

REGIONAL CO-OPERATIVE AGREEMENT  
INTERNATIONAL ATOMIC ENERGY AGENCY

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# REPORT

TWENTY-SECOND GENERAL CONFERENCE MEETING  
OF  
REPRESENTATIVES OF RCA MEMBER STATES

IAEA - Vienna, 29 September 1993



# REPORT

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OF  
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**TWENTY-SECOND CONFERENCE MEETING OF  
REPRESENTATIVES OF RCA MEMBER STATES**

**8:30h Wednesday, 29 September 1993  
VIC, C07, Conference Room V**

1. OPENING

The Meeting was attended by 27 delegates representing all RCA Member States with the exception of Singapore. A list of those attending is attached as **Annex 1**.

The Meeting was opened by the Interim Chairman, Mr. Yoshifumi Okamura, Deputy Director, Science and Nuclear Energy Division, Foreign Policy Bureau, Ministry of Foreign Affairs, Japan. He made reference to the 15th RCA Working Group Meeting in Manila as a successful meeting for the exchange of information and the formulation of the future of the RCA. On behalf of the RCA Member Countries, he expressed appreciation to the Government of the Philippines for its hospitality. He pointed out that it was widely recognized that RCA had brought significant benefits to the region especially in terms of transfer technology and development of human resources. All this had only been possible because of the mutual co-operation from all the RCA countries. He pointed out that the various kinds of meetings, such as Project Formulation Meetings, Consultants Meetings, Research Co-ordination Meetings, Expert Advisory Meetings, and most significantly, the annual Working Group Meetings, had ensured that the RCA projects were maintained on the right track. He thanked all IAEA officials and experts who had taken the time to attend those Meetings.

The Interim Chairman pointed out that Mongolia had joined the RCA in the last twelve months and that the new joint UNDP/RCA/IAEA project on Environmentally Sustainable Development had started in January this year. He thanked all those who had spent time and effort to make all activities possible during the last year. An important task of this meeting would be to discuss the plans for 1994 and he wished the Meeting success.

The Interim Chairman invited Mr. Qian to address the Meeting on behalf of the Agency.

Mr. Qian welcomed all delegates on behalf of the IAEA Director General, Dr. Blix. He mentioned that this year for the first time, there would be a joint AFRA/ARCAL/RCA Meeting. He reminded RCA Governments of the important role of the National Co-ordinators and expressed his appreciation that Malaysia and the Philippines would be joining the donor countries of RCA and depositing funds with the Agency. The full text is presented in **Annex 2**.

The Interim Chairman called for nominations for Chairman. Dr. Carlito Aleta, Director, Philippine Nuclear Research Institute was nominated by Indonesia, seconded by Malaysia and unanimously elected Chairman.

Dr. Aleta expressed his gratitude to the delegates for electing him Chairman. He thanked the outgoing Chairman and expressed his thanks to the IAEA and the RCA Member States for their support during the last Working Group Meeting. He pointed out the developments during the last year, in particular the approval of the new UNDP/RCA/IAEA project on Environmentally Sustainable Development. He welcomed Mongolia to their first RCA General Conference Meeting as an RCA Member and expressed his hope that others would join the RCA soon.

The Chairman presented the agenda which was adopted unanimously. The agenda for the Meeting is presented in **Annex 3**.

The Chairman invited the RCA Co-ordinator to present his report.

## 2. REPORT BY RCA CO-ORDINATOR

The RCA Co-ordinator outlined the various events that had occurred in 1994 related to the joint UNDP/RCA/IAEA project, tracing them from the formal UNDP agreement to fund to the results of the National Co-ordinators Meetings.

He mentioned the two Project Formulation Meetings set down for 1993 in the fields of Energy and Nuclear Power Planning and Research Reactor Utilization and Member States participation in project planning and decision making through these Meetings.

He concluded by mirroring Mr. Qian's remarks on the importance of National Co-ordinators to the achievements of the RCA programme.

The full text of the report is attached in **Annex 4**.

### 3. FIFTEENTH RCA WORKING GROUP MEETING, MANILA, PHILIPPINES, 16-19 MARCH 1993

The report was accepted without comment.

### 4. RCA ANNUAL REPORT 1992

China accepted the report and expressed its appreciation of the efforts of the Secretariat and in particular to the RCA Co-ordinator. China was happy to see major activities implemented which meet Member States' needs and to see the new joint UNDP/RCA/IAEA project approved and assured the Meeting of China's desire for close co-operation with the IAEA and RCA Member States.

China requested that the Annual Report should include, where possible, more information on the benefits and the impacts of the projects. With reference to the National Co-ordinators network, China requested that information and documents on projects sent to National Project Co-ordinators should also be sent to the National RCA Co-ordinators. Finally, China pointed out that at the 1992 RCA GCM, the delegates had requested a review of the activities on the research reactor utilization and nuclear power planning with a view to strengthen them. China expressed its appreciation that this year two Project Formulation Meetings, one for each field had been planned and hoped that they would be supported.

The Annual Report 1992 was accepted with no further comments.

### 5. RCA PROGRAMME 1994

The Chairman went through the issues for the 1994 RCA programme as listed in the background papers.

#### 5.1 Venue, timing and administrative arrangements for the 16th RCA Working Group Meeting.

Indonesia announced that it would host the 16th RCA Working Group Meeting, probably to be held in Bali, 21-25 March 1994 and invited all RCA Member States to participate. The dates are to be confirmed.

5.2 Status of the joint UNDP/RCA/IAEA Project on "The Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development" following UNDP approval of the Project Document (Annex 5).

The RCA Co-ordinator commented that the programme was now firmly in place. A clear mandate for the implementation of the projects had been given in four National Co-ordinators' Meetings recently held in the fields of NCS and Tracers (**Annex 6**), Nuclear Analytical Techniques (**Annex 7**) Radiation Technology and Non-destructive Evaluation (**Annex 8**). He pointed out that there were some RCA events where the location was still to be decided. He asked Member States to look at them with a view to possibly making proposals.

Malaysia offered to host the Regional Training Course on Project Design Evaluation and Management on 31 January - 9 February 1994; the Regional Workshop on Upgrading of Gamma Cameras in November or December 1994 and the Regional Workshop on Use of Tracer Technology in Surface Water Effluent Studies in 1994.

5.3 Review of current list of RCA footnote a/ projects.

The Chairman pointed out that there were currently seven footnote a/ projects (**Annex 9**), all but one, "the Use of Computers for Technetium-99m Imaging", were funded. The RCA Co-ordinator informed the Meeting that Agency funding was going to be made available for 1994 for this project so that there were now no unfunded footnote a/ projects. The Chairman thanked the Governments of Australia and Japan for their funding of the footnote a/projects.

5.4 Recording of National investments in Industrial Nuclear Technology.

The RCA Co-ordinator requested all Member States to provide information to him on their national investments in nuclear technology. He said that very shortly all Member States would be asked in more detail to provide information on

investments in nuclear technology as a follow-on of an experts meeting held the previous week in Vienna.

#### 5.5 Country Statements

It was agreed that country statements would be submitted in writing and included in the report of the Meeting.

#### 5.6 Future Food and Agricultural projects for RCA

The Chairman pointed out that under present regulations any projects in food and agriculture had to be agreed by FAO. In the case of training courses, suitable applicants from outside RCA countries would also have to be considered if they were from FAO Member States.

Indonesia asked all Member States to study the conclusions and recommendations made at the RCM of RPF Phase III, Seoul, 20-24 September 1993 and requested that Member States should consider support for a continuation of RPF Phase III into the 1994 programme. The RCA Co-ordinator replied that this request would be considered within the Agency; a proposal should also be submitted to the RCA Working Group Meeting in Bali 1994. A specific proposal was requested by him which could then be distributed to Member States as part of the Briefing Documents for this Meeting.

Pakistan referred to the regulations in Food and Agricultural Projects and the inclusion of non-RCA countries in Regional Training Courses and asked for further clarification, in particular what criteria applied for candidates from outside RCA Member States. The RCA Co-ordinator replied that the qualifications had to fit the description and target group defined in the prospectus. He also pointed out that only official Government nominations could be considered. Pakistan asked which candidate would be chosen, if there were a candidate each from an RCA and a non-RCA country with equal qualifications. The RCA Co-ordinator replied that both candidates would then be taken if this were possible from a budgetary viewpoint. He added that in other RCA training activities, candidates from outside RCA countries were also accepted provided there were no costs to RCA and provided that the host country was in agreement.

Australia complimented the DDG-TC, the RCA Co-ordinator and other staff of TC for their efforts in obtaining this funding from UNDP which had emphasized the importance of intensive lobbying by Member States. The important historical role of UNDP in funding RCA projects was also highlighted.

5.7 Verification of names, titles, addresses, phone and fax numbers in lists of National Co-ordinators and Counterparts for RCA projects

The Chairman asked all delegates to review the lists in the Background Document and provide any changes as soon as possible to the RCA Office.

5.8 Recording of the full extent of project activities and project impacts.

The RCA Co-ordinator briefed the Meeting about the Expert Meeting on this subject held the week previous and explained that more detailed information would be necessary to fully identify the contributions by Member States to RCA projects, particularly at the national level. Questionnaires were being prepared and sent to Member States to record their inputs.

5.9 Proposed RCA Project Activities for 1994

The RCA Co-ordinator referred to the tables (**Annex 10**) included in the Background Papers with the proposed activities for 1994.

Pakistan felt that the area of agriculture was not adequately covered in the RCA programme, especially since the region is predominantly an agricultural producer. The RCA Co-ordinator replied that this problem had been raised at the Working Group Meeting in Manila and added that the Director and the Section Heads of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture would be making presentations during this Meeting to outline proposals for delegates to be considered.

Australia stressed that in the last five years the activities in agricultural projects had decreased because RCA Countries had shown interest also in other areas and the projects in the 1994 programme represented their stated priorities.

India commented that it was also very interested in food and agricultural projects.

Japan supported the proposed 1994 project activities and wished to bring three issues to the attention of the delegates: Firstly Japan has contributed technically and financially in the field of nuclear medicine (imaging procedures for the diagnosis of liver diseases). This project will be completed at the end of 1993 and Japan will now support technically and financially the new CRP proposal on evaluation of radioactive iodine therapy for hyperthyroidism recommended by the RCA Working Group Meeting in Manila if this proposal is endorsed by this Meeting; secondly, Japan has supported the CRP on improvement of cancer therapy which will also be completed by the end of this year. Various possibilities for a follow-on project are now being considered and Japan hopes to receive suggestions from interested Member States in order to get an approved project proposal at the next Working Group Meeting. Thirdly, the CRP on Reference Asian Man has its final Research Co-ordination meeting in China in October 1993. A second phase will be discussed and Japan will consider support for a second phase.

Vietnam expressed appreciation for the Japanese funding and asked who would be the technical officer for the project on evaluation of radioactive iodine therapy for hyperthyroidism. The RCA Co-ordinator replied that it was Dr. Toshiro Yamasaki.

The Chairman asked if the three areas which might be supported by Japanese funds would be included in the 1994 programme. The RCA Co-ordinator replied that they would be included in the list of activities as soon as formally approved by the Working Group Meeting and the General Conference Meeting. At this stage only the iodine therapy CRP would be able to be implemented early in 1994.

#### 5.10 RCA budget and budget estimates for 1994

Referring to the background papers, the RCA Co-ordinator presented the budget framework for the proposed activities (**Annex 11**). He emphasized that the funds indicated against the extrabudgetary contributions of Australia and Japan

were only indicative and not binding on those countries. Although RAS/6/016 was shown in parenthesis, this activity will now be supported by the Agency in 1994.

Japan commented that although it was not in a position to commit itself to specific contributions, it would support the RCA programme technically and financially in 1994.

The RCA Co-ordinator added to the comment of Japan by reminding Member States that Japan often contributed more than was stated in these tentative budgets and thanked Japan for its very generous contributions over many years.

The budget and budget estimates for 1994 were accepted.

#### 5.11 Tentative list of Regional and RCA Training Courses for 1994

Referring to **Annex 12**, the RCA Co-ordinator pointed out that some of the training activities were not yet fully defined with respect to location and timing and asked for the co-operation of all Member States in notifying him of any wishes to host these training activities. He also asked Member States to bring the dates for hosting as close to the beginning of the year as possible to avoid an the compression of training activities towards the end of the year.

#### 5.12 Project on the Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development

The RCA Co-ordinator commented that this project document was for Member States information (**Annex 5**); it represented the final paper that had gone to UNDP and had been approved. He noted that it did not commit the Member States to an exact programme of support, the purpose of the document had been to convince UNDP of Member States support for the project. The extrabudgetary contributions from Australia and Japan were given in separate papers.

#### 5.13 RCA footnote a/ projects 1993

The Chairman commented that this item had already been discussed and therefore moved to the next item on the Agenda.

#### 5.14 New Project Proposals

The Chairman pointed out the two new project proposals, "CRP on Evaluation of radioactive iodine therapy for hyperthyroidism" and "Project Formulation on Energy and Nuclear Power Planning".

The RCA Co-ordinator commented that the CRP on Evaluation of radioactive iodine therapy for hyperthyroidism had been unanimously supported at the last Working Group Meeting and it was now for this Meeting to formally endorse it. The Project Formulation Meeting on Energy and Nuclear Power Planning, which had taken place in Jakarta, 19-23 July 1993, had come up with a number of recommendations. The report will go to the next RCA Working Group Meeting in Indonesia. An advance copy of the report had already been distributed to the Meeting. He pointed out that an expansion of the programme had been proposed to also include the ENPEP programmes. The National Co-ordinators had made strong recommendations for support to be given to a project to facilitate national implementation of nuclear power programmes through pooling and analysis of information on effective strategies used in RCA Member States. The delegates were asked to consider this proposal which will be discussed at the next Working Group Meeting.

The CRP on Evaluation of radioactive iodine therapy for hyperthyroidism was accepted by the Meeting as part of the 1994 programme.

### 6. RCA FUTURE PROGRAMME ON NUCLEAR TECHNIQUES IN FOOD AND AGRICULTURE

The Chairman presented seven speakers from the joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture.

Mr. B. Sigurbjörnsson presented an "Overview of programmes of the Joint Division of Nuclear Techniques in Food and Agriculture relevant to Asia and Pacific". His detailed presentation is in **Annex 13**.

Mr. C. Hera presented "Increasing crop yields in the tropics and sub-tropics through agroforestry". His proposal is included in **Annex 14**.

Mr. B. Ahloowalia's presentation was on "Induced mutations and related biotechnologies for improvement of vegetatively propagated crops". His proposal is included in **Annex 15**.

Mr. J. Dargie spoke on "Establishment of a regional rinderpest seromonitoring network in Asia in support of the South Asia Rinderpest Eradication Campaign (SAREC)". His proposal is included in **Annex 16**.

Mr. D. Lindquist commented on "The environmental advantages of fruit fly control with the sterile insect technique". His proposal is included in **Annex 17**.

Mr. R. Hance presented "Agricultural countermeasures following a nuclear or radiation accident". His proposal is included in **Annex 18**.

Mr. P. Loaharanu spoke on "Public Information and Trade Developments Irradiated Food in Asia and the Pacific". His proposal is included in **Annex 19**.

Following the presentations the Chairman opened the floor for discussions.

Indonesia congratulated all the speakers for their very interesting presentations and expressed support for these proposals as well as the hope to have them discussed at the next RCA Working Group Meeting.

India expressed its great interest in food irradiation and a desire to support the area of food irradiation in the region.

Pakistan asked to have the lectures presented by the joint IAEA/FAO staff to be compiled and distributed to delegates.

The Chairman thanked the speakers for their presentations and requested to have the written materials included in the report of the Meeting.

## 7. COUNTRY STATEMENTS

The Chairman noted that the country statements would be included in the report of the Meeting. These are included in the following Annexes:

Australia	- <b>Annex 20</b>
Bangladesh	- <b>Annex 21</b>
China	- <b>Annex 22</b>
India	- <b>Annex 23</b>
Indonesia	- <b>Annex 24</b>
Japan	- <b>Annex 25</b>
Rep. of Korea	- <b>Annex 26</b>
Malaysia	- <b>Annex 27</b>
Pakistan	- <b>Annex 28</b>
Philippines	- <b>Annex 29</b>
Sri Lanka	- <b>Annex 30</b>
Thailand	- <b>Annex 31</b>
Viet Nam	- <b>Annex 32</b>

## 8. OTHER BUSINESS

Republic of Korea commented on the importance of the Regional Co-operative Agreement and said that the Project Formulation Meeting on the Utilization of Research Reactors will be held in Seoul in October 1993. Republic of Korea offered to host the 17th RCA Working Group Meeting in 1995 to emphasize the importance of the RCA programme.

Malaysia also offered to host the Working Group Meeting in 1995.

The RCA Co-ordinator, in response to the offers of the Republic of Korea and Malaysia to host the 17th RCA Working Group Meeting, pointed out that the hosting of the Working Group Meetings had been entered a second cycle and it has been assumed that the order of the second cycle would be the same as the order in the first cycle (**Annex 33**). However there had not been a formal decision by Member States on this. He proposed that the order of the countries should follow that in the first cycle and, if a country could not host the Working Group

Meeting at that time, it could be offered to be deferred and other proposals from Member States could then be accepted.

The Chairman asked for comments on this proposal.

India, Australia, and Bangladesh supported the proposal made by the RCA Co-ordinator.

The above proposal was accepted by the Meeting.

The Chairman thanked all delegates for their active co-operation and contribution and said he was looking forward to meeting them at the 16th RCA Working Group Meeting in Bali.

#### Actions

1. The RCA Member States who would like to host training activities in 1994 and/or financially support them were requested to inform the RCA Office of their intentions as soon as possible.
2. The RCA Co-ordinator was requested to provide the proposals presented by the Heads, Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture as Annexes to the Report of the RCA General Conference Meeting.

#### Summary of decisions taken by the Meeting

1. The Report of the 15th RCA Working Group Meeting, Manila was accepted.
2. The RCA Annual Report 1992 was accepted.
3. The RCA project activities for 1994 were accepted.
4. The RCA budgets for 1994 were accepted.
5. The offer by Indonesia to host the 16th RCA Working Group Meeting in 1994 was confirmed.
6. The proposal to follow the order in the first cycle in hosting the RCA Working Group Meetings was accepted.

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**TWENTY-SECOND GENERAL CONFERENCE MEETING OF  
REPRESENTATIVES OF RCA MEMBER STATES  
29 SEPTEMBER 1993  
ADDRESS OF WELCOME  
BY  
QIAN JIHUI, 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 22nd General Conference Meeting of RCA Member States.

I have keenly observed the RCA programme over the past year. It is no secret that I believe that RCA experience, accumulated over the past 20 years, can contribute both to the other regional programmes as well as aspects of the TC programme.- You will all be aware that there will be a joint AFRA/ARCAL/RCA Meeting on the afternoon of Thursday this week where, for the first time, there will be a discussion involving the Chairperson for each of the three Regional Co-operative Agreements. Three countries from each region have been invited to participate officially and there is an open invitation to the other Member States to attend as observers. Major donors, either existing or potential, have been invited to attend as well. We are trying to highlight the effectiveness of Regional programmes in getting technology to end users outside of the National Nuclear Research Institutes.

In the ten years of the UNDP Industrial Project from 1982 to 1991 a lot of experience was gained in organizing and interfacing with industry. The fine tuning of management and the administration strategies to meet the project needs was carried out very effectively as the end results have shown. It is now important that these valuable lessons and experiences be shared with the other areas that are or will be involved in similar activities.

Effectiveness in this process of technology transfer is not just dependent on these management procedures, I have just talked about. There has to be an effective and a comprehensive project design with clear aims and objectives to start with. In this regard I would like to see more efforts placed in the formulation and presentation of project proposals so that there can be more effective reviews and evaluation.

One particular management strategy that has clearly been very effective is the use of the national co-ordinator networks for the technical as well as the administrative aspects of the RCA programme. All RCA Technical Projects now have National Co-ordinators in recognition of their strong beneficial role in achieving efficient, effective and appropriate use of resources for Member States needs.

I think it is appropriate to briefly review their part in the overall working of the project. National Co-ordinators act as the interface between the Agency and the end users of a technology in their country and it is important that there is a two way flow of information to enable the project to be responsive to changing needs and imperatives. It is the National Co-ordinators duty to actively pursue developments in the particular area of technology, establish and maintain links with individuals and, where they exist, professional societies or interest groups and keep them informed and involved in the Agency's programme. Their country inputs are relayed back to ensure that the Agency is up-to-date in its appreciation of the local situation.

I think that Governments need to be reminded that all this National effort is part of the obligations countries make under the RCA. Article V(1) states that each participating Government will "make available the necessary scientific and technical facilities and personnel for implementation of the co-operative projects". They also need reminding that the choice of National Co-ordinator is very important since much of the vitality and the viability of the projects at the National level will be directly bound up in this selection. RCA has been very fortunate in the very high standard of National Co-ordinators that have been put forward and this needs to be maintained.

As a final point on this subject, it also needs to be emphasized that the periodic National Co-ordinators Meetings are an essential part of the total project management since this forum allows all Co-ordinators to gain from direct face-to-face contact with the Agency Technical Officers and project managers and also from the sharing of the experiences of their opposite numbers in other RCA Member States. It is at these Meetings that the technical decisions and recommendations are made for the project and these are arrived at by consensus. If a Member State is not represented then it is difficult for their views and needs to be thoroughly represented.

In conclusion I would like to acknowledge the substantial contribution that all Member States make to the RCA programme through their "in-kind" contributions. Your

strong commitment to RCA through your provision of services and manpower to support and supplement the activities is very much appreciated and a very visible and tangible evidence of the strong ties that unite the Member States. There is also a new development. I would like to say how pleased I am that the Governments of Malaysia and the Philippines have become donors to RCA with their decisions to deposit funds with the Agency. It is part of the maturing of the Region that Member States can now donate something back to assist the overall programme after an initial period when they have only been recipients. I would ask all Member States to look into the possibilities of making donations to the Agency to support additional RCA activities. No sum is too small even a few thousand dollars from each of you could fund a training course or other significant event.

Mr. Chairman, I look forward to today's discussions. I am sure there will be plenty of stimulating and important contributions that will assist us in continuing the positive progress of RCA.

Thank you.



**Twenty-Second General Conference Meeting of  
Representatives of RCA Member States**

**08:30h Wednesday, 29th September 1993  
VIC, C07, Conference Room V**

**Agenda**

1. Opening

- . Remarks by interim Chairman
- . Welcome on behalf of the IAEA
- . Election of Chairman
- . Statement by Chairman elect
- . Adoption of Agenda

2. Report by RCA Co-ordinator.

3. Fifteenth RCA Working Group Meeting, Manila, 16-19 March 1993.

The Meeting is invited to accept the report as presented or with any agreed amendments. The basic report is presented as background paper 1.

4. RCA Annual Report 1992.

The Meeting is invited to accept the report as tabled or with any agreed amendments. The report was circulated separately.

5. RCA Programme 1994.

The Meeting is invited to comment on the 1994 RCA programme documents presented in background paper 2.

6. RCA Future Programme on Nuclear Techniques in Food and Agriculture.

The Director of the Joint FAO/IAEA Division Mr. Sigurbjoernsson and his Section heads will make short presentations outlining possible new project directions appropriate to regional Asian needs.

7. Country Statements

Member States may choose to provide written Country Statements for inclusion in the Meeting Report. Matters of urgency can be dealt with orally under this agenda item.

8. Other business.



**TWENTY-SECOND GENERAL CONFERENCE MEETING OF  
REPRESENTATIVES OF RCA MEMBER STATES  
29 SEPTEMBER 1993**

**COMMENTS BY  
JOHN F. EASEY, RCA CO-ORDINATOR**

Mr. Chairman, Distinguished Delegates, Ladies and Gentlemen.

I am pleased to be able to report on the progress of the RCA programme since the Working Group Meeting in Manila in March.

The biggest event has been the agreement of the UNDP to support the new joint UNDP/RCA/IAEA project on Environmentally Sustainable Development. On 8th April UNDP formally agreed to proposals in the Project Document we had prepared and submitted to them in late January. The Agency received the official copy of the signed agreement on 19 April and the project RAS/8/071 was officially incorporated into the Technical Co-operation Project Schedules on 26 April so that funds could be accessed for project activities. This was the signal to immediately start up the necessary meetings so that the activities within the Project Document could be implemented. It should be remembered that, although there had been much effort expended in producing the Project Document so that there was a clear statement of aims and objectives, quantifiable outputs and the logical activities, there was no detailed form to the activities to specify the fine detail.

Within constraints of the Agency's internal administrative arrangements, the first meeting of National Co-ordinators for Nuclear Analytical Techniques was carried out in Kuala Lumpur within the minimum possible time - 8 weeks. Two weeks later the next meeting of National Co-ordinators, this time for Nucleonic Control Systems and Tracer Technology, took place in Sydney. The summary reports have been included in the background papers. In September the remaining two National Co-ordinators Meetings took place. In Tokyo there was the NCM for Non-destructive Evaluation (NDE) and in the next week in Takasaki there was the NCM for the Radiation Technology. The summary for the NDE meeting is available to you today.

These very important Meetings have allowed Member States to participate in the formulation of the fine detail of each of the five technology areas.

Efforts have been made to expand and maximize Member States participation in the planning and decision making processes effecting the RCA projects. This year there will be Project Formulation Meetings for two RCA Projects. The PFM for Energy and Nuclear Power Planning took place in July in Jakarta and the PFM for Research Reactor Utilization will take place in mid October in Taejon. Again the summary report from the PFM in Jakarta was included in the Background Papers. Member States are therefore being informed as fully and as quickly as possible so that the momentum and the dynamic movement of the projects can be maintained.

Every effort has been taken to ensure the fullest information flow within the resources of the RCA Office. As has been the recent practice the RCA Annual Report has been constructed so that it is a basic reference source for all RCA information. Your co-operation in maintaining the accuracy of some of the details is gratefully acknowledged.

As a final comment, Mr. Chairman, I would like to endorse Mr. Qian's statement on the importance of National Co-ordinators. In the meetings where we have been putting in the fine detail to the projects within the new joint UNDP/RCA/IAEA project these National Co-ordinators have put enormous efforts into getting the project tuned exactly to the regional needs.

The importance of these National Co-ordinators as an interface for information is going to have even greater importance. Last week there was an Expert Meeting with four distinguished representatives from RCA Member States here in Vienna who were deliberating on what information should be recorded so that the inputs and the achievements in RCA projects can more accurately quality. The first draft of this document is ready and will soon be delivered to the National Co-ordinators. This is going to require them to take an even more active role in RCA affairs. They will be supplying valuable information to the Agency so that we can not only determine the baseline as we are starting to our new projects but also we can measure the increment of the success of these projects on a yearly basis as well. This again emphasizes the National Co-ordinators vital involvement with RCA. I hope that the message on the importance of National Co-ordinators will be relayed to the Governments of the Member States and it will be seen how vital their role is to the full implementation of what is going to go on within the RCA programme. Mr. Chairman, I will conclude my remarks here. I do wish to thank all the contributions from National Co-ordinators. A lot of the success achieved within the RCA programme

must result from the very efficient and dedicated way in which the National Coordinators play their part.

Thank you.



**THE PROJECT DOCUMENT**

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

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**SECTION A: CONTEXT**

(a) Description of the sub-sector

In industrialized countries, isotopes and radiation technology have been successfully applied to the needs of industry and the economic and technological benefits of this technology have been well demonstrated to varying degrees. Developing countries in the Asia and Pacific region have also begun to apply and develop this technology to support their industrial development. However, the sustainability of such technological development is dependent on the availability of indigenous trained manpower, backed by scientific and technical capability. Management skills in the introduction of new technology into industry and an effective mechanism for technology transfer to the industry are additional requirements.

The National Nuclear Research Institutes in the participating RCA Member States are responsible for the development of isotopes and radiation technology. Although the institutes have had some experience in liaising with industry as part of their national programmes and projects associated with IAEA programmes, further efforts are required to set up infrastructures that can be properly responsive to this important task.

In most Member States the regulatory provisions and the infrastructure for the control and safe use of ionizing radiation (including radioactive materials) is well established. The updating of regulations in conformity with upgraded international standards is on going and the adoption of such standards is a key element in ensuring safe, efficient and effective utilization of these technologies by industry.

Industrial acceptance of nuclear technology has to be addressed since this can be a major obstacle to the movement of isotopes and radiation technology into industry, if the key industrial decision makers are not convinced of the safety of the technology. Additionally, the wider issue of public acceptance has to be considered.

(b) Host Country's Strategies

Recognizing that human resource development is vital to the effective development of any technology, participating RCA Member States would participate in training activities organized at the regional level to train key personnel who would then form the core group of experts in the specific application of isotopes and radiation technology. National training activities supported by national and international experts would be implemented subsequently to widen the trained manpower base. The promotion of this technology to the target industries would be addressed through national seminars for top-level executives and decision makers in the various related industries. These seminars or workshops would not only create awareness in this target group but would also serve to establish linkages between the Nuclear Institutes and industry. To sustain the industrial technological development, participating RCA Member States would assist in process and product development and at the same time advise on regulatory provisions for the incorporation of the relevant international standards.

(c) Prior and Ongoing Assistance

1. Under the Articles of the RCA Agreement, Member States will make available the necessary scientific and technical facilities for implementation of activities under this project. They will make significant 'in-kind' contributions through the hosting of meetings, seminars and training courses as well as the provision of experts.
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 (refer Annex 1 and 2).
3. Country programmes on the application of nuclear techniques in industry in participating RCA Member States are being supported by the IAEA through the Technical Co-operation Programme.

(d) Institutional Framework

The task of planning, co-ordination and implementation of this project is assigned to the IAEA through the office of the RCA Co-ordinator. The RCA Co-ordinator will be supported by various sections in the IAEA Technical Co-operation Department as well as the relevant technical officers from the IAEA's technical departments. At the country level, the co-ordination and implementation will be undertaken by the assigned government organizations responsible for the RCA programme which in most cases are the National Nuclear Research Institutes. Each country in turn will nominate an RCA/UNDP counterpart and co-ordinators for each area of technology to create networks that can assist in the efficient implementation of the activities and act as effective interfaces for information transfer.

**SECTION B: PROJECT JUSTIFICATION**

(a) Problem to be addressed; the present situation

The Asia Pacific Region is undergoing rapid economic expansion with several of the RCA Member States experiencing average annual growth rates over the past decade of eight to ten percent. Recognizing the need for technological development and advancement to meet this rapid growth in these RCA countries, the IAEA has implemented projects on the application of isotopes and radiation technology at the regional level supported country programmes.

Through the UNDP assisted projects RAS/79/061 and RAS/86/073, efforts were concentrated on developing the trained manpower base in these applications. These projects have resulted in the establishment of core groups of experts at the National Nuclear Research Institutes (NNRI) to assist the industry in tracer technology, non-destructive testing (NDT), radiation technology and nucleonic control systems (NCS). Although these technologies have been adopted to varying degrees by regional industries in the RCA Member States, some NNRI's are not yet self-sufficient for scientific backstopping of the technologies or for undertaking exploitation of the technology as a service function.

In January 1990, a mid-term review of project RAS/86/073 made recommendation that due emphasis should be given to:

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

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

In December 1990, an expert advisory group meeting concerned with the future development of the project identified four major elements that should be supported:

- Public Health and Environment
- Industrial Production
- Industrial Quality Control
- Materials Research and Development

On the basis of these recommendations, a draft project framework was drawn up and submitted for discussion at the RCA Working Group Meeting held in Viet Nam in March 1991. The RCA Member States agreed on several criteria to assist in the development of the final PFF, namely:

- the programme should concentrate on high quality, in depth projects, with more efforts to be placed on training 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; and
- the programme should have high quality technical management and have increased use of long-term technical experts stationed in the region.

In order to achieve sufficient impact from these proposals, it was recognized that co-financing by the traditional donor countries Australia and Japan would be essential. The modified project proposal was then accepted by the RCA Member States at the Meeting in Viet Nam and confirmed in subsequent correspondence. The project proposal was endorsed by the RCA General Conference Meeting in September 1991.

(b) Expected end of 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 in the development of increased links with industry and utilities.

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

In those sectors covered by this programme, 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 regulations and procedures will provide an effective environment for the encouragement of regional trade, entrepreneurial activities and increased TCDC activities. Specifically most participating Members States will have adopted the standards and guidelines based on international recommendations Qualifying and Certification of NDT personnel for Industrial Sterilization of Medical Products and Devices; and Maintenance and Operation of Radiation Facilities.

(c) Target Beneficiaries

The target beneficiaries in the participating countries will be the industries associated with natural resource - based production, industrial quality control and private as well as government agencies involved in environmental managements activities.

(d) Project strategy and implementation arrangement

1. The regional networking involving staff of the National Nuclear Research Institute as well as staff of specific industries is expected to yield benefits in the improvement of general scientific and technological backstopping and bringing about a great awareness of the need of industry and the capabilities of the NNRI.
2. The training and technology transfer resulting from this project will flow into the industrial sector and other related agencies. Through national seminars, they will be alerted about new technologies. 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 (IAEA) through the RCA Co-ordinator. As recommended at the Terminal Review of RAS/79/061 and RAS/86/073, a Chief Technical Officer stationed in the region will co-ordinate and supervise the activities and conduct missions in the appropriate area of technology expertise. Additional long-term experts also stationed in the region will assist in the smooth implementation of the various activities planned under their area of expertise and will assist in maintaining momentum and consistency of approach.
4. The project strategy and implementation arrangements chosen stem from the previous ten years experience with projects RAS/79/061 and RAS/86/073. Over this time the management has been developed and well tested to ensure effective delivery of the programme.

(e) Reason for assistance

Over the past twenty years RCA has established itself as one of the most successful inter-governmental co-operative ventures and Member States are very reluctant to dilute the regional spirit and character through the acceptance of field financial support from governments outside the region. Impartiality of funding sources is therefore a premium requirement and UNDP's multilateral neutrality would ensure the continuation of this successful arrangement. UNDP support is also needed to mobilize a level of resources beyond that realistically achievable through solely IAEA and traditional donors (Japan and Australia) contributions. A high level of donor cost sharing will be contingent on significant financial support from UNDP. This proposal has been constructed on the basis of significant cost sharing in addition to the UNDP funds and the estimated budget clearly demonstrates this.

**SECTION C: DEVELOPMENT OBJECTIVE**

The common development objective of all the RCA Member States participating in this project is to maximize the effective transfer of technology from developed countries so that they have self-sufficiency. 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 backstopped 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 these structures.

## **SECTION D: IMMEDIATE OBJECTIVES, OUTPUTS AND ACTIVITIES**

### Immediate Objective

Upgrading 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 industrialist informed on the technology.

#### Activities for Output 1.1

- 1.1.1 Experts 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 informed on the technology.
- 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 industrialist 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 and quality control in trace element analysis.
- 1.4.4 National seminars for analytical laboratories on quality control and nuclear analytical techniques.
- 1.4.5 Regional inter-comparison of standard materials
- 1.4.6 Experts assistance to laboratories
- 1.4.7 Fellowships to regional centers of excellence
- 1.4.8 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 person 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 process 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.

#### Output 1.7

At least one scientist 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 Expert Advisory Group Meeting.
- 1.7.9 International symposium on radiation vulcanization of natural rubber latex (RVNRL)
- 1.7.10 National training course/workshops on RVNRL.
- 1.7.11 Fellowship training in advanced application of radiation technology.

## Immediate Objective 2

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.

## Success Criteria

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 coordinate 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 E: INPUTS

### Participating Countries

The participating countries Bangladesh, China, India, Indonesia, Malaysia, Mongolia, Pakistan, Philippines, Republic of Korea, Sri Lanka, Singapore, Thailand and Viet Nam would provide 'in-kind' contributions through the hosting of regional training courses, seminars, workshops and meetings. In addition, some of these countries, in particular those with established facilities in the National Nuclear Research Institutes, would provide fellowship training and expert services either short-term expert missions or lecturers for national training activities.

The estimated costs of in-kind contributions by activity is given in Annex 3.

The Governments of participating RCA Member States will nominate National Counterparts and National Co-ordinators. They will liaise with the IAEA and the Project Staff who will be involved in the co-ordination of national and regional activities.

### Donor Countries

Japan has indicated support for several activities in the fields of Nucleonic Control Systems, Non-Destructive Evaluation and Radiation Technology. The detailed structure of the assumed contribution from Japan is shown by activities in Annex 4. It has been estimated by the IAEA that for the period 1993 - 1997 the Japanese contribution could be US \$1,603,000, comprising the following funded activities:

21	Regional Training Courses and Workshops	US \$802,000
44	Japanese experts to lecture in National Training Courses, Seminars and Workshops	US \$153,000
4	National Co-ordinators' Meetings	US \$189,000
6	Expert Advisory Group Meeting and meetings associated with the Examination and Certification Scheme for Non-Destructive Evaluation Personnel	US \$235,000
1	International Symposium on Radiation Vulcanization of National Rubber Latex (RVNRL)	US \$ 80,000
25	Experts on short-term missions	US \$111,000
	Fellowships	US \$ 33,000
	Total	<u>US \$1,603,000</u>

The government of Australia through the Australian International Development Bureau (AIDAB) has proposed to fund an RCA project on 'The Applications of Isotopes and Radiation Technology to Regional Development with Special Reference to Industry and Nuclear Medicine with budget of approximately A \$500,000 (US \$350,000) per year over three years from mid 1992 to mid - 1995. There are three components in this project, applications to industry, applications to nuclear medicine and application of radiation protection to the industrial use of isotopes and radiation. Two of the segments of this proposed project, namely Industry and Industrial Radiation Protection are closely interlinked to this project on "The Use of Isotopes and Radiation Technology to strengthen Technology and support Environmentally sustainable Development" as shown in the Australian project document (Annex 5). Within the industry segment, funds will be allocated for Regional Training Courses and expert missions to assist in the National Training Activities. The industrial Radiation Protection segment will support the industry segment and will involve the development and distribution of high quality training manuals for use in the region.

The funds which will be allocated for the Industry segment and part of the Industrial Radiation Protection segment, will be utilised for the following activities:

2	Regional Training Courses	US \$160,000
30	Expert Missions to assist in the National Training Activities	US \$102,000
	Equipment for National Training Activities	US \$ 50,000
9	Man-months short-term expert missions	US \$ 90,000
	Development of training manuals in radiation protection for industrial applications	US \$230,000
		<hr/>
	Total	<u>US \$632,000</u>

The detailed breakdown of the proposed allocation of funds to be made available by Australia is shown in Annex 6.

It is also planned to put proposals to the government of Australia for further support to this project to cover the remainder of the life of this project from mid 1995 to mid 1997. The budget for this additional support is estimated at US\$368,000. Bringing the total estimated Australian contribution to US\$1,000,000.

### UNDP

It is proposed that UNDP provide a sum of US \$2,985,400 for this project to fund the following activities.

