



International Atomic Energy Agency

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THIRTEENTH MEETING OF  
REPRESENTATIVES OF RCA MEMBER STATES

26 SEPTEMBER 1984  
KONGRESSZENTRUM NEUE HOFBURG, VIENNA

S U M M A R Y R E P O R T

Thirteenth Meeting of  
Representatives of RCA Member States

26 September 1984  
Kongresszentrum Neue Hofburg, Vienna

SUMMARY REPORT

The 13th Meeting of Representatives of RCA Member States was held on September 26, 1984 in Vienna. A list of participants is attached as Appendix 1.

Mr. M. Zifferero, Deputy Director General and Head of the Department of Research and Isotopes, IAEA, welcomed the participants and made a statement on the progress achieved within the RCA programmes during the past year. He pointed out that some of the projects have now entered Phase II of implementation after successful completion of the initial stages, and emphasized the importance of the RCA Working Group meetings, strongly urging the participation of all RCA Member States. The 7th Working Group meeting will be held in Pakistan in March 1985.

Mr. Zifferero noted with special pleasure the presence of observers in this meeting from the People's Republic of China, and expressed the hope that China would be participating in RCA in the near future. Mr. Zifferero's remarks are attached as Appendix 2.

Mr. Zifferero then called for the election of the Chairman of the meeting, and Mr. P.K. Bhatnagar of the Office of the Chairman, Atomic Energy Commission of India, was elected Chairman by acclamation.

The tentative agenda for the meeting was approved. A copy is attached as Appendix 3.

In his opening remarks, the Chairman stressed the ever increasing importance of good cooperation in the more basic aspects of national nuclear programmes, including the prospection of mineral resources, nuclear power planning and implementation, as well as power reactors, their operation and waste management.

Report of the Sixth RCA Working Group Meeting

The Sixth RCA Working Group Meeting was held in Kalpakkam, India, 20-23 March 1984. The Summary Report was presented by the IAEA Secretariat, and the major conclusions in the report and items to be discussed during RCA/13 were outlined. This report, which had previously been submitted formally to the Member States, was accepted to serve as the Report of Recommendations for RCA/13. The summaries are attached as Appendix 4 and 4a.

The Agency's Scientific Officer of the Project on Imaging Procedures for the Diagnosis of Liver Diseases reported briefly on the Planning Meeting for this project, held in Seoul, Republic of Korea, 22-24 August 1984, where the draft proposal and the action plan for the project had been accepted.

The Head of the Programme Coordination Section, Department of Technical Cooperation, IAEA, gave a detailed report on the progress of the IAEA/UNDP Industrial Project including recent activities of project evaluation and the recommendations of the 4th UNDP Senior Board of Advisors Meeting.

Following the reports by the IAEA Secretariat, the delegates expressed their general satisfaction with the progress achieved in all the projects, and presented their comments.

All the delegates extended a very warm welcome to the delegates from the People's Republic of China, and expressed the hope that China would soon be joining RCA as a full-fledged member.

The delegate from Australia reviewed recent Australian cooperation in the IAEA/UNDP Industrial Project, Nucleonic Control Systems, sub-project on Mineral Exploration, Mining and Processing. This cooperation was implemented with the assistance of the Philippine Atomic Energy Commission and the Philex Mining Company, Philippines. The Australian delegate further reported on the Executive Management Seminar held in the Philippines, 11-12 June 1984. He also recalled the in-kind support extended by the Government of Australia to the project on Hydrology and Sedimentology, and the forthcoming IAEA training course on Radioimmunoassay (1985). The delegate from Australia then officially announced his Government's decision to support the project on Food Irradiation Phase II, at a level of US\$260,000 over a period of three years, starting in 1985. He also announced that the Government of Australia would host a workshop on the subject in May 1985.

The Australian delegate requested the Agency to take stock of coordinated research projects under RCA, and to endeavour to avoid overlap by thoroughly examining the definition, objectives and priorities of the 14 ongoing projects, and urged a real tangible commitment on the part of the Member States.

The delegate from Japan stated that his Government would continue to make contributions to the extent possible. The total contribution to RCA for the year 1984 amounts to US\$380,000, including US\$260,000 for the UNDP Industrial Project and US\$120,000 for the project on Medical and Biological Applications. The Japanese delegate recommended that the Secretariat coordinate the views and interests of the participating countries in selecting and clarifying the priority of ongoing and future projects. He also recommended a strengthening of the coordination between the Departments of Research and Isotopes and Technical Cooperation. The first step to this effect was recently taken by creating the UNDP Task Force. He noted the recommendation of the UNDP Senior Board of Advisors that IAEA should consult with Member States to a larger extent before proposing changes in sub-projects, and to keep the Senior Board of Advisors fully informed of such changes, especially noting the proposed two-tier management.

