II

In the 12th RCA Working Group Meeting held at Chiang Mai, Thailand, the delegate from Pakistan suggested that a 2nd RCA Seminar may be convened on similar lines as that for the first Seminar. Pakistan again reiterates its suggestion for convening RCA Seminar - II in 1992.

2. Civil Engineering

Keeping in view the importance of Civil Engineering in the area of public welfare including soil investigation, materials testing, water resources management (waterlogging and salinity, seepage from reservoirs and canals, etc.), sewerage engineering, it is suggested that this field should be given due importance in RCA programme.

Pakistan fully supports RCA activities and has great desire to further promote this cooperation and looks forward to further renewal of RCA agreement in 1992. On behalf of Pakistan, I would like to thank the Government of Vietnam for hosting 13th RCA Working Group Meeting.

COUNTRY STATEMENT OF THE PHILIPPINES

13TH WORKING GROUP MEETING OF THE RCA MEMBER STATES

HO CHI MINH CITY, VIET NAM, 4-7 MARCH 1991

The Philippines as a signatory to the RCA Agreement is participating in the following activities:

1. Regional Industrial Project

- 1.1 Tracer Technology in Industry
- 1.2 Nucleonic Control Systems
- 1.3 Non-destructive Testing
- 1.4 Radiation Technology

2. Medical and Biological Applications of Nuclear Techniques

- 2.1 Radioimmunoassay of Thyroid-Related Hormones/Hepatitis
- 2.2 Use of Computers in Technetium 99m Imaging
- 2.3 Imaging Procedures for the Diagnosis of Liver Diseases (Phase II)
- 2.4 Inhalation Imaging for the Diagnosis of Respiratory Diseases
- 2.5 Radiation Sterilization of Biological Tissue Grafts
- 2.6 Strengthening of Radiation Protection Infrastructure
- 2.7 Care and Maintenance of Nuclear Medicine Instruments

3. Agricultural Projects

- 3.1 Food irradiation Process Control and Acceptance

4. Research Reactor and Energy Based Projects

- 4.1 Research Reactor Utilization
- 4.2 Energy and Nuclear Power Planning

Tracer Technology in Industry

A member of the national tracer group attended the training course on Tracer in Industry, held in Lahore, Pakistan 27- October - 15 November 1990. Two members of the national tracer group will undergo three months on-the-job training at the Australian Nuclear Science and Technology Organization during the second quarter of 1991. A national demonstration course is planned for late 1991.

The Philippines supports the proposed project on the use of tracers for termite control. Studies using I-131 labelled baits have been initiated.

Non-Destructive Testing

The Philippines was host to the training course on Non-Destructive Testing, RT-3 held in Quezon City, 4-22 June 1990. This is the second time the Philippines hosted a training course under this sub-project.

Five national training courses were held during the period: RT-2; UT-1 (two); UT-2; SM-2. From 1 September to 9 November 1990, the National Certifying Body (NCB) conducted the qualification evaluation and acceptance of applications to certify qualified NDT practitioners in the different NDT techniques and levels. A total of 228 certificates for the different techniques and levels for 103 NDT practitioners were issued.

The National NDT Co-ordinator participated in the Second Meeting of the Ad-hoc Regional Board of Examination Review Sub-project: NDT and the Expert Advisory Group Meeting on Radiation Protection for NDT Radiographers held in Jakarta, Indonesia from 28 January to 1 February 1991.

For 1991, certification and qualification of NDT personnel under the national standard PNS - 146: 1987. The Philippines expects to send one candidate to the Regional Qualification Examination for Radiography Level 3 in Kuala Lumpur, Malaysia from 21-25 October 1991. National training courses in: ET-1, SM-1, ET-2, UT-1, UT-2, and RT-2 are programmed for the year.

Radiation Technology

Medical Sterilization

A national training course on Radiation Sterilization of Medical Products was conducted at the Philippine Nuclear Research Institute, 8-12 October 1990. Three IAEA experts and five local experts lectured in the course. Thirteen participants attended the course.

A quality control manager from Ashford Laboratory, a pharmaceutical firm, attended the training course on Industrial Radiation Sterilization - Quality Control and Sterility Assurance, Bangkok, Thailand, 14-25 May 1990. A quality assurance manager from Johnson and Johnson (Phil), Inc., a manufacturing company of medical supplies in the Philippines attended the training course on Industrial Radiation Sterilization - Quality Control and Compatibility of Materials, Bombay, India, 17-28 September 1990.

A survey of radiation sterilization users is planned for completion in 1991.

Radiation Curing

The UV curing system being provided under the project was installed at the particle board secondary processing plant of the Forest Products Research and Development Institute (FPRDI). However, to make the system operational for demonstration and training purposes, the expert who did the installation recommended that a transformer and a suitable conveyor be procured. In view of this the national training course has been postponed until such time that the system is operational.

The Philippines had two participants in the training course on Radiation Curing of Surface Coatings on Wood Products held in Jakarta, Indonesia, 4-22 June 1990. The President of the Chamber of Furniture Industries attended the training course on Radiation Curing of Surface Coatings, Sydney, Australia, 18 February - 1 March 1991.