13	Regional Training Courses and Demonstrations	US \$ 805,000
113	National Training Courses, Seminars and Workshops	US \$ 604,800
1	Expert Advisory Group Meeting	US \$ 30,000
11	National Co-ordinators' Meetings	US \$ 320,000
24	Man-months of short-term expert missions	US \$ 240,000
54	Man-months long-term experts	US \$ 495,000
45	Man-months fellowship training	US \$ 150,000
3	National Counterparts/Tripartite Review meetings	US \$ 120,000
1	Mid-term Review	US \$ 80,000
	Expendible equipment and miscellaneous costs	US \$ 100,600
	Official travel	US \$ 40,000
	Total	<u>US \$2,985,400</u>

The detailed distribution of proposed UNDP funds is given in Annex 7.

### Government of Malaysia

At the 1992 RCA Working Group Meeting in Tokyo 24 - 27 March 1992, the Malaysian delegation pledged US\$50,000 to support project activities, contingent on significant UNDP support. This was confirmed at the 1992 RCA General Conference Meeting held in Vienna 23 September 1992. The activities to be supported have not been identified.

### Bridging Activities

In anticipation of UNDP's acceptance of this project for funding, a bridging programme of activities were undertaken during 1992 to maintain the momentum of work in this area of technology and enable the new initiatives to be implemented as rapidly as possible because of the major management infrastructures being already in place and tested. The details are listed in Annex 8.

It should be noted that, in addition to financial support from IAEA, Japan and Australia, there were contributions from the Governments of China and India who each funded one regional training course.

### IAEA

As the Executing Agency of this project, the IAEA will carry out its task through the RCA Coordinator who will in turn be supported by in-house technical officers from the various Technical Departments and administrative staff from the Technical Co-operation Department.

In addition, funds will be allocated largely to support one long-term expert who will be the Chief Technical Officer stationed in the Region.

1993 15 Man-months	US \$183,150*
1994 13 Man-months	US \$150,400
1995 14 Man-months	US \$160,000**
1996 15 Man-months	US \$170,000**
1997 16 Man-months	US \$180,000**
Total	<u>US \$843,550</u>

\*\* Estimated about 5% inflation per-year over base year 1993/94 and also provision is subject to IAEA Board's approval.

### **SECTION F: RISKS**

<u>Potential Risk</u>	<u>Estimated Likelihood</u>
1. At the Outset of the project, none are foreseen	
2. During project implementation, problems in the economies of the participating countries could limit adoption of the technologies by industries and related agencies.	Low
A lack of resolve by participating governments to address pollution management could limit the applications of some of the techniques.	Low

## **SECTION G: PRIOR OBLIGATIONS AND PREREQUISITES**

### Prior Obligations

None.

### Prerequisites

1. The National Governments of all the participating RCA Member States to the project are signatories to an inter-governmental Agreement. The provision of full counterpart support is covered in Article V (1) of the Agreement which states:

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.
2. The National Governments are required to communicate to the UNDP their countries' intent to participate in the project.

## **SECTION H: PROJECT REVIEWS, REPORTING AND EVALUATION**

- 1 (a) The project will be subject to tripartite review (joint review by representatives of RCA Member States, IAEA and UNDP) at least once every 12 months, the first such meeting to be held within the first 12 months of the start of full implementation. The tripartite review meetings will coincide with the National Counterparts Meetings. The National Project Coordinator and Chief Technical Officer designated by the IAEA shall prepare and submit to each tripartite review meeting a Project Performance Evaluation Report (PPER). Additional PPERs may be requested, if necessary, during the project.
- 1 (b) A project terminal report will be prepared for consideration at the terminal tripartite review meeting. It shall be prepared in draft sufficiently in advance to allow review and technical clearance by IAEA at least four months prior to the terminal tripartite review.

2. The project shall be subject to review in the middle of the implementation cycle which is about 24 months after the start of full implementation. It is proposed that this mid-term evaluation be conducted by visits to six of the participating countries following a meeting between the evaluators, all national counterparts and the long-term experts. However, the organization, terms of reference and timing will be decided after consultation between the parties to this project.

#### **SECTION I: LEGAL CONTEXT**

Not applicable.

#### **SECTION J: BUDGETS**

The total budget for this project is estimated to be US \$ 6,481,950 with the following breakdown of sources:

UNDP	US \$2,985,400
IAEA	US \$ 843,550
Government of Japan	US \$1,603,000
Government of Australia	US \$1,000,000
Government of Malaysia	US \$ 50,000
Total	<u>US \$6,481,950</u>

The requirements of UNDP funds for each year is shown in Annex 9.

It should be noted that Government of Australia has only indicated financial support for 3 years to mid - 1995, amounting to US\$632,000, the additional US\$368,000 for the 18 months to the end of 1997 has been assumed, without any donor commitment.

The allocation of funds according to the main categories of activities are as follows:

<u>Activity</u>	<u>Cost (US \$)</u>
Training (Regional, National, Symposium, Fellowship, Training Manuals)	3,672,800 (56.7%)
Experts	1,963,550 (30.3%)
Meetings (Expert Advisory Group, National Counterparts)	585,000 (9.0%)
Review/Evaluation	200,000 (3.1%)
Equipment	60,600 (0.9%)
Total	<u>6,481,950</u>

However taking into consideration the in-kind contribution of participating countries, the total budget would be higher by US\$1,903,800 bringing the total contribution to US\$8,385,750.

COUNTRY STATEMENT - JAPAN  
21ST MEETING OF THE RCA MEMBER STATES  
VIENNA, 23 SEPTEMBER 1992

Mr. Chairman,

On behalf of the Japanese Government I would like to thank the IAEA for its support and coordination at the 14th Working Group Meeting in Tokyo last March. I would also like to express our thanks to the RCA member states for your kind cooperation and active participation during the Working Group Meeting. I am sure that all this contributed enormously to make the Meeting a success.

I wish to offer on behalf of the Japanese Government my congratulations to the IAEA and the RCA member countries on the Extension Agreement of the 1987 RCA Agreement coming into effect on 11th of June this year. The RCA framework is thus being secured legally for the further period of five years. Japan received in Vienna, as the IAEA's covering letter puts it, "a copy of the agreed text" on 29th of June, and after clearing the national formalities Japan notified the IAEA's Director General of its acceptance of the Extension Agreement on 11th of this month. I would like to take this opportunity to invite those countries which have not yet notified their acceptance to complete their necessary procedures as early as possible.

Mr. Chairman,  
Ladies and Gentlemen,

Japan sees the RCA a very serviceable architecture, and is pleased to note the continued progress of the RCA activities. Considering the expansion of uses and applications of nuclear techniques in the RCA countries which has so far brought enormous advantages especially in the fields of industry, medicine, radiation protection, and agriculture, we should not disregard the importance of peaceful applications of nuclear energy so as to develop economies in and bring social benefits to this region. Japan will therefore continue to support the RCA activities as ever, not only technically but financially, as most important vehicle for cooperation of this kind. And Japan hopes to see continuously 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 the RCA is so very proud.

On the further development of the RCA cooperation, Japan believes that a successful co-operation depends on picking up promising projects which well correspond to the needs of the RCA Member States on one part, and on the

Member States' manifesting self-help spirit on the other. Of course, smooth communication and coordination as we have today should be maintained between the IAEA and the Member Countries. It also seems sound and appropriate to take into consideration the limitation of the RCA finance, if it exists, at the time we consider a new project, and therefore to explore with courage the possibility of employing the principle of scrap and build when it is needed. Bearing those in mind, Japan is eager to continue to extend as much support and contribution to the RCA as possible, with emphasis on the further development of the human resources in the region, as ever, through sending the Japanese experts and receiving foreign experts, with a view to seeing the region further prosper.

Mr. Chairman,

Japan reiterates on this occasion its support to the realisation of a new UNDP/RCA project titled "the Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development", an "Environment Project" to be short.

In order to secure the realisation in 1993 of the Environment Project, in October last year Japan asked the UNDP Headquarters in New York, together with Australia, to support the Project financially. Again in January this year at the UNDP Meeting of Aid Coordinators in Asia and the Pacific (MAC-5) held in Manila, a Japanese representative made a statement to ask the UNDP to give due and favourable consideration for the Environment Project.

Japan will technically and financially provide as much support to this Project as possible like it did for the past UNDP/RCA Industrial Project. I must note, however, that the past performance explicitly indicates Japan has been a major financial contributor to the RCA projects on one hand, and that Japan has not been in a position to commit itself to a specific amount of future financial contribution on the other. In this regard I wish to point out that the UNDP's PROGRAMME WORK PLAN 1992 reproduced in 5.d) of this Meeting's BACKGROUND PAPERS is inaccurate in describing Japan having already pledged a certain amount of contribution, and therefore ask the IAEA Secretariat for necessary explanation to the UNDP.

Mr. Chairman,

Japan supports the Proposed RCA Project Activities for 1993. With regard to a Regional Workshop on the Application of NCS in the Paper Industry in Tokyo tentatively listed in 5.d) of this Meeting's BACKGROUND PAPERS, I would suggest

to hold a few national workshops in a few countries instead, to which Japan would be despatching its experts. I am sure that we would be better off in this way from the cost-benefit point of view.

As for the RCA budget for 1993, Japan is not in a position to commit itself to a specific amount of contribution. As in the past, however, Japan will technically and financially provide as much support to the RCA in 1993.

With regard to the question of financing the RCA project from outside the region, Japan is of the view that a regional cooperation such as the RCA should be carried out for projects of high interests among member countries, based on the principle of self-reliance, and within its own co-operative framework. It is perhaps likely that receiving finance from outside introduces consequently certain other elements to the RCA's tradition.

In case the RCA's endeavour to secure the UNDP's financial contribution should fail, realistic approach needs to be adopted. It will be necessary then to consider the possibility of putting some projects being in financial trouble on the footnote /a project list to look for interested donors from outside, or of RCA's finding alternative-multilateral sources of funding.

Mr. Chairman,

As for the bridging project in 1992 in the field of industrial application, Japan is extending its support as much as possible. Japan believes this will hand over the ample momentum to an "Environment Project".

With respect to Medical and Biological Applications Project Japan will extend technical and financial support as possible as before in sub-projects on Imaging Procedures for the Diagnosis of Liver Diseases, Improvement of Cancer Therapy, and Compilation of Anatomical, Physiological, and Metabolic Characteristics for a Reference Asian Man.

With regard to Strengthening of Radiation Protection Infrastructure Japan hosted last June the Project Formulation Meeting for Phase II. In light of the importance of nuclear safety in the RCA member states where uses and application of nuclear techniques are expanding, Japan will continue to support this project technically and financially.

Regarding Phase III of the Food Irradiation Project, Japan ceased its financial support, due to its domestic reasons towards food irradiation, at the completion

of Phase I. Japan remains interested, however, in considering in-kind co-operation on a case-by-case basis to limited aspects of receiving foreign trainees and sending its experts.

As regards Research Reactor Utilisation Project, Japan will continue to extend possible support through, for instance, sending its experts, and accepting foreign researchers and trainees etc.

Thank you, Mr. Chairman.

**Japanese Country Statement**  
**at**  
**The 14th RCA Working Group Meeting**  
**Tokyo, Japan, 24-27 March 1992**

Mr. Chairman, Distinguished Delegates, Ladies and Gentlemen,

On behalf of the Japanese delegation I would like to express that we are privileged to host this 14th RCA Working Group Meeting in the year to celebrate the 20th anniversary of the establishment of the RCA, and are honoured to have the opportunity to welcome both the distinguished delegates of the member states and observers from Mongolia to Tokyo, and we wish you all a pleasant stay in Japan.

Japan has actively associated itself with the RCA activities since its participation in 1978 and has made financial and technical contributions required for the RCA projects. Japan strongly believes that the RCA provides excellent opportunities for the promotion of peaceful uses of nuclear energy to contribute to the economic development and prosperity in the region, bringing about at the same time scientific and technological benefits for each member state.

Japan has been promoting the co-operative activities within the framework of the RCA with particular emphasis on the transfer of technical skills and on the development of human resources. This year Japan will continue to support three large RCA projects, namely the bridging activities for 1992 in the field of Industry, the Medical and Biological Project, and the Radiation Protection Project.

Mr. Chairman, Distinguished Delegates, Ladies and Gentlemen,

Japan congratulates the RCA on its successful completion of the 2nd Phase of the UNDP/RCA Industrial Application Project, to which Japan extended a financial support of about US\$1.43 million. The 2nd Phase obviously realized considerable results with efforts of each member country during these 10 years especially in the field of research and development, transfer of technology, and promotion of human resources. It is hoped that the outcome of the Industrial Project will be consolidated and introduced more to practical uses in the future.

If I may outline briefly the activities of this project in 1991 which Japan participated in, with regard to Radiation Processing, Japan hosted 3 activities and sent 2 experts to a regional training course in Indonesia. As to Non-Destructive Testing, Japan hosted 1 regional training course and sent 7 experts to courses in Indonesia, Viet Nam, Malaysia and Thailand. With respect to Nucleonic Control System, Japan hosted 1 regional workshop and sent 1 expert to a national seminar in China.

Japan supports the realization of a new UNDP/RCA project titled "the Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development." Let us call it an "Environment Project" to be short. In order to secure the realization in 1993 of the Environment Project, in October last year Japan asked the UNDP Headquarters in New York, together with Australia, to support the Project financially. Again in January this year at the UNDP Meeting of Aid Co-ordinators in Asia and the Pacific (MAC-5) held in Manila, a Japanese representative made a statement to ask the UNDP to give due and favourable consideration for the Environment Project. On our part Japan will technically and financially provide as much support to the Project as possible like it did for the UNDP/RCA Industrial Project.

Japan supports a bridging activities in 1992 in the field of Industrial applications, and will extend technically and financially as much contribution as possible by sending Japanese experts and hosting activities. Due to the constrained budgetary situation with the UNDP contribution being nil for this year, Japan hopes to be in closer touch with the RCA Secretariat for the implementation and further details of the activities so as to produce good results out of these activities.

Japan welcomes the new project proposal from Australia in the field of industry, industrial radiation protection, and nuclear medicine, and wishes to make some comments. With regard to industrial applications, Japan hopes to see it well co-ordinated with a UNDP/RCA Environment Project. As to industrial radiation protection, Japan welcomes the Australian initiative of preparing training manuals, which would certainly become one of the assets to be shared with the RCA activities. And on holding training workshops in this field, Japan wishes to see them well co-ordinated with a 2nd phase of Radiation Protection Project to be started in 1993. A project formulation meeting for a 2nd phase to be conducted in Tokai this June could offer an excellent opportunity for this co-ordination with Australia. With respect to nuclear medicine, Japan could contribute not only by sending Japanese experts to an advisory committee on nuclear medical education for medical technologists, but also to the programme itself in such fields as handling of equipments and improvement of fundamental knowledge, and hopes therefore to have consultations with Australia.

Japan made active contribution in 1991 in the field of Medical and Biological Applications Project. With regard to Nuclear Medicine, both the ultra sound images of phantoms acquired from participating countries and analysis made by participating countries on 103 samples of liver diseases were respectively reviewed in 1991. Japan will continue to support this CRP on "Imaging Procedures for the Diagnosis of Liver Diseases" so as to successfully conclude its 2nd phase (1988-92) this year with conducting its critical review and holding a

consultant meeting for a 3rd phase before March next year. It is intended to publish the outcome of the 2nd Phase as an atlas by 1993. As to Radiation Therapy, in 1991 Japan sent experts to Sri Lanka. And, while using an existing software for computer-related therapy so as to familiarize the participating experts with radiation treatment planning techniques, Japan promoted a development of an original software. Japan will continue this effort in 1992, and will conduct its critical review and holding a consultant meeting for a 3rd phase of "Improvement of Cancer Therapy" by 1993.

Due to the domestic reasons towards food irradiation, Japan ceased its financial support at the completion of Phase I Food Irradiation Project. However, Japan has remained interested in co-operating and contributing in kind to R&D in this field. In 1991 Japan sent 1 expert to a regional workshop in Thailand and 1 expert to a research co-ordination meeting in Indonesia.

As to Research Reactor Utilization Project, Japan will continue to extend possible support through, for instance, sending experts and receiving researchers and a trainees.

Japan actively supported the Radiation Protection Projects (1988-1992) in 1991 by sending 1 expert to India and hosting a regional training course and a expert advisory group meeting. Japan will continue to support this project by hosting a 2nd regional expert workshop in Tokai in October on Comparison of Personal Dosimetry. The Radiation Protection Project will complete its term of 5 years by the end of this year. With this in mind, both the intensified activities in the field of peaceful uses of nuclear energy among the RCA Member States and the increasing importance of nuclear safety, Japan is pleased to announce that it wishes to support a 2nd phase of this project. For this purpose Japan will host a project formulation meeting in Tokai in June.

As the Draft RCA Annual Report 1991 puts it, it was unanimously agreed at the 20th RCA General Conference that renewal of the current RCA Agreement should be done in the form of "an extension agreement as had been done previously". Background Documents prepared by the RCA Secretariat contain a draft for the renewal of the Agreement. Japan ought to point out that the draft in there prepared by the RCA Secretariat should have been circulated much earlier than it was actually done, and that the form and contents there do not coincide with what the 20th RCA General Conference unanimously agreed. So as to review the current 1987 RCA Agreement without any alteration of the articles, as agreed in Vienna last September, Japan tables its draft before this Meeting for discussion and acceptance by the member states. This draft does correspond to the unanimous consent at the last RCA General Conference to follow the method previously adopted in 1977 and 1982 when our predecessors extended the 1972 RCA Agreement without any alteration of the articles.

In case more explanation is needed, the fact needs to be pointed out again that this time in 1992 we are in consent that the RCA framework and activities should be extended without any alteration of the articles of the 1987 RCA Agreement. And therefore it is logical and most appropriate not to follow this time the method adopted in 1987 but to follow that in 1977 and 1982. In 1987 the RCA member states extended the RCA framework and activities with alteration of the articles of the 1972 RCA Agreement, which is the reason the RCA member states did not follow the method of 1977 and 1982. Japan should be most grateful if this matter of renewal of the RCA Agreement is directed towards the right and consistent direction which well links the past and the future of the RCA.

Japan accepts the principle and outline of the 1992 action plan, and will extend active support as much as possible technically and financially to activities of this year. Japan hopes to be in closer touch with the member states and the RCA Secretariat in implementing those activities so as to maximize the outcome and lay a better foundation for the future.

Although it is not in a position to confirm the 1992 cost projections in the Background Documents, Japan will continue to extend as much financial support as possible to the RCA activities in which it participates, with a view to consolidating and enhancing the momentum of the activities.



DEPARTMENT OF FOREIGN AFFAIRS AND TRADE

CANBERRA. A.C.T. 2600

Mr Edward Polansky  
Programme Coordination Section  
Department of Technical Cooperation  
International Atomic Energy Agency  
Vienna

11 November 1992

Dear Mr Polansky

I refer to a fax dated 23 October 1992 from the RCA Office to Mr Pat Bull of the Australian Nuclear Science and Technology Organisation (ANSTO), drawing our attention to a letter to you from Mr Sebastian Zacharia, Chief of the Regional Programme Division, UNDP. Mr Zacharia noted the need for confirmation from Australia of the amount it would contribute to the UNDP Fifth Cycle Inter-Country Programme.

I would like to confirm that amount to you and ask that you convey this information to Mr Zacharia in response to his requirement for official advice from Australia.

You will be aware that the recently approved Australian sponsored IAEA Regional Cooperative Agreement for Asia and the Pacific (RCA) Project, titled *The Applications of Isotope and Radiation Technology to Regional Development*, has a component on industrial applications of isotopes and radiation technology. This has been designed specifically to meet UNDP conditions, and with close linkages to the UNDP Project proposal as described in Section 3, particularly Section 3.2 (page 26) of the Australian Project Design Document of September 1992.

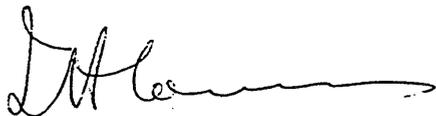
Specifically, the activities and outputs of the industrial applications component meet UNDP Project activities/outputs 1.2, 1.6, 1.7, 1.8, 1.9, 1.21 and the industrial radiation project component meets UNDP activity/output 2.3.

The Australian Government, through the Australian International Development Assistance Bureau (AIDAB), has agreed to fund these IAEA/RCA project components over three years to a total of A\$1.01 million (US\$700,000), out of the A\$1.5 million provided by Australia for the whole project.

Hence on a pro rata basis and allowing for the fact that not all of the UNDP Project activities are covered by the

Australian sponsored IAEA/RCA project activities, the Australian Government believes this contribution will be sufficient to enable the UNDP Project to proceed, without any further Australian contribution. This is of course conditional on a substantial UNDP financial commitment to the programme.

Yours sincerely

A handwritten signature in cursive script, appearing to read 'I Cousins', with a long horizontal flourish extending to the right.

Ian Cousins  
Assistant Secretary  
Nuclear Policy Branch

**'IN-KIND' CONTRIBUTIONS**

It is recognized that for the RCA Member States in the Asia Pacific Region there is a wide variation in living standards, salary rates and cost structures and so it is a difficult, if not impossible task to produce a single figure to represent the average 'in-kind' contribution. Although it might be better to measure the 'in-kind' contribution in terms of "hours to complete task" or other non-monetary indicators, the present documentation requires the estimate to be made in dollar terms.

Following from the experience in the RCA region with other projects, including other UNDP ones, it is proposed to assess the in-kind contributions as follows:

Hosting of Regional Training events including demonstrations	US\$2000/day
Hosting of National Training events	US\$ 1000/day
Provision of senior staff for Project Co-ordination Meetings, tripartite and other review meetings	US\$ 250/day
Provision of experts for advisory meetings, lecturing at training events, expert assignments	US\$ 200/day

On the basis of the following events, using these figures, a nominal total 'in-kind' contribution can be calculated for the following events being planned for the developing countries in the region:

35	Regional Training Events and demonstrations	US\$700,000
169	National Training Events	US\$423,000
15	National Co-ordinator Meetings	US\$244,000
24 m/m	Short Term Expert (80% from the region)	US\$116,600
54 m/m	Long Term Expert (80% from the region)	US\$259,200
7	Expert Group Meeting	US\$ 91,000
4	National Counterparts Review	US\$ 70,000
<b>Grand Total</b>		<b><u>US\$1,903,800</u></b>

**UNDP/IAEA/RCA WORK PLAN 1993 - 1997 RELATING TO RADIATION TECHNOLOGY**

**(DRAFT)**

UNDP OUT PUT No.	CODE	1993	1994	1995	1996	1997
1.6 and 1.7 Radiation Chemistry	NCM RTC Basic Appl. NTC	JPN (1w) JPN (1w) JPN (1w) PHI (1w)	JPN (1w)  VIE (2w) BGD (2w)	JPN (1w)  THA (2w) SRL (2w)	JPN	JPN (1w) JPN
Advanced Radiation Technology	RWS					JPN
1.6 Flue Gas Treatment	NTC NEMS  NWS RWS	CPR (2w)  IND (2w) INS (2w) JPN (1w)	INS (2w) IND (2w) THA (2w)  CPR (1w)	THA (2w)  ROK(2w)  THA (1w)	ROK(2w)  PHI (2w)  INS (1w)	INS PHI (2w)
1.6 Sewage Sludge Utilization	NTC  EXP  RWS	THA (2w)  MAL (2w) BGD (2w) CPR (1w)	MAL (2w) BGD (2w)	CRP(2w) INS (2w) PHI (2w)  MAL(1w)	PHI (2w) VIE (2w)  THA (1w)	ROK BGD (1wk)  INS (1w)
1.7 RVNRL	NEMS EAG FELLOWSHIP SYMPO	THA (1w) MAL SRL (6w)	VIE (1w)  CPR (6w)	SRL (1w)  JPN (1w)	CPR(1w)	PHI (1w)
1.7 Radiation Curing	NEMS  RWS	IND (1w) THA (1w)	INS (1w) PHI (1w)  MAL	CPR(1w) SRL(1w)	BGD PAK (1w) MAL	ROK VIE (1w)
2.1 Safe Operation of Industrial Radiation Facilities	RWS		JPN (1w)		JPN (1w)	

w - week

**(Draft) WORK PLAN FOR 1993 - 1997 NON-DESTRUCTIVE TESTING**

<b>ITEMS</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>
1. PTP Phase 1 for level 2 RT and UT	ROK (20d) SIN	IND (20d) THA PHI			
2. Meeting of Expert Group for Assessment	AUL (17d)	JPN (5d)			
3. Meeting of National Co-ordinators			? (5d)		
4. Expert Mission		? (20d)			
5. Regional Seminars and Workshops on NDE for specific industry applications				JPN(5d)	
6. Meeting Regional Board of Examination Review			JPN (5d)		
7. Production of sample level 2 Examination papers			JPN (5d)		
8. Regional Model Qualifying Examinations				?(5d)	?(5d)
9. Regional Workshops on training of fabrication of test pieces and validation.			AUL (5d)		AUL (5d)

? - to be identified

d - day

CONTRIBUTION FROM JAPAN

Output	Activities	No. of activity/ No. of Experts/ Man Month expert	Cost (US \$)
<b>RTC/RW</b>	1.5.3	1	50,000
	1.6.1	4	120,000
	1.6.4	4	140,000
	1.7.1	2	60,000
	1.7.3 (basic rad. chem.)	2	80,000
	1.7.3 (app. rad. chem.)	3	120,000
	1.7.6	1	60,000
	2.2.3	2	92,000
	2.3.2	2	80,000
<b>Sub-total</b>		<b>21</b>	<b>802,000</b>
<b>NTC/NS/NW</b>	1.6.2	12 exp.	40,000
	1.6.5	15 exp.	50,000
	1.7.2	5 exp.	25,000
	1.7.7	7 exp.	23,000
	1.7.10	5 exp.	15,000
<b>Sub-total</b>			<b>153,000</b>
<b>NCM</b>	1.5	1	39,000
	1.7	3	150,000
<b>Sub-total</b>		<b>4</b>	<b>189,000</b>
<b>EAGM</b>	1.7.8	1	30,000
	2.2.4	2	48,000
	2.2.5 & 2.2.7	1	15,000
	2.2.8	2	98,000
	2.2.9	2	44,000
<b>Sub-total</b>		<b>8</b>	<b>235,000</b>
<b>Inf. Symposium</b>	1.7.9	1	80,000
<b>Short-term expert</b>	1.1.1	2 m/m. 20 exp.	80,000
	1.5.1	20 days. 2 exp.	20,000
	1.6.3	3 exp.	10,000
<b>Sub-total</b>			<b>111,000</b>
<b>Fellowship</b>	1.1.5	1 m/m	23,000
	1.7.11	2 persons	10,000
<b>Sub-total</b>			<b>33,000</b>
<b>Grand total</b>			<b>1,603,000</b>

**(Draft) WORK PROGRAMME 1993 - 1997 NUCLEONIC CONTROL SYSTEMS (NCS)**

<b>ITEMS</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>
Expert Mission (Steel)		INS (1w)		CPR (1w)	? (1w)
Expert Mission (Paper)	PHI (10d) VIE	CPR (10d)		? (10d)	
Fellowship (Civil Engineering)			ROK (2x1w) MAL THA		
Scientific Visits	CPR (2x1w)		CPR (2x1w) VIE		? (2x1w)

? - to be identified

d - day

w - week

AUSTRALIAN ASSISTANCE TO THE  
IAEA/RCA 1992 - 1995

THE APPLICATIONS OF ISOTOPE  
AND RADIATION TECHNOLOGY  
TO REGIONAL DEVELOPMENT WITH SPECIAL  
REFERENCE TO INDUSTRY AND NUCLEAR MEDICINE

DESIGN DOCUMENT

Australian International Development Assistance Bureau

September 1992

IAEA / RCA PROJECT ON

THE APPLICATIONS OF ISOTOPE AND RADIATION TECHNOLOGY TO  
REGIONAL DEVELOPMENT WITH SPECIAL REFERENCE TO  
INDUSTRY AND MEDICINE

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**IAEA / RCA PROJECT ON**

**THE APPLICATIONS OF ISOTOPE AND RADIATION TECHNOLOGY TO  
REGIONAL DEVELOPMENT WITH SPECIAL REFERENCE TO INDUSTRY  
AND NUCLEAR MEDICINE**

**FORWARD**

The goal of the project is to enhance regional cooperation by activities which increase the use of nuclear technology in industry and health care and through this further regional economic development, industrial productivity and quality of health.

This document presents the details of an "IAEA / RCA Project on the Applications of Isotope and Radiation Technology for Regional Development with Special Reference to Industry and Medicine". The project incorporates the recommendations of the June 1991 AIDAB Review of Australian Assistance to IAEA / RCA 1987-90 and Sub-projects of the project are closely interlinked to the proposed UNDP project for 1992-96. Three project Sub-projects are proposed:

- Industry
- Industrial Radiation Protection
- Nuclear Medicine

A total budget of A\$1,500,000 over three years is assumed.

In framing the project efforts have been made to reach the end users of the technology in a cost effective manner. The mechanism varies from Sub-project to Sub-project. Within the Industry Sub-project, two regional training courses in Australia will be complemented by seven expert missions, each to two recipient countries and each specialising on an industry sector requested by the recipient. Each mission will conduct a national seminar organised and supported by the local Atomic Energy Authority and attended by industry participants.

The Industrial Radiation Protection Sub-project will support the industry sub-project and also sponsor the development and distribution of high quality training manuals for use in the Region.

The Nuclear Medicine Sub-project will be designed towards developing a correspondence course for the benefit of medical technicians. The syllabus will be developed in close consultation with national experts and accreditation sought through a body acceptable to the Region such as the Asia and Oceania Society of Nuclear Medicine.

## 1. INTRODUCTION

### 1.1 Activity Setting

Australia has been supporting programs of nuclear technical cooperation within the framework of the IAEA Regional Cooperative Agreement (RCA) since 1980. The projects are appraised and funded through Australian International Development Assistance Bureau (AIDAB) whose mission is to promote development in recipient countries. The June 1991 AIDAB Review of Australian Assistance to IAEA / RCA 1987-1990 makes the following recommendations:

- "(i) Support should focus on a smaller number of larger activities. The most attractive opportunities appear to rest with the application of nuclear technology for industrial production or perhaps in nuclear medicine.
- (ii) Close linkages should be established between related regional (UNDP), bilateral and Asian Development Bank projects.
- (iii) Budget support should be of the order of \$A0.5 million annually for three years."

As a result of these recommendations, a regional program of nuclear technical assistance within the framework of the IAEA / RCA for the period 1992 to 1995 has been formulated. The project is "IAEA / RCA Project on the Applications of Nuclear Techniques to Regional Development with Special Reference to Industry and Medicine".

The umbrella project will comprise Sub-projects in Industry, Industrial Radiation Protection and Nuclear Medicine. Its overall Purpose is to contribute to regional development through a combination of institute infrastructure development, personnel training and equipment support implemented through activities related to the industrial and medical applications of isotopes. The Industry and Industrial Radiation Protection Sub-projects are closely integrated.

The project proposal was announced at the IAEA / RCA General Conference Meeting 1991 and the draft document distributed to RCA Member States. Responses are collated as Annex 1. The project was further discussed at the IAEA Meeting of National Coordinators for the UNDP / IAEA / RCA Regional Industrial Project, Jakarta 1991, and at the RCA Working Group Meeting, Tokyo, March 1992.

## 1.2 Analysis and Formulation

The project has been prepared within a broad policy framework which is discussed in Annex 2 under the headings: 1) Australian Government policy, and 2) UN policy on environment and development with specific reference to relevant statements on the Rio declaration, the UNDP inter country program, and IAEA Technical Cooperation policy. The following considerations are relevant in formulating this project:

- (i) The achievements of previous projects have resulted in a cadre of personnel who have been trained in Australia and who are contributing to resilient RCA networks within the recipient countries through which the benefits of the technology can be transferred to the end users (either productive industry or hospital patients).
- (ii) The lessons from the previous projects which include:
  - (a) the benefits of following up regional training with expert missions to complement the process of technology transfer;
  - (b) the need to implement more cost effective training modalities including distance learning concepts and national training;
  - (c) the need to select those technologies which are appropriate from both the Australian and recipient country perspectives, which contribute to sustainable development, and which are amenable to the establishment of linkages with other AIDAB programs, with IAEA/UNDP activities and Asian Development Bank projects. In this context, the industrial and radiation protection Sub-projects of the proposed project are closely aligned to the Purposes and activities given in the Project Formulation Framework for the proposed UNDP project for 1992-96 on "The Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development" (Annex 3);
  - (d) the need to complement isotope applications projects with radiation protection activities related to workplace safety; and
  - (e) the need to involve a wide range of Australian expertise from Ansto, local industry, teaching hospitals and universities.
- (iii) Environmental issues are addressed by selecting those isotope techniques which enhance industrial efficiency through savings in energy and materials. The environmental impact per unit of production is reduced and a practical step made towards reconciling the aspirations of developing countries to increase living standards with the global necessity to minimise the inevitable environmental pollution.

### 1.3 Rationale

#### 1) Industrial Applications of Isotope & Radiation Technology Sub-project 1

The aim of the Sub-project is to contribute to sustainable development in industrialising countries in Asia and the Pacific through the transfer of appropriate nuclear science and technology. A two stage process for technology transfer is assumed. Firstly, Regional Training Courses will be held at ANSTO in the fields of Radiation Technology, Industrial Isotope Applications and Material Science. ( The Radiation Technology Course has already been held.) Graduates from these Courses will augment the existing RCA structure to form a network which will provide a basis for organising a series of National Seminars. Previous experience indicates that at least 50 key people from government, industry and academia will attend each Seminar. Each RCA country will have the opportunity of hosting at least one during the lifetime of the Project. A list of topics and a timetable for implementation are shown. The project concept has been well received within the Region (Annex 1). RCA countries are now being invited to nominate their priorities for individual Seminars from the list. This process is needed to ensure that the Seminars offered match national priorities to the greatest extent possible. The industrial activities will be augmented by radiation protection Sub-project.

At the end of the Project approximately 40 people will have received specialist training in Australia in the fields of industrial isotope applications and materials science. In addition approximately 700 people will have participated in National Seminars in priority areas. The three person Australian lecturing will comprise at least one from private industry. Scientific infrastructure will be improved through the provision of a modest level of equipment. The Seminars will contribute to the further strengthening of networks between Australian and Regional enterprise to the benefit of all involved.

#### 2) Industrial Radiation Protection Sub-project 2

There are 14 member countries in the Asia Pacific Region with possibly two more joining in the near future. A number of these countries have sophisticated radiation protection infrastructures, Australia being one of that number, and others require support in developing basic minimum radiation protection standards and practices and an infrastructure for implementation of the same.

In achieving this overall goal we are assured that our neighbours follow internationally accepted good practices.

The specific achievements of this project will be the establishment of a network of contacts at the coal-face of need, the provision of radiation protection materials and a methodology of presentation to enable the maximum application of those materials at the minimum of cost and in a distance learning format that enables the participation of geographically disparate individuals. The project will also maximise the actual number

of recipients of the training through a train - the - trainer approach to disseminating radiation protection information.

Meanwhile achievements will be the actual production of training materials, the output from the expert workshop, and the outcomes of trialling the material in the region.

### 3) Nuclear Medicine Sub-project 3

To provide a program of distance education so that practising technologists in the region achieve a higher standard and uniformity of education in nuclear medicine technology. This would enable more effective use of existing nuclear medicine technology, promote further development of techniques in nuclear medicine and enhance the quality of health care in the region. Following successful completion of the project, it could be expected that the nuclear medicine community within the RCA member countries would have acquired a level of self-sufficiency with the training materials and methods provided during the project to be able to provide a continuing training program.

## 1.4 Identification Of Participants

### 1) Industrial Applications

The process involves the following steps:

1. A formal announcement of the course (based on Regional priorities determined in negotiations associated with development of the project document). The announcement is circulated to RCA Member States together with
  - a. a full course description
  - b. a detailed outline of the qualifications, experience and work responsibilities of participants likely to obtain maximum benefit from the course.
  - c. a request by Member States to nominate candidates
2. Frequently Ansto/IAEA is aware of individuals who are likely to receive particular benefits from the Course. In this case a suggestion is made that the qualifications of the named individuals may be given special consideration. This advice is, of course, not binding on the Member State, but is frequently taken.
3. As a matter of course, IAEA Member States are requested to give special consideration to suitably qualified women.
4. The IAEA (in consultation with the Course Coordinator) has the right to refuse to accept any candidate put forward by Member States who are not deemed to be adequately qualified or who may be rejected on other grounds (inappropriate experience, recent attendance at other courses).

In general, there are sufficient checks and balances to ensure that good candidates are selected.

## 2 Radiation Protection.

Key participants in participating countries have already been identified through their participation in a workshop in Sydney in February 1992, however IAEA will approach each recipient country through formal channels specifying their key role in coordinating Radiation Protection training and / or regulating the sources of ionising radiation.

Individual contacts identified through this formal contact would then be utilised to identify appropriate individuals and categories of individuals to actually take part in trials of the training materials.

This method of selection of participants was based on dialogue with participating countries both at the "Regional (RCA) Training Course on the Development of Infrastructures for Ensuring Radiation Protection, Sydney and Adelaide, September 1990" and at the "Regional (RCA) Workshop on the Development of Training

Techniques and Methods of Instruction in Radiation Protection, Sydney February 1992".

As a matter of course, IAEA Member States are requested- to give special consideration to suitably qualified women.

### 3 Nuclear Medicine

A course Advisory Board will be formed with presentation from all participating countries. The role of this Board will include:

- a. make commitment for country to provide local support for the course
- b. publicise the course availability at a National level and promote participation
- c. identify suitable country coordinator
- d. provide advice on suitable candidates for pilot and full courses

The course is intended for all practising Nuclear Medicine Technologists in the region who have not undertaken a recognised course of study in Nuclear Medicine Technology. Initially, under the pilot scheme, a limited number of technologists will be selected in each of six countries. Those persons should be nominated via the country coordinator and should satisfy the following requirements:

- a. actively employed in Nuclear Medicine as a technologist
- b. completed a tertiary course in a Medically related field eg radiography, nursing, medical technology
- c. have good understanding of written and spoken English with reasonable communication skills
- d. be prepared to play an active role in supervising other technologists who may undertake the course

The IAEA (in consultation with the Course Coordinator and Project Manager) has the right to refuse to accept any candidate put forward by Member States who are not deemed to be adequately qualified or who may be rejected on other grounds (eg inappropriate experience).

## 1.5 Women in Development

The question of women in development is addressed by actively supporting the IAEA Technical Cooperation policy of encouraging participating countries to take special note of the claims of qualified women in nominating candidates for training courses and seminars. Since the primary focus of the Project is towards scientific institutions and hospitals, it can reasonably be predicted that significant numbers of women will benefit directly from the technology or will play a key role in the transfer of the technology from the source in Australia to the end user in the developing country.

The Project is being implemented through the IAEA and will be subject to both AIDAB and IAEA guidelines. The IAEA specifically requests Member States to take special note of suitably qualified women in choosing candidates for technical cooperation activities. As a consequence, the proportion of women benefiting from IAEA projects is steadily increasing.

Professional women have also been significantly involved in the development of this RCA project and will be actively involved in the implementation of at least two of the three sub projects.

## 1.6 Environmental Considerations

The overall Purpose of the Project is consistent with the AIDAB Interim Policy Statement "Ecologically Sustainable Development in International Development Cooperation" 1990, and in particular the section "Industry: Producing More with Less".