The Japanese delegate announced that the First Research Coordination Meeting on Imaging Procedures for the Diagnosis of Liver Diseases will be hosted by Japan in 1985, and that training of local staff will be provided after shipment to Malaysia of the Ralstron equipment donated by Japan. In conclusion, he suggested a revision and update of the text of the Regional Cooperative Agreement to eliminate existing discrepancies between the text and actual practices.

The delegate from India outlined the extent of Indian support to RCA, and announced that his Government proposed to offer facilities for the development of the Medical and Biological Applications project. He stressed that the recent recommendations of the Senior Board of Advisors (UNDP) regarding the management of the project should be given most careful consideration, and suggested that it would be appropriate for the project management to be based in the region. He reiterated the statement made by the Chairman concerning new programmes including the development of nuclear power programmes in the region.

The delegate from Malaysia conveyed his Government's offer to host the train-the-trainers workshop on maintenance of nuclear instruments in Kuala Lumpur, November 1984, and suggested postponement of the training workshop on brachytherapy of uterus cancer from 1984 to 1985.

The delegate from Pakistan reviewed activities in his country and requested the support of other Member States towards the realization of a commercial  $\gamma$ -irradiation facility for food in Pakistan.

The delegate from the Philippines reported on progress achieved in the projects in which his country is participating.

The delegate from Indonesia informed that the construction of the electron accelerator for surface coating will be completed by November 1984 and the first training course will begin immediately following inauguration.

He requested that training in NDT level III be included in the UNDP Industrial Project plan for the next five years.

Progress reports were also presented by the delegates from Bangladesh, Sri Lanka and Thailand.

In relation to the recommendations of the UNDP Senior Board of Advisors, the delegates from Sri Lanka and Thailand requested that more detailed information be conveyed to the national counterparts by IAEA before reaching any final decisions.

The delegate from Sri Lanka conveyed his Government's offer to host the 9th RCA Working Group Meeting (1987).

In his closing remarks, DDG-RI expressed the Agency's great appreciation to the Government of Australia for the generous contribution to the Food Irradiation Project Phase II.

In reply to the statement made by the delegate from Japan, he said that the Secretariat was aware of certain discrepancies between the original provisions made for the implementation of RCA projects (INFCIRC/167) and actual practice, and said that IAEA was prepared to consider certain revisions, if and when necessary. Concerning increased coordination between the Departments of Research and Isotopes and Technical Cooperation, Mr. Zifferero pointed again to the recently created Task Force. He further assured the Meeting that it was not the intention of IAEA to move management responsibility for the UNDP Industrial Project from Indonesia to Vienna, but rather to create a wider margin for improved administration.

With regard to questions raised on the recommendations of the SBA for the future scope of the UNDP/RCA industrial project, the Head of the Programme Coordination Section, acting as project officer for the technical cooperation activity, said that final recommendations would be formulated by the SBA as part of their mid-term project review at their next meeting to be held in December 1984 in Tokyo. A formal review of these recommendations would follow in January 1985 at a Tripartite Review Meeting at which UNDP representatives, national coordinators of participating governments and the Agency would participate. This meeting is scheduled to be held in Jakarta in January 1985 and was designed to ensure full participation by all concerned. Only a project revision following the Tripartite Meeting signed by all parties concerned could introduce significant changes to the present project design.

As to the proposal by the delegate of India to extend RCA activities to the fields of nuclear power planning, fuel cycle and waste management, DDG-RI replied that this item had already been discussed during the 4th Working Group Meeting in Kuala Lumpur, 1982, and could come again under discussion at the next Working Group Meeting at the request of Member States.

The delegate from Pakistan confirmed his Government's offer to host the 7th RCA Working Group Meeting in 1985.

The delegate from Australia expressed his Government's concern, also manifested by a number of other Member States, at the apparent proposal to appoint a Project Manager for the UNDP Industrial Project to be based in Vienna. It is, he said, his Government's view that such an appointment would need the most careful review and consideration, and urged that all the Member States should be involved in such a decision.

The Chairman then summarized the discussion. The Thirteenth Meeting of Representatives of RCA Member States was adjourned at 17:00 hours.