Electron Beam Treatment of Flue Gases

A national executive management seminar on Electron Beam Treatment of Flue Gases was held at the National Power Corporation, 22 October 1990. The seminar had two foreign and one local lecturers. Eighteen participants attended the seminar.

Radioimmunoassay of Thyroid Related Hormones/Hepatitis

Two medical technologists from two government hospitals will be attending the training course on diagnosis of viral hepatitis infection by radioimmunoassay, Shanghai, China, 18-29 March 1991.

Use of Computers in Technetium 99m Imaging

A medical technologist from a local hospital attended the training course on the Use of Computers in Tc-99m Imaging held in Sydney, Australia, 26 February to 12 April 1990.

Imaging Procedures for the Diagnosis of Liver Diseases (Phase II)

The present study under Research Contract No. 5692/JN involves a baseline investigation of current capabilities of participating hospitals in the interpretation of liver images in both nuclear medicine and ultrasound. Gamma camera and ultrasound instruments are tested for quality control and quality assurance.

Inhalation Imaging for the Diagnosis of Respiratory Diseases

The Philippines participates in this program through Research Contract No. 4808/RB. Using the BARC-developed aerosol generator and inhalation apparatus, initial studies were conducted

using Tc-99m labelled diffusible and non-diffusible aerosols (Tc-99m phytate and Tc-99m DIPA). Results are satisfactory. Other lung diseases may be studied using the technique.

Radiation Sterilization of Tissue Grafts.

The establishment of a bone and tissue bank at the College of Medicine, University of the Philippines, under the Department of Orthopedics, Philippine General Hospital has made possible the availability of tissue allografts (bone and amnion). Gradually, allografts from the tissue bank are gaining popularity as a common alternative to autografts. Six medical centres, are now using these allografts, namely: Philippine General Hospital, Philippine Orthopedic Centre, Chinese General Hospital, St. Martin de Porres Hospital, Tondo General Hospital, and Tala Leprosarium.

Two medical doctors attended the training course on Radiation Sterilization of Tissue Grafts for Clinical Use, Seoul, Korea, 3-14 December 1990.

Strengthening of Radiation Protection Infrastructure

The Philippines participated in the Regional Workshop on Intercomparison of Personal Dosimeters held at the Japan Atomic Energy Research Institute and Power Reactor and Nuclear Fuel Development Corporation (PNC), Japan, 22-26 October 1990. The Philippine results in the dosimetry intercomparison programme were presented during the workshop.

It expects to participate in the research co-ordination meeting for the project: "Compilation of Anatomical, Physiological and Metabolic Characteristics for a Reference Asian Man" which will be held in India, March 1991. It participated in the TC on the Development of Infrastructure for Ensuring Radiation Protection, Australia, 10 September - 5 October 1990.

Care and Maintenance of Nuclear Medicine Instruments

The Philippines participates in this program through Research Contract No. 5446/R1/RB. Under this contract an expanded in scope to conform with the information requirements set by the program. The survey now includes other hospitals in addition to the eight previously covered.

To upgrade personnel capability for maintenance of nuclear medicine instruments a national seminar-workshop on Quality Control and Quality Assurance of Nuclear Instruments is planned for late March 1991. One of the outputs of this research contract is a draft manual on the organization of training courses for technologists involved in the quality control and preventive maintenance of nuclear medicine equipment. Materials from counterpart institutes in the programme will be used as a basis for the draft manual.

Food Irradiation Process Control and Acceptance (RPFI Phase III)

Two research contracts are being undertaken under this project, namely: Research Contract No. 6388/DP "Evaluation of Shelf Life and Quality of Mangoes Irradiated with Doses Required for Fruit Fly Disinfestation - Simulated Commercial Trials" and Research Contract No. 5944/DP "Use of Gamma Irradiation for Enhancing the Marketability of Selected Seafood and Agricultural Corps".

Research Reactor Utilization

The Philippines was pleased to host the first research co-ordination meeting of the co-ordinated research programme on the "Application of Personal Computers to Enhance Operations and Management of Research Reactors", 12-16 November 1990.

Research Contract 6049/RB commenced in August 1990. The objective of the study is to show that personal computers can be successfully incorporated into the existing instrumentation system of a research reactor without major hardware modification of either the computers or instruments, and that doing so will immediately bring significant safety and operational benefits.

Enough new hardware to assemble the personal computers needed by the project have been obtained since the research contract commenced. The computer hardware is being tested. Parts for the interface with the reactor instrumentation, mostly analog-to-digital cards and opto-isolating cards, will be obtained soon. Software development will begin as soon as the hardware is ready.

COUNTRY STATEMENT OF THAILAND
13TH RCA WORKING GROUP MEETING
4-7 MARCH 1991, HO CHI MINH CITY, VIET NAM

Mr. Chairman,

On behalf of the Thai delegation, I would like to express my sincere congratulation to you on your unanimous election as the Chairman of this important meeting of the Representative of the RCA Member States.

I am most pleased to meet with other delegations here in Ho Chi Minh City to review the RCA activities over the past year and to discuss the peaceful uses of nuclear science and technology in the Asia and Pacific region.