Project activities generally fall within the:

<b>Category 3 Targeted</b>	"Environmentally targeted activities" or
<b>Category 4 Neutral</b>	"Activities that rarely have significant environmental impact"

of the AIDAB document "Environmental Assessment for International Development Cooperation".

- 1) **Industrial Radiation Protection. Sub project 2**
- 2) **Nuclear Medicine. Sub-project 3**

These sub projects totally fall into **Category 4 Neutral** Activities that rarely have significant environmental impact"

- 3) **Industrial Applications of Isotopes and Radiation. Sub project 1**

This sub project falls into both **Category 3 Targeted** and **Category 4 Neutral**. Details are given below. The numbering of the project activities refer to that in the logframe. Of necessity, concrete examples of the application of the technology will be taken from existing or past technical cooperation projects.

The thrust of the Project is technology transfer through Regional Training in Australia augmented by a series of national seminars organised through the national nuclear institutes. All of the isotope technology proposed in this project is widely used in Australia. Some of it is already used by foreign companies in support of their enterprises in developing countries. This technology is usually inaccessible to public institutions and cannot be used to contribute to wider national development. All of the project activities, implemented with AIDAB funding, fall within the AIDAB Category 4 (education and training; institutional development). Since the immediate aim of the National Seminars is to stimulate the practical applications of the technology, it is relevant to comment on the environmental impact of these applications.

Seminar 1.1.2.2 Coastal Engineering

This falls within AIDAB Category 3 (example: coastal zone management). An example of the use of the technology is the approved cooperative-study with UTN Malaysia of sediment movement near Kuala Marang. The data will be used to calibrate an existing mathematical model, the output of which will be used to optimise the line of a new dredging channel, and to define the site for the dredge spoil dumping. The fishing port will benefit from improved access, and the impact of the engineering works on the environment will be minimised.

- Seminars 1.1.2.3 Waste Management and Minimisation,
- 1.1.2.6 Off-shore Resources Development and
- 1.1.2.7 Environmental Impact Assessment

These generally fall within AIDAB Category 3 (example: pollution control and safe disposal of waste material).

An example of 1.1.2.3 is the Ansto implemented IAEA funded project to investigate the reason for the reduced efficiency of a mercury stripping unit in a natural gas plant.

Seminar 1.1.2.6 will be directed to the use of isotope techniques to assess the integrity of plan and hence to minimise the possibility of oil spillage into the ocean. In this instance the wide experience of the Tracerco group of companies through Tracerco Australasia will be tapped.

An example of 1.1.2.7 is a forthcoming demonstration in the Philippines involving the study of sub surface water intersecting the new metro Manila tip.

- Seminar's 1.1.2.4 Chemical and Refining Industries,
- 1.1.2.5 Metals and Manufacturing Industries and
- 1.1.2.1 Radiation Surface Coating

These will be directed towards the application of nuclear related technologies to improve the efficiency of existing processes. In general they will lead to processes which are optimised with respect to the use of materials and energy. Waste products and energy and hence environmental impact will be minimised.

## 2. ACTIVITY DESCRIPTION

### 2.1 Project Goal and Purposes

#### Goal

The goal of the project is to enhance regional cooperation by activities which increase the use of nuclear technology in industry and health care and through this further regional economic development, industrial productivity and quality of health.

#### Purposes

The principal purposes of the project are to provide a combination of institute infrastructure development, personnel training and equipment support implemented through activities related to the industrial and medical applications of isotopes. Broadly speaking, each Sub-project of the project involves the following elements:

- 1) **Regional training in Australia.** The industrial Sub-project includes two regional training courses; regional training was a feature of previous Australian funded activities in Radiation Protection and Nuclear Medicine and can be considered complete.
- 2) **National training.** The aim of the national training is to supplement the regional activities and to ensure that the technologies are extended to as many working level scientists and engineers as possible. The particular method will depend on the technology area.

The goal and purpose will be realised through three project Sub-projects to be implemented concurrently.

### 2.2 Sub-project Description and Purposes

**Industry:** A series of national seminars will be held. The Australian team will comprise experts from Ansto and industry and will lead seminars on topics nominated as priority areas by recipient countries within the framework of the overall implementation plan outlined in Section 3.2. This arrangement will permit the essential flexibility needed to respond to the requirements of countries with very different development status.

**Radiation Protection:** A pressing need has been identified for high quality information packages provided by training materials and distance learning techniques in the field of industrial radiation protection. Close liaison with the Agency will minimise any duplication. The aim is to reach all technologists working with industrial radiation sources through their national training systems.

**Nuclear Medicine:** A systematic program of distance learning and accreditation for technologists handling modern equipment such as gamma cameras will be implemented. To ensure that the accreditation is seen to truly reflect the regional situation, a key role for the Asia and Oceania Society of Nuclear Medicine is planned. The project is designed to benefit all technicians responsible for the quality of output of nuclear medical instruments.

**The specific Purposes of the Project are:**

- 1) to supplement the regional training course on Radiation Processing of Surface Coatings, Sydney, February 1990, with regional courses on the Applications of Modern Isotope and Radiation Technology to Industry, and on the Applications of Nuclear Techniques to Materials Characterisation and Compatibility Studies. The output will be that approximately 40 key people will receive specialised training in Australia. They will play an important role in subsequent national technology transfer activities;
- 2) through the national infrastructure which will include the training course participants and the existing IAEA/RCA networks, to arrange a series of national seminars (at least one in each participating country) on topics chosen by the developing countries on the basis of their national development priorities from a list proposed by the Project. (On the basis of previous experience, it would be expected that at least 50 participants from industry, government and the universities would attend each seminar.);
- 3) to supplement the technology transfer to industry with activities in the field of Occupational Health and Safety and Radiation Protection. The activities will be designed to benefit those involved with isotope and UV technology at the workplace. The methodology will involve augmenting national training programs with well chosen, high quality distance learning packages;
- 4) to supplement the two Regional Training Courses on the Applications of Technetium-99m Imaging to Nuclear Medicine with a program of distance learning designed to benefit all personnel in RCA countries with technical responsibility for the quality of diagnostic images from gamma cameras.

The successful meeting of these project Sub-project Purposes will ensure the project goal will be realised. Further detailed descriptions of each Sub-project's background, activities and implementation is provided in sections 3, 4 and 5.

2.3 Budgets and Cash Flows

The overall indicative annual budgets are as follows:

Project Sub-project:	\$ Annual	\$ Project
Industrial Applications	200,000	590,000
Radiation Protection	140,000	420,000
Nuclear Medicine	140,000	430,000
Administration	20,000	60,000
<b>TOTAL</b> A\$	<b>500,000</b>	<b>1,500,000</b>

The project cash flows are listed below. Detailed data provided in Annex 4.

Year 1 FY 1992/3	\$
Industrial Applications	190,000
Radiation Protection	50,330
Nuclear Medicine	79,550
Administration	20,000
<b>TOTAL</b> A\$	<b>339,880</b>

Year 2 FY 1993/4	\$
Industrial Applications	200,000
Radiation Protection	171,430
Nuclear Medicine	96,840
Administration	20,000
<b>TOTAL</b> A\$	<b>488,270</b>

Year 3 FY 1994/5	\$
Industrial Applications	200,000
Radiation Protection	196,210
Nuclear Medicine	145,890
Administration	20,000
<b>TOTAL</b> A\$	<b>562,100</b>

Year 4 FY 1995/6	\$
Industrial Applications	-----
Radiation Protection	-----
Nuclear Medicine	109,140
Administration	-----
<b>TOTAL</b> A\$	<b>109,140</b>

**TOTAL FOR 3 YEAR PROJECT A\$    1,499,310**

## 2.4 Organisation & Management

The project is an IAEA/multi-lateral project administered and implemented by Australian authorities (Ansto and RPAH). The IAEA has detailed procedures regarding implementation and reporting which will be complied with, covering all aspects such as expert recruitment, equipment procurement, selection procedures for trainees, obtaining recipient government approvals, conduct of training courses and expenditure and accountancy procedures as well as implementation, review and evaluation procedures. The IAEA requires that these normal IAEA procedures be followed so no special arrangements need be specified in the individual project documents.

The organisation arrangements and responsible officers are as follows:

**1) IAEA/RCA Coordinator. Dr John Easey Vienna**

The IAEA/RCA Coordinator is responsible for ensuring RCA member countries obtain the benefits of the project and overall financial management (distribution of project funds).

**2) Australian National RCA Coordinator  
Dr David Cook, Executive Director Ansto**

The Australian National RCA Coordinator is responsible for facilitating implementation of the project and associated policy, and reporting to the IAEA on project implementation and milestones through reports to the RCA working group meetings (annual meeting which rotates through Member States) and the General Conference Meeting of RCA Member States. The National Coordinator is assisted by Ansto External Affairs Program in this regard.

**3) Project Manager  
Michael Pearce, Deputy Director, Occupational Health & Safety Ansto**

Responsible for implementation of all the activities of this program through the managers for each individual Sub-project.

This includes coordination of the technical involvement of Ansto programs, RPAH and associated outside bodies and liaison with IAEA and AIDAB as required for this purpose.

**4) Sub-project Manager Industrial Applications  
Dr Peter Airey, Project Manager Coastal and Marine Processes ,Ansto**

Coordination of Sub-project 1 will rest with the Project Manager Coastal and Marine Processes (Dr Peter Airey). He will liaise with the Project Manager (Deputy Director

Occupational Health & Safety, Mr Michael Pearce) on all administrative matters, and as appropriate with the Director, Applications of Nuclear Physics Program (Dr John Boldeman) and the Deputy Director, Advanced Materials Program (Dr Ron Hutchings). As required by the IAEA Course Directors will be appointed to administer the Regional training Courses and to liaise with the IAEA on day to day matters. AIDAB will be informed in advance of Ansto's nomination for the Course Directors.

**5) Sub-project Manager Radiation Protection**  
**John Grey, Director Occupational Health & Safety Ansto**

The Sub-project Manager John Grey, Director Occupational Health & Safety Ansto, will maintain an overview of the progress of the Consultant Health Physicist and / or academic consultant. He will also facilitate international communications and organisational arrangements in Australia and the participating countries in the Region. The Technical Liaison / Support Officer, David Woods, Head Radiation Protection, Ansto will overview the Consultant Health Physicist's progress and assist where necessary in identifying appropriate specialist requirements and assist in policy definition.

The Consultant Health Physicist will develop training material, coordinate the expert workshop and implement trial of material.

The Academic Consultant will assist the Consultant Health Physicist in educational format and presentation of the technical material.

**6) Sub-project Manager Nuclear Medicine**  
**Brian Hutton, Chief Physicist, Department of Nuclear Medicine, Royal Prince Alfred Hospital, Sydney.**

Brian Hutton will have overall responsibility for the Nuclear Medicine Sub-project. Details of the roles of the Advisory Committee, the Course Coordinator, an Academic Consultant, the Country Coordinators, Technical Writers and Visiting Assessors are given below.

**Advisory Committee:**

The regional advisory committee will consist of:

1. 12 senior nuclear medicine officials, representing each RCA country in the SE Asia region who are in a position to:
  - a. ensure program assistance at a national level
  - b. readily identify an appropriate country coordinator
  - c. address their country needs and provide input to the course syllabus
  - d. identify efficient communication links and network
  - e. liaise with country Coordinator and local Society of Nuclear Medicine
2. Course Coordinator
3. Academic Consultant

4. IAEA Representative
5. Asia and Oceania Society of Nuclear Medicine (AOSNM) representative

This committee would meet at the commencement of the project - January/February 1993 and establish all points related in 1a to 1e.

The IAEA and AOSNM representative will offer assistance and advice where necessary and link the outcomes to project execution (eg expert visits, workshops) and, if appropriate, accreditation requirements.

Following this meeting the course coordinator and academic consultant will action the development of the distance education package along with other experts in the field.

### **Position Responsibilities**

**Course Coordinator: Heather Patterson, Training Coordinator, Department of Nuclear Medicine, Royal Prince Alfred Hospital, Sydney.**

- To liaise with all levels of organisation management
- Responsible for collation of course material
- Coordination of program development:
  - assess needs and syllabus structure
  - consult with technical writers and distance education experts
  - ensure availability of media material, communication links, etc
- Coordinate -
  - Advisory Committee meetings
  - Country Coordinators meetings

### **Stage 1**

- identify suitable in-country assessors
- initiate and monitor 'pilot' scheme
- distribute material by predetermined means
- define the necessary relevant criteria to be met within each country on assessment visits
- design and produce a 'check list' for the assessors
- On assessment of Stage 1 ensure study material refinements and other recommended improvements are implemented and arrange for continual assessment:
  - by technical writers
  - by local supervisors

### **Stage 2**

- distribute material to Country Coordinators
- coordinate the marking and assessment of completed and returned assignments
- ensure regular communication and feedback from Country Coordinators
- plan and arrange assessment and workshop visits
- ensure material refinements and other recommended improvements are implemented and arrange for continual assessment by technical writers and local supervisors

**Coordinator's Meeting:**

identify all issues for improvement and implement changes  
prepare 6 new coordinators for Stage 3

**Stage 3**

distribute material to country coordinators  
coordinate the marking and assessment of completed and returned assignments  
ensure regular communication and feedback from country coordinators  
plan and arrange assessment and workshop visits

**Throughout the entire project:**

provide regular feedback to Advisory Committee and IAEA on course progress  
provide regular budget reports to AIDAB  
report on results of project at appropriate meetings  
arrange a panel of experts and assessors etc to review each participant's performance and eligibility for certificate of completion

**Academic Consultant: Brian Hutton, Chief Physicist, Department of Nuclear Medicine, Royal Prince Alfred Hospital, Sydney.**

- Officiate at the Advisory Committee meeting
- Instruct and advise on:
  - structure of course syllabus
  - educational material media
  - necessary practical equipment
- Maintain the training program at the appropriate educational level
- Preside at consultancy meetings with other institutions
  - distance education consultant
  - subject specialists/technical writers
  - visiting assessors - technical and scientific officers
- Preside at all assessment and review meetings
- Liaise with course coordinator assisting with professional advice

**Country Coordinator: These will be nominated by the Countries concerned in conjunction with the Advisory Board**

Must be familiar with the practice of nuclear medicine technology and available to devote time and commitment to this project

**Duties:**

- Assist in promoting and advertising the course
- Identify participants
- Attend Course Coordinators' meetings
- Liaise with:
  - country adviser

- course coordinator
- local Society of Nuclear Medicine, Atomic Energy, university, hospitals, supervisors and participants
- Through liaison with above institutions:
  - access to photocopier, computer, audiovisual facilities, etc
  - national assistance to cover costs eg. postage, faxes, internal travel
  - coordinate the availability of gamma camera and computer for specific practicals
- Act as intermediary between Course Coordinator and participant:
  - ensure delivery of subject material
  - return assignments
  - advise supervisors and teachers
  - report success/problems
- Coordinate travel/accommodation for students to attend other hospitals and/or workshops
- Assist assessors with visits and incountry travel/accommodation
- Assist assessors with translation, where necessary, in oral examinations

**Technical Writers: To be advised in consultation with the Advisory Committee**

- Specialists in the field of nuclear medicine who will provide subject material. They will liaise with:
  - Academic consultant
  - Course coordinator
- Set and mark assignments
- It is envisaged that an adviser from a distance education institution will instruct the technical writers in the most effective way to delivery their educational material for this project.
- Review and update technical material

**Visiting Assessors: To be advised in consultation with the Advisory Committee**

- Suitably qualified personnel to visit each country and assess the practical capability of each student
- a. senior nuclear medicine technologists with teaching experience to implement
  - practical training, demonstrations
  - practical assessment
  - set-up workshop
- b. radio pharmacist or physicists who, with the assistance of technologists, will teach at workshops
  - identify and attempt to solve any specific problems
- Submit a full report on their assessment visits to the Course Coordinator

## 2.5 Schedule Of Major Tasks

### 1) Australian National RCA Coordinator Dr David Cook, Ansto

This section identifies Ansto's major tasks provided either by the Australian National RCA Coordinator or his support department, External Affairs. These services are covered by the Project Administration budget.

- (a) Provide technical advice to AIDAB on nuclear technology matters supported from AIDAB's SEA Regional Program.
- (b) Coordinate AIDAB's SEA Regional Nuclear Technology Program and/or projects in the SEA Region between IAEA, IAEA contractors in Australia, Department of Foreign Affairs and Trade, AIDAB and other institutions in Australia as agreed in writing with special emphasis on the IAEA/Regional Cooperative Agreement ) RCA Program. In undertaking the coordination role Ansto will provide timely advice to AIDAB on matters likely to affect the program. In addition Ansto will provide regular reports at agreed intervals to AIDAB on:
  - (i) policy and technical matters likely to affect Australia's interests;
  - (ii) project activities including implementation and financial performance.
- (c) Identify potential projects or activities from any source for the peaceful use of nuclear technology to meet Australia's obligations under the Nuclear Non-proliferation Treaty with the IAEA consistent with Australia's development assistance policies and programs
- (d) Arrange for the Executive Director of Ansto, or nominee, to:
  - (i) act as RCA National Coordinator for Australia
  - (ii) attend IAEA/RCA Working Group meetings as necessary in Technical Adviser capacity (but without authority to commit AIDAB to fund project proposals
  - (iii) attend annual RCA General Meeting when held in association with IAEA conference at 20% cost contribution by AIDAB
  - (iv) provide position papers/briefs to AIDAB for appropriate comment prior to attendance at meeting
  - (v) provide a written report to AIDAB at conclusion of each meeting
  - (vi) monitor and report on project implementation and expenditure to IAEA and AIDAB.

## 2) Industrial Applications Of Isotope &amp; Radiation Technology Sub-project 1

This Sub-project will be implemented by two Regional training courses to be conducted at Ansto and a series of seven national seminars to held in participating countries in the Region. Details of the topics for the training courses and seminars are given in the table that follows.

<b>Industrial Applications Of Isotope &amp; Radiation Technology Sub-project 1 Schedule of Major Tasks</b>	<b>Schedule Dates</b>
National seminar radiation surface coating (RCA countries A & B) Regional training course; applications of modern isotope and radiation technology to industry.	Jan/Feb/Mar 1993 Apr/May/Jun 1993
National seminar; coastal engineering (RCA countries C & D). Regional training course; applications of nuclear techniques to materials science.	Jul/Aug/Sep 1993 Oct/Nov/Dec 1993
National seminar; waste management and minimisation (RCA countries E & F).	Jan/Feb/Mar 1994
National seminar; chemical and refining industries (RCA countries E & F).	Jul/Sep/Aug 1994
National seminar; metals and manufacturing industry (RCA countries I-& J).	Oct/Nov/Dec 1994
National seminar; off shore resources development (RCA countries K & L).	Jan/Feb/Mar 1995
National seminar; plastics industries (RCA countries M & N).	Apr/May/Jun 1995

**NOTE:** Countries A, B, C etc indicate developing countries approved for participation in this project. These include RCA countries and, subject to confirmation, DPRK and Mongolia. Individual countries will be identified from responses to an IAEA communication on their needs and priorities.

## 3) Industrial Radiation Protection Sub-project 2

The use of a Health Physics expert together with assistance from an academic consultant to develop distance learning material will be the backbone task of this Sub-project. The initial development phase will run for the first year of the project. A regional workshop of experts from the SEA countries will take place in Sydney during the first quarter of 1994 prior to an exhaustive trial of the product in the participating countries. During those trials, which will last for up to a year, regional seminars and practical laboratory workshops will be held in six participating countries to support the trials. By the first quarter of 1995 the distance learning package will have been refined to a user friendly form and experts in participating countries will have significant skills in using it.

The final phase of the project will be expert evaluation of the effectiveness of the package, this is scheduled for April to June 1995.

<b>Industrial Radiation Protection Sub-project 2 Schedule of Major Tasks</b>	<b>Schedule Dates</b>
Experts to develop distance learning material. Printing and production of distance learning material.	Jan 1993-Mar 1995 Apr/May/Jun 1993 Jun/Aug/Sep 1994
Regional workshop in Sydney on distance learning and the application of the developed materials	Jan/Feb/Mar 1994
Trial of distance learning package in radiation protection in the region	Apr 1994-Mar 1995
Regional seminars and practical laboratory workshops in South East Asia in support of distance learning package.	Oct 1994 - Mar 1995
Expert evaluation of the effectiveness of the package	Apr/May/Jun 1995
Sub-project management	Jan 1993 - Jun 1995

## 4) Nuclear Medicine Sub-project 3

A meeting of the Course Advisory Board will first be held to advise on course material. The package will then be developed, and during development a briefing of the coordinators from 6 countries will be held. A pilot scheme will then be implemented in those 6 countries. The success of the pilot scheme will be assessed and material refined as necessary. The full program will then be implemented in the same 6 countries, this will include workshops and assessment visits in the countries at the midpoint of course duration.

At that time there will also be assessment meeting in Sydney to review the course. The course will continue in those 6 countries and will commence in a further 6 countries. A further assessment visit will be made to all participating countries.

Nuclear Medicine Sub-project 3 Schedule of Major Tasks	Schedule Dates
Advisory Board meeting	Jan/Feb 1993
Development of DE package	Jan 1993 - December 1993
Course coordinators meeting.	Apr/May/June 1993
6 Pilot countries	
STAGE 1	July - December 1993
Implement pilot scheme.	
6 in-country assessments.	Nov/December 1993
Refinement and completion of education material.	Jan/Feb/Mar 1994
STAGE 2	Jan 1994 - June 1995
Program 1 commencement	
DE Implementation in 6 countries.	
Workshop / assessment visits in 6 countries.	Jul/Aug/Sep 1994
Course assessment meeting with all coordinators.	October 1994
Final refinement of course material.	Nov/Dec 1994
STAGE 3	Jan 1994 - June 1996
Program 2 commencement	
Package implementation in additional 6 countries.	
Final - Stage 2.	Jul/Aug/Sep 1995 &
6 in-country assessments.	Apr/May/June 1996
6 in-country assessments and workshops (Stage 3)	Jul/Aug/Sep 1995
Final - Stage 3	Apr/May/July 1996
6 in Country assessments	

## 2.6 Monitoring

### 1) Industrial Applications of Isotope & Radiation Technology Sub-project 1

Monitoring of progress will be through Course Director's and Seminar Leader's reports, the regular IAEA evaluations .

### 2) Industrial Radiation Protection Sub-project 2

The Sub-project Manager John Grey, Director Occupational Health & Safety Ansto, the Technical Liaison / Support Officer, David Woods and the Consultant Health Physicist will meet on a two monthly basis to review progress and set targets.

The Expert Workshop will review material prior to trial.

The Sub-project Manager will review the success of the trialed material and provide a final review report of the project.

### 3) Nuclear Medicine Sub-project 3

Performance Indicators:

#### Stage 1

- Assessment of 6 country 'Pilot' scheme

Review of

- distributed teaching material and its comprehension
- efficiency of communication network
- effectiveness of national support

In-country assessment

- interviews with country coordinators, supervisor and participants
- visits of training facilities

#### Stage 2

- 18 month full program in 6 countries

Assessment methods

- returned and marked assignments

- completed Log-Book

- regular feedback from country coordinators

- Australian technologist visit: practical performance assessment

- Scientific Officer visit: workshop performance assessment

- Final in-country visit: practical and oral assessment

**Coordinators Meeting - October 1994**

- Meeting with country coordinators
- Review of Stage 2 with the 6 countries involved  
    further refinement of teaching material as necessary  
    efficiency of communication and support network
- Prepare coordinators of 6 countries participating in Stage 3

**Stage 3**

- 18 month program in 6 countries

**Assessment methods**

returned and marked assignments

completed Log-Book

regular feedback from country coordinators

Australian technologist visit: practical performance assessment

Scientific Officer visit: workshop performance assessment

Final in-country visit: practical and oral assessment

- Certificate of Completion - end of course.

### 3. INDUSTRIAL APPLICATIONS OF ISOTOPE AND RADIATION TECHNOLOGY

#### 3.1 Purposes

The Purposes of the industrial applications Sub-project are to contribute to sustainable national development through the application of modern isotope and radiation technology to industry. This shall be achieved through the conducting of (a) two regional training courses and (b) a number of national seminars targeted to specific industrial sectors (Paper and Printing, Oil and Gas, Chemical, Off-shore and Coastal Engineering, Waste Minimisation and Metals and Manufacturing) with an emphasis on the amelioration of the environment. Direct consultation will be established with the sub-project on industrial radiation protection. Close linkages will be established with the proposed IAEA/UNDP project "Use of Isotopes and Radiation Technology to Strengthen Technology and Support Environmentally Sustainable Development". See paragraph "3.2 Implementation", below, for details of linkages.

#### (a) Regional Training Courses

The following Regional Training Courses will be conducted at Ansto:

##### (i) The Application of Modern Isotope and Radiation Techniques to Industry.

The course will be conducted by Ansto, Tracerco Australasia and other Australian companies and will concentrate on the application of nuclear techniques to plant dynamics, process optimisation and waste minimisation. Particular attention will be focused on the collection, processing and visualisation of data and their application to process control. A number of case studies will be presented and visits organised. A Sub-project on industrial radiation protection will be integrated into the Course.

##### (ii) The Application of Nuclear Techniques to Materials Characterisation and Compatibility Studies

The availability of personnel skilled in materials characterisation is fundamental to the development of modern industry. The course will cover neutron and X-ray diffraction, radiography as well as advanced ceramics and surface engineering. This training course would support activities in the proposed Coordinated Research Project on "Nuclear techniques in development of advanced ceramic technologies". This area of technology was identified and recommended as an RCA regional priority at the expert advisory group meeting held in Vienna in December 1990.

#### (b) National Seminars

A number of national seminars will be conducted to complement the regional training. The seminars will be organised by counterparts in the national atomic energy authorities and will be focused on an industrial sector most relevant to the needs of the

recipient country. During the course of the 3 year project each recipient RCA country will be given the opportunity of holding at least one seminar. The lecturing staff will comprise local experts and an Australian team including:

- one or two experts in nuclear technology;
- an expert from the relevant industry;
- if appropriate, an occupational health (radiation protection) expert;

Two countries will be visited during each mission. Industrial demonstrations will be arranged and a small amount of appropriate equipment made available.

The aims of the seminars are:

- (i) to consolidate the training received at the regional courses;
- (ii) to raise the awareness of local industry to the benefits of the technology;
- (iii) to strengthen the capacity of the local nuclear research institutes to provide a service to industry, perhaps with some support from Australia.

### 3.2 Implementation

Broadly speaking, the project will be implemented according to the following timetable. The linkages with outputs or activities with the proposed UNDP Project (Annex 3) are identified where possible.

1993 quarter 1 (Q1): National Seminars on the Application of Radiation Surface Coating Technologies to Printing Industries. These seminars complement the Regional Training Course on Radiation Processing of Surface Coatings Sydney, February 1990, and would meet UNDP Project Activity 1.2.

1993 (Q2): Regional Training Course on the Application of Modern Isotope and Radiation Technology to Industry (UNDP Activities 1.6, 1.7, 1.8, & 1.9).

1993 (Q3): National Seminars on the Application of Nuclear Techniques to Coastal and Construction Engineering (UNDP Activity 1.6).

1993 (Q4): Regional Training Course on the Applications of Nuclear Techniques to Materials Science (UNDP Output 1.12).

1994 (Q1): National Seminars on the Application of Radiation and Isotope Techniques to Waste Minimisation and Management (UNDP Outputs 1.8).

1994 (Q3): National Seminars on the Application of Nuclear Techniques to the Chemical and Refining Industries (UNDP Output 1.7 & 1.8).

1994 (Q4): National Seminars on the Application of Nuclear Techniques to the Metals and Manufacturing Industries (UNDP Output 1.12).

1995 (Q1): National Seminars on the Application of Nuclear Techniques to Off-Shore Resources Development.

1995 (Q2): National Seminars on the Application of Nuclear Techniques to Environmental Assessment (UNDP Output 1.6).

## 4. INDUSTRIAL RADIATION PROTECTION - DISTANCE LEARNING

### 4.1 Sub-project Goal

To continue to improve the radiation protection infrastructure of countries within the Asia Pacific Region through dissemination of safe radiation protection practices and procedures in the industrial application of sources of ionising radiation.

### 4.2 Background

During the first 5 year phase of Strengthening Radiation Protection Infrastructures in the region, Australia was an active participant in providing three specialist comprehensive courses in radiation protection. These courses, although considered quite successful, focused on key individuals from developing countries in the region. To achieve a greater, more long lasting, impact on the improvement of national radiation protection infrastructures, it is considered desirable to reach a greater number of people and to create a self-sufficient scheme in which trainers are trained and training materials are produced to enable these trainers to train others within their own countries. To this end, residual monies from the previous Australian contribution to the IAEA/RCA Strengthening Radiation Protection Infrastructures project, were utilised to fund an IAEA/RCA Workshop on the Development of Training Techniques and Methods of Instruction in Radiation Protection held at Ansto in Sydney, 17-28 February 1992. This workshop targeted specialist radiation protection trainers and sought to identify areas of training need, appropriate training syllabi and training materials. The workshop was very successful and established a network of appropriate contacts within the Region.

### 4.3 Proposal

In the second phase of the IAEA/RCA project, the Australian initiative is to provide a package of distance learning materials in radiation protection, which can be offered through correspondence courses with participants attending practical classes at a Regional Centre at an appropriate frequency. It is considered that this material is best disseminated through national centres concerned with radiation safety or national regulatory bodies concerned with licensing the usage of ionising radiation sources. This conclusion and the initial range of contacts resulted from the IAEA / RCA Workshop on the Development of Training Techniques and Methods of Instruction in Radiation Protection held at Ansto in Sydney, 17-28 February 1992.

The aim of the project is to develop this material, trial it and then provide it to member countries for adoption and incorporation within national frameworks.

#### 4.4 Methodology

The Ansto Project Manager would contract a consultant health physicist part-time for 2 years to develop and trial the distance learning material. As needed, a consultant academic specialist with skills in distance learning will also be contracted.

The target groups would be those with a national responsibility for policing radiation safety regulations and/or those with a national responsibility for providing radiation protection training.

The distance learning materials would be in modular format identifying common core material and specialised industrial application topics.

The distance learning package is intended to be comprehensive but may be utilised in Sub-project parts by the trainer for persons requiring training in a specific industrial application that does not require the total training package.

The training material is to be developed in the first year and would utilise available existing resources of the IAEA and participating countries. Where existing suitable training materials are identified these would be adopted to the distance learning format.

At the beginning of the second year an expert Workshop on the developed distance learning package would be held at Ansto to enable participating country representatives to fine tune the material prior to trialing it and also to formalise the network of contacts and method of implementation in each country.

This Workshop would be followed by a trial period monitored by the Project Manager in conjunction with the consultant health physicist.

During this period practical training would also be given at selected regional centres.

At the completion of the project, the Project Manager will review the success of implementation of the package in those countries that formulate follow-on programs, beyond this project time frame.

A possible Australian follow-on to this project may then be the establishment of a formal accreditation process for radiation safety practices.

#### 4.5 Purpose

To provide radiation protection training in a distance learning format to persons with a national responsibility for the provision of radiation protection training.

#### 4.6 Output

Training manuals and teaching material in radiation protection suitable for application in a distance learning format.

The complete program will take into account the requirements identified by the IAEA during various missions such as Radiation Protection Advisory Teams (RAPAT) to member countries. Major subjects covered in this program will include:

- Review of radioactivity and radiation ;
- Principles of radiation protection ;
- Detection, measurement and control of radioactive material ;
- Safety in the use of unsealed sources ;
- Safety in the use, design and fabrication of sealed sources ;
- Safety in the use of X-ray, electron beam and ultraviolet radiation ;
- Safety in specific industrial uses ;
- Safety in packaging and transport of radiation sources ;
- Radioactive waste management ;
- Emergency planning, preparedness and response ;
- Regulatory requirements.;

#### 4.7 Activities

1. Expert to develop distance learning materials.
2. Regional Workshop on distance learning and the application of the developed materials.
3. Trial of distance leaning package in radiation protection in the region.
4. Expert evaluation of the effectiveness of the package.

## 5. NUCLEAR MEDICINE

### 5.1 Activity Setting

Many RCA member countries have made significant investments in nuclear medicine technology with the acquisition of modern equipment such as gamma cameras. However, the lack of appropriate training for medical technologists is a major constraint to the effective use of the technology in the region. Examination of the training syllabi for medical technologists in some RCA member countries shows a lack of sufficient instruction in Sub-projects of nuclear medicine education and a variation in syllabus content from country to country. There are few, if any, formal training courses for nuclear medicine technologists in the region, although many people working in the field have training in related specialities such as radiography or medical technology.

A brief assessment of the existing situation is given in Annex 5. The IAEA recognise the deficiencies in technologists' education and the need to provide adequate training, however no regional solution has been considered prior to this proposal. The level of technologist education varies considerably throughout the region ranging from none (or at best limited in-house training without theoretical basis) to reasonably comprehensive. It is anticipated that course materials can be used to enhance even the best developed training programs in the region. The IAEA are arranging a workshop in conjunction with the Asia and Oceania Society of Nuclear Medicine Congress in Jakarta in October 1992 on the subject "Ensuring Quality Assurance in Nuclear Medicine Through Enhanced Training Techniques". This meeting will offer a further opportunity to verify the current status and identify the areas where most assistance is needed. The identification of "accredited" training centres will be one early task of the project (via the Advisory Committee) although several centres can be easily identified as having sufficient equipment, trained personnel and range of studies to be able to support the program. This may involve hospitals, tertiary education institutions and Atomic Energy Authorities dependent on location but requires confirmation. For example, in Thailand both Siriraj and Chulalongkorn Hospitals are attached to Universities where Nuclear Medicine training is conducted and both centres have up to date equipment and trained personnel. On the other hand, in Indonesia, the Bandung Department has the best trained staff but have no links to formal technologist training programs.

### 5.2 Purposes

The Purpose of the proposed project is to provide a program of distance education so that practising technologists in the region achieve a higher standard and uniformity of education in nuclear medicine technology. This would enable more effective use of existing nuclear medicine technology, promote further development of nuclear techniques in medicine and enhance the quality of health care in the region. The necessity for such a program has been apparent in recent years as the use of more

technically involved nuclear medicine procedures and radiopharmaceuticals is increasing.

Following successful completion of the project, it could be expected that the nuclear medicine community within RCA member countries would have acquired a level of self-sufficiency with the training materials and methods provided during the project to be able to provide a continuing training program. It is anticipated that the training qualification would fulfil part of the requirements for accreditation by an appropriate body such as the Asia and Oceania Society of Nuclear Medicine.

### 5.3 Project Description and Implementation

The proposed project is to develop and implement a program of distance education for practising medical technologists without specialised training in the nuclear medicine field in RCA member countries. The Australian and New Zealand Society of Nuclear Medicine (ANZSNM), in conjunction with the Royal Prince Alfred Hospital (RPAH), is currently conducting a correspondence course as a conversion course for over 30 people with previous training in a field other than nuclear medicine. The material from this course, and experience gained in delivering it, could form the basis for the proposed project.

The project is extremely ambitious in attempting to develop a distance education program throughout the region which can supplement and improve existing training programs. Several aspects of the project require emphasis. Firstly the project's success is highly dependent on there being an effective network throughout the region as the course will be implemented and supervised in each country and tailored to meet specific needs. This requires close cooperation at two levels: at a senior level to ensure active National support and at a more junior level to ensure effective delivery of material and implementation.

There are therefore two important individuals needed in each participating country. Our suggestion is therefore to involve the senior persons in a Course Advisory Committee who can advise on course content and ensure that the course best meets the regional needs. This committee would only meet twice, initially to determine the course syllabus etc and at an intermediate point to assess progress and rectify any specific problems encountered. The second meeting involves the individuals who will actively coordinate each country's participation and set up the local support network, arrange workshops etc. These individuals will form a Coordination Committee and would form the main network for course implementation. A meeting to discuss course Purposes, timetables, methods etc is essential. This group would also provide essential feedback on progress.

To aid in management of the project the implementation will be organised in three stages:

1. Organise material and undertake 6 month pilot scheme in six countries.
2. Implement full 18 month program in same 6 countries.
3. Implement scheme in remaining 6 countries.

Using coordinator meetings, workshops and assessment visits and feedback from country coordinators material will be refined after stage 1 and at the half way point and end of stage 2. Stage 3 will commence half way through the implementation of stage 2.

It is envisaged that during the first year of the project the advisory committee comprising Australian and regional experts will be established to advise on course content and assist with country coordination, identify individual specific countries' needs and identify appropriate country coordinators, supervisors and participants. The development of educational material and course notes to suit the situation in RCA member countries would also occur during this year. It is essential that the material developed undergo preliminary testing to ensure that it meets individual country needs and to test the effectiveness of the network. In the latter half of the first year pilot material will be circulated for use by a limited number of individuals in each of six countries. An assessment of this pilot scheme will be used to further refine materials and to improve the distribution and support network. A meeting will be held with country coordinators to assist with planning implementation in each country and organising for experts to participate in workshops and practical assessment. In the first instance this meeting will involve only coordinators from the six countries included in the pilot scheme.

The second and third years of the project would involve the delivery of the course by correspondence work and assessment tests covering subjects at monthly intervals with local supervision by country coordinators. Practical training would occur at "accredited" training centres located in the region and where possible in the participant's home country. A workshop including practical and assessment work would be held each year for all participants. A further meeting of the country coordinators is recommended towards the end of the second year to assess progress and identify specific problems with implementation.

During the course of study each student will be required to submit assignments on a regular basis and complete a log-book detailing all procedures, protocols, materials used, methods etc. If there are essential studies which cannot be achieved within their own department then provisions must be made to spend time in another department where these assignments can be completed. Both the Country Coordinator and the visiting expert can assess the progress of each student during the course through the examination of the log-book. Log-book, written assignments, and oral examination

will be an integral gauge on their capability and during the country visits and workshops the students practical ability can be assessed. All these factors will be indicators for "Successful Completion".

On successful completion of the course, the participant can be considered for a certificate of accreditation by the Asia and Oceania Society of Nuclear Medicine. On completion of the project, a final review meeting of the advisory board is recommended. This, however, has not been included in the project budget.

The benefits of the proposed project include more effective use of existing nuclear medicine technology, the potential for further development of nuclear technology in the health sectors of the RCA countries, and the enhancement of the quality of health care in the region. The nuclear medicine community within RCA member countries would acquire a level of self-sufficiency with the training materials and methods provided during the project.

The proposed budget (see Annex 4.3) includes participation by all 12 RCA Member Countries, with one week minimum duration workshops and assessments being held in each country in years 2 and 3 of the project. The total estimated cost for the 3 year project is \$431,420.