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1984 RCA Costing Table

UNDP project on industrial applications of isotopes and radiation technology	\$1,316,156 <sup>1)</sup>
The use of induced mutations for improvement of grain legume production	27,000
Food irradiation	90,000 <sup>2)</sup>
Nuclear techniques to improve domestic buffalo production	73,000
Sterilization of biological tissue grafts	41,000
Health-related environmental research	55,000
Maintenance of nuclear instruments	65,000
Basic science using research reactors	40,000 <sup>3)</sup>
Isotope applications in hydrology and sedimentology	12,000
Semi-dwarf mutants for rice improvement	73,000
Improvement of cancer therapy	140,000 <sup>4)</sup>
Imaging procedures for diagnosis of liver diseases	85,000 <sup>5)</sup>
Nuclear techniques for tropical parasitic diseases	87,900 <sup>6)</sup>
Development of Tc-99m generator systems	100,000 <sup>7)</sup>
Working group meeting	<u>4,000</u>
<b>TOTAL</b>	<b><u>\$2,209,056</u></b>

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- 1) The project is funded by UNDP at a level of \$436,000, by RCA Governments at a level of \$734,327, and by industries at a level of \$145,829.
  - 2) To be funded by a contribution from the Government of Australia.
  - 3) To be funded by an expected special contribution of \$50,000 by the Government of India.\*
  - 4) Part of the cost (\$40,000) will be borne by an expected contribution of the Government of Japan (includes one training workshop - \$80,000). Revised.
  - 5) Part of the cost will be borne by the Government of Japan. Revised.
  - 6) Includes one training course (\$35,000).
  - 7) Includes one training course (\$60,000).
- \* The remainder (\$10,000) will be used to fund a training workshop.

13th Meeting of RCA Member States  
Kongresszentrum Neue Hofburg, Vienna  
26 September 1984

LIST OF PARTICIPANTS

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13th MEETING OF REPRESENTATIVES  
OF RCA MEMBER STATES

OPENING REMARKS

by

Maurizio Zifferero

Deputy Director General

Head of the Department of Research and Isotopes

Distinguished delegates and guests from RCA Member States,  
Ladies and Gentlemen.

On behalf of the Director General of the International Atomic Energy Agency, I welcome all the delegates, experts and observers to this Thirteenth Meeting of RCA. It is my great pleasure to welcome the delegate from the People's Republic of China as an observer to this meeting for the first time, and it is my hope that China may soon be participating in RCA.

To continue the tradition established in previous RCA meetings, I would like to give you a brief review of the progress of our activities since the last meeting.

All the RCA activities have steadily developed, and some of the coordinated research programmes have now entered Phase II after successful completion of their initial stages. Several new projects, have been implemented, such as the project on medical and biological applications. The 5-year UNDP Industrial Project, initiated in 1982, has reached the mid-way point of its duration, and the programme for the following five years will be considered after the mid-term evaluation of the ongoing project and market studies are completed.

The last Working Group meeting, held in Kalpakkam, India, resulted in a number of useful comments and recommendations, which will be reported on by the RCA Coordinator. Let me stress the importance of the meetings of the Working Group where all the technical issues relevant to the different projects are debated, proposals for new activities are discussed, and the orientation of future activities is decided.

The next Working Group meeting will be held in Pakistan in March 1985, and the participation of all RCA countries is strongly recommended.

The RCA consolidated budget for 1984 amounts to 2.6 million dollars, which shows a decrease of 1 million dollars as compared to the budget for 1983. The main reason for this decrease is the decline in expenditure for the UNDP project, for which all major investments in equipment have now been made. The total UNDP project budget for 1984 amounting to US\$1,767,080 is funded by UNDP (US\$453,880), by RCA Governments (US\$1,037,291), by industries in Member States (US\$147,269), and by the Agency at a level of US\$128,640.

Of the total amount of US\$833,500 earmarked for research contracts and research coordination meetings in 1984, US\$573,500 come from the Agency's regular budget, and the balance of US\$260,000 is expected to be funded by contributions from Australia, India and Japan.

It should be noted that the Agency's allocation was increased by 44.5% this year and has reached 16.7% of the Agency's total budget for research contracts. I would like to express, on behalf of the Director General, the Agency's sincere thanks to the Governments of Australia, India and Japan for their continuing support and financial contributions to RCA.

One of the highlights of the success achieved in the UNDP Industrial Project is the completion of the establishment of a 300 kCi Co-60 irradiation facility for natural rubber vulcanization at the Centre for the Application of Isotopes and Radiation in Jakarta, Indonesia. The construction of the 350 kV electron accelerator for the project on wood-surface coating will be finished this October at the same Institute, and the inauguration is planned for November 1984.