During the past year, there were several activities in our participation. I wish to take this opportunity to present the progress made in various activities in Thailand.

1. UNDP Regional Industrial Project

Tracer Technology

A national seminar and field demonstration on the use of tracer technology in petroleum and petrochemical industry was organized in the Eastern Seaboard Project area in the eastern part of Thailand with experts supported from the Project during 11-15 June 1990. There were 27 executives, engineers and scientists from petroleum and petrochemical industries and researchers and lecturers from research institutes and universities. Three main topics for the field demonstration were the depropanizer column scanning, flow-rate measurement of the cooling water system and material corrosion testing. Another one national seminar and field demonstration was planned to be organized in the mid of 1991.

Non-Destructive Testing (NDT)

In 1990, OAEP has conducted 3 national training courses: UT-1, UT-2, and RT-2, there were 55 participants; 30 from private sectors and 25 from government organizations and state enterprises. For the regional training courses, Thailand had sent 7 NDT persons to attend those courses.

For the standardization, Thailand is setting up NDT standardization and also establishing of qualification and certification of NDT personnel along with ISO draft standard.

Radiation Technology

A National Research Group (NRG) for the Radiation Vulcanization of Natural Rubber Latex (RVNRL) was set up among the scientists from 8 institutes. The National Co-ordinator, Radiation Technology Sub-project together with the leader of NRG are playing the major roles in R&D programme on RVNRL in collaboration with the other members of NRG. The NRG is intensively carrying out research and development national programme and co-ordinated programme to overcome the inferior properties of products from RVNRL and to reduce cost of radiation vulcanization. The national research project on "Technology Development of RVNRL Products" was planned for 3 years; starting from 1989 to 1991. The research is granted by Ministry of Science, Technology and Energy. The project is going on satisfactorily. The technology was introduced to public by broadcasting, seminar and national training course.

The OAEP's Thai Irradiation Centre (TIC) with 450 kCi Co-60 source has given services in the medical purposes. Due to the problem of public acceptance on food irradiation, the centre is the facility for carrying out the R & D on food Irradiation. Since its establishment in August 1989, the TIC has irradiated medical gloves, herbs, corn flour for pharmaceutical purpose and natural rubber latex for radiation vulcanization.

As for technology transfer, Thailand had hosted 3 regional training courses on industrial radiation sterilization with emphasis on quality control and sterility assurance since 1987 with the support from the project. A Regional Workshop on Industrial Radiation Sterilization - Regulatory Aspects is going to be held at OAEP in April 1991.

With respect to the environmental protection programme, OAEP is conducting R & D on radiation treatment of sewage sludge for safe disposal. A national seminar was organized at the OAEP in order to introduce the technology to other government institutions and private sectors.

Nucleonic Control Systems (NCS)

In Phase II, Thailand was selected to be the training and demonstration centre on the use of NCS in coal processing at Mae Moh Lignite Mine of the Electricity Generating Authority of Thailand (EGAT) in Lampang. Due to incomplete calibration of COALSCAN-3500 equipment by the supplier at the Mae Moh Mine, the activity on this project in 1990 was to be postponed.

2. Medical and Biological Applications of Nuclear Techniques

Radioimmunoassay of Thyroid Related Hormones

The Third National Co-ordinator Meeting on Radioimmunoassay of Thyroid Related Hormones was organized in Chiang Mai, Thailand during 12-16 March 1990. There were 24 participants; 8 Experts, 11 National Co-ordinators and 5 local scientists.

Imaging Procedures for the Diagnosis of Liver Diseases - Phase II

The comparison of the two methods for diagnosis of liver diseases; by gamma camera and by ultrasound, has been studied by a group of physicians and experts in nuclear medicine and ultrasound diagnosis. The result was reported in the National Co-ordinators Meeting in Bandung, Indonesia during 18-20 February 1991. It can be concluded, for the initial stage, that ultrasound is the better method for diagnosis of liver tumour while gamma camera can be used for other diffuse liver diseases such as cirrhosis and hepatitis. It is believed that the combination of the two methods should result a more accurate diagnosis of liver diseases. This subject is to be studied in the second stage of this programme.

Radioaerosol Imaging for the Diagnosis of Respiratory Diseases.

In 1990, the technique of mucociliary clearance study using modified BARC nebulizer system and technique of Tc-99m DTPA clearance using aerosol generator have been developed without any complicated procedure and the result was satisfied. The mucociliary clearance was performed in 10 normal subjects and 22 chronic obstructive pulmonary diseases (COPD) patients. The pulmonary epithelial permeability (Tc-99m DTPA clearance) was also studied in 10 normal subjects and 11 COPD patients. The result of the study was reported in the National Co-ordinators Meeting in Singapore during 11-13 February 1991.

Care and Maintenance of Nuclear Medical Instruments

The activities carried out under this project in the past year include the followings:

- collecting and updating of information regarding the medical units and the instruments available. All new units have been included into the preventive maintenance programme. The updating of the inventories has been carried on continuously.
- Evaluation and analysis of data collected.
- Supporting in the identification of minor breakdowns and cause of problems. Regular visits to medical units have been made by OAEP's staff responsible for the project.
- Development of simple coding system for the failure descriptions to ease the computerized analysis.
- Development of the teaching aids and development of educational packages for individuals learning.