CONTRIBUTION FROM AUSTRALIA

Output	Activity	No. of Activity No. of Experts/ Man-Month Expert	Cost (US\$)
RTC/RW	1.2.2	1	80,000
	2.1.3	1	80,000
<b>Sub-total</b>		<b>2</b>	<b>160,000</b>
NTC/NS/NW	1.1.3	6 exp.	20,400
	1.2.6	6 exp. + US\$20,000 equip.	40,400
	1.3.6	6 exp. + US\$20,000 equip.	40,400
	1.7.7	6 exp. + US\$10,000 equip.	30,400
	2.1.5	6 exp.	20,400
<b>Sub-total</b>		<b>30 exp. + US\$50,000 equip.</b>	<b>152,000</b>
Short-term expert	1.1.1	2 man-months	20,000
	1.2.5	3 man-months	30,000
	1.3.5	4 man-months	40,000
<b>Sub-total</b>		<b>9 man-months</b>	<b>90,000</b>
<b>Grand Total</b>			<b>402,000</b>

Programme for development of training manuals in radiation protection for industrial applications followed by regional workshops for trainers and experts visits and assessment of programme:  
 (2x5m/m expert + 1 regional workshop + visits and assessment by 2 experts)  
 = US\$ 100,000 + US\$ 80,000 + US\$ 50,000 = US\$ 230,000.

**Grand Total of contribution from Australia = US\$ 402,000 + US\$ 230,000 = US\$ 632,000**

**UNDP FUNDING**

Annex 7 of Annex 5

Out put	RTC	NTC/NS/ NW	Demo	EGM	Symp.	NCM	S.T. Expert (m/m)	L.T. Expert (m/m)	Fellows (m/m)	Field	Cost (US\$)
1.1	1	(9) 8	-	-	-	(3)*	3	12	9	NCS	333,100
1.2	-	(7) 6	1	-	-	(3)*	2	12	9	Tracer	303,700
1.3	2	(9) 5	2	-	-	(3)*	4	**	9	Tracer	432,000
1.4	2	(11) 9	-	-	-	3	4	12	9	NAT	495,800
1.5	-	(11) 8	-	-	-	(2)***	3	12	-	NDE	151,100
1.6	-	3	-	-	-	-	2	(6)****	-	Rad. Tech.	69,100
1.7	-	14	-	-	-	-	3	****	9	Rad. Tech.	188,300
2.1	2	20	-	1	-	-	-	****	-	Rad. Tech.	332,500
2.2	1	-	-	-	-	(2)***	-	***	-	NDE	133,000
2.3	1	11	-	-	-	-	3	****	-	Rad. Tech.	202,200
US\$	655,000	604,800	150,000	30,000	0	320,000	240,000	495,000	150,000		2,644,800
National Counterparts/Tripairite Review Meeting (US\$40,000 x 3)											
Mid-term review (1 meeting + 6 visits)											
Expendible equipment and miscellaneous											
Official travel											
<b>GRAND TOTAL</b>											<b>2,985,400</b>

\* - cost shared between 1.1, 1.2 and 1.3

\*\* - cost shared between 1.2 and 1.3

\*\*\* - cost shared between 1.5 and 2.2

\*\*\*\* - cost shared between 1.6, 1.7, 2.1 and 2.3

**PROJECT BRIDGING ACTIVITIES IN 1992**  
**TRACER TECHNOLOGY**

<b>DATE</b>	<b>VENUE</b>	<b>ACTIVITY</b>	<b>EXPERT</b>
<u>DEMO/NEMS</u> 8 - 18 March 1992	Colombo, SRL**	Demonstration of Leak Testing of Pipe Line	Dr. Hu Xusheng Dr. Wu Yuanfane Dr. Zhou Shuxuan Dr. Lu Qingqian Dr. Sun Xiaolei
23 Aug. - 1 Sept. 1992	Kampujung*, INS	Demonstration of Tracers for measurement of gas flow	Australians (2)
14 Sept. - 9 Oct. 1992	Manilan, PHI* **	Demonstration of Tracers for measuring performance of waste water treatment ponds	Australians (2) Malaysians (2)

**NON-DESTRUCTIVE TESTING**

<b>DATE</b>	<b>VENUE</b>	<b>ACTIVITIES</b>	<b>EXPERT</b>
<u>REGIONAL WORKSHOPS</u> 13 - 24 January, 1992	Bombay, IND (India funded)	Image Processing in Material Science	
<u>EXPERT MEETING</u> 20 June - 18 July, 1992  10 - 17 Oct, 1992	Jakarta, INS*** Kuala Lumpur, MAL  Tokyo, JPN***	Proficiency Testing Programme (PTP) Meeting I  Proficiency Testing Programme (PTP) Meeting II	Japanese (3) Australian (1)  Japanese (2) Mr. R. Gilmour
<u>EXPERT MISSION</u> May/June, 1992	INS, MAL, ROK***	PTP Evaluation	Japanese (2)
<u>NATIONAL TRAINING COURSE</u> 13 - 31 July, 1992	Serpong, INS***	RT-3	Japanese (1)

**RADIATION TECHNOLOGY**

<b>DATE</b>	<b>VENUE</b>	<b>ACTIVITIES</b>	<b>EXPERT</b>
<u>EXPERT ADVISORY GROUP MEETING</u> 20 - 23 Oct. 1992	Takasaki, JPN*	Radiation Technology for Environmental Conservation	12 experts
<u>EXPERT MISSION</u> 13 - 23 Sept. 1992	Beijing, Zhuzhou* CPR	RVNRL	Dr. K. Makuuchi
<u>SCIENTIFIC VISITS</u> 18 Oct. - 21 Nov 1992	Jakarta, INS**	Trial Irradiation VIE Latex (2 x 1m/m)	Vietnamese (2)

**NUCLEONIC CONTROL SYSTEMS**

<b>DATE</b>	<b>VENUE</b>	<b>ACTIVITIES</b>	<b>EXPERT</b>
<u>REGIONAL WORKSHOP</u> 8 - 12 June 1992	Shanghai, CPR (Chinese funded)	NCS - Steel Industry	Japanese (1) Korean (1) UK (1)

- \* - Australian funded
- \*\* - IAEA funded
- \*\*\* - Japanese funded

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

EVENT	YEAR	1993	1994	1995	1996
1. National Counterparts/ Mid-term Review Meetings		1	1	1 (Mid-term review)	1
2. Sub-project Co- ordinators Meetings:					
NCS		1		1	1
Tracer					
NAT		1	1		1
NDE		1			1
3. Long-Term Expert:					
NCS		6 m/m		6 m/m	6 m/m
Tracer		6 m/m	6 m/m		6 m/m
NAT					6 m/m
NDE					6 m/m
Rad. Tech.					6 m/m

EVENT	YEAR	1993	1994	1995	1996
4. Regional Training Course/Workshop/Demonstration					
NCS		1	1 (D)		
Tracer (Nat. Res)		1	1	1 (D)	1
Tracer (Environ.)		1 (D)	1	1	
NAT		1	1		
NDE		1	1		
Rad. Tech. (Medical)				1	1
Rad. Tech. (Procedure)				1	1
5. National Training Course/Seminar/Workshop					
NCS		2 (3)	2	2	2
Tracer (Nat. Res.)			2 (3)	2	2
Tracer (Environ.)		- (1)	2 (3)	2 (3)	1 (2)
NAT		2	3 (4)	4 (5)	2
NDE (Techniques)		2	2 (3)	2 (3)	2 (3)
Rad. Tech. (Environ.)			1	1	1
Rad. Tech. (Advanced)		2	4	4	4
Rad. Tech. (Medical)		2	6	6	6
Rad. Tech. (Procedure)			2	4	5

EVENT	YEAR	1993	1994	1995	1996
6. Expert Advisory Group Meeting			1		
7. Short-term expert					
NCS		1 m/m	1 m/m	1 m/m	1 m/m
Tracer (Nat. Res.)		1 m/m	1 m/m	1 m/m	1 m/m
Tracer (Environ.)		1 m/m	1 m/m	1 m/m	1 m/m
NAT		1 m/m	1 m/m	1 m/m	1 m/m
NDE					
Rad. Tech. (Environ.)			1 m/m	1 m/m	1 m/m
Rad. Tech. (Advanced)			1 m/m	1 m/m	1 m/m
Rad. Tech. (Procedure)			1 m/m	1 m/m	1 m/m
8. Fellowship					
NCS			3 m/m	3 m/m	3 m/m
Tracer (Nat. Res.)			3 m/m	3 m/m	3 m/m
Tracer (Environ.)			3 m/m	3 m/m	3 m/m
NAT			3 m/m	3 m/m	3 m/m
Rad. Tech. (Advanced)			3 m/m	3 m/m	3 m/m
9. Equipment + Miscellaneous		30,200	27,200	27,200	16,000
10. Official travel		10,000	10,000	10,000	10,000
<b>TOTAL COST (US\$)</b>		<b>506,960</b>	<b>797,300</b>	<b>822,900</b>	<b>858,240</b>

Project Budget Covering UNDP Contribution  
(in U.S. Dollars)

Region: Asia and the Pacific  
Project Title: The Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development  
Project Number: RAS/92/073/A/01/18

	1993		1994		1995		1996	
	m/m	US\$	m/m	US\$	m/m	US\$	m/m	US\$
<b>11</b>	<b>Total</b>	<b>US\$</b>	<b>m/m</b>	<b>US\$</b>	<b>m/m</b>	<b>US\$</b>	<b>m/m</b>	<b>US\$</b>
11-01	EXPERTS							
11-02	Advisory Group Mtgs.	30,000	1.5	30,000				
11-03	Co-ord. Meetings	320,000	9.0	110,000	3.0	42,000	9.0	128,000
11-04	Project Review Mtgs.	120,000	3.0	38,000	3.0	40,000	3.0	42,000
11-05	Short-term consultants	240,000	4.0	37,000	7.0	71,000	6.0	64,000
	Long-term consultants	495,000	12.0	101,000	12.0	112,000	18.0	176,000
11-99	Sub Total	1,205,000	28.0	286,000	26.5	284,000	22.0	225,000
15	Official Travel	40,000		10,000		10,000		10,000
16	Mission Costs	80,000		5,000		65,000		5,000
19	Component Total	1,325,000		301,000		300,000		425,000
30	TRAINING							
31	Indiv. Fellowships	150,000	45.0	175,760	15.0	45,000	15.0	50,000
32	Group Training	1,409,800		175,760		426,100		445,700
39	Component Total	1,559,800		175,760		471,100		495,700
40	EQUIPMENT							
40	Equipment	60,600		20,200		20,200		20,200
49	Component Total	60,600		20,200		20,200		20,200
50	MISCELLANEOUS							
51	Miscellaneous	40,000		10,000		7,000		16,000
59	Component Total	40,000		10,000		7,000		16,000
99	TOTAL UNDP CONTRIBUTION	2,985,400		506,960		797,300		822,900



**JOINT UNDP/RCA/IAEA PROJECT RAS/92/073**

**FIRST MEETING OF NATIONAL CO-ORDINATORS FOR  
NUCLEONIC CONTROL SYSTEMS AND TRACER TECHNOLOGY**

**ANSTO, Lucas Heights, Australia**

**6-9 July 1993.**

**1. OPENING SESSION**

The meeting was opened by Dr. David Cook, Executive Director, Australian Nuclear Science and Technology Organisation (ANSTO). He said that he was privileged to welcome the participants on behalf of the Australian Government. He noted that the Meeting would be one of the first activities organized under the framework of the new joint UNDP/RCA/IAEA project on the "Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development". He informed the participants about the linkages between this project and the programme of extrabudgetary assistance being provided by the Australian Government through the Australian International Development Assistance Bureau (AIDAB) to RCA. The first Regional Training Course on "the Application of Modern Isotope Techniques to Industry" which was held 3-14 May, had been part of this support. He invited participants to see ANSTO's facilities in a site tour and also arrangements would be made to deal with any specific interests. In conclusion he noted that the Meeting would have much to do in its task of interpreting the outline of the project, as set out in the Project Document, into a well-constructed programme that addressed the regional needs of the Member States and he looked forward to seeing the outcome.

Dr. J.F. Easey, RCA Co-ordinator, welcomed the participants on behalf of the IAEA and thanked the Australian Government and ANSTO for offering to host the Meeting.

Dr. Peter Airey was unanimously elected Chairman for the Meeting.

The participants and observers then introduced themselves to the Meeting. There were thirteen National Co-ordinators present from the RCA Member States, only Bangladesh and Singapore were not represented. There were 4 observers from Australia. The full list of participants and observers is given in Annex 1.

The draft Agenda was reviewed and slightly modified to take account of the absence of formal presentations from Bangladesh and Singapore (Annex 2).

Dr. Easey outlined the RCA programme of activities and reviewed the developments that had shaped the present project from its origins in the former UNDP Industrial project. Copies of overheads used in this presentation are given in Annex 3.

Dr. S.M. Rao presented a review of NCS and Tracers from a regional perspective. He had been a long-term expert for this area of technology in the UNDP Industrial Project and had had first hand experience of the status of the technology and the needs of various RCA Member States. The full text of his report is given in Annex 4.

Dr. B. Zatolokin, IAEA, presented an outline of the Agency's future programme in NCS and Tracer technology. The full text is given in Annex 5.

Dr. Y. Yurtsever reviewed the use of tracers for the study of pollutants in surface and ground waters (Annex 6) and also outlined where there would be Agency activities outside of the RCA programme that might be of interest to various Member States.

## **2. COUNTRY REPORTS**

In the pre-meeting documentation the participants were asked to prepare a Country Statement for presentation at the Meeting and for inclusion in the Meeting report. They were asked to:

- . detail their current situation
- . review the past impact of the activities in NCS and Tracers
- . outline future plans for national activities in NCS and Tracers
- . identify future assistance required from the project in a regional content.

Each National Co-ordinator made an oral presentation outlining the country situation. The full text of their Statements are listed in the following Annexes. (The proposed participant from Bangladesh had not be able to get to Australia but he had

made arrangements to have his Country Statement sent to the Meeting. This was photocopied to all participants for consideration during the technical session).

Bangladesh	-	Annex 7
China	-	Annex 8
India	-	Annex 9
Indonesia	-	Annex 10
Republic of Korea	-	Annex 11
Malaysia	-	Annex 12
Mongolia	-	Annex 13
Pakistan	-	Annex 14
Philippines	-	Annex 15
Sri Lanka	-	Annex 16
Thailand	-	Annex 17
Viet Nam	-	Annex 18

Following these Country reports, Dr. Airey made a special report on "NCS and Tracers in Australia" (Annex 19) and the Japanese expert, Dr. Yoshiyuki Shirakawa, made a special report on "Future trends in Nucleonic Systems in Japan" (Annex 20).

### **3. TECHNICAL SESSION**

Dr. Peter Airey was Chairman for the Technical Session. There was a full and active discussion of the matters raised in the formal Country Statements and in other discussions. The programme for NCS and Tracers, as defined in the Project Document in Outputs 1.1, 1.2 and 1.3 (Annex 21), was thoroughly considered and conclusions and recommendations were made to directly address the needs of the various activities specified there.

Dr. Airey informed the Meeting that the second Regional Training Course under the Australian extrabudgetary programme of support to this joint project would take place in 1994 and would be entitled "Applications of Nuclear Techniques to Materials Characterization and Compatibility Studies". The details of the associated National Seminar programme had been sent to all National Co-ordinators (Annex 22) and the results of their selections (Annex 23) would be now fitted into a time-table. Member States were asked to assist in the acceptance of the Seminars and their scheduling because the National Seminars have to be in pairs linked between countries to make efficient use of available funds.

#### **4. CONCLUSIONS AND RECOMMENDATIONS**

The following recommendations were made on the detail for the activities listed in the Project Document:

##### **a) Activities 1.1.2 and 1.1.4 (combined)**

Regional Workshop/Seminar on NCS small and medium sized paper industry.

- . Regional Workshop/Demonstration - 2 weeks
- . Regional Seminar - 1 week

##### **Target Group:**

- . Middle managers (2 weeks)
- . Decision makers (1 week)

##### **Possible Location:**

- . China, Shanghai Instrument Co.  
Beijing No. 1 Paper Mill

(Action: Professor Dang Shu Qin to investigate).

- . Thailand and Japan are also possible hosts.

**Timing:** During 1995 - to coincide with the Chinese Nuclear Society Meeting on the Industrial Applications of Radioisotopes.

##### **b) Activities 1.1.1 and 1.1.3 Expert Missions and National Seminars:**

- . One seminar per country
- . One expert mission per country, National Co-ordinators to inform IAEA of priority requests.

(Action: Records of recent missions to be reviewed to avoid duplication of effort).

c) **Activity 1.1.5 Fellowship Training/Scientific Visits:**

- 3m/m annually (1994-96)

d) **Activities 1.2.2 and 1.2.3 (combined)**

Regional Training Course on the application of isotope techniques in process optimization.

To include . mathematical modelling/data evaluation  
. planning of investigations  
. radiation safety  
. demonstrations

**Duration:** 3 week course:

Week 1: Preparation/general theory

Week 2: Demonstration (3 days)

Week 3: Data evaluation

**Target Group:**

National Tracer Group (NTG) or Industry personnel

**Possible Locations:**

Indonesia, Thailand, Sri Lanka, Philippines, Malaysia, India

(Action: National Co-ordinators in designated countries to approach industries and inform RCA Office).

**Timing:** During 1994

e) **Activity 1.2.4 Fellowship training/scientific visits**

- 3m/m annually (1994-96)

**f) Activity 1.2.5 Expert Missions**

- One expert mission per country, National Co-ordinators to inform IAEA of priority requests.

(Action: Record of recent missions to be reviewed to avoid duplication of effort).

**g) Activity 1.2.6 National Seminars**

- 1 Seminar per country, National Co-ordinators to inform IAEA of priority request.

**h) Activity 1.3.1**

- Regional Workshop on the Use of Tracer Technology to Study the Dispersion of Effluents in Waters.

To Cover . Environmental problems/policy  
. Planning of experiments  
. Radiation Protection  
. Data evaluation models  
. Case studies

**Duration:** 2 weeks

**Target Group:**

Pollution control expert (EPA) (at least 1); NTG Member.

**Possible Location:**

(Action: National Co-ordinators to enquire concerning the possibility of hosting and inform RCA Office).

**Timing:** During 1994

i) **Activity 1.3.2**

Regional Workshop on the Use of Tracer Technology to Study the Dispersion of Effluents in Groundwaters.

To cover: . Environmental problems/policy  
. Planning of experiments  
. Radiation Protection  
. Data evaluation models  
. Case studies

**Duration:** 2 weeks

**Target Group:**

— Pollution control expert (EPA) (at least 1); NTG Member.

**Possible Location:**

(Action: National Co-ordinators to enquire on the possibility of hosting and inform RCA Office).

**Timing:** 1995

j) **Activity 1.3.3 Field Demonstrations (combined)**

**Target Problems:** . River/Estuary/Ocean Dispersion  
. Waste Treatment Ponds  
. Aquifers  
. Seepage

**Duration:** 2 weeks; 1 week each for surface and groundwater

(Specific recommendations to follow; to be discussed at the National Co-ordinators Meeting 1995).

**Target Group:**

Pollution control expert (EPA) (at least 1; NTG Member; Participants from Regional Workshops (Participants from Regional Workshops 1.3.1, 1.3.2 to be given preference).

**Possible Location:**

Possibly Pakistan

(Action: National Co-ordinators to enquire on the possibility of hosting and inform RCA Office. Identification of suitable sites for demonstrations is important).

**k) Activity 1.3.4 Fellowships/Scientific Visits**

- 3m/m annually (1994-96)

**l) Activity 1.3.5 Expert Missions**

- 1 expert/country (average); National Co-ordinators to inform IAEA of priorities.

**m) Activity 1.3.6 National Seminars**

- 1 per country with the National Co-ordinators to inform the IAEA of their priorities, to be focused on EPA/Industry target groups.

It was noted that there would be some related relevant IAEA training events taking place in the future on aspects of hydrology. National Co-ordinators would like to be informed when the events are approved. They were:

Isotope Hydrology Analytical Techniques, 1994 Vienna (Interregional)

Isotope Applications with Emphasis on Flow and Transport Modelling (Interregional) - 1995 Vienna?

Nuclear Techniques in Soil Erosion and Sedimentation Transport and Related Environmental Studies (Regional: Asia and Pacific) 1996 (venue to be decided).

In addition to the matters concerning the Project Document the following additional recommendations were made by the Meeting:

- . it was recommended that requests on the maintenance of nucleonic equipment which is part of Nucleonic Control Systems should be considered to be a part of the existing RCA project on Nuclear Instrument Maintenance, RAS/4/008.
- . it was recommended that a mechanism for recording and distributing information on case studies and on technical experience in these technology areas of NCS and Tracer Technology should be investigated as a matter of priority.
- . it was recommended that, where applicable, there should be efforts towards compliance with the International Standards on Quality such as ISO 9000.
- . it was recommended that the IAEA compile a profile on each of the National Tracer Groups detailing their staff, equipment and experience for both industrial process control and hydrological investigations.

## **5. CLOSING REMARKS**

Dr. Airey reviewed the work of the Meeting and thanked the delegates for their contributions to the conclusions and recommendations which had been agreed. He said that the work by this Meeting had put on the detail required to define the various activities for the projects in NCS and Tracers and he looked forward to a successful programme being implemented. He wished all participants a safe journey home and reiterated how pleased both ANSTO and the Australian Government had been at having the privilege of hosting the Meeting.

Dr. Easey endorsed Dr. Airey's thanks to the participants for all their efforts which had translated into a good set of conclusions and recommendations. He

thanked the ANSTO Organizing Committee and the Secretariat for their planning and strong support which had contributed to the success of the Meeting. He wished all participants a good return journey and looked forward to future meetings.

**JOINT UNDP/RCA/IAEA PROJECT RAS/92/073**

**FIRST MEETING OF NATIONAL CO-ORDINATORS FOR  
NUCLEAR ANALYTICAL TECHNIQUES,**

**Kompleks PUSPATI, Bangi, Malaysia**

**22-25 June 1993**

**S U M M A R Y**

This Meeting was attended by National Co-ordinators from thirteen RCA Member States, only Singapore and Japan were not represented. In addition there were six observers, one from the Republic of Korea and five from Malaysia.

The Meeting considered the programme of activities set down in the UNDP/RCA/IAEA Project Document and agreed on the definition of the specific content for these activities so that the aims and objective could be realized. The major conclusions-and recommendations were that:

- . the Nuclear Analytical Techniques (NATs) needed to be backed by accreditation to an international standard in order to have the status to persuade potential users of the relevance and acceptability of NAT measurements.
- . the most appropriate international standard to be adopted for this purpose would be ISO Guide 25 and this would be the basis for regionally harmonized procedures.
- . the order of priority for the types of material to be analyzed for industrialization and environmental pollution was agreed as:

First priority: airborne particulate matter

Second priority: sediment and soil

Third priority: natural water bodies and biological accumulators.

**JOINT UNDP/RCA/IAEA PROJECT RAS/92/073**

**FIRST MEETING OF NATIONAL CO-ORDINATORS FOR NUCLEAR  
ANALYTICAL TECHNIQUES.**

**Kompleks PUSPATI, Bangi, Malaysia**

**22-25 June 1993**

**1. OPENING SESSION**

Dr. John F. Easey, RCA Co-ordinator, IAEA welcomed the participants to the Meeting and thanked the Malaysian Government for agreeing to host the event. He expressed his appreciation for the efforts of the Nuclear Energy Unit (UTN) organizing committee which had resulted in a very well organized and efficient start to the Meeting. He noted that this was both the first of the meetings for the various National Co-ordinators for the new joint UNDP/RCA/IAEA project on Environmentally Sustainable Development and also the first time that Nuclear Analytical Techniques had been a specific technology addressed within the RCA programme.

Y. Bhg. Dr. Ahmad Sobri Hj Hashim, Director General, UTN welcomed the participants and said it was a privilege to have this Meeting in Malaysia. He reviewed Malaysia's participation in the former UNDP Industrial project and announced that Malaysia would be fully participating in this new joint UNDP/RCA/IAEA project. In addition he announced that Malaysia would be contributing US\$50,000 for project activities over the life of project, 1993 to 1996. He reviewed the Nuclear Analytical Techniques emphasizing their advantages and also touched on the aims and objectives of the Meeting. In conclusion the hope was expressed that there would be a productive and successful Meeting. The full text of his speech is given in Annex 1.

The participants and observers then introduced themselves to the Meeting. There were thirteen National Co-ordinators from the RCA Member States, only Singapore and Japan were not represented. There was one observer from the Republic of Korea and five from Malaysia. The full list of participants and observers is given in Annex 2.

Dr. Pier Danesi, IAEA, Director, Seibersdorf Laboratory was elected Chairman for the Session and the programme adopted was that set out in the previously circulated draft agenda (Annex 3).

Dr. Easey gave a presentation outlining the RCA programme of activities, the results of the previous UNDP Industrial Project and the development of the present joint UNDP/RCA/IAEA project (copies of the overhead transparencies used are given in Annex 4). He then went through the parts of the approved Project Document (Annex 5) relevant to Nuclear Analytical Techniques including the activities required for the stated output, the budget and the time-tabling of the events. He explained that the role for the National Co-ordinators at this Meeting was to determine the detailed nature for these various activities in line with the consensus view on the regional priorities. In particular he emphasized the role of the National Co-ordinators and their importance in the successful implementation of the project work at both the regional and national level (Annex 6).

Dr. Danesi presented an overview on "Sustainable Development and Nuclear Techniques" (Annex 7) in which he reviewed the concept of sustainable development and the ways in which nuclear techniques could contribute to achieving the goals.

Dr. Parr (IAEA) presented a paper on "Environmental Applications of Nuclear Analytical Techniques: some International and Regional Perspectives" (Annex 8) in which he reviewed some IAEA programmes which illustrated the appropriate applications of NATs in monitoring and in research on environmental problems.

Dr. Zeisler (IAEA) presented the final paper for the morning session, entitled "Nuclear Analytical Techniques - Tools in the Harmonization of Environmental Measurements" (Annex 9). He reviewed some of the critical aspects concerned with the quality of results and the need for harmonization of the environmental measurements.

## **2. COUNTRY REPORTS**

In the pre-meeting documentation the participants were asked to prepare a Country Statement for presentation at the Meeting and for inclusion in the Meeting report. They were asked to:

- . detail their current situation
- . review the past impact of activities in Nuclear Analytical Techniques (NATs)
- . outline future plans for national activities in NATs

identify future assistance required from the project in a regional context.

Each National Co-ordinator made an oral presentation on these topics. The full text of their Country Statements are listed in the following Annexes:

Bangladesh	-	Annex 10
China	-	Annex 11
India	-	Annex 12
Indonesia	-	Annex 13
Republic of Korea	-	Annex 14
Malaysia	-	Annex 15
Pakistan	-	Annex 16
Philippines	-	Annex 17
Sri Lanka	-	Annex 18
Thailand	-	Annex 19
Viet Nam	-	Annex 20

Following these Country reports, Mr. J. Fardy made a special report entitled "Nuclear Techniques in Australia". The full text is given in Annex 21.

### **3. TECHNICAL SESSION**

Dr. Abd. Khalik Hj. Wood was elected Chairman for the Technical Session. There was a full discussion of the matters raised in the formal country statements and in other discussions. Analysis of the inputs identified a range of common foci which were then formulated into 14 conclusions and recommendations.

### **4. CONCLUSIONS AND RECOMMENDATIONS**

The Meeting discussed a wide spectrum of issues associated with activities, topic areas and other matters relevant to the use of Nuclear Analytical Techniques for environmental and industrial studies.

The major conclusions and recommendation of the National Co-ordinators were that:

1. the Nuclear Analytical Techniques needed to be backed by accreditation to an international standard in order to have the status to

persuade potential users of the relevance and acceptability of NATs measurements;

2. the most appropriate international standard to be adopted for this purpose would be ISO Guide 25 and this would be the basis for regionally harmonized procedures;
3. National Co-ordinators would promote the use of ISO Guide 25 at the National Level;
4. there would be an expert workshop on the details of ISO Guide 25 and this would be held in conjunction with the next meeting of National Co-ordinations in 1995, since it was the National Co-ordinators who were the most in need of detailed knowledge of the implications and the implementation of the standard;
5. the order of priority for the types of material to be analyzed for industrialization and environmental pollution was agreed as:

First priority: airborne particulate matter

Second priority: sediment and soil

Third priority: natural water bodies and biological accumulators.

6. priority problem areas should be chosen by national authorities on the basis of local needs. Major topics may include:
  - . the study of local pollution sources that may have a significant health impact;
  - . long range transport (by air and water) of pollutants and identification of pollution sources;
  - . baseline data for critical pollutants in selected environmental matrices;
  - . trend monitoring for selected pollutants and matrices.

7. it was also recognized that there was a pressing need for training in the area of data analysis and interpretation and in the identification of pollution sources. The IAEA should consider having a regional training course for Asia and the Pacific on the specific issue of data analysis and interpretation in 1995 as part of their regular course programme since this subject was beyond the scope of the activities in the joint UNDP/RCA/IAEA project document but was seen as a priority area by the National Co-ordinators;
8. because of the high level of interest and importance of air pollution studies in the region, the IAEA was asked to support a new CRP for the Asia Pacific region on "applied research on air pollution using nuclear related analytical techniques", which is related to the existing global CRP on this topic;
9. -- intercomparison studies will be carried out regionally and nationally using standard materials relevant to the identified priority list and the results of the intercomparison studies would be presented as part of the agenda of future National Co-ordinator meetings;
10. there was a general regional interest in the analysis of foodstuffs and biological materials using nuclear analytical techniques and such skills could contribute to any extension of the RCA CRP on Reference Asian Man that might be concerned with the compiling of data on diet and associated factors;
11. the RCA Co-ordinator was asked to bring this to the attention of the final research co-ordination meeting on Reference Asian Man and explore whether it would be possible for an expert on NATs to brief the final RCM on the benefits of these techniques for future studies relevant to future co-ordinated research work and the compilation of data on diet and associated factors;
12. interest was expressed in the regional TC project on "Marine Contamination and Sedimentation" and the use of low level counting techniques for measuring environmental levels of radioisotopes and the

use of environmental radioisotopes as an indicator for studying environmental processes. The RCA Co-ordinator was asked to try to seek further funding for this project when the current extrabudgetary funds have been spent;

13. the RCA Co-ordinator was asked to clarify with the relevant Japanese agencies whether there was going to be unnecessary duplication between this project's focus on the analysis of airborne particulate matter and the proposal under the Japanese initiated programme of "International Nuclear Co-operation in Asia and the Pacific" which has been formulated for NAA on airborne contamination;
14. the importance of properly constructed sampling strategies was considered crucial to an adequate monitoring programme and there was a general need for assistance in this aspect. Protocols on the collection of samples were required and the IAEA was requested to assist in the preparation of written protocols. In addition there was seen to be a need for the provision of environmental specimen banking in the region and again the IAEA was requested to provide advice and assistance on the setting up, running and maintenance of such a bank in the region.

These conclusions and recommendations were unanimously endorsed by the National Co-ordinators as an accurate summary of the output from this meeting.

## **5. OTHER MATTERS**

The Meeting considered it important to make as efficient use as possible of the financial resources through the linking of appropriate events. It was considered that economies could be achieved if the results of the intercomparison programmes were considered at the time of the National Co-ordinators Meeting (NCM). It was also considered beneficial to try to link the next NCM, scheduled for 1995, to the Australian Conference on Nuclear Techniques of Analysis being held in that year. Mr. Fardy undertook to discuss this with the organizing committee of which he is a member.

Participants also asked that emphasis should be placed at the country level to ensure that Governments understood the role of National Co-ordinators and the

tasks expected of them and also the role of the National Nuclear Research Institute in backstopping of technology acquired as a result of the TC projects.

The National Co-ordinators also requested that all NAT related project information be copied to them so that they could maintain awareness of current issues and actions. The Agency was asked to assist in this matter by instructing others involved in the project to pass communications to the respective National Co-ordinator.

The requirements for a Regional Training event scheduled in the Project Document for 1994 were discussed. The consensus view was that there were two major imperatives; one to inform senior management and decision makers involved in analytical laboratories about the benefits of using NATs; and, the other to provide training and "hands on" experience for "work bench" scientists who have direct responsibility for analyses. It was decided that both groups needed to be catered for and this would be done through a Regional Seminar for the senior managers and a Regional Training Course for the scientists. It was considered that this latter group could also benefit from the material presented at the Seminar which would be less technically oriented but would provide them with a better overall understanding of such issues as cost benefits, wider areas of potential application, etc. Both events would be phased in with the International Conference on Applications of Radioisotopes and Radiation in Industrial Development (ICARID-94), which is being jointly sponsored by the IAEA and will be held in Bombay 7-9 February 1994.

## **6. CLOSING REMARKS**

The RCA Co-ordinator reviewed the activities and decisions made by the Meeting and thanked all the participants for their contributions and the positive and constructive way in which the structure for the project activities had been decided and formulated. He thanked the Government of Malaysia and the Nuclear Energy Unit (UTN) for hosting the Meeting and for providing such generous support. There was a vote of thanks to the UTN staff involved in the planning preparation and administration of the Meeting, especially the Organizing Committee.

Mr. Adnan Hj. Khalid formally closed the Meeting on behalf of UTN and the Malaysian Government. He thanked the IAEA for holding the Meeting at UTN and said it had been an honour for them to be chosen. All participants were wished a safe

journey home and the wish was expressed that the outcome of the Meeting would enable the strong project design to achieve significant success over the next three to four years.



**JOINT UNDP/RCA/IAEA PROJECT RAS/92/073**

**FIRST MEETING OF NATIONAL CO-ORDINATORS FOR NON-DESTRUCTIVE EVALUATION**

**Japanese Society for Non-Destructive Inspection, Tokyo, Japan**

**August 30 - September 2, 1993**

**1. OPENING SESSION**

Dr. John F. Easey, RCA Co-ordinator, IAEA, welcomed the participants to the Meeting and thanked the Japanese Government for agreeing to host the event. He expressed his appreciation for the efforts of the Japanese Society of Non-Destructive Inspection in making all the arrangements for the meeting. He believed that it was very appropriate for the 1st meeting to be in Japan because Japan had contributed significantly to the success of the NDT activities in the RCA Regional Industrial Project over the last 10 years. He added that this was a very important meeting because it set the detailed framework for the new joint UNDP/RCA/IAEA Project.

Mr. Wada, Ministry of Foreign Affairs, welcome participants to the meeting. He thanked Professor Fukuoka, JSNDI, for the excellent work JSNDI had done working through the Ministry of Foreign Affairs, to organize the Japanese NDT contribution to the UNDP/RCA/IAEA Regional Environmental Project. He repeated that Japan was committed to providing assistance to the RCA.

Mr. Murasawa, Science and Technology Agency, welcomed participants. He reviewed STA's contribution to international agencies such as the IAEA.

Professor Fukuoka, President of JSNDI, welcomed participants on behalf of JSNDI. He expressed his sincere appreciation to Dr. Easey, Mr. Wada, Mr. Murasawa and Mr. Gilmour for their continuing work with JSNDI on regional NDT activities. He summarized Japan's contribution to the two phases of the Regional Industrial Project. He confirmed JSNDI's continuing commitment to Proficiency Testing and to providing Japanese experts for regional and national training courses and seminars.

Dr. Ooka, JSNDI, was elected Chairman of the Meeting and Mr. Gilmour was elected Secretary. Dr. Ooka emphasized the importance of the Meeting since it established the activities to be undertaken for the duration of the Project.

The draft agenda which had been circulated previously was adopted with only slight modification (Annex 1). All participants and observers then introduced themselves to the meeting. There were representatives from each of the fifteen RCA Member States (Annex 2).

Dr. Easey emphasized that the details of the project needed to be fully established by the end of the Meeting. He explained that the Project Document gave the activities which had to be completed to achieve project outputs. The Meeting needed to establish a consensus on all events that had to be organized. The Country Statements were an important part of the planning process since they showed the direction each country wanted to take over the next few years.

This new joint UNDP/RCA/IAEA project on environmentally sound technologies is one of the activities which RCA is undertaking. The distribution of the RCA budget over the past 8 years is shown in Figures 1 and 2.

The UNDP/RCA/IAEA project has the sub-projects shown in Figure 3. Essentially the sub-projects build on the linkages developed in the two phases of the UNDP Regional Industrial Project in the previous ten years (1982-1991).

The project terminal report emphasized that for a successful regional project it was necessary for:

- . the use of long-term experts stationed in the region to enhance the technical programme,
- . the importance of national training and national awareness programmes to reinforce the benefits of regional training,
- . the need for an effective network of Co-ordinators at the project and sub-project level. (The National Co-ordinators represent their Governments and should have the backing of their Governments.)

Dr. Ooka explained that there were two basic directions to the JSNDI proposed programme. Firstly, there is the need to continue to develop a core of NDT personnel in each country. Secondly, there was a need to develop regional NDT harmonization by implementing Proficiency Testing Programmes for Level 2 UT and RT personnel.

The draft JSNDI work plan for the project is shown as Figure 4.

Mr. Gilmour gave a summary report on the previous 10 years of the UNDP/NDT sub-project, highlighting the achievements of the project and identifying possible problems.

## **2. COUNTRY REPORTS**

In the pre-meeting documentation the participants were asked to prepare a Country Statement for presentation at the Meeting and for inclusion in the Meeting report. They were asked to report on:

- . the current situation
- . a review of the past impact of project activities
- . future plans for national activities
- . future assistance required from this project in a regional context.

Each National Co-ordinator made an oral presentation on these topics. The full text of their Country Statements are listed in the following Annexes:

Bangladesh	Annex 3
China	Annex 4
India	Annex 5
Indonesia	Annex 6
Republic of Korea	Annex 7
Malaysia	Annex 8
Pakistan	Annex 9
Philippines	Annex 10
Singapore	Annex 11
Sri Lanka	Annex 12
Thailand	Annex 13
Viet Nam	Annex 14

Special reports were submitted by Mr. Gilmour (Annex 15) and Dr. Ooka (Annex 16).

### **3. TECHNICAL SESSION**

Dr. Ooka continued as Chairman for the Technical Session. There was a full discussion on the activities listed in the Project Document. Analysis of the inputs identified the following consensus for the conclusions and recommendations listed in the next section.

### **4. CONCLUSIONS AND RECOMMENDATIONS**

The following recommendations were made on the details for the activities listed in the Project Document and, where appropriate, actions have been assigned.

#### Activity 1.5.1: Expert Missions

- a. It was recommended that there should be an expert mission to Mongolia as soon as possible to evaluate the current status of NDT in that country and the specific industrial needs.

ACTION: Mongolia to request

- b. National Co-ordinators will inform the IAEA of their specific needs for short-term expert assistance.

ACTION: National Co-ordinators

#### Activity 1.5.2: National Co-ordinators Meetings

- c. It was recommended that the next NCM be held in 18 months time (1st Quarter 1995) and that a mid-term review would be an agenda item. The NCM which would follow that would be held in the 4th Quarter 1996 and would assess the full impact of the project as part of the agenda. These meetings would be held possibly in Indonesia and Japan.
- d. The Meeting requested the Government of Japan to fund the 1995 NCM.

Activity 1.5.3: Regional Seminar/Workshop on NDE for Specific Industries.

- e. There was a recommendation that there should be Regional Seminars/Workshops on three specific industries:

- . NDT in Electric Power Generation
- . NDT in oil, gas and petrochemical
- . NDT in Aviation

There has been no specific funding set aside for this under the UNDP budget. National Co-ordinators were requested to enquire whether their Governments would be willing to provide financial support. National Co-ordinators will liaise with the RCA Co-ordinator on this aspect.