The 4th and 5th meetings of the UNDP Senior Board of Advisors were held in Kuala Lumpur, Malaysia (14-16 December, 1983) and in Adelaide, Australia (18-20 June, 1984), respectively. The next SBA meeting will be held in Japan in December of this year, and the mid-term evaluation of the project and the preparation of the next five-year plan will be on the agenda. Market studies on the UNDP Industrial Project were carried out this year by Mr. E.E. Fowler, and executive management seminars are also being carried out.

In respect of the certification scheme and the training programme for NDT specialists, which was presented at RCA/12, the comments of participating governments have now been received and were discussed at the meeting of the NDT Expert Advisory Group in Bangkok, 22-25 May 1984. It can be concluded that RCA Member States have approved the certification scheme and steps are being taken now to harmonize the local training to the scheme. It is also noteworthy that NDT societies and/or national certifying bodies are already in existence in six countries of the region.

The demonstration-training courses on the nucleonic control systems (mining, paper, steel), on the sterilization of medical products, and on tracer applications have been completed, as well as training courses for rubber vulcanization and nuclear instrument maintenance.

Four new projects in the field of medical and biological applications of nuclear techniques were implemented in 1983 and have made good progress in 1984. A large part of the budget for two of these projects is being funded through a special contribution by the Government of Japan. A planning meeting for imaging procedures for the diagnosis of liver diseases was held in Seoul, Republic of Korea in August, and the proposed project plan was discussed and approved by all the participants.

At the last Working Group meeting, the Government of India offered to support a workshop on neutron activation analysis as an activity under the project "Use of Research Reactors in Basic Research". The workshop will be held at the Bhabha Atomic Research Centre early next year.

At the last RCA meeting, delegates from Member States expressed their strong interest in continuing activities on food irradiation, focussing on the transfer of technology to local industries (RPFI Phase II). Proposals were discussed in principle at the RCA Working Group meeting held in Kalpakkam in March, and the technical details were discussed at the 4th Project Committee Meeting held in Seoul, Republic of Korea, in early April this year. The outcome of the two meetings has already been communicated to all Member States of RCA.

At both of these meetings, the Government of Australia expressed its interest in supporting financially the activities of the Food Irradiation Project Phase II, and a proposal to this effect was submitted by the Agency to the Australian Government in 1983, based on funding the project for three years at a cost of US\$90,000 per annum. We are awaiting notification that the Australian Government will accept this proposal.

In the meantime, and based on the recommendation of the 4th Project Committee meeting, the Agency initiated action to extend the Agreement establishing the project for another three years starting from 28 August 1984. I am pleased to report that, to date, the Governments of India, Indonesia, Malaysia and Thailand have already notified the Agency of their acceptance of the extension of the Agreement. The Agreement will enter into force as soon as acceptance is received from a donor Government.

RCA Member States may be interested in knowing that an International Consultative Group on Food Irradiation was established on 9 May 1984. The major objectives of the Consultative Group are to further the development and commercialization of food irradiation, and to assist Member States in the promotion of wholesome food supplies and proper nutrition. To date, five RCA Member States, i.e. Bangladesh, India, Malaysia, Philippines and Thailand are members of this Group.

The other coordinated research programmes are developing with satisfactory results. Two of these projects, namely those on the Use of Induced Mutation for Improvement of Grain Legume Production and Nuclear Techniques to Improve Domestic Buffalo Production, are being extended, and a new programme on Health-related Environmental Research is being prepared.



SIXTH WORKING GROUP MEETING  
OF RCA MEMBER STATES

Kalpakkam, India  
March 20-23, 1984

SUMMARY REPORT

The 6th Working Group Meeting of Member States of RCA (Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology) was held at the Reactor Research Centre, Kalpakkam, near Madras, India, March 20 to 23, 1984. The meeting was hosted by the Department of Atomic Energy of the Government of India and was attended by representatives from 8 RCA Member States. A list of participants is attached as Appendix 1.

Mr. C.V. Sundaram, Director, Reactor Research Centre, Kalpakkam, Department of Atomic Energy, India, welcomed the delegates and introduced the participants. He also briefly explained about the various activities of the Centre. His remarks are attached as Appendix 2.