- Arrangements for the availability of simple spare parts and electronic components needed by the medical units involved.
- Formulation of preventive maintenance protocols to be followed by the users and the operators of the equipment.
- Organization of a training course at a national level, 23 July - 3 August 1990.

3. Food and Agriculture

Food Irradiation Process Control and Acceptance (RPF1 III)

Dose mapping study for 50 Kg. commercial packages of fragrant rice and green mungbean was conducted using industrial, carrier type gamma irradiator at the TIC. Three carriers were used for product loading pattern, in which the middle carrier was used for the product dose mapping study, and the other two were used as dummy product carriers. The absorbed dose measurement was done along three vertical planes parallel to the side of the carriers. Dosimeters used were optic-Chromic FWT-70-40M and Gammachrom YR.

4. Research Reactor and Energy based Project and the New Project.

Thailand supports the project of Research Reactor and Energy Based and all new project proposals.

Comments

UNDP Regional Industrial Project

Thailand is pleased to support the project extension to Phase III with on-going activities. Emphasis should be made on activities involving with the control of environmental condition and pollution problems caused by industries. For public awareness, the public relation media in the context of introducing nuclear techniques and their applications, radiation safety and economic benefits of nucleonic equipments are necessary.

Medical and Biological Applications of Nuclear Techniques.

- a. Radioimmunoassay of Thyroid Related Hormones Project should be extended to Hepatitis B Diagnosis by Radioimmunoassay Project.
- b. For the Care and Maintenance of Nuclear Medical Instruments Project, more collaboration and interaction between each participating country should be generated via IAEA channel, especially those on exchange of information.

availability of instruments, tools, manuals, schematic diagrams etc. Expert services are still needed for solution of specific problems such as assistance in difficult repair cases, assistance in conducting training course on use, maintenance and quality control of modernized nuclear equipment such as SPECT. Recruiting of an expert from manufacturer would also very helpful.

In conclusion, Thailand wishes to express our fully support RCA activities or promoting regional co-operation in the peaceful uses of the nuclear technology.

Finally, I would like to join other delegates to express our thanks to the Government of Viet Nam for hosting this important meeting and the warm hospitality extended to us.

Thank you.

COUNTRY STATEMENT -- VIETNAM

13th RCA WORKING GROUP MEETING
HO CHI MINH CITY, VIETNAM, 4-7 MARCH 1991
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Mr. Chairman,
Distinguished Delegates,

Vietnam has the special honor and pleasure to host the 13th RCA working group meeting in Ho Chi Minh City, and to participate as an integral member of this constellation of RCA nations. Although being a late comer with extremely limited resources, Vietnam has nevertheless tried to keep up with current activities both in line with its multi-year projects within the framework of its National Programme for Peaceful Use of Atomic Energy and in line with overall RCA cooperation projects. It is of particular interest to make an objective assessment of the progress achieved during 1990, which happened to be the last year of most national 5 - year project plans 1986-1990. Vietnam's contribution to RCA's cause and achievements until now is still very modest, but with RCA providing ample opportunities for ever more effective cooperation in terms of transfer of technology and know-how (through RTC's, workshops, expert services, etc.) and material support, we could count on more maturing activities with wider scope on our part in the near future.

In the following sections, a summary of corresponding activities and results is presented with added comments and proposals when suited.

I. UNDP/RCA REGIONAL INDUSTRIAL PROJECT

1. NON-DESTRUCTIVE TESTING (NDT)

- A new NDT laboratory was officially set up at the Institute of Nuclear Science and Technology, Hanoi, under IAEA TA project VIE/8/006.

- The Saigon NDT Qualification and Certification Board was established in Ho Chi Minh City having legal authority for the Southern part of Vietnam.

- NDT methods, mostly ultrasonic and gamma radiographic testings, have been applied for quality control of weldings, castings, and civil engineering works (several hundreds objects nationwide; around 100 various objects in 20 industrial factories and plants in HCM City).

- Preliminary neutron radiographic testing has been carried out at the horizontal tangential beam tube of the Dalat reactor with adequate results. A South Korean expert on the subject made a short visit to Dalat NRI in February, 1990.

- 3 NTC's in compliance with ISO DTS 9712 requirements were organized in Vietnam as following :

NTC	Venue	Dates	No. Participants
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UT-1	HCM City	May 1990	15
UT-2	HCM City	Aug. 1990	21
RT-2	Hanoi	Nov. 1990	22

2 experts were provided by RCA for the courses.

1 NTC on NDE of concrete was also held in HCM City in December.

- 5 Vietnamese were sent abroad to participate in RTC's (4) and 1 in a regional workshop.

2. TRACER APPLICATIONS

- The tracer group of Dalat NRI was carrying out preliminary work for investigation on bed-load transport of sediment in rivers, reservoirs and ports, especially in preparation for investigating work on Haiphong sea port. Work underway : study of sand components of some ports and lakes; test fabrication of sediment-like glass sand to be used as tracers with required specific activity of 2 Ci/Kg; measurement equipment with under water (5-8 m in depth) gamma probes.