ACTION: National Co-ordinators

Activity 1.5.4: Regional Workshop on Non-Metallic Materials

- f. It was recommended that there be a Regional Workshop held on NDT of Concrete to review the manufacture of concrete, the types of defects which can occur and the advantages and limitations of the various NDT methods which have been utilized.

Duration: 2 weeks

Target Group: Senior NDT specialists with Level 2 qualifications in RT and UT with preference given to those with civil engineering or construction industry background.

Location: to be advised

Timing: 1995

Since this activity was not funded under the UNDP budget, National Co-ordinators were asked to approach their Governments to enquire whether they could fund this Activity. National Co-ordinators are to notify the RCA Co-ordinator as soon as possible.

ACTION: National Co-ordinators.

Activity 1.5.5: National Seminars

- g. National Co-ordinators are to advise the RCA Co-ordinator on their specific requirements. One week of expert assistance would be made available from the UNDP funding but would be on the basis of linked pairs of activities in two countries so that the costs of the airfares were minimized.

ACTION: National Co-ordinators

Activities 2.2.1 and 2.2.3: Regional Seminar and Workshop on NDT test pieces

- h. It was recommended that these two activities be linked together to enable a team approach to be made for the production of test pieces by an NDT specialist and an expert welder from each Member State. In a Regional Workshop the expert welders would be instructed on how to produce test pieces with known defects in flat plate and pipe to meet national certification body requirements.

Duration: 3 weeks

Target Group: Expert welders with specialization in manual metal arc welding.

Location: Possibly Malaysia, Pakistan or India.  
Those National Co-ordinators are to consult with their Governments and inform the RCA Co-ordinator.

ACTION: Malaysia, India and Pakistan National Co-ordinator.

Timing: Second half 1994

In a 1 week Regional Seminar/Workshop senior NDT specialists with qualifications preferably at level 3 in UT or RT would examine the test pieces produced at the end of the second week of the test piece fabrication Regional Workshop. Further test pieces would be produced by the welders depending on the results obtained.

Duration: 1 week

Target Group: Senior NDT specialists preferably with UT Level 3 or RT Level 3 qualification

Location: As for RW test piece fabrication

Timing: Second half 1994

The test pieces made will be available for National use.

Activity 2.2.2: Recommendations on NDE test pieces.

- i. Dr. Ooka will advise National Co-ordinators on the results of the ISO Meeting TC135/SC7 to be held in Johannesburg in October 1993.

ACTION: Dr. Ooka

There may be further discussion at the 1995 National Co-ordinators Meeting.

Activities 2.2.4 and 2.2.9: Proficiency Testing Programme

- j. It was recommended that the time table should be:

1993 Republic of Korea (November)  
Singapore (November)  
Japan (December)

1994 Australia (January)

1995 India and Philippines (1st half)  
or Pakistan and China

Thailand and Viet Nam (2nd half)

1996 India and Philippines (1st half)

or Pakistan and China

Bangladesh and Sri Lanka (2nd half)

Both the Thailand/Viet Nam and Bangladesh/Sri Lanka visits will be subject to available finance. The other missions have indicative financing from the Government of Japan.

There will be two associated Meetings to assess the results of the PTP. In January 1994 there will be an assessment of Australia, Japan, Indonesia, Malaysia, Republic of Korea and Singapore. This meeting will be attended by project experts and one representative from each of the six countries and will take place in Melbourne from 24-27 January 1994.

There will be a second meeting held in conjunction with the 1996 National Co-ordinators Meeting which will occupy two of the expected five days allotted.

Activities 2.2.5 and 2.2.6: Level 2 Examination Papers

- k. It was recommended that all National Co-ordinators should submit to the RCA Co-ordinator samples of Level 2 papers for each method. These should come from either national training courses or national certifying body examinations. They should be sent to Vienna by 15 December 1993.

All contributions will be amalgamated into a single booklet which will be distributed to all National Co-ordinators. Any further action will be reviewed at the next NCM.

ACTION: National Co-ordinators and IAEA

1. The Meeting recommended that there was a need to review the practices governing practical examinations in the various RCA Member States at the next NCM. It was therefore agreed that National Co-ordinators will submit the following to the RCA Co-ordinator in January 1994 concerning level 2 practical examinations in RT and UT.

- . marking scheme
- . examples of papers
- . instructions of participants
- . number and type of test pieces
- . examination duration

ACTION: National Co-ordinators

#### Activity 2.2.7: Regional Board of Examiners

This activity will be reviewed at the 1995 NCM in the light of the results obtained in activities 2.2.5 and 2.2.6.

#### Activity 2.2.8: Regional Model Qualifying Examinations

- m. It was agreed that National Co-ordinators will submit Level 3 papers to the RCA Co-ordinator for review at the 1995 NCM.

ACTION: National Co-ordinators.

### **OTHER RECOMMENDATIONS**

There were a number of other recommendations made by the Meeting:

- n. All National Co-ordinators would endeavour to get their Governments provide financial assistance to the project for those unfunded activities.

ACTION: National Co-ordinators

- o. The long-term expert should be recruited as quickly as possible within the budgetary limitations

ACTION: IAEA

- p. The long-term expert should undertaken the following duties during a 1 year assignment.

- . participate in all regional and all appropriate national training events

- . . . . . prepare training course notes for eddy current testing and the surface methods to meet as a minimum the TECDOC 628 Level 2 requirements
  - . . . . . amend the ultrasonic training course notes to meet as a minimum the TECDOC 628 requirements
  - . . . . . design the Regional Training Course for NDT of Concrete
  - . . . . . prepare notes for an executive management course on NDT.
- q. Bilateral agreements between NDT societies should be encouraged and every participating country without one should aim to have established an NDT Society by the end of the project in 1996.

ACTION: National Co-ordinators

- r. All National Co-ordinators are to supply to the RCA Co-ordinator the names of experts qualified in the five methods who would be appropriate to undertake missions under the project.

Action: National Co-ordinators

- s. The draft country reporting document (Annex 17) is to be referred to the Expert Meeting to prepare Materials for Accurately Recording and Monitoring Project Activities and Inputs in the RCA Projects, 20-24 September 1993, Vienna.

ACTION: RCA Co-ordinator

- t. The RCA Co-ordinator distribute copies of TECDOC 628 to all National Co-ordinators

ACTION: RCA Co-ordinator

- u. National Co-ordinators should investigate the feasibility of conducting a national proficiency testing programme on ultrasonic thickness

measurement based on the methodology used in Annex 18 and report on the outcome at the next NCM.

ACTION: RCA Co-ordinators

- v. All Member States that do not yet have national qualification and certification standards are encouraged to utilize ISO 9712 (Annex 19) as a basis for the development of such standards.

ACTION: Relevant National Co-ordinators

These conclusions and recommendations were unanimously endorsed by the National Co-ordinators as an accurate summary of the output from this Meeting.

## **5. OTHER MATTERS**

The Meeting welcomed the presence of the new National Co-ordinators from India, Indonesia and Mongolia and recorded its appreciation of the contribution made by the previous National Co-ordinators from India and Indonesia.

The Meeting proposed a vote of thanks to JSNDI for their generosity in hosting and supporting the Meeting and to JSNDI staff and Dr. Ooka for outstanding efforts in administrating and managing all aspects of the Meeting.

## **6. CLOSING REMARKS**

The RCA Co-ordinator reviewed the activities and decisions made by the Meeting and thanked all the participants for their contributions and the positive and constructive way in which the project activities had been discussed and resolved. He thanked the Government of Japan and JSNDI for hosting the Meeting and for providing generous support.

Dr. Ooka formally closed the Meeting on behalf of JSNDI and the Government of Japan. He thanked the IAEA for holding the Meeting at JSNDI and said it had been an honour for them to be chosen. He wished participants a safe trip home.



**RCA FOOTNOTE A/ PROJECTS 1993**

Project Number	Approval Date	Project Title	Status	Comments
RAS/6/016	1988	Use of Computers for Technetium-99m Imaging (RCA)	Unfunded	Supported by Australia from 1989 to 1991
RAS/6/022	1992	Strengthening Nuclear Medicine in RCA Member States	Funded	Supported by Australia
RAS/8/062	1987	Radioisotopes in Industry (RCA)	Funded	Supported by Japan and TC funds
RAS/8/064	1988	Radioisotopes in Industry (RCA)	Funded	Supported by Australia
RAS/8/069	1992	Isotopes and Radiation in Industry and the Environment (RCA)	Funded	Supported by Australia
RAS/8/070	1992	Isotopes and Radiation in Industry and the Environment (RCA)	Funded	Supported by Japan
RAS/9/006	1987	Strengthening of Radiation Protection Infrastructures (RCA)	Funded	Supported by TC funds, Japan and Australia



**PROPOSED RCA PROJECT ACTIVITIES FOR 1994**

Field	Project	Technical Officer	Project No.
Medical and Biological	Use of Computers in Tc-99m Imaging	A. Cuaron	RAS/6/016
	Radiation Sterilization of Tissue Grafts	R. Mukherjee	RAS/7/003 E3.10.04
	Radioimmunoassay for Hepatitis B Diagnosis	R. Piyasena	RAS/6/018
	Care and Maintenance of Nuclear Medical Equipment	Y. Xie	RAS/4/008 E1.10.06 E1.10.07
	Strengthening of Nuclear Medicine in RCA Member States	T. Yamasaki	RAS/6/022
Industry	Regional Project for Asia and the Pacific (RCA) on "Environmentally sound Technologies"	J.F. Easey (Project Officer)	RAS/8/068 RAS/8/069 RAS/8/070 RAS/8/071 (RAS/92/073)
	Sub-projects:		
	- Tracer Technology in Industry	B. Zatolokin	
	- Non-Destructive Testing	B. Zatolokin	
	- Radiation Technology	V. Markovic	
	- Nucleonic Control Systems	R. Mani	
- Nuclear Analytical Techniques	R. Parr		

**PROPOSED RCA PROJECT ACTIVITIES FOR 1994**

<b>Field</b>	<b>Project</b>	<b>Technical Officer</b>	<b>Project No.</b>
Agriculture	Increasing the Yield and Nitrogen Fixation Capabilities of Common Grain Legumes	S. Danso	RAS/89/045 (UNDP) RAS/5/021
Radiation Protection	Strengthening of Radiation Protection  Activities: - Intercomparison of Radioactivity Measurement  - CRP: Reference Asian Man	P. Strohal  J. La Rosa  R. Griffith	RAS/9/006   J3.20.01
General	Research Reactor Utilization Including Basic Science Using Research Reactors  Energy and Nuclear Power Planning  Nuclear Information System  Development of TCDC in Asia and the Pacific	K. Akhtar  P. Molina  Selma Chi Barreiro  J.F. Easey (Project Officer)	RAS/4/011 F1.20.09  RAS/0/013  RAS/0/019  RAS/0/015

**RCA BUDGET AND BUDGET ESTIMATES FOR 1994\***

Project No.	Title	Fund Source	BUDGET US \$k
			1994
RAS/0/013	Energy and Nuclear Power Planning	TC	80.80
RAS/0/015	Development of TCDC in Asia and the Pacific	TC IND ROK CPR	94.80 50.00 25.00 50.00
RAS/0/019	Nuclear Information Systems	TC	66.60
RAS/4/008 CRP: E1.10.06 E1.10.07	Nuclear Instrument Maintenance	TC	168.00
RAS/4/011 CRP: F1.20.09	Research Reactor Utilization	TC	80.80
RAS/5/021 (RAS/89/045)	Improvement of Grain-Legume Rhizobium Symbiosis to fix Atmospheric Nitrogen	UNDP	74.50
RAS/6/016	Use of Computers in Technetium - 99m Imaging	a/	(132.00)**
RAS/6/018	Radioimmunoassay for Hepatitis B Diagnosis	TC	204.80
RAS/6/022	Strengthening of Nuclear Medicine in RCA Member States	AUL	110.00
RAS/7/003 CRP: E3.10.04	Radiation Sterilization of Tissue Grafts	TC	153.20
RAS/8/068 RAS/8/069 RAS/8/070 RAS/8/071 (RAS/92/073)	UNDP "Environmentally Sound Technologies"	TC AUL JPN UNDP	150.40 155.00 320.00 797.30
RAS/9/006 CRP: J3.20.01	Strengthening of Radiation Protection Infrastructure	TC JPN AUL	92.40 200.00 102.50

<b>Project No.</b>	<b>Title</b>	<b>Fund Source</b>	<b>BUDGET US \$k</b>
			<b>1994</b>
CRP	Evaluation of radioactive iodine therapy for hyperthyroidism	JPN	100.00
Total			3076.10

- \* Note these figures are estimates only. In particular they do not imply commitment by donor countries.
- \*\* Unfunded not included in Budget total.

**REGULAR REGIONAL TRAINING PROGRAMME IN THE ASIA AND PACIFIC REGION**

**1994**

1. 11-20 April 1994 Project Design, Evaluation and Management,  
Kuala Lumpur, Malaysia
2. May 1994  
(2 weeks) Immunoscintigraphy and RIA Methods  
for the Detection of Cancer,  
Seoul, Republic of Korea
3. October 1994  
(3 weeks) Management of Waste from Spent Radiation  
Sources and other Small Nuclear  
Applications,  
Manila, Philippines
4. October/November 1994  
(5 weeks) Nuclear and Associated Techniques  
for Pesticide Research,  
Kuala Lumpur, Malaysia
5. 3 weeks in 1994 Strategies and Methodologies for  
Applied Marine Radioactivity Studies,  
Australia
6. 2 weeks in 1994 Preparation of Off-site Emergency Plans,  
Australia

**RCA TRAINING COURSES PROGRAMME IN ASIA AND THE PACIFIC**

**1994**

1.	April (3 weeks)	Regional Training Course on Analysis of Research Reactor Transients, Kuala Lumpur, Malaysia	RAS/4/011	Akhtar
2.	25 April - 13 May	Regional Training Course on Research Reactor Utilization, Sydney, Australia	RAS/4/011	Akhtar
3.	September (1 week)	Regional Workshop on Data Transfer and Soft-ware phantoms Bangkok, Thailand	RAS/4/008	Xie
4.	3rd quarter	Regional Training Course on Advanced Methods for local reagent production for RIA Hepatitis B markers and EQAS, Bangkok, Thailand	RAS/6/018	Piyasena
5.	November (3 weeks)	Regional Workshop on Upgrading of Gamma Cameras, Kuala Lumpur, Malaysia	RAS/4/008	Xie
6.	(4 weeks)	Regional Workshop on Protection of Nuclear Instruments, Manila, Philippines	RAS/4/008	Xie
7.		Regional Training Course of INIS	RAS/0/019	
8.	2nd quarter	Regional Training Course on Open Learning Techniques Applied to Radiation Sterilization of Tissue Grafts	RAS/7/003	Mukherjee

- |     |             |  |                                |           |
|-----|-------------|--|--------------------------------|-----------|
| 9.  | 4th quarter | Regional Workshop on Dissemination of Information on Testing Procedures for Radiation Sterilized Tissue Grafts | RAS/7/003                      | Mukherjee |
| 10. | ?           | Regional Training Course on Calibration and Maintenance of Monitoring Instruments for Radiation Protection     | RAS/9/006<br>(Japanese funded) | Strohal   |
| 11. | ?           | Regional Workshop on Regulatory Aspects of Control, Safe Handling and Disposal of Sealed Sources               | RAS/9/006                      | Strohal   |

**TRAINING COURSES AND SEMINARS WITHIN THE FRAMEWORK**  
**OF THE UNDP/RCA/IAEA REGIONAL PROJECT**  
**ON THE USE OF ISOTOPES AND RADIATION TO STRENGTHEN TECHNOLOGY**  
**AND SUPPORT ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT**  
**RAS/92/073**

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**1994**

- |    |                      |  |                                     |           |
|----|----------------------|--|-------------------------------------|-----------|
| 1) | 24 Jan. -<br>11 Feb. | Regional Workshop on<br>Environmental and Industrial<br>Applications of Nuclear<br>Analytical Techniques,<br>Bombay, India | RAS/8/071                           | Parr      |
| 2) | 7-11 Feb.            | Regional Seminar on<br>Applications of Nuclear<br>Analytical Techniques,<br>Bombay, India                                  | RAS/8/071                           | Parr      |
| 3) | 2nd quarter          | Regional Training Course on<br>Materials Characterization,<br>Sydney, Australia  | RAS/8/069<br>(Australian<br>funded) | Lewkowicz |
| 4) | (2 weeks)            | Regional Training Course on<br>Application of ISO to<br>Industrial Sterilization,<br>Bangkok, Thailand                     | RAS/8/070<br>(Japanese<br>funded)   | Markovic  |
| 5) | (2 weeks)            | Regional Training Course on<br>Process Control in Radiation<br>Processing,<br>?  | RAS/8/070<br>(Japanese<br>funded)   | Markovic  |
| 6) | (2 weeks)            | Regional Training Course on<br>Radiation Processing of<br>Municipal and Industrial Waste<br>Japan                          | RAS/8/070<br>(Japanese<br>funded)   | Markovic  |

- |    |           |   |           |
|----|-----------|---|-----------|
| 7) | (3 weeks) | Regional Training Course on Application of Isotope Techniques in Process Optimization | RAS/8/071 |
| 8) | (2 weeks) | Regional Workshop on Use of Tracer Technology in Surface Water Effluent Studies       | RAS/8/071 |
| 9) | (3 weeks) | Regional Workshop on NDE for Metallic and non-Metallic Materials                      | RAS/8/071 |



## Presentation to the General Conference Meeting of the RCA

Wednesday, 29 September 1993

It has been said that a person can live a long and healthy life without ever seeing a medical doctor or taking medicine. It has also been said that a person can live a long and healthy life without ever driving a motor car or watching television. But watch a person who has been without food for one week and you will find him neither healthy nor happy.

There is no question that food represents the main preoccupation of mankind. As you will see on the graph, the world population is rapidly growing by roughly 1,000 million additional persons per decade. When we had a strategic planning meeting in the Joint Division a year ago the challenge we discussed was how to feed an additional 3 billion people by the year 2020.

As you will see on the next table, most of the world's population lives in Asia, or 56,1 %, and that the agricultural population in Asia is over 70%. What is most alarming about the statistics in this table is that the estimated number of malnourished persons in Asia in 1988 was 400 million and that 80% of malnourished persons in the world live in Asia.

The next table shows the development of some nutrition statistics over the years 1965 to 1990. While it is evident that things are improving, one is nevertheless struck by the fact that in 1990 about 45% of all children in Asia are underweight. In absolute numbers, there are about 160 million children underweight in Asia.

It is obvious to me that any region in the world which has this alarming number of starving children cannot afford to ignore the food problem and neglect efforts to stimulate food production and equitable food distribution among its subjects. It was therefore a source of surprise and some embarrassment when it was discovered that after 1994 there would be no food and agricultural projects within the RCA programme.

The Agency in its joint programme with FAO had earlier extensive agricultural programmes in the Asian region. Some of the very first coordinated research programmes dealt with both fertilization and breeding of rice. Within RCA there were earlier several agricultural and food programmes. In the last very few years the number of projects, particularly technical cooperation projects, have sharply declined in the Asian region, and, as I said, food and agriculture threatens to disappear from the RCA programme after 1994.

It is tempting to assume that the reason for this is that there has been enough research done in food and agriculture, that there has been enough development in food and agriculture in Asia and that there is no need to continue work along these lines.

On the next graph you will see rice yields per hectare as they were in 1989. The data, drawn from an FAO report, show the enormous difference in yield which is obtained in the various countries of Asia and the Pacific. While in Australia the yield per hectare of rice is almost 8 tons, it is only about 2,500 kilos in the Philippines, India

and Bangladesh, about 2,000 in Pakistan, less than 2,000 in Thailand and less than 1 ton in Kampuchea. In a recent report on some of the Agricultural Research Institutes of the Consultative Group of International Agricultural Research, there was a statement on the goals set for the International Rice Research Institute in the years to come. One of the main goals was to increase rice productivity which had not significantly increased since the release of the first rice variety by IRRI in 1966, the famous IR-8, the very symbol of the green revolution.

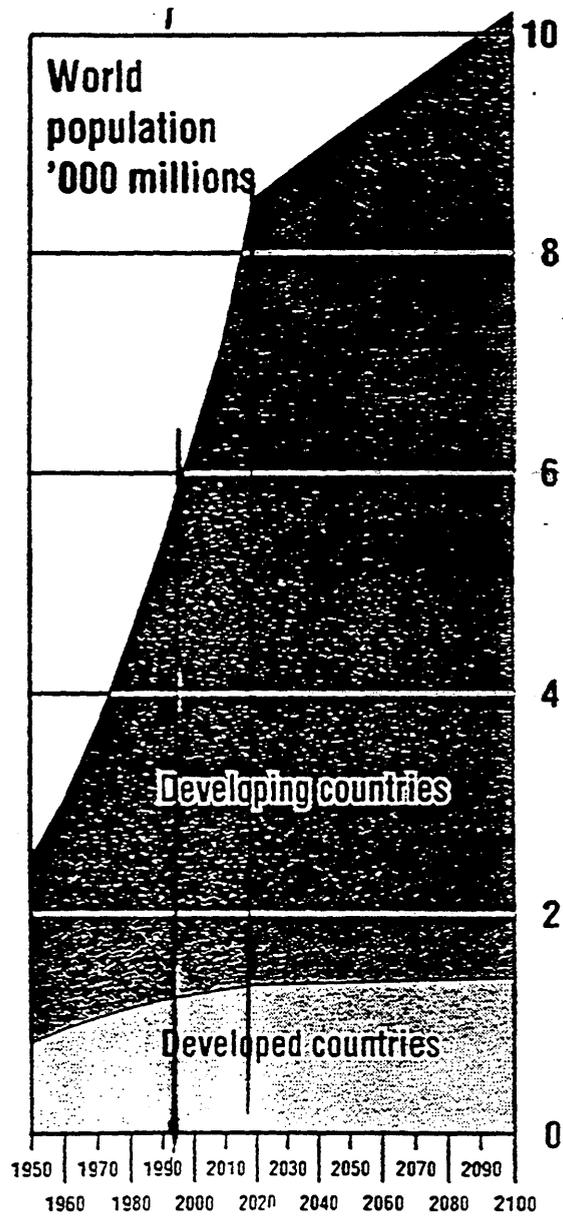
You will see from this graph alone that agricultural research in Asia has a long way to go. It is also interesting to see on the next table the enormous difference in the levels of mineral fertilizers applied to rice in Asia, ranging from 415 kilos in Japan to 0,3 kilos in Laos. Although we are not about to encourage every farmer in Asia to apply high amounts of mineral fertilizers, this indicates the difference in development in food production in the various Asian countries.

I hope these examples illustrate to you the enormous possibility for agricultural research and development in Asia and in this regard the Agency can help by assisting with the application of nuclear techniques in research and in development. We have a whole menu to select from in nuclear techniques as you see on the next chart.

Irradiation can be used to inhibit sprouting in potatoes and onions, it can sterilize insects for use in the sterile insect technique campaigns for control or eradication, it can induce mutations in crop plants leading to improved varieties, it can kill microbes in foodstuffs and thereby prolonging shelflife of perishable food items, it can eliminate dangerous foodborne pathogenes in such products as chicken and it can disinfest grain and thereby facilitate movement in international trade of a number of products including both grain and fruits and vegetables. Likewise, as seen in the next picture, isotopic tracers, both radioactive and stable, can be used in agricultural research for studying photosynthesis, nutrient uptake from soil, nutrition of animals, movement of nutrients throughout the animal body for the formation of meat and production of milk, for tracing pesticides and their residues in food and the environment. The use of isotopic tracers has become an essential feature in productive research in food and agriculture.

The next chart shows you the structure of the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture. As you see, the Division is a part of two UN organizations, the FAO and the IAEA. This ensures that the programmes and activities that the Division undertakes and supports is always within the line of priorities established by Ministries of Agriculture which form the Governing Bodies of FAO as well as the priorities established within the Atomic Energy side which represented by the Governing Bodies of the IAEA. The Joint Division has six subject matter Sections dealing with soils, plant breeding, animal production, agrochemicals, insect control and food preservation. Five of these Sections are supported and serviced by corresponding units in the Seibersdorf Laboratory. Research and project opportunities for RCA will now be presented by Heads of the six Sections of the Joint Division.

# WORLD POPULATION GROWTH

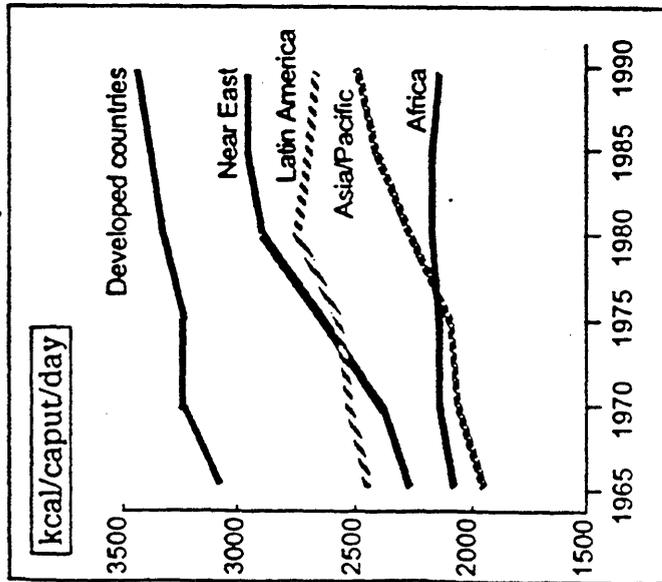


## ASIAN STATISTICS (1988)

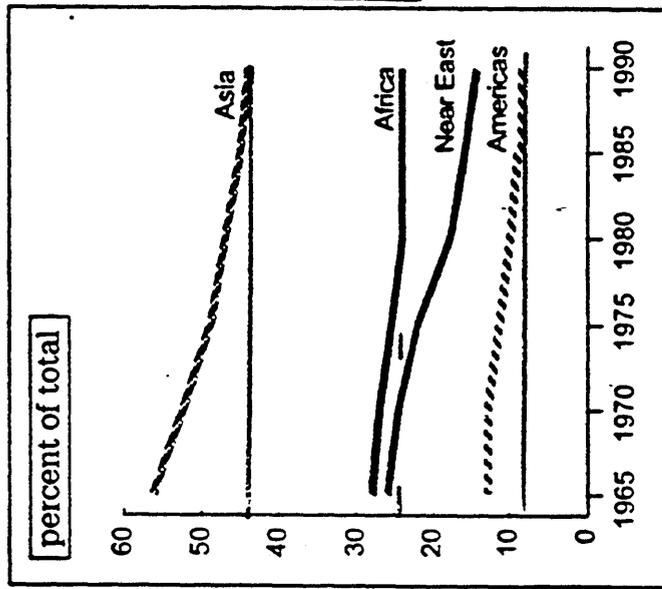
	Asia- Pacific	Rest of World	Asia-Pacific as % of World
Total population (m)	2,871	2,245	56.1
Agricultural population (m)	1,706	642	72.7
Agricultural land/agricultural pop.	0.26	1.60	41.3
Estimated no. of malnourished (m)	400	100	80.0

# RD Special: Nutrition

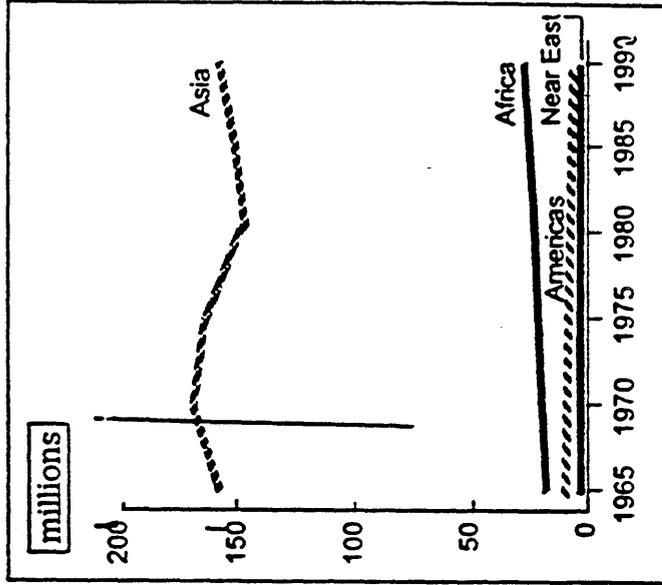
World dietary energy supply continues to increase...



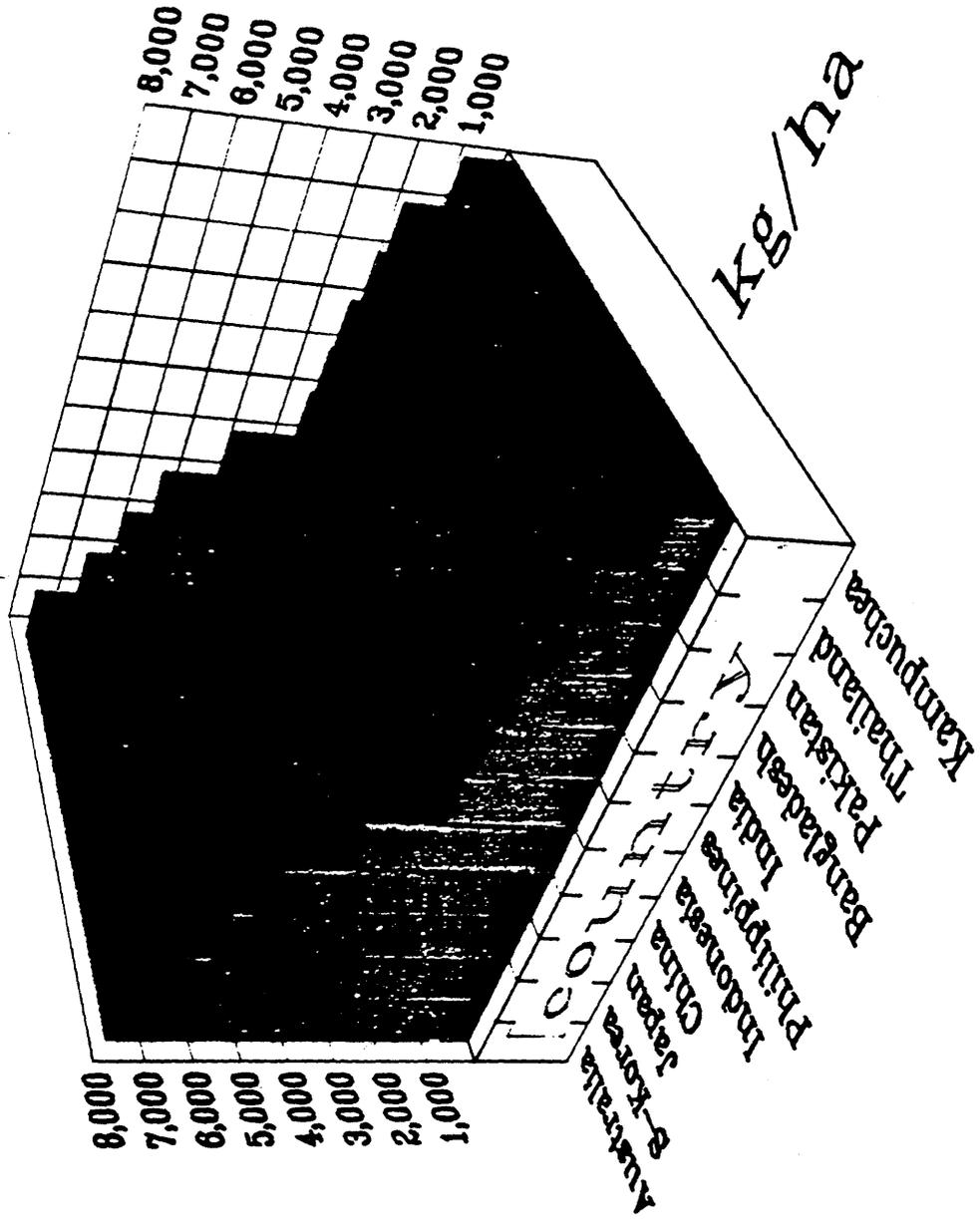
The incidence of underweight in children is falling...



...but numbers of underweight children remain high



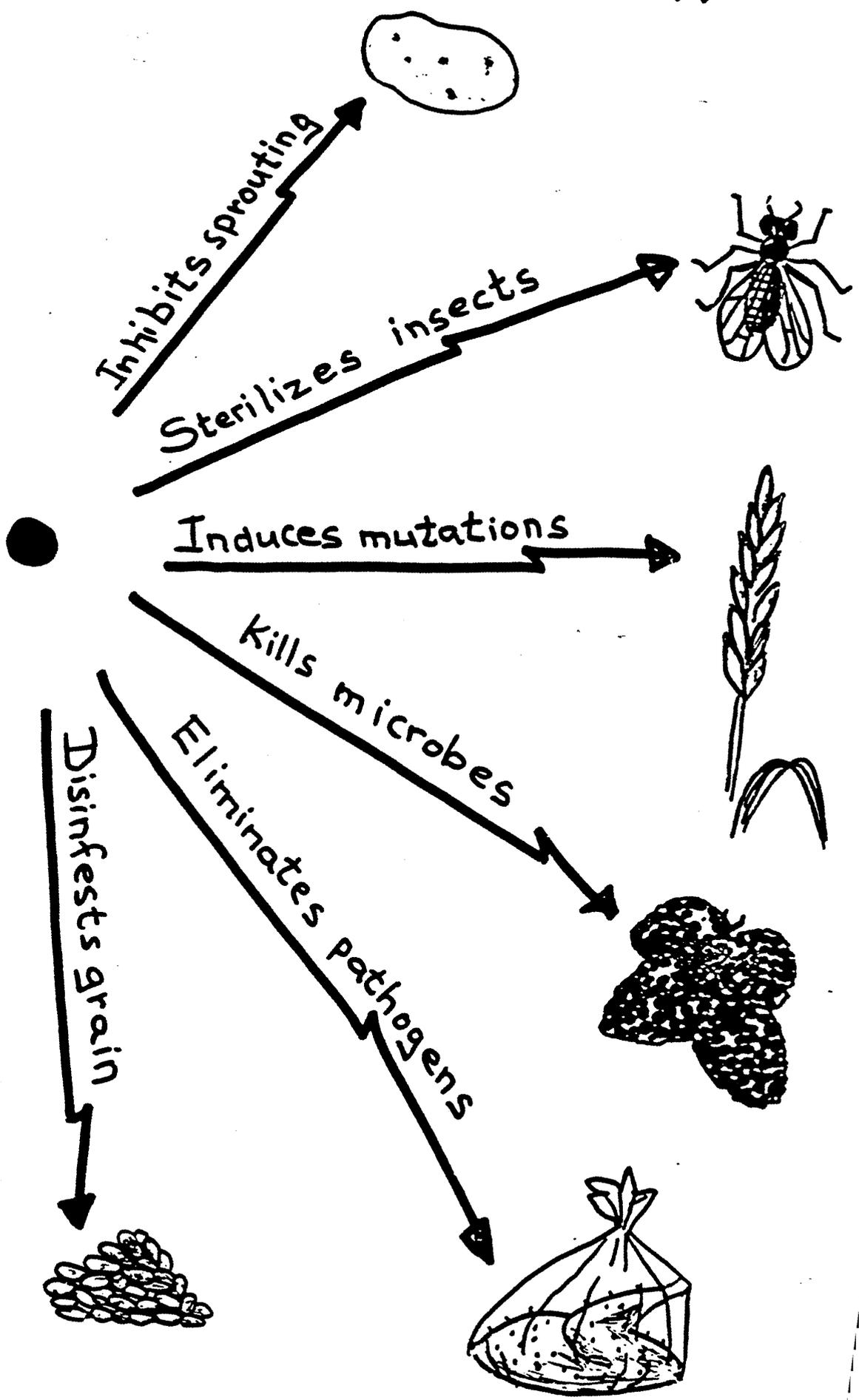
# RICE YIELDS (1989)