Professor M. Zifferero, Deputy Director General and Head of the Department of Research and Isotopes, International Atomic Energy Agency, traced the history of RCA and reviewed its current activities in his opening remarks (Appendix 3): Prof. Zifferero pointed out that IAEA is putting ever increasing emphasis on RCA activities and that, to facilitate this task, a full time Co-ordinator had been appointed, at the level of Director, in the person of Dr. M. Kobayashi.

Dr. R. Ramanna, Chairman of the Atomic Energy Commission of India and Secretary to the Department of Atomic Energy, Government of India, in his inaugural address recalled the active role played by India in RCA activities. He drew attention to the common problems of introducing nuclear power in developing countries and suggested that RCA should address itself to co-operative aspects of this question (Appendix 4). Dr. D.V. Gopinath, Head, SRL, Reactor Research Centre, presented a vote of thanks on behalf of the Local Organizing Committee for the Working Group Meeting. It is attached as Appendix 5.

Following the opening of the meeting, Dr. P.K. Iyengar, Director, Bhabha Atomic Research Centre, Bombay, was unanimously elected Chairman of the meeting. His name was proposed by the representative of Japan and seconded by the representatives of Australia and the Republic of Korea. Dr. Iyengar thanked the representatives of the Member States and re-emphasized the need for greater co-operation among RCA countries. While appreciating the considerable efforts already put into RCA by Member States in the field of isotope applications in agriculture, medicine and industry, he felt that it would be desirable to develop good programmes in basic research. In this context, he suggested that a team of scientists drawn from various Member States might form a research group and work on specific projects in designated laboratories in Member States under guidance for durations of six months or more.

The provisional schedule of the meeting was circulated and accepted.

## AGENDA ITEM I

### Progress of RCA Research Projects

A status report of co-operative research projects for the years 1983-84 was presented by Dr. M. Kobayashi, RCA Co-ordinator of IAEA. The report is attached as Appendix 6.

The representatives of Member States generally expressed satisfaction with the progress made in the various research projects. The discussions regarding individual research projects are summarized below:

#### 1. Use of induced mutations for improvement of grain legume production

In view of the good progress achieved thus far in this project, it was agreed to extend the duration of the programme until 1986.

#### 2. Food Irradiation Phase I

The participants expressed the view that in most countries the food irradiation programme had reached a stage where it can be transferred on a pilot-plant or industrial scale for specific commodities. Copies of the revised version of the Recommended Codex International General Standard for Irradiated Foods were made available by the IAEA Secretariat to serve as guidelines in formulating national standards (Appendix 7).

#### 3. Nuclear techniques to improve domestic buffalo production Phase I

While generally appreciating the progress made in this project, the representatives from India and Thailand desired that specific accomplishment should be highlighted.

#### 4. Radiation sterilization practices for medical supplies

The project was completed in 1983 with the compilation of a code of practice. The Indian representative requested that copies of the recommended code of practice prepared previously by the Agency and further outlined in a coordinated research programme in 1983 should be made available to all RCA Member States. He also expressed the view that further updating of the code of practice should depend on the outcome of further international efforts.

#### 5. Health-related environmental research

It was noted that upon successful completion of the project, it was phased out by the end of March 1984.

6. Maintenance of nuclear instruments

Comments made by participants included the following: a) IAEA should consider establishing a "spare parts" bank to provide urgent supply of spare parts of nuclear instruments to Member States; b) it was felt that sufficient emphasis had been given to areas like air conditioning and power fluctuation and that these need not be further stressed in future training programmes; c) the representatives from India and Thailand suggested that training programmes in the field of maintenance of industrial nucleonic control systems are important and should be given adequate attention; d) the Deputy Director General, Department of Research and Isotopes, IAEA, informed the participants that the Agency is considering to conduct, at its laboratory at Seibersdorf near Vienna, quality control of all nuclear instruments to be supplied under the Agency's technical co-operation programme.

7. Basic science using research reactors

A report on the IAEA-RCA Workshop on the use of microprocessors in research reactor utilization, held in early 1984 at the Bhabha Atomic Research Centre, India, was presented by the Indian representative. The report is attached as Appendix 8. The members appreciated the useful programme of the course and felt that similar workshops should be held in future. The use of personal computers in analysing scientific data might also be included in the future programmes.

8. Isotope application in hydrology and sedimentology

The Australian representative expressed the view that the countries participating in this programme have reached a stage where further cash contributions to the programme will not be needed. Hence, he informed that future Australian contributions to this programme may be "in kind" contributions. The representative of Malaysia agreed with this view.