- The Hanoi Institute of Physics continued to use radiotracers like Eu-152, Tb-160, Tm-170, Ca-45 ..., all supplied in 1990 by the Dalat NRI to determine the efficiency of rare-earth separation and extraction precipitation by the method.

3. NUCLEONIC CONTROL SYSTEM (NCS)

- The CNT, HCM City, has helped check and put into operation 11 NCS equipment (level gauges, using Cs-137 from 30 mCi to 2 Ci) of the Kien Luong (Ha tien) Cement Plant. The Tan Mai paper mill installed a new production line utilizing NCS gauges (2 level gauges and 1 thickness gauge).

- A state-funded project for production of several coal ash gauges was established, on the basis of previously designed prototypes (in 1989) by the Hanoi Institute of Nuclear Technology. 2 new modified version instruments already completed. A level gauge intended for checking liquid CO₂ in fire extinguishers was designed by CNT.

4. RADIATION TECHNOLOGY

- Making use of the Dalat Co-60 irradiation (present activity around 12,000 Ci), the following activities have been carried out :

* Radiation vulcanization of natural rubber latex (RVNRL), about 500 Kg for experimental production of nearly 5000 pairs of surgical and general-purpose gloves.

* Radiation cross-linking of polyethylene for high impact resistance material required to make pickers (1000 pieces) for the textile industry.

* Making 20 Kg of thermoplastic elastomer by radiation grafting MMA onto RVNRL for test production of catheter and shoe heels.

* Radiation sterilization of graft tissue was carried out and some preliminary results were obtained (amniotic membrane, bone, etc.)

* Other sterilization activities : experimental sterilization of enzyme products (750 Kg) and Ringer's lactate (1000 lit.); Selection of micro-organism strains to be used as biological monitors (*B. pumilus*); to establish procedure for selection of sterilization dose by international standard B1 method.

- A feasibility study for the installation of a 300 KCi gamma irradiation plant (for application of radiation technology on a commercial scale, especially for sterilization of medical products) was completed and submitted to the Scientific Council of Ho Chi Minh City (July 1990).

5. COMMENTS AND PROPOSALS

In regards to the new RCA Project Proposal for possible UNDP funding in the 5th Programming Cycle 1992-1996, Vietnam's views and proposals are as following :

- Vietnam supports the new orientations and objectives of the Project Proposal, and agrees fully with the 2 objectives of Document 4.

- The 16 outputs of the Project Proposal (Document 4) are all important, however, from our point of view, outputs 1.2, 1.4, 1.10 and 1.12 should be at lower priorities, while output 1.9 be at higher priority. Outputs 1.7 and 1.8 could be combined into one. The amount of activities in output 1.13 could be reduced.

- Instead of the proposed 4 long-term experts, 2 long-term experts might be reasonably acceptable as in Phase II of Industrial Project.

- Proposed regional activities in Vietnam for 1992 :

- * RTC on nuclear Analytical Techniques in Dalat NRI.
- * Regional Seminar on NDE for specific non-metallic materials, Ho Chi Minh City / Hanoi.
- * Regional workshop on NCS in Small-Medium size paper industry, Ho Chi Minh City.
- * Regional workshop on RVNRL in Dalat NRI.

II. MEDICAL AND BIOLOGICAL APPLICATIONS

1. NUCLEAR MEDICINE

- In relation to project RAS/80/073 on sterilization of biological tissue grafts, the works done in 1990 comprise development of the routine procedure procurement, processing, radiation sterilization and preservation of amniotic membranes; assessment of the effectiveness in using these membranes for treatment of burns and other skin lesions. Investigations are being carried out on bone grafts and other tissue materials. Under consideration is proposal for exchange of tissue graft materials and cross quality control between tissue banking centers of Hanoi and Ho Chi Minh City and with advanced tissue banks in the area.

- Relating to project RAS/6/011, there were 3 centers applying RIA techniques for diagnosis (T₃, T₄, TSH). Around 1600 patients have been diagnosed by RIA last year. Imaging procedures for the diagnosis of liver diseases have also been applied, using in-vivo kits labeled with Tc-99m. For better quality imaging, a gamma camera seems to be a necessity. Fortunately, the Cho Ray Hospital in Ho Chi Minh City is going to get shortly a gamma camera system from the IAEA through a TA project on nuclear medicine.

- The Dalat NRI and Center of Nuclear Techniques CNT in HCM City have jointly provided maintenance service to nuclear medicine equipment in various hospitals in the Southern part of Vietnam. Similar service carried out in the North. The Dalat NRI has furthermore, during 1990, constructed 2 sets of nuclear medical instruments and supplied them to 2 new nuclear medicine laboratories at 2 hospitals in Central Vietnam (Khanh Hoa and Da Nang Hospitals). These instruments consist of renographs (one

computer-based), single channel analyzers for thyroid uptake measurements and radiation monitors. Another computer-based, 4-channel renograph was constructed by CNT and supplied to Choray Hospital. One IAEA/VINATOM International Advisory Group Meeting on Regional Cooperation in Nuclear Instrumentation Maintenance was recently held in Dalat (16-22 January, 1991) discussed in depth all aspects and problems of maintenance of nuclear instruments as a whole (not restricted to nuclear medicine instruments) and has come to agree on 6 final recommendations essential for successful cooperation (viz. training, exchange of information, spare parts, selection of equipment, center of excellence and financial support). These recommendations could be readily integrated into new RCA project RAS/4/012 on nuclear instrument maintenance for implementation after a few additional discussions with IAEA headquarters.