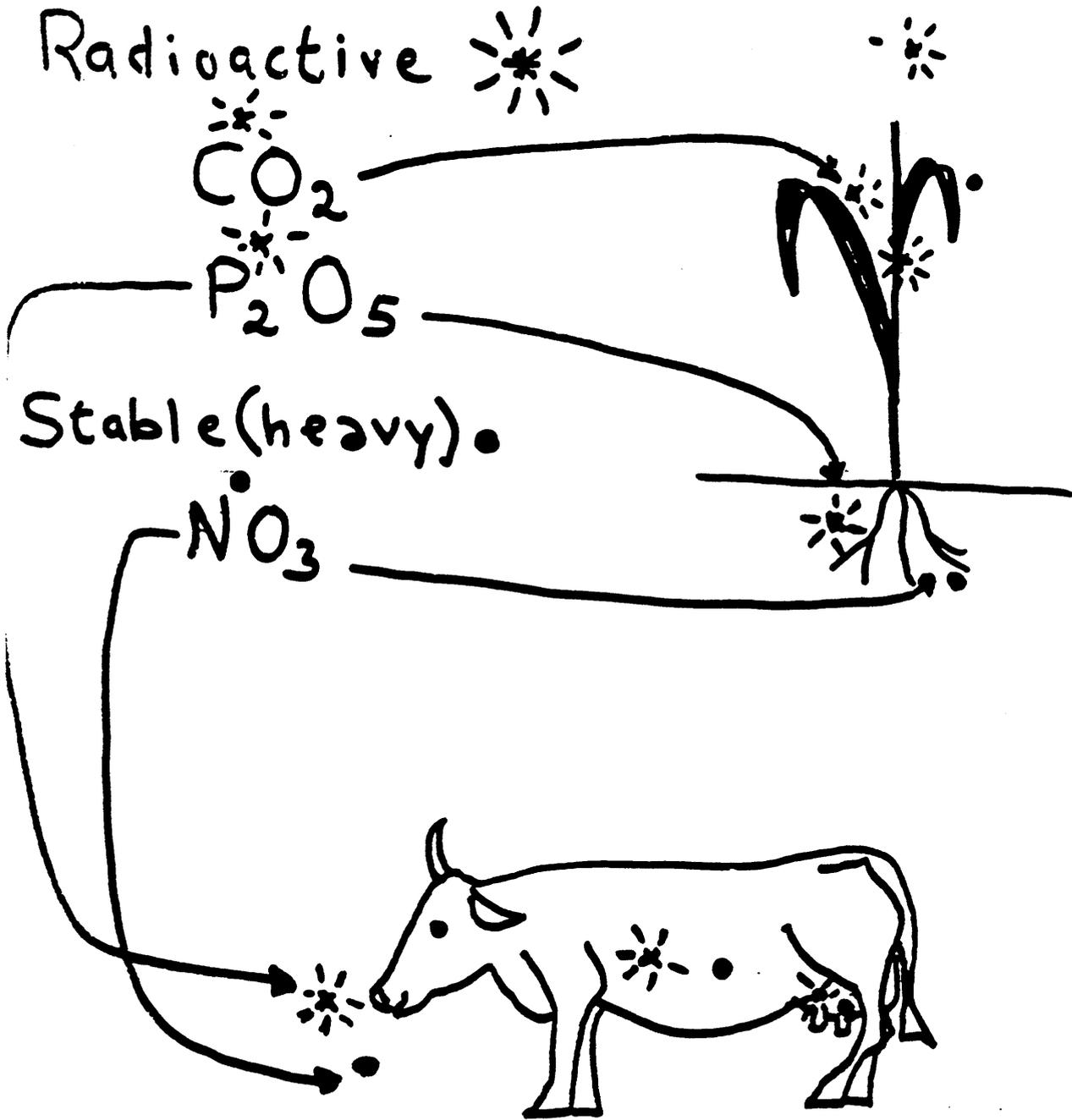
### USE OF FERTILIZERS IN ASIA IN 1988

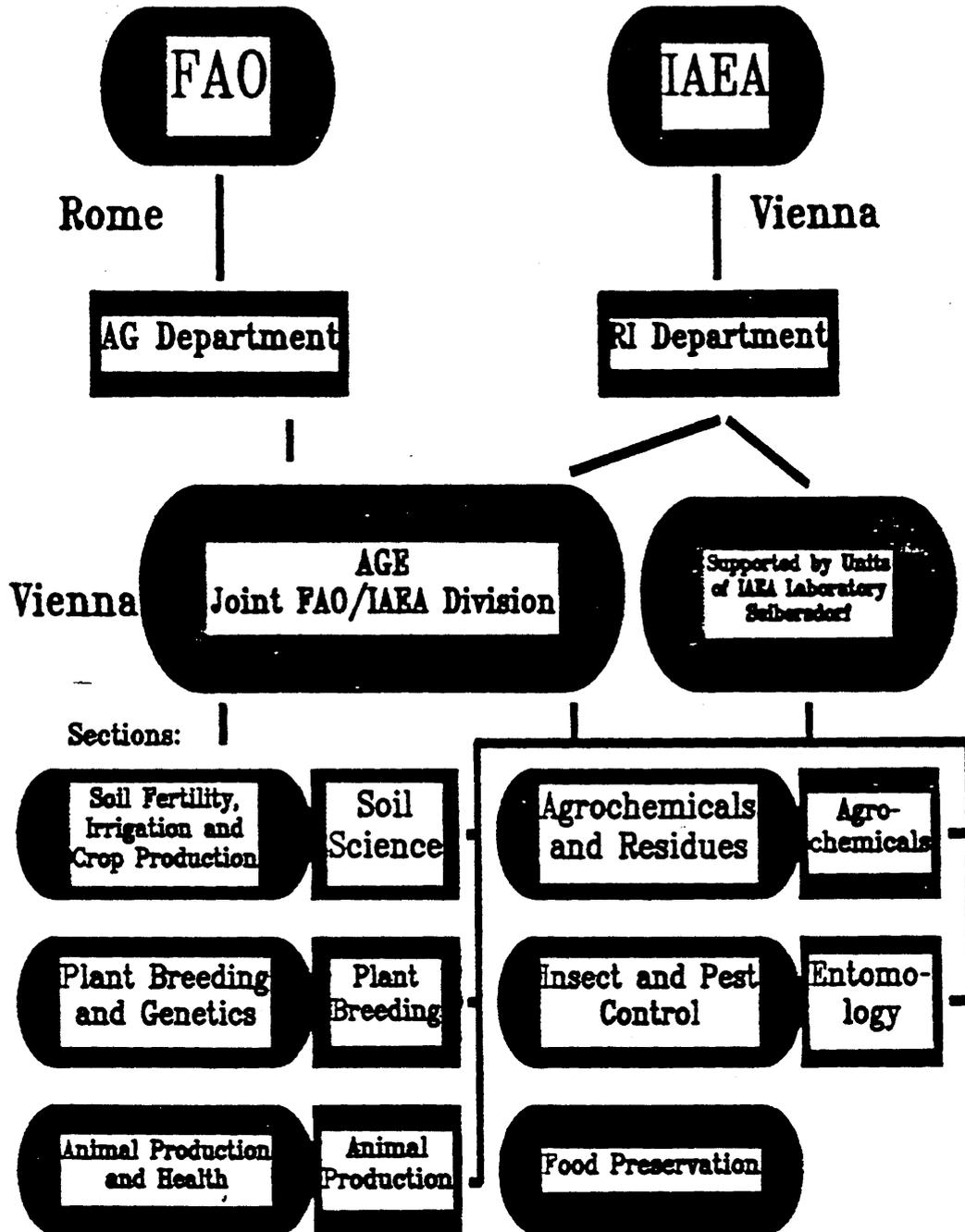
COUNTRY	KG/HA
JAPAN	415
REPUBLIC OF KOREA	400
D.P.R. KOREA	340
CHINA	262
INDONESIA	113
INDIA	65
PHILIPPINES	63
THAILAND	39
LAOS	0.3

# IRRADIATION



# ISOTOPIC TRACERS





FAO/IAEA

**PROPOSAL FOR A**



**RCA**

**REGIONAL CO-OPERATIVE AGREEMENT FOR ASIA AND THE PACIFIC**

**PROJECT ON**

---

**INCREASING CROP YIELDS IN THE TROPICS AND SUB  
TROPICS OF ASIA AND THE PACIFIC THROUGH  
AGROFORESTRY**

---

Soil Fertility Irrigation and Crop Production Section



**JOINT FAO/IAEA DIVISION**  
OF NUCLEAR TECHNIQUES IN FOOD AND AGRICULTURE



September 1993

## **PROPOSAL FOR A RCA REGIONAL PROJECT**

ON

# **INCREASING CROP YIELDS IN THE TROPICS AND SUB TROPICS OF ASIA AND THE PACIFIC THROUGH AGROFORESTRY**

### **SUMMARY**

1. Many Asian countries have major problems of:
  - a. rapidly declining soil fertility and crop production
  - b. soil erosion
  - c. large areas of saline and sodic soils
  - d. acute fuelwood shortages
  - e. desertification (in some cases)
  
2. The successful management of nitrogen-fixing trees in agroforestry systems will materially help to overcome these problems by:
  - a. maintaining soil fertility for associated crops by means of nitrogen fixed being transferred to associated crops by addition of prunings and by underground transfers from roots of N fixing trees.
  - b. by protecting soil against erosion
  - c. growing salt tolerant N fixing trees (and non-fixing trees) in saline and sodic soils where the level of salt is too high for crop production.
  - d. providing fuelwood in areas where it is badly needed.
  - e. helping the rehabilitation of damaged soils. The input of N and organic matter from trees is essential for this.
  
3. While the potential of such trees is widely recognized, achieving their full potential depends on developing an expertise in laboratory and field studies to exploit large demonstrated bacterial/plant genotype differences, and the effects of management such as cutting times and intensity, effects of small addition of nutrients such as phosphate, effects of mycorrhizal fungi and, factors affecting the transfer of fixed N to associated plants.

4. An Asian Regional Network, through the Regional Co-operative Agreement for Asia and the Pacific (RCA) is proposed, to focus on the management of agroforestry systems as an effective approach to sustained, low input agriculture, while providing fuelwood for agricultural communities. The estimated cost for 10 collaborative countries over 5 years is \$ 1,204,000.

## BACKGROUND

A good farmland must produce food, fodder and fuelwood for the farmer with least inputs and if not improving, at least maintaining the fertility of the soil. These outputs could be expected in agroforestry - a system which mixes traditional farming with tree growing. The integration of trees, especially nitrogen fixing trees into agroforestry systems can make a definite contribution to restoring and maintaining soil fertility thus sustaining crop production, combating erosion, in addition to providing fuelwood. Field trials carried out at the IITA (Ibadan, Nigeria) have shown that incorporation of *Leucaena* leaves into the soil can increase maize grain yield by about 60% when *Leucaena* is inoculated with an elite strain of Rhizobium. This is 30% more than the yield obtained by applying ammonium sulphate at the rate of 150 kg N/ha. There is also evidence that the decay of underground parts of nitrogen fixing trees especially after coppicing can make a substantial contribution to increasing the fertility of soil. In alley-cropping systems, rows of trees are grown alternating with rows of crops such as cereals and vegetables. The trees fix nitrogen and are periodically pruned - the foliage is used as manure for the crops thus giving them nutrients and building up organic matter which improves soil physical properties. Some of the foliage can also be used as fodder and the stems give the fuelwood.

The use of trees for rehabilitating and maintaining soils in agricultural systems is particularly attractive both for high rainfall and low rainfall areas. In semi-arid and arid areas, trees are often able to tap soil water not available to more shallow rooted plants. Their perennial nature with a wide spreading deep root system makes them especially good for holding soil against erosion - a major problem affecting soil fertility in upland areas and at the same time aggravating floods (almost an annual misery in Bangladesh) in low lying areas. Again, field experiments at IITA have shown that *Leucaena* and *Gliricidia* grown as alley-crops can decrease soil erosion by over 85% if grown at 4 m spacing and can virtually arrest erosion if grown at a 2 m spacing.

In Pakistan alone about 5.7 million ha of land on the Indus plain suffer from salinity and alkalinity. Agricultural production losses are estimated at US\$ 140 million per year. Similar situations exist in India, Bangladesh, Sri Lanka, Thailand. Growing salt-tolerant trees has often been recommended to rehabilitate saline areas and to provide fuelwood from what otherwise would be wasteland, e.g., an ACIAR (Australia) funded research project in Pakistan is aimed at identifying Australian tree and shrub species that can be grown and established in such saline and sodic (alkaline) soils. Similarly, acid soils are a major problem for crop production in many Asian countries (e.g., Malaysia, Thailand, Indonesia, Viet Nam and Sri Lanka). An approach similar to that used for saline soils is planned to be used to improve crop production in acid soils.

In almost every tropical and sub-tropical country forests are being cleared at some 11 million hectares annually, as a result of large population growth and a need for more food production. This has led to greatly shortened rotations, a rapid loss in productivity and the need to bring even more forest land under cultivation with a subsequent loss of fuelwood supplies. World bank data indicates that by the year 2000, some 3 billion people will be living in areas where fuelwood is acutely scarce or has to be obtained from elsewhere. Bangladesh, China, India, Indonesia, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam are categorized as deficit countries even now, while Nepal is reported to be in acute scarcity.

Although typical desert land is comparatively less in Asia than in places such as Africa, many areas suffer from arid climatic conditions. These areas will eventually turn into deserts unless they are protected. In this regard some nitrogen fixing trees (e.g., *Acacia* and *Prosopis*) because of their inherent capacity to thrive in soils of arid and semi-arid regions will form ideal agents of anti-desertification.

## **IDENTIFICATION OF THE PROJECT**

A group of world specialists on nitrogen fixing trees, tree nutrition, soil fertility and agroforestry addressed some of the problems in a meeting held recently at IAEA. It was revealed that despite world recognition of the potential of nitrogen fixing trees in agroforestry systems, there is a great lack of knowledge on the management of nitrogen fixing trees in such systems. Very few studies have been made identifying the potentially high N fixing tree species. They recommended that priority should be placed to focus attention on nitrogen fixing tree systems for use in agroforestry and soil conservation and to examine the effects of management practices on nitrogen fixation, benefits to associated crops and the change of soil fertility properties due to the trees. They also recommended that isotopes mainly  $^{15}\text{N}$ ,  $^{32}\text{P}$ ,  $^{13}\text{C}$  and other radiation techniques could contribute significantly to the success of this research.

## **ROLE OF IAEA - A MAJOR ONE**

A number of other agencies are involved in related projects, e.g., the ACIAR (Australian Centre For International Agricultural Research) has funded projects on trees for saline soils in some Asian countries (e.g., Pakistan), and a project on nitrogen fixation by *Casuarina* in the People's Republic of China. The BOSTID-USAID (Board on Science and Technology for International Development - United States Agency for International Development) has one (or possibly two) programmes on nitrogen fixation by trees in Asia.

The British Commonwealth Science Council is attempting to commence programmes on rehabilitation of soils by nitrogen fixing trees in 4 Asian/Pacific countries (India, Malaysia, Sri Lanka, Western Samoa). Agroforestry (using nitrogen fixing trees) is the major programme of ICRAF (International Council for Research in Agroforestry, Nairobi, Kenya) and also a major programme of ICRISAT (The International Centre for Research in the Semi-Arid Tropics, Hyderabad, India). We have had expressions of interest in a trees programme from the People's Republic of China, Malaysia, India, the Philippines, Pakistan, Sri Lanka, Thailand and Vietnam. We are aware of acute interest also in the Philippines and

Indonesia.

There is a great interest in agroforestry activities in Asia and the Pacific Region. However, at present, the activities carried out by other organizations are rather limited. The IAEA could therefore make a major impact by: (i) adding the considerable power of  $^{15}\text{N}$  and other isotope techniques to existing programmes, (ii) acting as a catalytic factor in bringing together existing workers in this important field and, (iii) in stimulating this research in other Asian countries. Its role in a network would be not only to transfer important technologies to Member States but also to bring together and act as a forum (via a network) for the limited resources and data available in the developing world in this activity.

Recent related activities initiated by the Joint FAO/IAEA Division includes two Co-ordinated Reserach Programmes, one on "The use of nuclear techniques in the management of nitrogen fixing trees for enhancing soil fertility and soil conservation" and the other on " The use of isotope studies on increasing and stabilizing plant productivity in low phosphate and semi-arid and sub-humid soils of the tropics and sub-tropics. In addition the Seibersdorf Laboratory plays an important role in back-up research. Studies so far in Seibersdorf have demonstrated large genotypic differences within tree species in nitrogen fixed, that cutting intensity can affect transfer of N to associated crops and that small P additions can have large effects on nitrogen fixation.

**DURATION:** 5 years

**NUMBER OF PARTICIPATING COUNTRIES:** 8 - 10 Countries

**TOTAL BUDGET:** \$ 1,204,000

**IAEA INPUTS REQUIRED**

Year	Experts mm	Equipment \$	Fellowships mm	Group meetings \$	Total \$
1995	5	200,000	12	30,000	316,000
1996	5	150,000	12	30,000	266,000
1997	3	150,000	12	30,000	246,000
1998	5	150,000	12	30,000	266,000
1999	3	50,000	-	30,000	110,000
<b>Total</b>	<b>21 (\$210,000)</b>	<b>700,000</b>	<b>48 (\$144,000)</b>	<b>150,000</b>	<b>1,204,000</b>

**WORK PLAN**

YEAR	1995	1996	1997	1998	1999
PHASE	<b>PHASE I</b>			<b>PHASE II</b>	
ACTIVITY	<b>RESEARCH ACTIVITIES</b>			<b>1. RESEARCH ACTIVITIES TO CONTINUE</b> <b>2. INITIATION OF EXTENSION SERVICES AND FARMERS FIELD TRIALS</b>	

## **OUTPUTS EXPECTED**

1. The ability to establish agroforestry (alley-cropping) systems suitable to the country for increased crop, fuelwood and fodder production, and maximize their benefit to agriculture.
2. Government-sponsored projects to use N fixing tree species to prevent or minimize erosion and arrest desertification.
3. Greater interaction and self-reliance at regional level on research for increasing crop, fuelwood and fodder production, prevention of erosion and desertification.

## **TARGET BENEFICIARIES**

Initially, research institutes and universities (at the research stage - Phase I) and subsequently, the rural farming communities through agricultural extension networks (Phase II - a model project stage).

Responsible Officers:

**Christian HERA**

*Head, Soil Fertility Irrigation and Crop Production Section  
Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture*

and

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Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture*



**Meeting on Regional Co-operative Agreement For Research Development and Training related to Nuclear Science and Technology for Asia and the Pacific Region (RCA), September 29, 1993, Vienna International Center, Vienna, Austria**

**Induced mutations and related biotechnologies for improvement of vegetatively propagated crops**

**B.S. Ahloowalia**

**Plant Breeding and Genetics Section, Joint FAO/IAEA Division,  
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After cereals, crops such as banana, plantain, cassava, potato, sweet potato and sugarcane are the major source of calorie-intake in many Asian and Pacific countries. Indeed, among the low income groups, these crops are the only source of food security against starvation.

The vegetatively propagated crops are multiplied from tubers, bulbs and stems cuttings. Many of these plants do not produce seed. And when they do, the progeny does not resemble the parent. Hence, the conventional methods of breeding and selection can be supplemented with mutation induction to upgrade the well adapted local cultivars by changing specific characters such as tolerance to diseases and stress, e.g. soil salinity, drought.

It is now possible to multiply plants in tissue culture through a process called micropropagation. In this technique, small pieces taken from a plant are cultured under completely germ-free conditions on a nutrient medium. The medium is made from simple chemicals such as salts, vitamins, sugar to which a gelling agent such as agar is added to provide a solid base. The cultured pieces, tissues and cells, are kept under controlled conditions of light, temperature, humidity and day-length which simulate the best summer-like conditions. As a result of the cultural conditions, the plants multiply rapidly, in a small space, short duration and disease-free situation, and produce clones - exact copies of the original plant.

To give you an idea, in potato, a 10 mm long stem cutting can produce a complete plant with roots and a shoot with three leaves within one week of culture. This plant when cultured again can give rise to 3 plants in one week. If a plant doubles once a week, then repeating the process 20 times can produce 1.06 million plants in 21 weeks.

It is also possible to produce complete plants from single plant cells through a different but related process known as regeneration. In this process, cells are cultured on several complex media and in a step-wise manner. In many crops, plants can be regenerated from cells by producing somatic embryos. These embryos are similar to those formed in seeds, except they originate from vegetative rather than reproductive cells. During this process, the cells often grow first into a lump of cells - a callus, which on further culture produces complete plants. Often, some of the plants produced from callus differ from the donor plants from which cells were taken - a phenomenon called somaclonal variation.

These simple technologies of cell and tissue culture have wide implications in the production of new and improved cultivars of vegetatively propagated plants, and their rapid multiplication and distribution as disease-free propagules to the growers and farmers.

A plant cell carries all the genetic blue-print in it. The plant cells of which several thousand can be grown in a single Petri dish, can be irradiated to induce mutations to change their genetic make-up. In a manner, each cell taken from a vegetatively propagated plant is like a seed which after irradiation is capable of giving rise to a new type.

It is now possible to rapidly multiply the irradiated cells, tissues, and plants through tissue culture, and then select the desired plants either by growing them in the field or sometimes by changing the growing conditions while still in culture. For example, by adding salt or subjecting cells to desiccation, it is possible to select cells and plants resistant to salinity or drought.

In the Coordinated Research Programs and Technical Cooperation Projects for the improvement of vegetatively propagated plants, we have adopted the strategy of combining tissue culture with irradiation as a means to rapidly modify, select and multiply new and improved varieties of such crops. We are proposing the use of mutation induction in combination with plant tissue culture to breed high yielding, improved quality, disease resistant and stress tolerant cultivars of basic food crops in Asia and Pacific region. Starch producing plants such as potato, banana and plantain are the prime model crops amenable to improvement through this technology. We hope that the improved cultivars of these crops along with those of cassava, sweet potato, and sugarcane shall contribute to the increased food production in this region in the same way as has been achieved with wheat and rice.

Scientists around the world are attempting to identify, isolate and clone important genes which determine yield, quality and disease resistance. The long term goal and dream of the recombinant DNA technology is to be able to delete and insert specific genes in crop plants. On the other hand, the technologies of mutation breeding and tissue culture are already well advanced, and can pay handsome dividends in a short time and at a much low cost. In addition, induced mutations in the vegetatively propagated crops shall provide the basis of gene identification, isolation and insertion.

## **TITLE**

Establishment of an inter-regional rinderpest sero-monitoring network in support of the Global Rinderpest Eradication Programme.

## **OBJECTIVES**

To establish and quality assure an ELISA-based capability in national veterinary laboratories to serologically monitor rinderpest as part of the programme of global eradication of this disease and its causative virus.

## **BACKGROUND**

Rinderpest (cattle plague) is the world's most devastating cattle disease. Although never occurring in the Americas and Australasia and eliminated from Europe at the beginning of the century, it still continues to cause enormous economic losses to livestock producers in Africa, Arabia and Asia. These losses are attributable not just to the animals that die, but to the cost of annual vaccination programmes, preventive measures and lost export markets in countries free of rinderpest. In the past five years in Africa, national vaccination programmes alone have cost over \$ 200 million.

In 1986, Africa embarked on a regional eradication programme, the Pan African Rinderpest Campaign (PARC). Central to this programme has been the mass vaccination of cattle in the region to eliminate the disease, followed by a period of intense surveillance to ensure that the causative virus has been eliminated and that no pockets of virus activity remain. At the outset of the programme 14 African countries were infected, today only two (Sudan and Ethiopia) still have rinderpest. West Africa, now for the first time ever clear of rinderpest, is embarking on the process of obtaining international status of freedom from rinderpest.

Similar programmes are now being undertaken in Arabia (WAREC, West Asian Rinderpest Eradication programme) and Asia (SAREC, South Asia Rinderpest Eradication programme) under the overall umbrella of the global rinderpest eradication programme (GREC). Without doubt this is the largest ever livestock disease control programme, estimated to cost around \$ 1 billion and the socio-economic benefits although difficult to quantify, will be enormous.

Crucial to both the vaccination and surveillance phases of this global programme is the serological examination of cattle for antibodies to rinderpest - during the vaccination phase as evidence of successful vaccination, and during the surveillance phase for the detection of evidence of remaining pockets of virus activity.

Under PARC the FAO/IAEA ELISA based system for rinderpest sero-monitoring has been successfully introduced to over 21 national veterinary laboratories and some 2 million cattle sera have been screened so far. By adopting a network approach, fully validated and standardised procedures have been used throughout the region and an external quality assurance programme has ensured that the results being reported are correct.

The FAO/IAEA system has been accepted by the world's veterinary regulatory body, the OIE (Office International Des Epizooties), as the official serological procedure to be used as part of the process of OIE declarations of freedom from rinderpest. This five year process, starting with a cessation of rinderpest vaccination is the corner-stone of the eradication programme and sero-surveillance the most vital aspect.

#### **NATIONAL INPUTS**

Countries participating, whether in PARC, SAREC or WAREC will have a requirement to provide suitable laboratories facilities to carry out serological and disease surveillance. This will require not only the provision of suitable laboratory buildings and the infrastructure for them to operate effectively, but the necessary trained man-power and transport to ensure the collection and testing of samples. In the case of PARC, in nearly all participating countries EEC-funded national projects have ensured sufficient resources to provide for the field collection of sera and much of the required laboratory equipment.

#### **AGENCY INPUTS**

The role of the Agency will primarily be one of technology transfer and coordination, linked with an external quality assurance programme to ensure the validity of the results being obtained.

For many participating countries, and for all in Africa, previous and current IAEA technical cooperation projects and previous FAO/IAEA research coordination programmes will have already introduced an ELISA capability, through the provision of suitable equipment, training and technical backstopping. However, central to the inputs for this inter-regional programme is the provision of a validated and standardised rinderpest ELISA kit to national laboratories, technical backstopping to ensure its correct usage and the operation of an external quality assurance programme to assure both national and international bodies that the eradication programme is achieving its objectives.

### **LONG-TERM IMPACT**

The successful global eradication of rinderpest will have enormous benefits to livestock producers in the world's poorest countries - since these are the very countries which still have rinderpest today! These benefits are not merely ones of reduced direct losses through the disease and control measures, but include indirect ones of increased export markets and improved veterinary services created during the programme of eradication.

Vital to eradication is sero-surveillance, without which it is extremely unlikely that success could be achieved. Thus in real terms the impact of this inter-regional programme will be to ensure that the largest and most costly animal disease control programme can be seen to have succeeded.

**COSTS**

Year	Experts		Equipment	Training	Total
	Months	CC \$	CC \$	CC \$	CC \$
1	12	124,000	120,000	60,000	304,000
2	12	129,000	60,000	-	189,000
3	12	134,000	40,000	60,000	334,000
4	12	139,000	40,000	-	179,000
5	12	144,000	40,000	-	184,000

**Grand Total: US\$ 1,190,000**

**TABLE I: THE IMPACT OF RINDERPEST IN ASIA**

Country	IAEA Member State	Rinderpest	Cattle numbers (millions)	Vaccinat. carried out	Cost of Vaccination (US\$ x 10 <sup>3</sup> )	<sup>*)</sup> Overall losses from rinderpest
India	yes	yes	198	yes	792	2.2 bil.
Pakistan	yes	yes	17.7	yes	70.8	560 mil.
Afghanistan	yes	yes	1.6	yes	6.4	120 mil.
Bangladesh	yes	yes	23	yes	92	100 mil.
Nepal	no	?	63	yes	25.2	50 mil.
Butan	no	yes	0.4	yes	1.6	10 mil.
China	yes	?	81.4	?	?	?
Myanmar	yes	no	9.3	no	-	10 mil.
Thailand	yes	no (border)	6.0	yes	?	10 mil.
Indonesia	yes	no	10.3	no	-	?
Philippines	yes	no	1.6	no	-	?
Mongolia	yes	yes	11.2	yes	11.2	150 mil.
Sri Lanka	yes	yes	1.8	yes	8.0	10 mil.
South Korea	yes	no	2.1	no	-	?
Vietnam	yes	?	3.3	?	?	?
<b>Totals</b>	<b>yes</b>		<b>366</b>		<b>998</b>	<b>3.2 US\$ (Billion)</b>

<sup>\*)</sup> These include direct losses due to animal death and loss of productivity, control programmes (vaccination, etc); movement restrictions and indirect losses due to loss of export markets.



PRESENTATION AT RCA MEETING, 29 SEPTEMBER 1993

**Fruit Flies in Asia: The Environmental Advantages  
of Fruit Fly Control with the Sterile Insect Technique**

Fruit flies cause enormous losses in Asia. Nearly all fruits and many vegetables require insecticide sprays in order to harvest eatable produce. The environmental impact of these insecticide sprays is becoming more pronounced and more recognized by Government officials and by environmental activists.

The Philippine Government has decided to develop mango production on Guimaras Island as a high priority agricultural development programme. Guimaras Island regularly produces outstanding quality mangos, however, fruit flies take a heavy toll of the fruit. Fruit fly control is mandatory if saleable mangos are to be produced. Fruit fly control is either by repeated insecticide sprays or by putting a paper bag around each mango. Both of these technologies are expensive, totalling from 25 - 40% of total mango production.

There are about 500,000 mango trees on the island; a total of 1 - 2 tons of insecticide are used annually for fruit fly control on these mango trees. There are of course many other fruits produced on the island, all of which require protection from fruit flies.

The SIT has been proposed as a solution the fruit fly problem on Guimaras.

The Australian Government has utilized the Sterile Insect Technique (SIT) for control of the Mediterranean fruit fly and the Queensland fruit fly. Also, the Australian Government is developing the Sterile Insect Technique for use against the Old World screwworm; this programme will be located in Malaysia.

The Japanese (Okinawa) Government has just completed a \$ 100 million project to eradicate the melon fruit fly and the oriental fruit fly from their country. The Sterile Insect Technique was extensively used in this programme. The fruit fly factory in Okinawa can produce several hundred million sterile fruit flies a week.

The Sterile Insect Technique requires no insecticide and is environmentally friendly. As has been demonstrated in Australia and Japan, it is a very effective method of fruit fly control or eradication.

Thus, Asia has a factory for fruit fly production in Okinawa, considerable experience in fruit fly SIT programmes in Australia and Japan, and a serious fruit fly problem. In addition, the IAEA has TC projects for fruit fly control in Pakistan, Thailand and the Philippines.

All of the pieces for an effective regional programme are present in Asia. What is needed is a regional approach, a regional organization and some enthusiastic leadership. A Co-ordinated Research Programme, consisting of about 15 contracts and/or agreements, with annual meetings, will provide the spark to initiate fruit fly SIT activity in Asia. This programme will cost about \$ 200,000 per year and should continue for 5 years.

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### Suggestion for RCA Project

#### **Agricultural countermeasures following a nuclear or radiation accident**

There are currently 72 operational nuclear power plants in Asia with a further 18 under construction (Table 1). Examination of maps of prevailing winds shows that there are occasions when countries where there are no nuclear power plants could be subject to radioactive fallout from a nuclear accident elsewhere. Also, a release of radioactivity from some other source could have limited effects on agriculture as was shown in the Goiania incident in Brazil in 1985. Therefore, contingency plans are necessary, so that, in the event of an accidental release of radiation, steps can be taken to reduce the contamination of agricultural produce.

Immediately following a nuclear accident, short-term measures may be imposed to reduce exposure to  $^{131}\text{I}$  which has a half-life of only 8 days. Basically consumption of potentially contaminated food is restricted until radioactive decay has reduced the radiation to an insignificant level, an action which is applicable almost everywhere. However, contamination of the agricultural environment with longer lived radionuclides, which will principally be  $^{137}\text{Cs}$  and  $^{90}\text{Sr}$ , requires more extensive measures to restore agricultural land to some sort of production.

There is a variety of techniques available, described as "agricultural countermeasures", with which to avoid or reduce radioactive contamination of agricultural products. However, almost all of them have been developed in temperate climates, many in response to the Chernobyl accident in 1986. There is little evidence to show which may be effective in tropical and sub-tropical conditions.

One option is to change the use of land by growing crops or varieties that accumulate lower levels of radionuclides than the crop normally grown in the area. This requires basic information about the uptake of radionuclides by different crops which is lacking for most tropical and sub-tropical crops. This particular issue is being partly addressed by a CRP run jointly by RIFA and NENS but only 7 participants are in Asia.

Other major options are to use various soil treatments to reduce the uptake by plants of Cs and Sr. The use of mineral fertilizers (K & P) at rates normally used in intensive agriculture has proved to be effective in reducing Cs and Sr uptake respectively in soils in the CIS of low fertility. The addition of lime to soils of low pH and of organic materials has also been useful. The circumstances under which these measures would be effective in tropical soils are not known.

The proposal, therefore, is to organize a coordinated programme of pot and small-scale field trials to establish the effectiveness of soil treatments in reducing Cs and Sr uptake by the major crops in typical soils of the region. Results must be obtained for at least 2 years for each combination of soil and crop.

It is anticipated that the costs would be similar to those of a Co-ordinated Research Programme, that is about US \$5,000 per year for each participant plus the costs of a meeting to plan the work and another to prepare a final report.

**Table 1 - Nuclear Power Plants in Asia**

	Operational	Being built
China	2	1
India	9	5
Japan	44	9
Kazakhstan	1	
Korea, Republic of	9	3
Pakistan	1	
Taiwan	6	

**Title: PUBLIC ACCEPTANCE OF AND TRADE DEVELOPMENTS  
IN IRRADIATED FOOD IN ASIA AND THE PACIFIC**

**Background:** The Asian Regional Co-operative Project on Food Irradiation - RPFI (Phases I, II, III), in operation under the RCA since 1980, has demonstrated the effectiveness of irradiation as a technology for reducing food losses and food-borne diseases and facilitating food trade. The technology has been successfully transferred to local industries in several Asian countries including Bangladesh, China, India, Indonesia, Republic of Korea, Pakistan, the Philippines, Thailand and Vietnam. All of these countries have promulgated regulations to control the application of this technology as well as built demonstration/commercial irradiators to introduce irradiated food into the market. Market testings and commercial scale of irradiated foods in several countries in the region have been successfully carried out.

The achievements of RPFII complement the IAEA General Conference Resolution 588 on "Practical Utilization of Food Irradiation in Developing Countries", unanimously adopted in September 1992 and the approval of the IAEA Board of Governors at its June 1993 Session of the detailed project proposal requested by the Resolution 588.

Thus, the objectives of the three phases of RPFII have been met. There is a need to further co-ordinate activities of food irradiation in the region to ensure wide acceptance by the public and free circulation of irradiated food in RCA countries. The next phase of RPFII (5 years), therefore, should be supported by TC as a "model project" according to the following plan.

**1. Public Information Seminars**

A number of national seminars will be organized at the time countries in RCA are introducing irradiated food into the market on a commercial scale. The seminars will serve the purpose of not only informing the local public of the safety and benefits of irradiated food but to neutralize and counteract any negative views from activists/opposition groups of the technology. It could facilitate removal of perceived consumer resistance and build up confidence on food irradiation as a benefit to health and economy. A total of eight such seminars of 3 days duration each are envisaged per country.

**2. Expert Services**

Expert assistance on marketing of irradiated food should be provided just prior to and during the sale of irradiated food (1m/m per country)

3. *Free Exchange of Irradiated Foods*

Subject to local regulations, irradiated food produced in one RCA country should be allowed to enter and be put on sale in another RCA country without any restriction. Such a free exchange would provide a strong incentive to international trade in irradiated food in the region and possibly worldwide.

4. *Regional Seminar*

The experience on public acceptance, market testings and commercial sale of irradiated food, import/export of such food, etc. should be evaluated at a regional seminar to be attended by key policy makers from the region, i.e. representing governments, food industry and trade, consumer organizations, the massmedia. Such a seminar should be organized at the end of the tenure of this project.

5. *Project Co-ordinator*

To ensure timely implementation of activities mentioned above and close liaison with governments, food industry and trade, consumer organizations, etc., a regional expert (P-4) should be appointed to oversee the operation of the project.

## COUNTRY STATEMENT AUSTRALIA

### TWENTY SECOND GENERAL CONFERENCE MEETING OF REPRESENTATIVES OF RCA MEMBER STATES

Mr Chairman, Delegates, Ladies and Gentlemen

The continuing success of the RCA is evidenced by the significant benefits achieved from the peaceful applications of nuclear science and technology in regional Member States. The new UNDP/RCA Regional Project is now firmly established following UNDP approval. Following the series of project formulation meetings the necessary impetus for the commencement of the implementation of the new programs has been provided. Australia has maintained its involvement in, and support for, RCA/UNDP activities during the past year and has provided funds for activities that parallel those of the new RCA/UNDP project. Australia welcomes the growth in membership of the RCA with the addition of Mongolia and would welcome other regional states who wish to take an active part in the RCA program. The increase in the provision of resources by RCA Member States is further evidence of both the success and the maturity of the RCA.

#### **New Project 1993-1996**

Activities under the new Australian RCA project that deals with the application of isotope and radiation technology to regional development with special reference to industry, including industrial radiation protection, and nuclear medicine, commenced at the beginning of this year. These activities have been designed specifically to meet IAEA and UNDP requirements and have close linkages to the activities and outputs of several parts of the UNDP project. The project is funded by an Australian extra-budgetary contribution to the RCA of \$1,500,000 for the 1993-1995 triennium.

A Regional Training Course on the industrial applications of radioisotopes was held in Sydney on 3-14 May 1993. During this course particular emphasis was placed on technologies designed to improve production efficiency, enhance the recovery of natural resources and to monitor and reduce the environmental impact of development. To supplement this course a series of national seminars have been initiated to augment the transfer of technology to end users. The seminars will cover nuclear technology applications in the following areas: surface coatings, coastal engineering, waste management, chemical and refining industries, metals and manufacturing industries, off-shore resources development and environmental impact assessment. RCA countries have been requested to choose two of these topics for their individual national seminars. This will permit the seminars to be designed to give special attention to the development priorities of each Member State.

On 6-9 July 1993 Australia hosted the first meeting of National Co-ordinators for nucleonic control systems and tracer technology at ANSTO, Sydney. This meeting provided the necessary interaction among the thirteen National Co-ordinators resulting in a detailed and well-structured program of activities for the next three years.

A Regional Training Course on the applications of nuclear techniques to materials science is scheduled for April 1994. The course is designed to enhance skills in material characterisation, an area that is fundamental to the development of modern industry. The

fields of neutron and x-ray diffraction, radiography as well as advanced ceramics and surface engineering will be given particular attention in the syllabus.

Two important aspects of human resource development have been given special attention in the new project, namely distance learning and regional certification. It is considered that support for national technical education programs is essential if there is to be cost effective widespread transfer of a technology through industrialising countries. In support of the industrial radiation protection component, a package of distance learning material that can be offered through correspondence with participants attending practical classes at a regional centre has been formulated. In the nuclear medicine component, emphasis is placed on the qualification and certification of medical physicists and technologists responsible for computerised gamma camera systems. The aim is the development and implementation of a program of distance education for practising medial technologists without specialised education in nuclear medicine. It is anticipated that the training qualification will fulfil part of the requirements for accreditation by an appropriate body such as the Asia and Oceania Society for Nuclear Medicine.

### **New Research Reactor Proposal for Australia**

In response to a proposal for the replacement of the HIFAR research reactor with a modern facility, the Australian government established the Research Reactor Review in September 1992 to consider several matters. These included the need for a new reactor in relation to the benefits and costs for scientific, commercial, industrial and national interest reasons; a review of the operation of HIFAR including its likely remaining useful life and its eventual closure and decommissioning; and if required, siting matters for a new reactor. An assessment of the scientific research results was also made. The Review, after considering submissions from interested parties and a series of public hearings, reported to the Minister of Science and Small Business in August 1993.

The major findings of the Review were:

- maintain operation of the present reactor HIFAR
- commission a Probabilistic Safety Assessment to ascertain the remaining life and refurbishment possibilities of HIFAR.
- provide additional funds for scientists to gain access to international advanced neutron scattering facilities
- make a positive decision on a new reactor in about five years time when the relative arguments relating to neutron sources might become clearer and there is evidence of strong and diverse applications of neutron scattering capability in Australian science

It is expected that the Government will consider these recommendations in October 1993.

### **Conclusions**

Australia believes that the technical co-operation and regional expertise and infrastructure developed as a result of the RCA provides significant benefits towards regional prosperity and understanding. Australia looks forward to continued participation in RCA/UNDP activities that we have enjoyed in the past with other Member States.

## Statement of Chairman, Bangladesh Atomic Energy Commission in the Meeting of RCA in the 37th Session of the General Conference of the IAEA

### **Mr. President**

As mentioned in the country statement in the present session of the General Conference of the IAEA, Bangladesh considers RCA to be a very effective forum in addressing problems common to many countries in the region. Over the years since inception of the RCA, Bangladesh has found its projects and programmes to be objective with direct relevance to problems faced by different sectors of its economy. Recognising such an overwhelming role of RCA, Bangladesh has associated with almost the entire range of RCA programmes and projects. We are happy to state that Bangladesh has been immensely benefited from such an association. Our country statement on the need for continuation and enhancement of RCA activities is a manifestation of the importance we attach to RCA.

### **Mr. President**

I would like to have the privilege of appraising the meeting of the status of the RCA projects in which we have been involved. Bangladesh participated in training courses, meetings and workshops under RCA during the last year. Such participation did not only supplement our efforts on development of human resources, but also provided us with opportunities for exchange of information and experience. Effectiveness of such activities was thus enhanced and helped stimulate our own programmes.