9. Other on-going projects

The participants approved the progress reports on the ongoing programmes related to semi-dwarf mutants for rice improvement, cancer therapy, tropical parasitic diseases, and production of Tc-99m generators, which were included in the background document prepared by the IAEA secretariat.

AGENDA ITEM II

Progress of the RCA/UNDP Industrial Project

A summary of progress achieved was presented by the RCA Co-ordinator. The Japanese representative reported on Japanese co-operation in 1983/84 and expressed the intention of his government to make every possible effort to continue this co-operation.

Unfortunately, the Project Co-ordinator, Mr. Sobhak Kasemsanta, was able to attend the 6th Working Group meeting only for one day (March 22) and the detailed discussions were postponed until his arrival. The report and work plan were presented by Mr. Kasemsanta during the session held on March 22. The text of Mr. Kasemsanta's presentation is included as Appendix 9.

The Indian representative pointed out the usefulness of the various sub-projects of the UNDP Industrial Project, and especially noted the training/demonstration programmes. He gave a detailed progress report of the training programmes conducted in India and other countries, particularly in tracer technology (India and Singapore), radiation sterilization (India and Republic of Korea), and nucleonic control systems in the steel industry (India and Japan). He made two further observations: Regarding the annual budget, it was, he said, important that the national counterparts be consulted before any major changes in individual sub-projects are made. He suggested proceeding with caution regarding market survey studies for radiation equipment and nucleonic systems. While some of the sub-projects are at a mature stage, e.g. nucleonic systems in the paper industry, in some other programmes such as application of electron beam processing, no equipment has been installed yet and the first training/demonstration has yet to take place. Also, the technology for radiation vulcanization of rubber is not yet completed and the sub-project is not ready for technology transfer.

Industries in developing countries are just becoming aware of the value of electron beam machines. Market surveys will be more meaningful after about one year when the above technologies are established and the first series of executive management seminars in different sectors is completed.

The representative of Malaysia generally agreed with the need to establish a demonstration programme before the market survey was carried out. The representative of Bangladesh emphasized the need for an intensive train-the-trainers programme. The IAEA representative suggested that national agencies should take care in the selection of candidates for training and mentioned that the Senior Board of Advisors had suggested that about 70% should be from industry and 30% from national centres. It was generally agreed that the training/demonstration programmes were useful and that survey studies should be taken up only after careful planning at the appropriate time.

To optimize the benefits of the training courses, it was recommended that follow-up action be taken on the continuing engagement of the trainees in their respective areas of specialization.

AGENDA ITEM III

Action Plan for 1984 and Cost Projection for 1985

The 1984 RCA action plan and 1985 cost projection were presented by the IAEA secretariat. (Appendix 10). The total budget for RCA projects in 1984 is US\$2,454,559. Of this amount, the budget for research projects amounts to US\$833,500 and that for the UNDP industrial projects to US\$1,621,059. The representatives expressed their great appreciation of the IAEA's continuing financial support to RCA and urged strong support for the activities planned for 1984 and 1985. Certain representatives enquired about relative priorities of the various projects under the RCA research programmes and the flexibility existing to respond to such priorities. The DDG-RI, IAEA, clarified that, within the total allocation limit, re-allocation to different projects is possible and can be done to meet the wishes of RCA Working Group members. It was agreed that a system for the evaluation of the projects and for establishing priorities should be established. The achievements in the projects should also be highlighted in such evaluations.

AGENDA ITEM IV

Basic Science for Advanced Reactors

In the context of RCA programmes and basic sciences and research reactor utilization, Mr. C.V. Sundaram, Director of the Reactor Research Centre, gave a presentation on the research programme carried out at the Kalpakkam Centre and highlighted some of the important areas of basic research necessary for advanced reactors.

AGENDA ITEM V

Medical and Biological Applications of Nuclear Techniques (Revised)

After reviewing Japanese cooperation in RCA, including JICA's activities, the Japanese representative stated that his government would support the project, especially in the fields of nuclear medicine and cancer therapy. A draft agreement is being prepared similar to the Agreement for the Food Irradiation Project, with an expectation of wider participation of RCA Member States. He also explained the results of radiation treatment of cancer under hyperthermic conditions and using sensitizers, and emphasized the relative cost advantage of hyperthermic machines in comparison with high LET radiation techniques which require expensive cyclotrons. The representative from Korea urged to caution as this technique is still in a research and development state.