2. DEVELOPMENT OF Tc-99m GENERATORS

The Dalat NRI and various nuclear medicine laboratories have carried out the evaluation on the performance of chromatographic gel-type Tc-99m generator systems, Gelutec-A, -B, -C. These portable systems were developed at Dalat NRI, using Titanium-Molybdate column packing material. In 1990, more than 50 generators of activity from 200 to 300 mCi were used for clinical application and evaluation. The assessment was positive. A production line for this type of Tc-99m generator will be installed at Dalat NRI, starting March 1991, for larger capacity production. A proposal for IAEA research contract on "Development of portable gel-type Tc-99m generators" is to be submitted in 1991.

3. STRENGTHENING OF RADIATION PROTECTION

Vietnam is participating to an RCA CRP on Reference Asian Man, and has for this aim implemented a statistical report on Vietnamese "morphological" data. Two dosimetry groups have taken part in an international dosimetry intercomparison organized by Japan.

Two NTC's on radiation protection have been organized one for X-Ray practitioners, and the second for radiation protection officers.

III. FOOD AND AGRICULTURE

Although agriculture plays a very important part in the national economy, the application of nuclear techniques in this field is still rather modest. Fortunately, in the past decade, the IAEA has provided Vietnam with 4 technical assistance projects, covering several topics : mutation breeding (Dalat

NRI); use of isotope techniques in soil-plant studies (HCM City); food irradiation (Hanoi) and animal sciences (HCM City).

1. MAIN ACTIVITIES

The following main activities related to RCA programmes have been carried out in 1990 :

- Participation to the CRP "The use of nuclear techniques to improve domestic buffalo production in Asia - Phase II" : use of RIA technique to detect pregnancy of buffalo by using progesterone kits.

- Carrying out 2 research contracts, one related to "Strengthening animal production research in Asia through the application of immunoassay techniques", and the other to "Strengthening animal disease diagnosis in Asia through the application of immunoassay techniques".

- Participation to RCA project on Food Irradiation Process Control and Acceptance (RPF1-III).

- The laboratory on the use of isotope techniques in soil-plant studies has been in close cooperation with half a dozen other research establishments to carry out 4 research programmes making use of P-32 and N-15 techniques (in the framework of National Research Programme and in cooperation with IRRI).

- Vietnam has also undergone related activities in the framework of IAEA RC's, such as (i) Participation in the project of improving food quality by irradiation and combination with other processes; (ii) Study of mutagenesis on sweet potatoes by combined action of gamma irradiation and other biological techniques.

2. PROPOSALS

For the future, Vietnam is willing to have the possibility to take part in 2 on-going RCA Coordinated Research Programmes, one related to the "Improvement of Grain-legume Rhizobium Symbiosis to Fix Atmospheric Nitrogen", and the other to the problem of "Integrated Control of Tropical Plant Viruses with Nuclear Techniques".

Vietnam supports the two Proposals on :

- Regional Asia Project on nitrogen fixing trees for increasing soil fertility, crop and fuel wood production.

- Control of the diamondback moth in SEA using F-1 sterility.

IV. RESEARCH REACTOR AND ENERGY-BASED PROJECTS

1. REACTOR UTILIZATION

- In 1990, the Dalat reactor has been operated for more than 1500 hrs., during which 170 Ci of radioisotopes (mainly P-32, I-131, Tc-99m, Ir-192, etc.) were produced (12 times the total amount produced in 1985) and around 5000 samples of various types were irradiated to be analyzed by nuclear analytical techniques.

- A second neutron beam is being implemented using a radial horizontal beamport. By means of neutron filters, quasi-monochromatic neutron beam was obtained permitting performance of experiments in fundamental research and nuclear data measurements.

- Use of reactor neutron flux for silicon doping intended for production of power diodes and investigation on doping techniques for GaAs semiconductor materials.

- Implementation of a PC-based protocol system allowing to acquire and to record main reactor technical parameters, such as power, period, logic states of reactor control system, coolant temperatures at various in-core positions, coolant flow rates, etc. Measurements of fuel element cladding temperatures, lengthwise and at various in-core positions, permitted comparison with theoretical calculations. On this basis, assessment of the available safety margin could be made for prospective power upgrading of the reactor.

These activities showed that Vietnam is pursuing very similar objectives as compared with those of the RCA Research Reactor Utilization Project. Unfortunately we are part of this CRP only in a Research Contract aimed at creating a set of reactor physics calculation codes. We would like to propose participation in other subjects like reactor data acquisition and interfacing, environmental impact of research reactor operation, etc.

2. ENERGY-BASED PROJECTS

Vietnam is taking part in RCA energy-based projects and not only participated to all regional training courses and workshops related to Energy and Nuclear Power Planning as well as to Nuclear Power Project Planning and Implementation, but has benefited of equipment which proved to be useful for conducting WASP calculations. Unfortunately some difficulties remain to be resolved concerning the quality of input data to WASP and also concerning the ability to use the MAED programme.