Bangladesh has been participating in all four components under Radiation Technology, namely Non-destructive Testing, Tracer Technology and Nucleonic Control, Radiation Processing and Nuclear Analytic Techniques. In the case of NDT, the role of BAEC include both services and dissemination of the technology. Training programmes helped develop a core of personnel in the levels of I, II and III of ISO. We also issue personnel certification based on performance of the trainees and many local organizations have already been involved in this process. Use of tracer technology in Gas Flow Calibration in the national gas network was successful and the technology is now used in fertilizer production process. We

are also participating in the UNDP-IAEA-RCA Regional projects in NDT. In the field of radiation processing, our scientists are engaged in wood plastic surface coating using UV techniques. It is envisaged that the results of this project will help us establish a pilot plant for treating wood, which will be the basis for future commercialization of this technique. In the field of nuclear analytical techniques, Proton Induced X-Ray Emission and atomic absorption spectrometry techniques are used successfully in estimation of trace elements in medical, biological and industrial samples. Such services are now provided to various local organizations. It is expected that use of such techniques in medical and biochemical investigations will increase further in future.

**Mr. President**

Bangladesh has been active in all the programmes of medical science, with the exception of Radio-therapy. Five Radioimmunoassay laboratories have already been set up in the country. In view of acute incidence of iodine deficiency in the country, this programme has been very fruitful. External Quality Assessment Scheme, in which we are participating along with Singapore, Pakistan and Indonesia, has been useful in ensuring quality of RIA in Bangladesh. Four laboratories have been set up for developing a low cost and reliable method using RIA for screening and diagnosis of viral hepatitis. Screening are conducted on three distinct groups of people, namely pregnant mothers, blood donors and medical and paramedical staff. Comparison with conventional method of screening Hepatitis is also conducted under this programme. Our scientists have been pursuing the project on radiation sterilization of tissue graft. Sterilized amniotic membrane for dressing to burn wound and bone pieces for use in orthopedic and dental surgery are being supplied in limited quantities to different hospitals. Irradiation facility at Savar is being used for this purpose. A surgical tissue bank is planned to be established in future. Bangladesh is committed to participate in the RCA project on development of human resources in nuclear medicine and biology. Bangladesh is also expected to participate in two other projects, namely improvement of cancer therapy and use of radioiodine in management of thyrotoxicosis.

**Mr. President**

The RCA project on Energy and Nuclear Power Planning has been successful in enhancing capabilities of planners in the RCA countries in the use of analytical tools like WASP, MAED, ENPEP and their various modules. This, we believe, would have far reaching impacts on energy planning in these countries. The on-going training programme and the envisaged programme on training of national trainers would benefit the countries by facilitating development of human resources in energy planning.

On the other hand, we strongly feel that since the project addresses both energy planning and nuclear power, equal emphasis should also be attached to implementation of nuclear power provided these models identify nuclear power as a viable option and the concerned country is interested in implementing the same. If the project fails to help such a country, the objective of the project could be reduced to some extent.

It is heartening to note that as many as five of the RCA Member states (Japan, Republic of Korea, China, India and Pakistan) have nuclear power plants operating in these countries, while at least three others, namely Indonesia, Vietnam and Bangladesh have active interest in implementing nuclear power.

Introduction of nuclear power plants in the developing countries is in general difficult and the identifiable problems include lack of confidence of the suppliers, potential financiers, including the international development financing institutions in the issues like safety of nuclear power, waste management and disposal, nuclear proliferation, environmental pollution, capability of the developing countries in operating a nuclear power plant safely and reliably, cost-economics of nuclear power viz-vis its alternatives, return on investment and in particular capability of such a project in making repayment on loan.

We believe, answers to most of such apprehensions would be positive. But this has to be confirmed by IAEA so that the related agencies and organization have sufficient confidence in viability of nuclear power in the developing countries. The RCA can play a positive role

so far as convincing the regional institution like the ADB and the suppliers in the region on such issues.

The recent meeting of the RCA Co-ordinators of the project on Energy and Nuclear Power Planning, has recognized this inadequacy and recommended a regional project on exchange of experience of the countries in the region. This project may be considered as the first action in this direction. But we expect that other action oriented programmes under RCA should be considered to facilitate introduction of nuclear power in the developing RCA countries. The country statement of Bangladesh in the present General Conference has made a specific recommendation in this connection.

**Mr. President**

Bangladesh attaches special priority on strengthening indigenous capabilities in repair and maintenance of equipment and facilities, especially their electronic and control systems, used in its R&D programmes. The related RCA programme has been very effective and helpful in this context. BAEC is actively involved in RCA projects on utilization of the research reactor, especially in gamma spectrometry, neutron scattering and radiation activation analysis. Attempts are being made to apply nuclear activation technique in physical and biological investigation. We, in Bangladesh, strongly feel that RCA activities in future should also focus on capacity utilization of research reactors in the participating countries. Innovative and value added utilizations like silicon doping may be cited in this regard.

Use of irradiation techniques for food preservation and medical sterilization has been an important project of BAEC. The success in this field was instrumental in the recent installation of the country's first commercial irradiation facility. In addition to this, scientists of BAEC have also been involved in investigation of vital parameters of quality and acceptability of various consumer products.

Application of nuclear techniques in agriculture, which are now being conducted at the Institute of Nuclear Agriculture under the Ministry of Agriculture, has been quite intensive

over the last three decades. The project on fixation of atmospheric nitrogen are now being conducted under RCA. Field experiments are being focused on compatibility studies.

Bangladesh takes keen interest in RCA activities on radiation protection. The scope under infrastructure development for enforcing radiation protection is likely to increase in future as our national Parliament has passed the Nuclear Safety and Radiation Control Act, 1993. We are now drawing up plans for development of infrastructure for implementation of the provisions of the Act and for developing related codes, guides and standards. Secondary standardization of radiation dose and calibration of equipment have been initiated with the assistance of the IAEA. Bangladesh is also involved in the regional project on dose related to Asian reference man and radiation measurement. Imported food stuff are also tested against radiation doses in order to ascertain their fitness for consumption.

**Mr. President**

The present description of involvement of Bangladesh in various RCA projects is a manifestation of Bangladesh's firm commitment to use nuclear power for peaceful purposes and also the importance Bangladesh attaches to regional co-operation in this connection. We want to express our concern over the challenges all countries, especially those in the developing world, are apprehended to face in the path of their socio-economic development in the next century. It needs concerted effort and co-operation in enabling them to pursue a path of economic development. As such we expect that the scopes of RCA will be enhanced further in the existing and new fields of nuclear application.

**Mr. President**

We consider the RCA as forum for exchanging experience and to benefit from them. Unfortunately, one of our senior colleagues was denied visa for participation in one of the recent RCA activities. While honouring the right of individual country to deny entry to citizens from other countries, we want to stress on the need to select venues for future RCA

activities in such a way that participation of representatives from all the countries can be ensured without any hindrance. This would broaden the scope for cooperation on a regional basis.

Before I Conclude, I would like to thank you all for your patient hearing.

**CHINESE COUNTRY STATEMENT**  
**22ND GENERAL CONFERENCE MEETING OF RCA MEMBER STATES**  
**VIENNA, AUSTRIA, 29 SEPTEMBER 1993**

Mr. Chairman:

It is the great pleasure of my delegation to participate in the 22nd General Conference Meeting of Representatives of RCA Member States. I would like, first of all, to congratulate you on your election as Chairman of the Meeting. I am confident that under your guidance, the meeting will successfully achieve fruitful results.

I also wish to extend our welcome to the Mongolia Government for its joining RCA last October. I hope to see that more countries in the region will become RCA member states.

The past year was the first year of the Extension Agreement of 1987 RCA Agreement. China is satisfied with the implementation of the activities in the past year. We are very happy to see the major activities in the RCA programme in the past year fit well with the member states' needs and the new -UNDP/RCA project entitled "The Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development" has been approved and begun being implemented. While China has benefitted a lot from the RCA programme, we have also made our efforts to contribute to the region. In 1994, China will continue to commit US\$ 50,000 in financing two regional workshops to be held in China.

Now, I would like to take this opportunity to brief you on some RCA activities and some significant nuclear developments in China.

Industrial Application

In order to speed up the development and commercialization of radiation processing technology, China sponsored a regional workshop titled "Radiation Processing - Economic Benefits" under our donation to be held in Beijing next month. While the commercial application of radiation crosslinking techniques are being further spreaded over China, R & D on techniques for radiation curing of surface coating is being carried out in several institutes. We have a desire to hold a National Executive Management Seminar on Radiation Curing in 1994 under the support of project RAS/8/069.

In the field of radiation sterilization of medical products and devices, the Beijing Radiation Application Center equipped with 550 kCi source at present has irradiated medical products valued more than 100 million US\$ in the past 3 years. National Technical Regulations for Radiation Sterilization have been laid out and come into effect and Quality Control Standards are being formulated.

In order to promote the R & D work on EB flue gas treatment, a national seminar on Environmental Application of Radiation Technology will be held in Shanghai in coming December.

In addition, China has an intention to hold a regional workshop on Radiation Technology on Biomedical Application under our extra-contribution in 1994. Also, China would like to host the Regional Training course on Application of Isotope Techniques in Process Optimization at Baoshan Iron and Steel Complex, Shanghai.

#### Agriculture

New varieties of rice, wheat, cotton and rapeseed resulted from radiation mutation breeding or combination of radiation and biology techniques were released such as rice "Zhefu 802" wheat "Hezu 8", cotton "Lumian 1", rapeseed Ganyou 5". The accumulated planting area of the rice variety "Zhefu 802" has reached 10 000 000 ha. up to 1992.

The commercialization of irradiated food in China is in progress. More than 50,000 tonnes of irradiated food have been sold in domestic markets. A commercial irradiation facility for treating 9000 tonnes of rice per year has been planned to be built in Institute of Atomic Energy Application, Beijing Agriculture Academy of Science.

#### Medical and Biological Application

China is actively participating and supporting the medical and biological project. The China made RIA Kits for Hepatitis B diagnosis were distributed to more than 50 participating labs in 13 countries of the region. In order to disseminate and transfer production technology to other developing countries, China hosted a regional training course on Production and Characterization of Hepatitis B of Primary Reagents for RIA.

China supports projects on development of audiovideo teaching materials for training and development of simple and low-cost nuclear instruments for medical use. In recent years, China has developed some kinds of simple and low-cost equipment to meet the needs of medium and small hospitals, such as cobalt 60 Remote Therapeutic Machine and Cobalt 60 High Doserate Postpositioned Therapeutic Machine. Also, development of miniature gamma camara is in progress.

Great success has been achieved in utilization of irradiated tissue grafts. The irradiated pigskin has been applied to more than 3000 cases for the 2nd degree burns and 38 cases for the 3rd degree burns. In the latter cases, small pieces of autografts are seeded in the irradiated pigskin covering after emergency escarectomy performed. Development of clinical quality control practices and standards for processing and radiation sterilization of tissue grafts is being made in China. In June 1994, the Suzhou Medical College will host RCA Training Course on Open Learning Techniques Applied to Radiation Sterilization of Tissue Grafts and the 5th Asia-Pacific Conference on Tissue Bank.

#### Radiation Protection

In March 1993, China hosted the Expert Advisory Group Meeting on RCA project "Radiation Protection Infrastructure". China also sponsored a regional workshop on radon monitoring under our extrabudgetary contribution, which will take place next month.

China attaches great importance to strengthening national infrastructure and manpower training on radiation protection. Every year, the China Radiation Protection Training Center holds several national training courses independently. We support RCA work on development of distance and audiovideo teaching materials to enhance the national training capability in the region. In 1994, China intends to sponsor a regional workshop on External Dose Assessment Techniques under our extrabudgetary contribution.

#### Research Reactor and Power Planning

We hold views that activities on research reactor utilization and nuclear power planning should be strengthened. The economy in many countries of the region is growing fast and shortage of electricity supply is serious. Nuclear power is an important option in many states and so we hope the Project Formulation Meetings in

In China, the first nuclear power plant-Qinshan plant is now under high power operation following connected into grid in December 1991. The unit 1 of Da Ya Bay nuclear power plant reached critical on 28 July and connected to grid for the first time on 31 August 1993. China is wishing to host a regular regional training course on Safety and Reliability Improvement through Optimized Maintenance of NNPs in 1994 or 1995 which was recommended by the IAEA Advisory Committee Meeting on Training in Nuclear Power and Safety held in May 1993.

Mr. Chairman,

In conclusion, China wishes to express its thanks and satisfaction to the Agency for their great efforts on enhancing the regional co-operation and will continue our close co-operation with the Agency and other RCA member states.

Thank you.

Country Statement - India  
22nd Meeting of RCA Member States  
Vienna, 29 September 1993  
(37th General Conference)

1. India is very happy to participate in the Annual Meeting of representatives of RCA Member States being held along with the 37th General Conference. India has participated in and supported a number of RCA activities during the last year and looks forward to continued co-operation with other RCA member states through future activities. We recognise the important role nuclear technology can play in national development since it helps to spin-off technologies developed initially for the nuclear programme for developments in other sectors. Considerable amount of technical expertise has been generated as a result of implementation of nuclear energy programme in India and we are now making sustained efforts to transfer this technology and expertise to other areas of national development. Work on all aspects of the nuclear fuel cycle and applications of isotope techniques is being pursued vigorously. In the past we have shared our facilities and experience with other member states through RCA activities and other bilateral arrangements. We will continue to do so in the future also.

2. India has always supported RCA activities in the field of research reactor utilisation and has shared its facilities with scientists from RCA member states in pursuing programmes of mutual interest. During October/November 1993, India will host a Regional Workshop on Applied Aspects of Neutron Scattering at BARC, Bombay out of its special contribution to the RCA. India has supplied neutron spectrometers to some of the countries of RCA region and has provided experts for training local staff in the application of neutron techniques in research investigations. We are looking forward to successful implementation of activities planned under the RCA Project on Research Reactor Utilisation.
  
3. India can play a significant role in the formulation and implementation of a project on Nuclear Information under RCA. The proposal to initiate a RCA project of this nature has been supported by many RCA countries. While ARCAL (Latin American Co-operative Agreement) has a project on nuclear information and AFRA (African Regional Co-operation Agreement) plans to have one, the implementation of a project on this subject under RCA is long overdue. India proposes to initiate activities in this area by organising a Regional Workshop on INIS in 1994 which will be funded from India's special contribution to RCA. The 2 weeks workshop will cover

subjects such as INIS input preparation, processing of INIS output tape, use of INIS-CD-ROM, basics of personal computers and computer networking on-line search and INIS input submission using E-mail.

4. The maintenance of nuclear medicine equipment is an important area and needs constant attention for upgrading the skills of instrument technicians. India has organised and hosted specialised workshops and training courses for technicians from RCA countries. India recently concluded a 3 weeks Regional Workshop on Trouble Shooting and Repair of Gamma Chambers at BARC, Bombay. India will continue to play a key role in the project on Nuclear Instruments Maintenance.
  
5. The use of radioisotopes in medicine and agriculture are areas of direct and immediate relevance to many RCA member states. India has actively participated in many RCA projects under these subjects. Particular mention may be made of the project on "Aerosol Imaging for Diagnosis of Respiratory Diseases" under which India made available a technique based on radioaerosol generator using reactor produced TC-99m for use in nuclear medicine procedures. These techniques were found to be very practical and useful by other participating countries of this project. India strongly supports the co-ordinated Research Programme on Evaluation of Radioactive Iodine Therapy of Hyperthyroidism which is proposed for inclusion under RCA. Considering the high

incidence of thyroid diseases in many countries of the region, there is a need to evaluate the current practices in radioiodine therapy in the RCA countries and to evolve uniform procedures to assess clinical efficacy and post-therapy hyperthyroidism.

6. India is happy to note that the activities of the new UNDP funded project on the use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development have been started and the work plans for the next 2-3 years are being firmed up through the meetings of the national co-ordinators of the various sub-projects. India will host two important events in the new sub-project on Nuclear Analytical Techniques viz. 3 weeks Regional Training Course and 1 week Regional Seminar for senior staff during February 1994 using the facilities available at BARC. These events are being planned to coincide with a 3 day International Conference on Applications of Radioisotopes and Radiation in Industrial Development (ICARID-94) being held in Bombay during February 7-9, 1994. This International Conference is being held in co-operation with the IAEA and is co-sponsored by the Department of Atomic Energy, Government of India. India will continue to act as a resource country for the new UNDP funded project by providing equipment experts and training facilities. The project has identified centres of excellence in the region where certain technical

programmes and events could be conducted and India is one of the countries where such centres have been recognised for conducting project activities.

7. India recognises RCA as an important tool for promoting regional co-operation in the peaceful uses of atomic energy. Our participation in the RCA over the years has been satisfying and productive and we look forward to further growth of RCA activities in the coming years.



**COUNTRY STATEMENT OF INDONESIAN  
DELEGATION AT THE TWENTY SECOND  
GENERAL CONFERENCE MEETING OF  
REPRESENTATIVES OF RCA MEMBER STATES  
29 SEPTEMBER 1993**

Mr. Chairman,

It is my great pleasure to participate at the Twenty Second General Conference Meeting of Representatives of RCA Member States here in Vienna, Austria.

I do believe that almost all Member Countries have benefited much from the collaborative activities of RCA. We are now entering the third phase of our RCA/UNDP Project entitled The Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development. I am confident that much experience will be gained from this new project in the context of transfer of nuclear science and technology to the RCA Member Countries.

My Delegation would like to take this opportunity to present its country report beginning with the activities related to the previous industrial project of isotopes and radiation carried out during the last year.

**1. Radiation Technology**

Radiation technology is still one amongst the application of the Indonesian sustainable nuclear technology carried out by CAIR-BATAN. Activities done during the last year in this regard are as follows:

i). Radiation vulcanisation of natural rubber latex (RVNLR)

Research and development (R & D) on radiation vulcanisation of natural rubber latex is still continued to overcome the sticky problem on the results of dipping products such as gloves and condom. R & D on the application of RVNRL for the production of rubber goods such as foam,

rubber composite, adhesives, thermoplastic elastomer are also being conducted.

Routine production of irradiated NR latex is around two tons monthly and it is mainly supplied to adhesive company.

Three research scientists from Vietnam have been visited CAIR-BATAN in October - November 1992 under the UNDP/IAEA/RCA project RAS/0/015/-11. The purpose of visit is to conduct an irradiation trial on Vietnamese latex in a pilot scale. About one thousand eight hundred kgs latex was sent from Vietnam to CAIR-BATAN for irradiation service. Analysis was done before irradiation. After irradiation the latex was sent back to Vietnam for evaluation.

Two scientists from Sri Lanka will be visiting CAIR-BATAN in October 1993 for the same purposes.

#### ii). PE cross linking

In order to obtain an optimum condition for cross linking of PE as insulator material, a group researchers has been established. Research work on this subject has been carried out in collaboration with the Indonesian Science Institute (LIPI) and the University of Indonesia.

#### iii). Biomaterial

R & D on the preparation of polymer synthetic based on PVA and PVP are intensively conducted under a bilateral research co-operation with JAERI. This activity is partly supported by TA project of IAEA.

#### iv). Surface coating

Economic feasibility study on the application of EBM 300 KeV for wood panel surface coating indicated that the process is still not competitive with the present conventional existing process in Indonesia.

The high cost of pre polymer and the high operation cost of EBM 300 KeV due to liquid nitrogen consumption seems to be the main constraints.

In addition to these, the plywood companies in Indonesia are relatively small in size and lacking of skilled manpower with adequate background of radiation chemistry and technology.

v). Sterilisation of medical devices

Services for sterilisation by irradiation of medical devices and supplies for commercial purposes have been transferred to the private owned commercial irradiator Indogama/Sterigenic since early April 1993. CAIR-BATAN is still continuing irradiation services for R & D purposes. CAIR-BATAN provides assistance to Indogama/Sterigenic in achieving Good Radiation Practice (GRP).

## 2. Non Destructive Testing (NDT)

Due to the rapid growth of NDT activities in the past three years a number of courses have been conducted by BATAN, B4T Bandung and IPTN Bandung during 1992 and August 1993. Number of courses and certified personnels resulted during that time contained in the following table.

NDT METHODS	Courses		
	Level I	Level II	Level III
RT	5 (195)	2 (70)	1 (6)
UT	6 (87)	5 (55)	-
MT	6 (68)	-	-
PT	6 (76)	-	-
ET	1 (18)	-	-

( ) = Number of certified personnels

A National Seminar on NDT was held in June 1993 attended by 50 participants from various governmental and non-governmental institutions.

### **3. Tracer Industry and Nucleonic Control System**

It was apparently true, that participation of Indonesia in the previous RCA/IAEA/UNDP Project on industrial application of Isotopes and Radiation Technology has given great advantage in supporting the existing national programme. The strengthening of the infrastructure especially in tracer technology seems to give significant enhancement in various activities in the past. The main objectives of this technology were to create and establish a tracer group with a certain degree of expertise who were able to cope problems of tracer application in industry. Awareness of industries and related institutions to the usefulness of this technology was accelerated through training courses, seminars, workshops and demonstration as well through individual approaches.

The current activities on tracer technology carried out in Indonesia are as follows:

- i) The project on the enhancement of oil recovery is still continued in the Lirik Oil Field, South Sumatera.
- ii) A project on column scanning was carried out at the chemical industry of PT Asahimas, West Jawa.

Indonesia has been represented at the National Coordinator Meeting for Tracer and NCS held in Sydney, Australia.

### **4. Nuclear Analytical Techniques (NAT)**

Indonesia has been participated at the First National Co-ordinators' Meeting on Nuclear Analytical Techniques (NAT) in Kuala Lumpur, Malaysia from 22 - 25 June 1993. In accordance with the recommendations of the meeting, the following activities have been carried out:

- i) Intercomparison study amongst the existing laboratories within BATAN (PPTN Bandung, PPTA Serpong, PAIR Ps. Jumat, and PPNY Yogyakarta) for neutron activation analysis of synthetic samples prepared in the participating laboratories. In general satisfactory results were obtained, even at very low levels (below 0.1 ug or Sm).
- ii) The work was continued with the analysis of unknown dust samples.
- iii) Work in progress at present is dealing with the collection of environmental samples (airborne particulates) of Jakarta region.

Further work will involve sample collection and analysis of airborne particulates and waste water. To ensure the validity of the measurements, proper standard reference materials are needed.

#### **5. Diagnosis of Hepatitis B by RIA**

To minimize the widespread of Hepatitis B, a sensitive method with low cost is required. RIA bulk reagents methodology seems to be an appropriate method for the diagnosis.

Four laboratories in Indonesia are involved in this project, namely:

- i) Nuclear Medicine Sub-Unit at Fatmawati Hospital, Jakarta to study on the prevalence of Hepatitis B in high risk groups.
- ii) Clinical Pathology Laboratory at Cipto Mangunkusumo Hospital, Jakarta in studies on the prevalence of Hepatitis B in general population and post vaccination programme.
- iii) Nuclear Medicine Laboratory at Hasan Sadikin Hospital, Bandung, in the study on the prevalence of HBs Ag and Anti-HBs in normal subject and patients with liver abnormalities.

- iv) Blood Bank of Jakarta in collaboration with the Radioisotope Production Centre of BATAN in studies on the prevalence of Hepatitis B in blood donors as well as evaluation of post vaccination subject.

Testing of hepatitis B kits has also been performed by the clinical pathology laboratory of Cipto Mangunkusumo Hospital and at the Centre for Radioisotope Production of BATAN. During the year 1992/1993 a total of 187 kits containing HBs Ag, Anti-HBs, Anti-HBc, Anti-HBe and Be-Ag have been regularly supplied by the IAEA to Indonesia. Four autobead washers were also supplied by the Agency.

Three staff from the participating laboratories have been participating at various training courses organized by the Agency held in Shanghai and Beijing, China. A local training course for the operators of the participating laboratories has been conducted to introduce the RIA techniques especially CIAE's and Panavita's RIA Hepatitis B kits, with special emphasize on technical aspects rather than the theories.

The 1993 programme are:

- i) Two more laboratories will be involved in the program, namely Sutomo Hospital in Surabaya and the Hepatology Laboratory at the Cipto Mangunkusumo Hospital, Jakarta.
- ii) It is expected that IAEA could supply two more autobead washers to the new coming laboratories in the programme.
- iii) The Centre for Radioisotope Production is expected to start with the preparation of tracer using I-125 and immobilization of antigen or antibody into special beads.

## **6. Food Irradiation Process Control and Acceptance**

This project has come to the end on 15 August 1993. Activities carried out during this period were: determination of free radicals in

irradiated food, determination of physiochemical properties of irradiated rice during the storage and market testing of irradiated food.

Some achievements obtained are:

- i) The amount of free radicals in irradiated food increases with the doses, but in general, the free radicals disappear within one month. Some natural products even before being irradiated already contained free radicals.
- ii) Rice irradiated with a dose of 3 kGy or higher undergoes a very significant change in its colour, therefore, 3 kGy can be recommended as maximum dose for decontamination purpose.
- iii) Acceptance of food irradiation by food industries is increasing.
- iv) Regulatory procedure to support the implementation of the Minister of Health's Decree No.826/Menkes/Per/XII/87 concerning Food Irradiation has been issued by the Directorate General for Drug and Food Control, Department of Health on 22 July 1993.

## **6. Radiation Sterilization of Tissue Grafts**

Indonesia has hosted a RCA/IAEA Workshop on Total Quality System for Tissue Banking Radiation Sterilized Surgical Grafts held at CAIR-BATAN, Jakarta, from 2-13 August 1993.

## **7. Strengthening Nuclear Medicine in RCA**

Around seven General Hospitals in Jawa have been furnished with gamma camera since several years ago, two hospitals in Sumatera and another one in Ujung Pandang, South Sulawesi. Besides Gamma camera several hospitals are also equipped with RIA counters, renograph and Thyroid uptake. Isotopes used in the hospitals have been provided by BATAN.

## **8. Maintenance of Nuclear Instruments**

One of the activities of the project is supporting the application of nuclear science and technology in medicine through preventive maintenance of equipments in the general hospitals.

Other activities are dealing with technical consultations and suggestions in case the hospitals are planning to purchase new nuclear medicine equipments and supervising the installation of new equipments such gamma camera, etc.

Several staff have been participating at the training courses organized by the IAEA, namely:

- i) Regional Workshop on the Utilization and Further Development of Computerized Management of Presentative Maintenance, September 1992, Kuala Lumpur, Malaysia.
- ii) Third Research Coordination Meeting (RCM) on Maintenance of and Related Equipments in Medicine, June 1993, Guangzhou, China.
- iii) Training course on Preventive Maintenance and Troubleshooting of Nuclear Medicine Equipments, September 1993, Bombay, India.

## **10. Strengthening of Radiation Protection Infrastructure**

Activities on personnel dosimeter intercomparison, phase 3, between PSPKR-BATAN and JAERI, Japan have been carried out smoothly. Intercomparison of 27 TLD LNG-0670 personnel dosimeter from BATAN have been irradiated by JAERI Japan, and evaluation was done at BATAN.

## **11. Activities on Reference Asian Man**

Achievements gained from the activities carried out in Indonesia, are namely anthropological data, internal organ measurements and food consumption of 200 persons each.

## **12. Research Reactor Utilization**

A Regional (RCA) Training Course on Calculation and Measurement of Neutron Flux Spectrum for Research Reactors will be held at Serpong (Jakarta), Indonesia, 27 September - 15 October 1993.

The course will be attended by 13 participants from eight RCA member countries and some additional participants from the hosts observers.

## **13. Energy and Nuclear Power Planning (ENPP)**

A Project Formulation Meeting on Energy and Nuclear Power Planning was held in Jakarta, Indonesia from 19 - 23 July 1993. The meeting was attended by twelve representatives from twelve RCA Member countries two representatives from the IAEA and two observers from the Indonesian Directorate General for Electricity and Energy Development.

### **Sixteenth RCA Working Group Meeting 1994**

I am pleased to announce Indonesia will host the next sixteenth RCA Working Group Meeting probably to be held in Bali, Indonesia. The tentative date will be around 21 - 25 March 1994.

Confirmation of the venue and times of the meeting will be officially communicated to the RCA Co-ordinator asap after local arrangements have been finalized.

I would like to take this opportunity to invite all representatives of the RCA member countries to enable participating at the next RCA Working Group Meeting in Indonesia.

I hope to seing you all at the sixteenth RCA Working Group Meeting in 1994 hopefully to be held in Bali.

Thank you for your attention.

Vienna, 29 September 1993

**JAPANESE COUNTRY STATEMENT**  
**ON THE OCCASION OF**  
**22ND GENERAL CONFERENCE MEETING OF REPRESENTATIVES OF RCA MEMBER STATES**

**29 September 1993, Vienna, Austria**

Mr. Chairman,

I would first like to congratulate you on your election as Chairman of this 22nd General Conference Meeting of the Representatives of RCA Member States. Having you here as Chairman, I feel assured that this Meeting will surely add one more distinguished page to the history book of RCA co-operation.

I would also like to take this opportunity to express my deep appreciation to the Government of the Philippines for its superb preparation and kind hospitality shown to us all during the 15th Working Group Meeting in Manila last March.

Mr. Chairman,

Ladies and Gentlemen,

Japan sees the RCA a very serviceable architecture, and is pleased to note the continued progress of the RCA activities. Considering the expansion of uses and applications of nuclear techniques in the RCA countries which has so far brought enormous advantages especially in the fields of industry, medicine, and radiation protection, we should not disregard the importance of peaceful applications of nuclear energy so as to develop economies in and bring social benefits to this region. Japan will therefore continue to support the RCA activities as ever, not only technically but financially, as most important vehicle for co-operation of this kind. And Japan hopes to see continuously the spirit of mutual co-operation, self-reliance, and understanding which has indeed distinguished the RCA as a guiding light for other regional co-operative undertakings, the very fact of which the RCA is so very proud.

On the further development of the RCA co-operation, Japan believes that a successful co-operation depends on picking up promising projects which well correspond to the needs of the RCA Member States on one part, and on the Member States' manifesting self-help spirit on the other. Of course, smooth communication and co-ordination as we have today should be maintained between the IAEA and the Member countries. It also seems sound and appropriate to take into consideration the limitation of the RCA finance, if its exists, at the time we consider a new project, and therefore to explore with courage the possibility of employing the principle of

scrap and build when it is needed. Bearing those in mind, Japan is eager to continue to extend as much support and contribution to the RCA as possible, with emphasis on the further development of the human resources in the region, as ever, through sending the Japanese experts and receiving foreign experts, with a view to seeing the region further prosper.

Mr. Chairman,

Japan basically supports the Proposed RCA Project Activities in 1994.

In this connection I would like to bring three issues to the attention of this Meeting. First is on Nuclear Medicine. Japan has co-operated technically and financially in the Co-ordinated Research Project on Imaging Procedures for the Diagnosis of Liver Diseases since 1983, and with enormous and recognized success this project is to be completed at the end of this year. To continue to support the RCA co-operation in the important and useful field of Nuclear medicine, Japan is pleased to announce that it would support technically and financially as much as ever a new CRP project proposal on Evaluation of Radioactive Iodine Therapy for Hyperthyroidism, which was strongly supported and approved at the 15th RCA Working Group Meeting in Manila.

Second is about Radiotherapy. The CRP on Improvement of Cancer Therapy, which Japan has also actively supported in technical and financial terms, is due to complete its 2nd phase at the end of this year. To follow-up and enhance an achievement in this field, various possibilities on a successive project are now being considered positively among experts. Japan has an intention to continue to support as ever a good project in this field, and hopes that opinions of interested Member countries will be co-ordinated as early as possible at a consultant meeting, so that a project proposal can be considered and approved at the 16th Working Group Meeting next year.

Third and last is concerned with the CRP on Reference Asian Man. To conclude the 1st phase of this CRP at the end of this year, the Final Research Co-ordination Meeting is to be hosted by China in October this year. There the future direction of the 2nd phase will also be discussed and considered in detail. Japan has an intention to continue to support actively the 2nd phase of Reference Asian Man as much as ever.

Mr. Chairman,

As for the RCA budget for 1994, Japan is not in a position to commit itself to a specific amount of contribution. As in the past, however, Japan will technically and financially provide as much support to the RCA in 1994.

With regard to the question of financing the RCA project from outside the region, Japan is of the view that a regional co-operation such as the RCA should be carried out for projects of high interests among member countries, based on the principle of self-reliance, and within its own co-operative framework. It is perhaps likely that receiving finance from outside introduces consequently a certain other elements to the RCA's tradition.

In case the RCA budget does not correspond to a very strong willingness of the Member Countries to increase the number or expand the scale of activities, a realistic approach needs to be adopted. It will be necessary then to explore a possibility of RCA's finding alternative multilateral sources of funding, or to consider a possibility of putting some projects of lower priority on the RCA footnote a project list to look for interested donors from outside.

As for the Environment Project which started this year, Japan is extending active support as much as possible, recognising the importance of environment conservation and so on. For this project, Japan has already extended extra-budgetary contribution for 1993.

With respect to Medical and Biological applications Projects, Japan will continue to extend technical and financial support as much as before in sub-projects on Nuclear Medicine, Radiotherapy, and Reference Asian Man. For these projects, Japan has already extended extra-budgetary contribution for 1993.

With regard to Strengthening of Radiation Protection Infrastructure, Japan will continue to support this project technically and financially with in mind the importance of nuclear safety in the RCA member states where uses and application of nuclear techniques are expanding. For this project, Japan has already extended extra-budgetary contribution for 1993.

As regarding Phase III Food Irradiation Project, Japan ceased its financial support, due to its domestic reasons and so on towards food irradiation, at the completion of Phase I. Japan remains interested, however, in considering in-kind co-operation on a case-by-case basis to limited aspects of receiving foreign trainees and sending its experts.

As regards Research Reactor Utilization Project, Japan will continue to extend possible support on a case-by-case basis through, for instance, sending its experts, and accepting foreign researchers and trainees etc.

Thank you, Mr. Chairman.

Country Statement - The Republic of Korea  
22nd General Conference Meeting of the Representatives of  
RCA Member States  
29 September 1993, Vienna

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Mr. Chairman,  
Distinguished Delegates,  
Ladies and Gentlemen,

On behalf of the Korean government, I would like to thank the IAEA and the Government of the Philippines for the excellent organization of the 15th Working Group Meeting in Manila last March. I would also like to extend my congratulations to you on your election as Chairman of the General Conference Meeting of Representatives of RCA Member States. I believe that under your excellent leadership this annual meeting will be successful and conducive to productivity.

My delegation also extends congratulations to the delegation from Mongolia on admission to the RCA community.

Mr. Chairman,

As a member state, the Republic of Korea has been involved in RCA activities since its inception and has greatly benefitted from through close linkage between the IAEA and Member States through training, through participation in various regional meetings, workshops and seminars, and by undertaking a number of meetings, research contract/agreements with the Agency and Member States under the umbrella of the RCA.

1. Undertaking the RCA meetings

Korea hosted a FAO/IAEA Final Research Co-ordination Meeting on the Asian Regional Cooperation Project on Food Irradiation with Emphasis on Process Control and Acceptance (RPMI-Phase III). This meeting involved 14 national counterparts from 12 countries and 3 staff members from the Agency and was held from September 20 to 24, 1993 at the Korea Atomic Energy Research Institute.

In Regards to the sub-project, research reactor utilization, the Project Formulation Meeting will be hosted at the Korea Atomic Energy Research Institute (KAERI). We estimate that the meeting will open with 17 participants from Member States and the Agency.

## 2. UNDP/RCA Regional Project on Industrial Applications of Isotopes and Radiation Technology

### 2.1 Tracer Technology and the Nucleonic Control System

Korea participated in the first national coordinators' meeting on tracer technology and the nucleonic control system held from 6 to 8 July, 1993 at Sydney. However, due to delayed approval of the project, activities were limited.

Korea has studied column scanning of an air distillation plant in collaboration with a local tracer company. We will conduct further studies in the preparation of equipment for column scanning, in the PC simulation programme for RTD analysis, in the leak tests of buried pipeline, and in process optimization for chemical and refining industries.

The government of Korea has recently approved a long-term nuclear R & D Program. In addition to radiation and radioisotope application, industrial tracer application technology was included in the program. The addition of at least one full-time participant is expected in the near future to enable in-depth analysis.

### 2.2 Non-destructive Testing

The Korean government will make an extra-budgetary contribution to the IAEA and Member States by hosting a regional training course on industrial application of non-destructive testing and evaluation from October 7 to 27, 1993. It is expected to open to 15 participants from the RCA Member States with about 50,000 US Dollars.

It is our understanding that Korea will continue to contribute to the RCA program by undertaking a regional training course in various common concerns under the umbrella of the RCA.

### 2.3 Radiation Technology

Sterilization of medical products has been performed by a private company, the Greenplatech Co. through the use of a 500 kCi Co-60 irradiator.

The Korea Atomic Energy Research Institute[KAERI] will further study the radiation process of sewage sludge, waste and flue gas, radiation process in printing and packaging and radiation vulcanization of rubber latex. Also, KAERI will resume the operation of an industrial sterilization facility which was moved from Seoul to Taejon.

### 2.4 Nuclear Analytical Techniques

Due to the past lack of a coordinator to this project, Korea was limited in participation. However, in this year, a coordinator participated in the first national coordinators meeting held in Malaysia. In the future Korea will continue to contribute vigorously to the project.

### 3. Medio-biological Projects

#### 3.1 Computer-assisted planning and dosimetry in radiotherapy of carcinoma of the cervix

The Korea Cancer Center Hospital[KCCH], a spin-off organization of the Korea Atomic Energy Research Institute[KAERI], undertook this project and effected a clinical application of the results which were obtained from the research activities. The hospital will continue to carry out the clinical application of radiotherapy of carcinoma of the cervix.

#### 3.2 Quality control of advanced nuclear medicine equipment in Korea.

This project was begun in 1984 and finished in 1993. The original installation of 48 SPECT cameras in 1984 has been increased by 128 as of 1993. About 80 medical centers carried out QC tests and lectures. Korea will initiate a new programme entitled, "The Certification of Quality Control of Nuclear Medicine" in order to enhance this project for 1994.

### 4. Agricultural projects

#### 4.1 Food irradiation process control and acceptance[RPM Phase III]

The Korea Atomic Energy Research Institute[KAERI] has published approximately 20 research papers related to this field. The Korean government has licenced 18 items to be used for irradiation process.

It is our understanding that this project will continue under the supervision of UNDP and the Agency will provide Member States with programmes to facilitate the consumers' understanding of food irradiation technology despite worldwide anti-nuclear feelings.

#### 4.2 Improvement of legume crops with nitrogen fixing organisms

### 5. Research Reactor Utilization, Energy-based and General Projects

#### 5.1 Research reactor utilization

Korea will assist in hosting a project formulation meeting on research reactor utilization from 18 October to 22 October, 1993 at the Korea Atomic Energy Research Institute[KAERI]. To enhance manpower capability, Korea will participate in the scheduled workshops, "Calculation and Measurement of Neutron Flux Spectrum for Research Reactor", and "Applied Aspects of Neutron Scattering", and will also participate in the project formulation meetings.

## 5.2 Energy-based technical cooperation projects

Korea has 9 commercial reactors in operation and 5 under construction. It is advised that we share and exchange our experiences with the RCA Member States to build up this project.

The Korean government will host a workshop on effective strategies for the implementation of nuclear power plant construction and operation, and provide proper experts in this field for the member states' request through the Agency's technical co-operation programme.

## 5.3 Nuclear information system

Korea will participate in this project when this project is settled by the Agency.