Within the co-operative research project on nuclear medicine for liver and thyroid diseases, it was proposed, based on the recommendation of a recently IAEA consultants' meeting, to initiate a programme on "Imaging procedures for the diagnosis of liver diseases". The revised proposal, along with revised budget estimates, is attached as Appendix 11. In the revised programme, the envisaged training programme on radioimmunoassay techniques for thyroid hormones will be held in 1985 by IAEA, possibly with the support of the Australian government. The Indian representative informed that training programmes in RIA techniques are held regularly in India. He also said that the possibility of including candidates from RCA countries in one of the regular training courses or even conducting a special training course for them could be examined in 1985.

The representative from Korea indicated that the Specialists' meeting on imaging procedures for diagnosis of liver diseases under this project will be held at Seoul as proposed, pending final approval of his government. He also informed that the meeting could be held during the first week of September 1984, following the Asia-Oceanian Congress of Nuclear Medicine, scheduled to be held in Seoul from 27-31 August, 1984.

#### AGENDA ITEM VI

##### Nuclear Techniques to Improve Domestic Buffalo Production Phase II

In view of the good progress achieved in Phase I of this programme, it was decided to implement Phase II of the project. However, it was felt that the work plan as envisaged covers too many areas and it may be advisable, considering the limited resources available, to concentrate on selected areas such as nutritional aspects. It was felt that IAEA should consider this aspect at the time of awarding the contracts.

#### AGENDA ITEM VII

##### Future Programmes and New Proposals

###### 1. Food Irradiation Phase II

The representative from Bangladesh announced that an irradiator from USSR would be provided to his country under the IAEA technical cooperation programme, and he offered its use to other Member States of RCA. He also announced that irradiated food had been cleared for human consumption in his country. The representative from Thailand informed that the present trend in his country is towards commercialization of food irradiation (onions and potatoes) in the private sector.

The representative from India said that the objectives and work plan as outlined may require certain modifications. The objective outlined in point 1.1 of the document prepared by the IAEA secretariat may be modified so that food irradiation technology should be applied to

products carefully selected to suit the needs of the region. From this point of view, the insect disinfection of fruits would receive lower priority. He also pointed out that the irradiation of frozen sea food would need to be dove-tailed into the existing technology and hence the economics would have to be carefully examined. He felt that priority should be given to areas like the study of transport of irradiated foods within the region, their market testing, consumer acceptance, and economic evaluation. Most Member States expressed strong support for this programme and welcomed the trend towards commercialization. The delegate of Australia announced that the Australian Government is considering the possibility of extending financial support to Phase II of the project.

2. Energy from Agricultural and Agro-Industrial Residues through the Use of Radiation and Industrial Micro-organisms

After a brief introduction by the IAEA secretariat, the Bangladesh representative presented the project proposal. (Appendix 12). The DDG-RI, IAEA, expressed the view that this project, although of great significance for the energy needs of developing countries, contained only a small nuclear component for consideration by IAEA as a coordinated research programme. The position may be reviewed after the scope of activities of other UN organizations in this area has been examined, to avoid a conflict of interest. However, it would be possible to consider, on its own merits, any individual research contract proposal for any specific component of the programme involving major use of radiation techniques.

3. Other New Proposals

A proposal for conducting a workshop on "Reactor neutron activation analysis" under the reactor utilization programme of RCA was presented by the Indian participant. The detailed proposal is attached as Appendix 13. The course is planned for a duration of 2-3 weeks and will be funded from India's special contribution to RCA. The Indian representative also indicated his country's willingness to share the neutron beam facilities available in Indian research reactors and associated instruments with other RCA countries for use in research programmes. The representatives of Malaysia, Bangladesh and the DDG-RI, IAEA, fully supported this proposal since it would be beneficial in the utilization of research reactors. The proposal was accepted.

AGENDA ITEM VIII

Country Statements by RCA Representatives

The country statements presented by the representatives are attached as Appendix 14.

Report on the 6th RCA Working Group MeetingOn-going Research Projects

## 1. Use of induced mutations for improvement of grain legume production

The programme was established in 1977 to link and coordinate, through IAEA support, mutation breeding work in RCA countries aiming at developing improved cultivars of grain legumes. The programme has made good progress in developing new, more productive mutants of various species (soybean, mungbean, peanut, lentil, chick pea).

The programme was thoroughly reviewed at the 4th research coordination meeting held at NIAB, Faisalabad, Pakistan, in March 1984 and results were reported at the 6th RCA Working Group meeting at Kalpakkam, India. In view of the good progress achieved thus far the Agency was requested to extend this programme until 1986 - the proposed extension was discussed and approved by the Agency's Committee for Contractual Scientific Services in July 1984.