CONCLUSION

Mr. Chairman,
Distinguished Delegates,

It can be said that Vietnam has become an active member of the RCA "Club" only after it officially joined the UNDP/RCA project in 1989, so that 1990 constitutes practically the very first year of activities of Vietnam as a junior Member State. This could account for the rather modest results of research and application of nuclear techniques in various spheres of the national economy, despite obvious efforts shown by the leadership and involved professionals.

Nevertheless, for the sake of full development of atomic energy in our Asia-Pacific Region, Vietnam will make effort to play an ever more active role in the majority of RCA activities and experts farsighted guidance and support from IAEA/RCA leadership.

In this spring-time atmosphere, suitable for establishing close friendship and mutual understanding, we feel honored to have the privilege to host the 13th RCA Working Group Meeting and to greet IAEA/RCA leaders and representatives of RCA Member States. Our task has been and is to make everything possible for the success of this Meeting, in terms of smooth organization, fruitful discussions and equally important, a pleasant stay for all Delegates. We hope the goal could be attained.

Our special thanks go to IAEA/RCA authorities in the persons of Prof. Noramly and Dr. Easey for their support and help in the organization of the Meeting.

Thank you.

RCA ACTION PLAN 1990 - 92 (February 1991)

Project No.	Title	1990	1991	1992
RAS/0/013	Energy and Nuclear Power Planning	X	X	X
RAS/0/015	Development of TCDC in Asia and the Pacific	X	X	X
RAS/4/008 CRP: E1.10.06 E1.10.07	Nuclear Instrument Maintenance	X	X	X
RAS/4/011 CRP: F1.20.09	Research Reactor Utilization	X	X	X
RAS/5/020 (RAS/89/044)	Food Irradiation Process Control and Acceptance	X	X	X
RAS/5/021 (RAS/89/045)	Improvement of Grain-Legume Rhizobium Symbiosis to fix Atmospheric Nitrogen	X	X	X
RAS/5/022	Control of Tropical Plant Viruses	X	X	X
RAS/6/011	Radioimmunoassay of Thyroid Hormones	X	X	
RAS/6/016	Use of Computers for Technetium-99m Imaging	X		
RAS/6/018	Radioimmunoassay for Hepatitis B Diagnosis		X	X
RAS/7/003 CRP: E3.10.04	Radiation Sterilization of Tissue Grafts	X	X	X
RAS/8/061 RAS/8/062 RAS/8/064 (RAS/86/073)	UNDP Industrial Project	X	X	
RAS/8/066	Isotope Techniques in Hydrology	X	X	X
RAS/9/006 CRP: J3.20.01	Strengthening of Radiation Protection Infrastructures	X	X	X
CRP: E1.30.06	Imaging Procedures for Diagnosis of Liver Disease (Phase II)	X	X	X
CRP: E3.30.08	Improvement of Cancer Therapy (Phase II)	X	X	X

Project No.	Title	1990	1991	1992
CRP: E1.3.05	Radioaerosol Imaging for Diagnosis Respiratory Diseases	X	X	
CRP: F2.20.09	Tc-99m Generator for Low Power Reactors	X		
CRP: E4.30.02	Nuclear Techniques for Toxic Elements in Foodstuffs	X	X	

RCA BUDGET AND BUDGET ESTIMATES 1990 - 92

Project No.	Title	Fund Source*	Budget US \$K		
			1990	1991	1992
RAS/0/013	Energy and Nuclear Power Planning	TC ROK ADB	64.4 25 -	78.85 25 90	79.3 25
RAS/0/015	Development of TCDC in Asia and the Pacific	TC IND ROK CPR	58.8 25 25 25	35.4 25 25 25	37.2 25 25 25
RAS/4/008 CRP: E1.10.06 E1.10.07	Nuclear Instrument Maintenance	TC IND Reg	73.8 25 31.9	45.4 - 21.6	236.5 - -
RAS/4/011 CRP: F1.20.09	Research Reactor Utilization	TC IND CPR Reg	(25)** (25)** 10.7	86.55 25 25 27.3	87.9 25 25 -
RAS/5/020 (RAS/89/044)	Food Irradiation Process Control and Acceptance	UNDP CPR	153 25	160.5 -	165.5
RAS/5/021 (RAS/89/045)	Improvement of Grain-Legume Rhizobium Symbiosis to fix Atmospheric Nitrogen	UNDP	243.2	224.3	245.4
RAS/5/022	Control of Tropical Plant Viruses	Unfunded***	-	103.3	-
RAS/6/011	Radioimmunoassay of Thyroid Hormones	TC	160.8	-	-
RAS/6/016	Use of Computers for Technetium-99m Imaging	AUL	116.2	100	-
RAS/6/018	Radioimmunoassay for Hepatitis B Diagnosis	TC	-	118.1	120.8
RAS/7/003 CRP: E3.10.04	Radiation Sterilization of Tissue Grafts	TC Reg	67.95 27.4	38.85 -	236.5 -