## Concluding statement

The Republic of Korea reaffirms its commitment to the RCA and wishes to express her full support of the RCA activities for the promotion of regional cooperation in the peaceful uses of nuclear technology, especially in the areas of isotopes and radiation, in order to strengthen technology development and to support environmentally sustainable development.

**COUNTRY STATEMENT OF THE MALAYSIAN DELEGATION OF  
THE 22nd. GENERAL CONFERENCE MEETING OF THE  
REPRESENTATIVE OF RCA MEMBER STATES, 29 SEPTEMBER 1993**

Malaysian Delegation would like to extend a warm welcome to Mongolia to the RCA programme and congratulate the IAEA and the RCA Member States on the Extension Agreement of the 1987 RCA Agreement for the further period of five years which came into effect on 12 June 1992.

The extension of the RCA programme after twenty years of steady progress and the participation of Mongolia which now makes the total to fifteen members in the RCA programme are evidence that the RCA is a mature association of Asia Pacific countries with significant benefits being realised in the peaceful applications of nuclear science and technology in the region. Malaysia reiterates on this occasion, its support in all RCA activities.

Malaysian Delegation would also like to take this opportunity to congratulate the IAEA in its effort together with the co-operation of Member States, for having succeeded in convincing the UNDP to financially support the new UNDP/RCA project titled "The Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development", or in short "UNDP Environmentally Sound Technologies Project". Malaysia contributes US \$50,000.00 for this project for a period of five years.

Malaysia has maintained active participation in the RCA activities over the past years. The summary of activities carried out during 1993 in relation to RCA programme is as follows:-

1. **UNDP Environmentally Sound Technologies Project**

In the field of **Non-Destructive Testing (NDT)**, a concerted effort by the Nuclear Energy Unit (UTN), the Standards and Industrial Research Institute of Malaysia (SIRIM), the National Vocational Training Council (NVTC) and the Atomic Energy Licensing Board (AELB) in the implementation of national NDT activities and programmes has resulted a safe as well as systematic and efficient practice of such activities in Malaysia. New areas of NDT applications are being pursued, in particular applications for non-metallic materials. A National Seminar on NDT for non-metallic materials was organised jointly by UTN and the UTM in December 1992. The response from the relevant research institution and industries were very encouraging.

Malaysia is also in the process of further strengthening the various fields of NDT, and is very interested to host Regional Workshops and Seminars on the fabrication of test pieces and validation in 1994.

With respect to the **Tracer Technology**, a core group of trained personnel at Nuclear Energy Unit has been established and engaged to assist port authorities in solving problems related to siltation of ports and tidal estuaries. Malaysia is willing to host the Regional Workshop on Use of Tracer Technology in Surface Water Effluent Studies in 1994 and Regional Field Demonstration On Use of Tracer Technology in Surface and Ground Water in 1996.

In the field of **Radiation Technology**, Malaysia has hosted the Expert Advisory Group Meeting on Radiation Vulcanization of Natural Rubber Latex (RVNRL) on 23 - 26 February 1993. The potential of Radiation Vulcanization of Natural Rubber Latex is being recognised by the relevant industries in Malaysia. Nuclear Energy Unit will be constructing a pilot plant for RVNRL to promote the exploitation of RVNRL. Malaysia is keen to host the International Symposium on RVNRL along with Expert Advisory Group Meeting in 1995.

Radiation curing using EB and UV is another area which Malaysia is strongly involved. Recently, on 2 - 9 Sept. 1993, a seminar and workshop on surface finishing by radiation curing technology were organised jointly by JICA, IAEA and UTN with the following objectives:-

- upgrade and enhance surface finishing method by introducing and promoting the use of radiation curing technology,
- highlight the current status and progress of industrial applications of radiation curing technology for surface finishing.
- provide a forum for exchange of ideas and for close interactions between scientists, technologists and industrialists from various research research institutions and industries involed in surface finishing business and in related fields.
- identify areas for research cooperation.

The response from the industries was very encouraging and Malaysia believes that with the strengthening of the facilities at NEU, the technology can be transferred to the industries. Thus, Malaysia is willing to host Regional Workshop on Radiation Curing in 1995.

Another subject under the UNDP Environmentally Sound Technologies Project that is gaining importance in Malaysia is **Nuclear Analytical Technique**. Malaysia hosted the First National Coordinator Meeting on Nuclear Analytical Technique on 22 - 25 June 1993. The meeting was attended by 13 National Coordinators from the RCA Member States, 1 observer from Republic of Korea and 5 observers from Malaysia. As a result of the meeting, Malaysia is setting up a National Coordination Committee on Nuclear Analytical Technique to strengthen networking in this area and also to harmonize the internationally accepted analytical procedure according to Guide 25.

## 2. Medical and Biological Applications of Nuclear Techniques

Malaysia participated in four projects in the field of medical and biological applications of nuclear techniques. The project on **Radioimmunoassay for Hepatitis B Diagnosis** is conducted by Clinical Diagnostic Laboratory, University Hospital, University of Malaya (UM), in collaboration with Institute for Medical Reserach (IMR), University Science of Malaysia (USM), Kelang General Hospital (KGH) and Medical Microbiology Laboratory (MML) of University Hospital (UH). The Clinical Diagnostic Laboratory has successfully developed two techniques for diagnosis of Hepatitis B using radioimmunoassay. The first technique involves the dissociation of Hepatitis B surface antigen (HB<sub>s</sub>Ag) from immobilised anti- HB<sub>s</sub>Ag antibody in a two site immunometric assay and the second technique involves the use of recycled antibodies immunometric assay. The first technique has been tested and proven to be used as a quality assurance monitoring of immobilised antibody for the next phase of this project. Participating countries in the region also were encouraged to try out the technique on the use of recycled antibody for the next phase of the project. Malaysia participated in the RTC on the Preparation of Basic Reagent for the RIA of Hepatitis Markers, 26 April - 7 May 1993, China.

With regard to the project on the **Radiation Sterilization of Tissue Grafts**, about 1480 pieces of radiation sterilized amnions have been processed by University Science of Malaysia in collaboration with Nuclear Energy Unit. Work on keratinocytes culture or skin culture has been initiated in addition to the work on amniotic membranes. Nuclear Energy Unit is also providing assistance to National University of Singapore in sterilization of bone grafts. Malaysia participated in the Regional Workshop on Total Quality Systems for Tissue Banking of Radiation Sterilized Surgical Grafts, Indonesia 2 - 13 August 1993.

Under the **Care and Maintenance of Nuclear Medicine Instrument Project** and its related TC Projects MAL /4/006, an overview study on status of

nuclear medicine in Malaysia has been carried out by the IAEA expert, Dr. James E. Carey from 5 - 15 April 1993. In order to strengthen the capabilities for maintenance of nuclear medicine instrument group, Malaysia will host the Regional Workshop on Upgrading of Gamma Cameras in November/December 1994.

### 3. Agriculture and Food

Under CRP on the Use of Isotopes in the Studies to Improve Yield and Nitrogen Fixation of Common Grain Legumes, a steady progress has been made whereby the nitrogen transfer study conducted at the organic-matter-labelled site has entered its second stage. A cereal (maize) has been established at different densities on the experimental plot.

### 4. Radiation Protection

With regard to the Strengthening of Radiation Protection Infrastructure Project, Malaysia hosted the Regional Workshop on The Application of the ICRP's 1990 Recommendations for Radiation Protection, on 16 - 27 August 1993. The workshop was attended by 14 participants from ten RCA Member States and 5 observers from Malaysia. There was a consensus that the objectives of the workshop have been achieved and it was suggested a follow-up workshop to be held in two or three years time to exchange information on the success and problems in the application of the ICRP's 1990 Recommendations.

### 5. Research Reactor Utilisation and Energy-Based Project

Under Phase I, project activities on Research Reactor Utilisation have contributed in upgrading the level of knowledge and expertise of Nuclear Energy Unit personnel in areas relating to the operation management and utilisation of research reactor. Malaysia continues to support and participate in Phase II of the project with greater commitments and preparations to overcome manpower constraints, to enable effective absorption of technological expertise and know-how by UTN personnel through project activities.

With respect to Energy and Nuclear Power Planning Project, a self-sufficient core group of expertise on the use of WASPS, MAED and ENPEP have been established particularly within Tenaga Nasional Berhad (TNB). However with the privatisation of TNB, it is recommended that a new alternative core group of expertise be established within Malaysia public sector with active participation by Nuclear Energy Unit.

Finally, the Malaysian Delegation would like to express our sincere appreciation to the IAEA and all the RCA Member States for the successful implementation of the RCA programme. Malaysia will continue to give full support and to participate in the RCA activities.

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COUNTRY STATEMENT - PAKISTAN

FOR

TWENTY SECOND GENERAL CONFERENCE MEETING OF RCA MEMBER STATES

VIENNA, SEPTEMBER 1993

Mr. Chairman,

My delegation would like, first of all, to congratulate you on your election as Chairman of this General Conference Meeting of Representatives of RCA Member States. I believe that under your able leadership this annual meeting will be successful and fruitful results would be achieved.

RCA is the most effective link between IAEA and the Member States of South East Asia and the Pacific over the 20 years of its existence. Pakistan has been associated with RCA activities since its inception and has greatly benefitted from them either by way of training, participation in working group meetings, workshops, seminars or by undertaking a number of Research Contracts with IAEA under RCA programme. Looking at the performance of the RCA, Pakistan firmly believes that RCA will continue to play a very useful role in promoting peaceful application of nuclear techniques in the field of industry, agriculture, biology and medicine.

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

It is a matter of satisfaction that the objectives set forth for the Phase-II of this project have been generally achieved to the desired level. PAEC is continuing training of personnel in Non-Destructive Testing Techniques (NDT) and more than 26 organizations in the public

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and private sectors have benefitted from various courses in NDT in Eddy Current Testing, Ultrasonic Testing, Surface Methods and Radiography Testing. During September 1992 until August 1993 six Level-1 courses were organised in Islamabad which were attended by more than 100 participants. Efforts are being made to launch a professional body solely devoted to NDT in Pakistan. It is hoped that the NDT area would receive further support from the RCA.

The activities carried out relevant to radiation technology included setting up of a polymer processing laboratory. The polymer laboratory has extended technical help to solve the compounding problems of masterbatches supplied by AEI and Union Carbide to cable firms. The optimum conditions in terms of RPM, run time and percentage concentration of crosslinking agents have been investigated. Two technical reports have been published to impart know-how to cable companies and collaborating institutes about quality control of crosslinked products and formulation. R&D work for PARAS, Lahore in the field of radiation sterilization of medical disposables has been underway. Facility is being extended to include irradiation of food for which R&D work will be undertaken.

The activities under tracer technology included application in paper industry, overall density profile of the critical portion of a refinery atmospheric distillation, build up and wear measurement in pipelines.

Work is in progress with the collaboration of IAEA/RCA to strengthen the radiation protection infrastructure in the country. In this regard data collection on physical parameters e.g. height, weight, chest and head circumference were carried out for all the age groups

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ranging from 5-50 years. Data on food consumption for reference Pakistan man was also being determined. More data collection is in progress. In response to IAEA request, PAEC has agreed to host Training Course/Expert Group Meeting in the field of Calibration in Dose Assessment, Calibration Procedures and Dosimetry Aspects of Medical Irradiation in 1994, which may be highly valuable for strengthening of radiation protection activities in the country.

PAEC is pleased to host the following national seminars in Pakistan within the context of the new Australian Project on Isotopes and Radiation in Industry and the Environment:

- (i) Process Optimization in Chemical and Refining Industries to be held at Institute of Nuclear Medicine & Oncology (INMOL), Lahore from 6-10 November, 1994.
- (ii) Application of Nuclear Techniques to the Metals and Manufacturing Industry to be held at INMOL, Lahore from 12-17 November, 1994.

2. **MEDICAL AND BIOLOGICAL APPLICATIONS  
OF NUCLEAR TECHNIQUES**

All the major objectives of the Project on Radioimmunoassay (RIA) of Thyroid Related Hormones have been met. Pakistan was identified as one of the countries for the supply of RIA reagents in the region for coordination in External Quality Assurance Scheme (EQAS). A new advanced software developed at INMOL, Lahore for EQAS data processing is being made available to the Agency for distribution to EQAS co-ordinating centres in the Region. This project has resulted in significant reduction in the cost per test and the establishment of sustainable regional capability for production of many of the reagents.

Pakistan is participating in RCA Project for Diagnosis of Hepatitis B with Radioimmunoassay. Kits and instruments received from

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IAEA have been distributed to four laboratories in the country participating in this project.

As regards the project on Maintenance of Nuclear Medicine Instruments, it is important to consider the spare parts services, upgradation of these instruments, information exchange and conversion of analogue gamma cameras to digital operation using PCs. Pakistan would welcome the idea of having second-hand scintillation cameras which have been refurbished and upgraded.

The anti Carcinoma Embryonic Antigen (CEA) antibody was successfully labelled at INMOL, Lahore. Radiopharmacy and Immunoscintigraphy was performed in 2 normal persons and 12 patients with suspected or recurrent colorectal cancer. Images were taken in anterior and posterior views of the thorax, abdomen and pelvis. In addition to this blood samples were taken before antibody administration for determining CEA levels in blood and for antimouse antibody hammatology. The value of immunoscintigraphy in diagnosing recurrent and suspected colorectal cancer was assessed in individual cases.

Pakistan is participating in the project on Computerized Dosimetry in Brachytherapy and Radiotherapy of Cancer Cervix in Asia and Pacific Region for Intercomparison of Treatment Planning using PC Based Computer and TP-11 Computer as well as on Project on Computer Assisted Planning and Dosimetry in Radiotherapy of Head and Neck Cancer.

### 3. AGRICULTURAL PROJECTS

Pakistan is conducting pilot scale studies on preservation of various food materials by gamma irradiation. We are in the process of formulating Regulations for Commercial Food Irradiation in Pakistan for

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which an IAEA expert visited Pakistan in May 1992. The Agency is requested to consider provision of a commercial demonstration irradiator to Pakistan. Experiments were conducted under the IAEA Research Contract on enhancing shelf-life of potatoes, onions and garlic and decontamination of spices and poultry meat. A Training Course on Food Science and Nutrition was conducted at Nuclear Institute for Food and Agriculture (NIFA), Peshawar from 4-15 April, 1993.

For the project on Improvement of Grain-Legume Rhizobium Symbiosis, it is suggested that studies on ecology of rhizobia and soil microflora using biotechnological tools as an important area be considered in the future. Pakistan is interested on the Study of Cotton Leaf Curl Virus Tolerant Varieties of Cotton through Biotechnology and other Methods. The new National Institute for Biotechnology and Genetic Engineering (NIBGE) has started functioning at Faisalabad since January, 1992. Pakistan offers to provide training to the scientists from the region in relevant fields through TCDC.

#### New Project Proposals

Pakistan is interested to participate in the following 3 new project proposals:

- |   |  |
|---|--|
| (a) Use of Sterile Insect Technique to Protect Fruit and Vegetables from Destruction by Tropical Fruit Flies.                   | Nuclear Institute for Food & Agriculture (NIFA), Peshawar, Atomic Energy Agricultural Research Centre (AEARC), Tandojam. |
| (b) Amelioration of Environmental Pollution by F-1 Sterility for Controlling Caterpillar Pests of Horticulture and Field Crops. | - As above -   |
| (c) Banana Improvement in Asia: Integration of Mutation and related technologies into Conventional Breeding.                    | Atomic Energy Agricultural Research Centre (AEARC), Tandojam.  |

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#### 4. RESEARCH REACTOR UTILIZATION

As regards the project on Application of Personal Computers to Enhance the Operating and Management of Research Reactors, a personal computer-based system has been developed for specialised information on radiation data from radiation monitoring channels installed at various locations in the reactor building of PARR-1 at PINSTECH. Pakistan would like that emphasis be given to experiments on material structure examination and investigation of micro-structure defects in reactor material. Programme for study on the stress and texture of materials be initiated to solve the problems by industry.

#### 5. ENERGY & NUCLEAR POWER PLANNING

A six week regional RCA Training Course on Electric System Expansion Planning was organised at Lahore, Pakistan from 26 April to 4 June, 1992. The course was attended by 22 participants from eight RCA Member States and seven observers from Pakistan. Besides contributing towards strengthening the electric system expansion planning capability of the member countries, the course also proved to be very helpful in providing an opportunity to power system planners in these countries for mutual exchange of their experiences. It is strongly felt that this regional training activity should be continued in future as well.

#### 6. OTHER COMMENTS

Pakistan is providing training to the scientists from the Region at its Nuclear Institute for Agriculture & Biology (NIAB), Faisalabad in agriculture and biology and would like to continue this cooperation so that other countries in the Region could also avail this offer through TCDC. Pakistan is also keen to send its experts to the Member States of the Region for short duration as and when required.

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Keeping in view the importance of Civil Engineering in the area of public welfare including soil investigation, materials testing, water resources management and sewerage engineering, Pakistan would like to propose that this area be given due importance under RCA programme.

In conclusion, Pakistan wishes to express its satisfaction with the implementation of various RCA activities and would continue to support the activities carried out under the framework of RCA in the coming years to further promote Regional Cooperation in peaceful uses of nuclear energy.

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**PHILIPPINE STATEMENT**  
**22ND GENERAL CONFERENCE MEETING OF RCA MEMBER STATES**  
**VIENNA, AUSTRIA, 29 SEPTEMBER 1993**

It was a great pleasure for the Philippines to host the 15th RCA Working Group Meeting. The meeting was a very successful one and reconfirmed the strength and maturity of the technical co-operation net work that the RCA has forged in our region.

The meeting had the added significance of Mongolia's first official participation as the latest signatory to the Regional Agreement and the first working group meeting for Mr. QIAN Jihui in his capacity as Deputy Director General of the IAEA.

The Philippines remains firmly committed to the RCA and its programs and activities and have high hopes that it will continue to strengthen the role of nuclear science technology in the national developmental efforts in each Member State. Although, we have very modest contributions to the RCA, we certainly hope for that day when we can be a substantial donor to the Agreement.

During the period under review, the Philippines participated in twelve (12) projects. Allow me to present the highlights of our participation.

**1. REGIONAL UNDP INDUSTRIAL PROJECT**

**1.1 Tracer Technology and Nucleonic Control System**

Due to delayed approval and implementation of the project, the activities for the period have been limited to participation in the following:

- a. 1st National Co-ordinators Meeting (Tracer and NCS) at Sydney, Australia on July 6-8, 1993 and
- b. RTC on the Application of Modern Isotope Techniques to Industry at ANSTO on May 3-14, 1993.

In the absence of reactor-produced radioisotopes, the Nuclear Tracers Group (NTG) is limited to tracer applications using  $^{99m}\text{Tc}$ ,  $^{131}\text{I}$ ,  $^3\text{H}$  and other relatively long-lived radioisotopes whose importation is economically feasible.

Plans for the next two years include spin-off activities from leachate treatment plant, national seminars, termite studies,  $^{85}\text{Kr}$  applications and sealed sources applications (e.g. column scanning).

Assistance requested from the Project may be in the form of a Regional Project on making available short-lived radioactive tracers to NTGs which have no access to an operating reactor. It is also requested that missions under activities 1.1.1 and 1.2.5 preferably to coincide with our local training course (Industrial Uses of Radioisotopes Course) conducted once a year.

## **1.2 Nuclear Analytical Techniques**

The National Co-ordinator participated in the NCM held at Kuala Lumpur from 22-25 June 1993. Since the PNRI has given priority to air pollution studies in view of the acute air pollution problems of the country, linkages have been established for a collaborative research with the Department of Environment and Natural Resources. Nuclear analytical techniques will be applied for multielement characterization of Metro Manila air particulates and emission profiles for major pollutant sources. The data will subsequently be used for sources apportionment studies.

## **1.3 Non-Destructive Testing**

During the period under review, a total of 5 national training courses were conducted: UT-2, RT-1, SM-2, RT-2 and UT-2. 59 participants took the courses.

## **1.4 Radiation Technology**

### **1.4.1 Radiation Sterilization**

- a. PNRI and BFAD are working together towards the setting up of regulations on radiation sterilization
- b. PNRI has completed the final draft of rules and regulations on the licensing of large gamma irradiators
- c. R & D on radiation sterilization of medical projects, pharmaceuticals, tissue and bone grafts are on-going. Some local manufacturers in co-operation with PNRI have obtained clearances from BFAD to use irradiation for the decontamination of empty gelatin capsules and for sterilization of empty aluminum tubes and sutures.

#### **1.4.2 Radiation Curing**

A 2 week expert mission on UV curing (November 15-27, 1992) and some chemicals for UV curing of wood surface coating were obtained from IAEA. During the expert mission, a one-day seminar/workshop on radiation curing of surface coatings was held at Forest Products Research and Development Institute. A total of 64 participants (from wood products/furniture industries, research institutes and universities) attended the said seminar/workshop.

#### **1.4.3 Radiation Vulcanization of Natural Rubber Latex**

- a. PNRI is doing R & D work on radiation vulcanization of natural rubber latex.
- b. An expert mission on radiation vulcanization of natural rubber latex (November 9-20, 1992) was obtained under IAEA TA project PHI/8/013. During this mission, a national consultative meeting on RVNRL was held. Twenty-five (25) participants from the rubber industry, universities and research institutions attended this meeting.

#### **1.4.4 Electron Beam Treatment of Flue Gases**

PNRI initiated dialogue with the National Power Corporation (NPC) and the Environmental Management Bureau (EMB) of the Department of Natural Resources on Electron Beam Treatment of Flue Gases. NPC has shown interest in the technology. PNRI in co-operation with NPC is considering submitting a project proposal on the Electron Treatment of Flue Gases.

PNRI submitted a project proposal on EB Treatment of Flue Gases to the Green Aid Plan of the MITI, Japan.

#### **1.4.5 Upgrading of the multipurpose Gamma Irradiation Facility**

- a. The source of the multipurpose gamma irradiation facility was upgraded in January 1993 with an additional 50 kCi Co60 through IAEA TA project PHI/8/013.
- b. Also under this project, equipment such as infra-red spectrophotometer, Instron, data module for HPLC, etc., were received. These are being used for R & D on applications of radiation processing.
- c. Industries are availing themselves of the gamma irradiation services of PNRI, for the radiation sterilization of empty aluminum tubes, sutures and gloves and for decontamination by radiation of empty gelatin capsules, spices, teas, herbs and handicrafts.

## **2. MEDICAL AND BIOLOGICAL APPLICATIONS**

### **2.1 Radioimmunoassay for Hepatitis B Diagnosis**

Ms. Aida D. Eugenio, the National Co-ordinator for the project attended the National Co-ordinators Meeting held in Colombo, Sri-Lanka, 12-16 July 1993.

The senior project staff member participated in the Regional Training Course on the Preparation of Basic Reagents for the RIA of Hepatitis B Markers in Beijing, China, 26 April - 7 May 1993.

### **2.2 Inhalation Imaging for Diagnosis of Respiratory Diseases.**

The extension phase of the study involves the determination of lung clearance of Tc 99m-DTPA aerosol as evaluated against prevailing air pollution levels for each participating country. Data have been collected and the final report is being prepared.

### **2.3 Radiation Sterilization of Tissue Grafts.**

Since a linkage has been established with the National Kidney Institute, procurement of bones, tendons and other soft tissue allografts has increased. Production of freeze-dried amnion dressing, bone allografts and tissue like fascia and dura is being continued.

An active staff of the Tissue Bank and a PNRI research of the project attended the RCA Workshop on Total Quality Systems for Tissue Banking in Jakarta.

### **2.4 Imaging Procedures for Diagnosis of Liver Diseases (Phase II)**

The nuclear and ultrasound cases sent to the Japanese Co-ordinators (NIRS) were sent to the different participating countries for interpretation of the nuclear medicine physicians and ultrasound experts. Results will then be evaluated by computers.

### **2.5 Radiation Therapy**

During the study period, twenty-nine (29) patients with stage II-B to III were included in the study. External beam teletherapy of 40 Gy without shielding for 4 weeks and 50 Gy with blocks plus brachytherapy of 20-24 Gy were given using LDR or HDR machine. Point A, bladder and rectal points were defined following ICRU 38 recommendations. The results showed dose calculations between commercially available computers and IAEA provided computers agree to within 20%. Results of TLD measurement in bladder and rectum however have shown wide range of variation.

Several problems such as brachytherapy machine and TLD reader breakdown, loss of patients to follow-up and others were encountered during the course of the project. For further study more patients should be included and the second software developed for IAEA will be tested.

### **2.6 Care and Maintenance of Nuclear Medical Equipment**

The Philippines is exploring the possibility of hosting a Regional Workshop on QA/QC of Medical Instruments in 1994.

### **3. RADIATION PROTECTION**

#### **3.1 Radiation Protection Infrastructure**

The Philippines had actively participated in this project and expresses support to the planned major activities to be undertaken in the context of the priority areas identified in the Second Project Formulation Meeting in Tokyo and reviewed in the Expert Advisory Group Meeting held in Beijing.

The Philippines plans to organize a national train the trainers course in radiation protection in industrial radiography and a national training course in cytogenetics. It is hoped however that the Agency supports this kind of activities in view of inherent resource constraints in pursuing activities under the RCA Program. It is recommended that the Agency assists these activities by providing expert services in implementing national organized seminars/training course in radiation protection.

#### **3.2 Compilation of Anatomical Metabolic and Physiological Characteristics of Reference Asian Man**

Anatomical Phase: Data on organ masses (liver, spleen, adrenal, gall bladder, kidneys, lungs, pancreas, heart and thyroid) were gathered from 100 subjects representing Region 1. Data were also gathered from 108 subjects from the Sto. Tomas University Hospital (National Capital Region). Said data are being computed for average, median and standard deviation.

Physiological Phase: Pulmonary function tests were done on 350 subjects. Water balance studies were also done in a total of 200 subjects.

Dietary Phase: 42% of Filipinos in 9 regions of the country were surveyed for dietary intake. Data on food and elemental composition were processed and will be compared from values obtained by other Asian countries.

#### **4. AGRICULTURAL PROJECTS**

##### **4.1 Food Irradiation Process Control and Acceptance**

The following were done during the year:

- a. Establishment of the D-value for Salmonella in Philippine prawns
- b. Studies on Irradiation of Frozen cooked, peeled and chilled stored prawns
- c. Storage stability of frozen irradiated and non-irradiated prawns at -20C.

##### **4.2 Improvement of Grain Legume Rhizobium Symbiosis to Fix Atmospheric Nitrogen**

Work on this project included the field evaluation of 19 groundnut varieties for fixation ability and yield performance and greenhouse evaluation using 10 genotypes of peanut in an acid and limed soil with or without phosphorus treatment. Samples will be sent to IAEA for N-15 determination.

The Chief Scientific Investigator of the project attended the Fifth Research Co-ordination Meeting from 30 August to 3 September 1993 in Tamworth, Australia.

#### **5. RESEARCH REACTOR AND ENERGY BASED PROJECT**

The IAEA approved the extension of the research contract until 14 April 1993. Since the approval, some hardware components are being upgraded while some minor custom hardware are being fabricated and some softwares are being developed.



COUNTRY STATEMENT - SRI LANKA

22nd Meeting of the RCA Member States

Vienna, 29 September 1993

Mr. Chairman, distinguished delegates and other participants.

Please accept my congratulations Mr. Chairman, on your selection to the Chairmanship of this meeting.

Sri Lanka which has been a party to RCA since 1972, notes with satisfaction the success which regional cooperation has achieved in meeting the goals of the RCA to promote and coordinate cooperative research, development, and training projects in nuclear science & technology through the sharing of regional resources, including facilities, equipment and expertise, and the pooling of knowledge and close communication between scientists. Sri Lanka has benefited from RCA activities in a number of areas by way of awareness, development of skilled manpower and application of knowledge to the solution of national problems. I wish to express our gratitude to the IAEA, UNDP, donor countries, national institutes and coordinators in RCA countries and all others who have contributed to the success of the RCA.

It is the declared policy of the Government of Sri Lanka to give highest priority to sustainable development programmes which will bring about improvements in the economic and social conditions, and the quality of life of our people without environmental degradation. The Government has recognized that the proper application of modern science and technology, including Nuclear Science and Technology is essential for achieving its stated objectives.

### INDUSTRIAL APPLICATIONS

Sri Lanka has benefited from the UNDP/IAEA/RCA Industrial Application project through creation of national awareness of the potentialities of NDT, radiation processing, tracer methods and nucleonic control systems and training scientists in these fields.

A national capability for training and for providing services to industry has been developed and a NDT Society has been established. National standards for training and certification of NDT personnel have been established and adopted by Sri Lanka Standards Institute.

Research and development in Sri Lanka on radiation vulcanization of natural rubber latex has shown that the process merits commercial application. I would like to express my appreciation to the Government of Indonesia, for providing assistance for irradiation of 2 tons of processed rubber, which will be used for production trials.

A number of persons have been trained and an awareness has been created through demonstrations on application of nuclear tracers. Sri Lanka supports and places a high priority on the proposed new project on non-destructive evaluation for quality control and materials development. It also supports the new project on nuclear techniques in processing, modification and characterization of materials.

### MEDICAL APPLICATIONS

Medical applications have been among the more successful nuclear activities in Sri Lanka. IAEA technical assistance has been provided to several medical centres including the Government Cancer Institute, National Blood Bank, Colombo General Hospital and the Medical Faculties

of the Peradeniya and Ruhuna Universities to upgrade and modernize the existing nuclear medicine facilities and to establish new ones. These include the development of RIA facilities for in-vitro diagnosis, the establishment of computer supported Gamma camera equipment for in-vivo diagnostic imaging, and the improvement of radiation therapy for cancer patients by the introduction of a high dose rate Co-60 Brachy-therapy system.

Sri Lanka International Eye Bank is in the process of setting up a Tissue Bank. Several persons have been trained and most of the required equipment have been obtained through IAEA. A Co-60 irradiator is needed to make the bank operational. The success the Eye Bank has achieved, having provided 31,000 donor eyes to 61 countries is indicative of the potential of the proposed Tissue Bank. A proposal for a "Model Project" on establishing a tissue bank has been submitted to the IAEA.

A Screening programme for Hepatitis-B positive blood using RIA has been introduced with IAEA assistance at the Central Blood Bank in Colombo.

The development of national capability for nuclear instruments maintenance and repair is a high priority programme for Sri Lanka. Under the IAEA project on this subject, national workshops have been held on the quality control and preventive maintenance and services are provided on maintenance and repair. The Atomic Energy Authority is in the process of establishing a centre for maintenance of Nuclear Instrumentation under an IAEA Technical Cooperation project to provide an efficient service and to develop local manpower.

Sri Lanka supports the new CRP on evaluation of radioactive iodine

therapy for hyperthyroidism.

#### FOOD AND AGRICULTURE

Under the RCA project on Food Irradiation, microbiological studies on irradiated commodities have been carried out, to determine the total mesophilic count, coliform count and fungal count. Studies are being conducted to obtain consumer reaction to irradiated food.

The RCA project on Grain Legume and Rhizobium Symbiosis is an important activity for Sri Lanka because of the need to enhance biological nitrogen fixation by field crops. This will help to reduce dependence on expensive inorganic nitrogen fertilizers.

Sri Lanka supports the new projects on "Banana Improvement in Asia: Integration of Mutation and Related Technologies into Conventional Breeding" and "Establishment of a Regional Rinderpest Sero-monitoring Network in Asia in Support of SAREC".

#### RADIATION PROTECTION

Sri Lanka places high priority on development of infrastructure for radiation protection activities as this is an essential pre-requisite for all nuclear related projects. National regulations have been revised and submitted to obtain necessary approvals. A workshop on radiation protection for medical physicists, technicians and nurses, was held in 1991 with IAEA assistance. A training exercise on quality control of X-ray machines for reduction of patient dose was conducted recently and a workshop is planned for medical scientists in 1993. Several training programmes have been conducted for industrial users.

ENERGY BASED PROJECTS

A number of persons from the Ceylon Electricity Board have been trained on the use of WASP which is being used now by the Generation Planning Branch of the CEB. Sri Lanka supports the continuation of this activity.

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THAILAND COUNTRY STATEMENT  
AT THE 20TH GENERAL CONFERENCE  
OF REPRESENTATIVES OF RCA MEMBER STATES  
29 September 1993

Mr. Chairman,

First of all, may I, on behalf of the Thai delegation, congratulate you on your assumption of the Chairmanship of this RCA General Conference.

On this occasion, I have a great pleasure to make a review on the activities undertaken during the past year in connection with the RCA Project and their impacts to Thailand. Also I would like to propose comments on the new projects to be implemented during the current phase.

In collaboration with UNDP, IAEA and contributions from all the member states, RCA Project has widely accelerated peaceful uses of nuclear technology generating a great deal of benefits to the countries in this Asia and the Pacific Region. Thailand is not an exception, the application of nuclear technology has rapidly expanded throughout the country in various fields, for instance; medicine, agriculture, industry, etc.

Focusing on industry, the utilization of this technology has significantly increasing for its benefits in saving energy and resources. Proven to be the effective technique, this technology has been spreaded into the modern industry, especially petroleum and petrochemical industry.

Thailand joins the other member states in congratulating the implementation of the new UNDP/IAEA/RCA "Use of Isotope and Radiation to Strengthen Technology and Support Environmentally Sustainable Project". This will emphasize its outstanding role in preservation and protection of our environment.

Assuring the fully continued and consistent support to all activities under the RCA Project, particularly those concerning the environmental preservation and protection, Thailand hosted the NEMS and Field Demonstration on the Use of Radiotracer Technology in Industry during 9-13 August 1993. In May 1994, Thailand has planned to host the other regional training course under the UNDP/IAEA/RCA Project on Radiation Sterilization - Quality Control and Application of ISO Standard.

With regard to the new project proposals submitted during 15th RCA Working Group Meeting in Manila, Thailand is pleased to place as the first priority, the Use of Sterile Insect Technique to Protect Fruit and Vegetables from Destruction by Tropical Fruit Flies. The next priorities have been listed as follows:

- Establishment of a Regional Rinderpest Sero-monitoring Network in Asia in Support of the South Asia Rinderpest Eradication Campaign (SEREC)
- Amelioration of Environment Population by of F-1 Sterility for Controlling Caterpillar Pest of Horticultural and Field Crops
- Banana Improvement in Asia: Integration of Mutation and Related Technologies into Conventional Breeding.

Finally, I would like to express our most grateful thanks to the IAEA, UNDP and all donor countries for their great and distinguished contributions rendered to Thailand in achieving the goals of the RCA Programme.

Thank you.

**COUNTRY STATEMENT - VIETNAM  
22nd MEETING OF THE REPRESENTATIVES OF  
RCA MEMBER STATES**

**29 September 1993, Vienna**

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Mr. Chairman,  
Distinguished Delegates,  
Ladies and Gentlemen,

On behalf of the Government of Vietnam, I would like to thank the IAEA and the Government of the Philippines for the support and the excellent organization of the 15th Working Group Meeting in Manila last March. I would also like to extend our congratulations to the IAEA and the RCA Member States on the success of the Meeting and the approval of the UNDP to support our Environmental Project financially. My congratulations are extended to the Delegation of Mongolia too, on the participation of Mongolia to our RCA community. All these facts are an expressive evidence of the effectiveness of RCA network's activities and prove the determination of all RCA States to get together in implementing the 1992 RCA Extension Agreement.

Mr. Chairman,  
Ladies and Gentlemen,

As a RCA Member State, Vietnam is pleased to say that over past years, the more we get involved in RCA activities the more we get benefits from them. Actually, the implementation of the RCA programme has integrated with the national activities of Peaceful Uses of Atomic Energy. Besides, taking part in the RCA network, Vietnam has got better mutual understanding and co-operation with neighbouring countries. The growing number of persons got training from RCA programmes has steadily provided the country with competent scientists of various subjects of Nuclear Science and Technology. This, in turn, has encouraged Vietnam to contribute to RCA as much as we can though it is not easy for us in terms of finance and techniques. During the period of 1992-1993, we have been accepted to host three regional activities : two

Regional Workshops and an AGM to be held in Hanoi in this December.

Mr. Chairman,  
Ladies and Gentlemen,

At this meeting, Vietnam would like to express its highest appreciation to the IAEA, Governments of Australia and Japan for their effective supports and generous contributions to the realisation of the UNDP/IAEA/RCA Environment Project. We are very glad to see that soon after the project got officially approved the IAEA, Australia and Japan have well co-ordinated to deploy the project as scheduled. Through the Plans of Action outlined at the NCMs and AGMs for the project, Vietnam would like to reiterate its support to the project, whose precedent project has helped us in creating firm basis for developing such industrial applications as NDT, NCS, Tracers Techniques and Radiation Technology, going to turn into a boom period, if it could be said so. Vietnam hopes that with the proposed programme in 1994 for this project a good outcome will be seen at the end. To contribute to the programme, in 1994 we would like to host some of regional activities for Radiation Technology and NDT.

Regarding the projects in medical and biological areas, we would like to express our thanks to the Government of Australia for its creation of and support to project RAS/6/022, which we found a good means for strengthening Nuclear Medicine in our country. At the same time, Vietnam has great interest in implementing project RAS/7/003 - on Radiation Sterilization of Tissue Grafts. A Regional Workshop for it is going to be hosted by Vietnam in this November.

Concerning Radiation Protection, in 1994 Vietnam has a plan to improve the national network of Nuclear Safety and Radiation Protection Monitoring technically and legislatively as well. Vietnam sees the implementation of project RAS/9/006 a good hand for our goal.

With respect to Research Reactor Utilization Project, Vietnam remains its interest and would like to

get more benefits from our only research reactor, which has successfully exploited over years.

Finally, I would like to reiterate Vietnam's strong support to the RCA proposed programme in 1994 and our sincere thanks to all donor countries for their contributions to RCA.

I wish the co-operation between RCA States more consolidated and successful.

Thank you.



**Hosting of RCA Working Group Meetings 1979 to 1992**

1. 1st RCA Working Group Meeting, Tokyo, Japan 15-19 October 1979.
2. 2nd RCA Working Group Meeting, Manila, Philippines, 27 March-1 April 1980.
3. 3rd RCA Working Group Meeting, Jakarta, Indonesia, 21-27 May 1981.
4. 4th RCA Working Group Meeting, Kuala Lumpur, Malaysia, 16-21 June 1982.
5. 5th RCA Working Group Meeting, Dhaka, Bangladesh, 11-16 May 1983.
6. 6th RCA Working Group Meeting, Kalpakkam, India, 20-23 March 1984.
7. 7th RCA Working Group Meeting, Lahore, Pakistan, 25-28 March 1985.
8. 8th RCA Working Group Meeting, Seoul, Republic of Korea, 25 April-2 May 1986.
9. 9th RCA Working Group Meeting, Colombo, Sri Lanka, 23-26 March 1987.
10. 10th RCA Working Group Meeting, Beijing, China, 11-14 April 1988.
11. 11th RCA Working Group Meeting, Sydney, Australia, 13-16 March 1989.
12. 12th RCA Working Group Meeting, Chiang Mai, Thailand, 19-22 March 1990.
13. 13th RCA Working Group Meeting, Ho Chi Minh City, Viet Nam, 4-7 March 1991.
14. 14th RCA Working Group Meeting, Tokyo, Japan, 24-28 March 1992.