Project No.	Title	Fund Source*	Budget US \$K		
			1990	1991	1992
RAS/8/061 RAS/8/062 RAS/8/064 RAS/86/073	UNDP Industrial Project	UNDP TC JPN AUL IND CPR	842.7 220.6 290 299 25 25	637.7 154.8 290 250 25 25	- 135.9 290 250 25 25
RAS/8/066	Isotope Techniques in Hydrology	Unfunded****	-	87.2	148.75
RAS/9/006 CRP: J3.20.01	Strengthening of Radiation Protection Infrastructure	TC JPN AUL (IND (CPR Reg	19.2 72 136.2 - - 39.3	11.7 72 50 25 25 25.45	6 72 50 - 25)** 25)** -
CRP: E1.30.06	Imaging Procedures for Diagnosis of Liver Diseases (Phase II)	JPN	63.6	30.9	-
CRP: E3.30.08	Improvement of Cancer Therapy (Phase II)	JPN	58.9	58.9	58.9
CRP: E1.3.05	Radioaerosol Imaging for Diagnosis of Respiratory Diseases	IND Reg	3 23	- 6.5	-
CRP: F2.20.09	Tc-99m Generator for Low Power Reactors	Reg	+		
CRP: E4.30.02	Nuclear Techniques for Toxic Elements in Foodstuffs	Reg	4.8	-	-
Total			3280.75	2814.8	2271.9

* Note these figures are estimates only. In particular they do not imply commitment by donor countries.

** Administered through RAS/0/015.

*** Not included in budget total.

+ This project terminated in March 1990 with the final RCM.

Notes

UNDP - United Nations Development Programme

ADB - Asian Development Bank

TC - Technical Assistance and Co-operation Fund

Reg - IAEA Regular Budget

JPN - Extra-Budgetary contribution from Japan

AUL - Extra-budgetary contribution from Australia

CPR - Extra-budgetary contribution from the Government of China

IND - Extra-budgetary contribution from India

ROK - Extra-budgetary contribution from the Republic of Korea

CLOSING REMARKS

By

PROFESSOR PHAM DUY HIEN

VICE-CHAIRMAN, VIETNAM ATOMIC ENERGY COMMISSION

Dear Professor Noramly,
Distinguished Delegates, Ladies and Gentlemen

It can be said that, through a process of development marked by a record of 13th Working Group Meeting's, RCA nowadays has attained its maturity and is expecting a bright future ahead. What are the main factors which contributed to build up its prestigious popularity among countries in our Asia-Pacific Region? I think there are three:

- . First of all, nuclear techniques are really needed and can be developed in our region. RCA's activities are in line with most countries' programme of scientific and technological development. The IAEA and UNDP have been fully aware of this and have offered their strongest support.
- . Secondly, all our countries are yearning for closer co-operation, and thanks to this co-operation, individual country strength could be somehow multiplied. Despite unequal stages of development, all our countries have co-operated in friendly, healthy and equal terms.
- . Thirdly, the organizational mechanism and activities of RCA under IAEA sponsorship have proved to be of high efficiency.

Looking to the future, we can be assured of much better results from our efforts, with our common determination to realize more significant progress and development involving the following aspects:

- . Firstly, all proven nuclear technologies must be transferred to commercialized area in all Member States.
- . Secondly, the problem of public acceptance of nuclear techniques including nuclear power must be solved for the better. This could be a consequence of the above-mentioned commercialization stage.

Moreover, I would suggest the IAEA to carry out a worldwide strategy for improving sharply the image of nuclear development to the eyes of the public.

Thirdly, the technology transfer process in our region must be advanced to the point of attaining the stage of technology exchange. I suppose that co-operation and integration are important factors in our times. But there are no co-operations without inherent competition, and this must not be trespassing or interfering with individual country's characteristics; instead, it must be stimulating and encouraging the process of learning from each other, in both directions.

I would like to propose, within the framework of Regional Co-operation, further increase of activities in advanced training courses, workshops, seminars, symposia, etc. where research and creative development results could be exchanged.

In this context, I am pleased to observe that our discussions during the last three days could be served as the basis for new development of RCA. Of course, we are still facing multiple difficulties, especially financial problems. Nevertheless, the uncertainty of the solution of certain problems has been sharply reduced. We could have chosen the right approach for the coming times. We could have challenging and straightforward discussions on the industrial application project, or the activity gap in 1992, etc. But all this should bring us to a final conclusion for the better.

Dear Professor Noramly,
Distinguished Delegates,

The agreed report could serve as foundation for us to continue to examine and to act accordingly for next year and for the next 5 years. Once more, we would like to express our utmost confidence in the farsighted leadership of Professor Noramly and skillful co-ordination of Drs. Easey and Manoon Aramrattana.

As all previous RCA WGM's, this 13th RCA WGM in Ho Chi Minh City could play a significant role in our co-operative activities. Once again, I would like to express our special honour and pleasure to have the privilege to host the 13th WGM of RCA, with the hope that the Meeting could leave lasting memories of successful outcome of the discussions, of real friendships and of Vietnamese hospitality. We are certain that the arrangements as provided to the guests could not be up to the expectation due to many difficulties, for this we would ask for your understanding.

Thank you.