## 2. Food irradiation - Phase I/Phase II

Phase I of this project was extended up to August 1984 and the final research coordination meeting was held in Seoul, Republic of Korea in April 1984. The progress and achievements in the past three years were reviewed and future plans of work were considered in light of the recommendations made at the 6th RCA Working Group meeting in Kalpakkam. The Working Group essentially recommended to focus Phase II of this project on the transfer of food irradiation technology to local food industries, including the problems of packaging and transport, market testing, consumer acceptance and economic assessment. Since Japan is, at the end of Phase I, shifting its financial support to the medical applications area, new funding is required to implement Phase II. The Agency has accordingly requested the Australian Government to consider this possibility and negotiations are in progress.

3. Nuclear techniques to improve domestic buffalo production  
Phase I/Phase II

Phase I of this project was terminated in January 1984 with the final research coordination meeting held in Manila, Philippines.

Following the request of the RCA Working Group in Kalpakkam, results achieved under Phase I of the programme will be published by the Agency in the Panel Proceedings Series, after editing by the staff of the Animal Section of the Joint FAO/IAEA Division. It is expected that the book will be published towards the end of 1984.

Eighteen proposals for contracts related to Phase II of the project have been received from Thailand, Philippines, Indonesia, Japan, Pakistan, Malaysia, Bangladesh and India. These are now under evaluation in the light of the comments made in the Kalpakkam Working Group meeting to concentrate on selected areas of investigation.

Attempts are being made by the Agency to obtain extrabudgetary funds for the programme from Australia and Denmark.

#### 4. Radiation sterilization practices for medical supplies

The RCA Member States, having acquired the technical and technological capability for sterilization of medical supplies by ionizing radiation, have expressed an interest to extend this practice to sterilize tissue grafts/implants as needed for health-care through reconstructive surgery of disabled persons. To date, the sources for production and supply of such tissue grafts are almost exclusively limited to the technologically advanced Member States in Europe, North America and Australia. Tissue banking facilities in those regions have been organized to store such sterile pre-packed, ready-to-use grafts to be supplied for surgical needs. It is felt that these practices could easily be introduced in Asia and the Far East.

Accordingly, an IAEA Seminar on Tissue Banking of Radiation Sterilized Grafts for Clinical Use was held in Manila, Philippines, 7-11 May 1984, to review the current status of practices and the health-care needs of those grafts in the RCA countries of Asia and the Pacific. The Seminar was attended by 34 scientists from eight Member States (Bangladesh, India, Pakistan, Philippines, Thailand, Sri Lanka, with invited instructors/experts from the United Kingdom and the United States of America).

The Seminar stressed the need to accumulate data from the RCA Member States with regard to availability of tissue grafts for rehabilitative surgery of trauma/accident patients; availability of donors for relevant tissues in the context of local socio-religious restrictions; availability of necessary technical facilities to sustain the practices and further development through new research as needed.

The participants of the Seminar were unanimous in their agreement with regard to the timely demand for such tissue grafts in the health care systems of the Member States concerned. In order to bridge this gap it was requested that an IAEA coordinated research programme on Radiation Sterilization Practices for Tissue Grafts in Clinical Use for Asia and the Pacific Region should be initiated under the RCA activity. Such a CRP has since been formulated and submitted by the project officer for approval by the Committee for Contractual Scientific Services (CCSS). The CCSS approved the proposal in July and negotiations have started for the participation of several institutes in RCA countries to join the programme.

#### 5. Health-related environmental research

This programme came to an end in March 1984 and results were reported to the RCA Working Group meeting in Kalpakkam.

A new programme for monitoring of toxic elements in human foodstuffs with the help of nuclear techniques is in preparation with the assistance of consultants, in view of a presentation to the 7th RCA Working Group meeting in 1985.

6. Maintenance of nuclear instruments

This project now has ten active participants. After completion of the power conditioning component, the programme is now focusing on air conditioning-dehumidification systems, training, maintenance and planning and, following the advice of the RCA WG meeting, Kalpakkam, on the supply of spare parts. The second train-the-trainers workshop, originally scheduled for May in Kuala Lumpur, Malaysia, had to be deferred due to the limited number of participants, and the course is now tentatively scheduled to be held 8 October - 2 November 1984.

7. Basic science using research reactors

The Indian-funded workshop on the Use of Microprocessors in Research Reactor Utilization was held at BARC, Trombay, from 30 January 30 to February 17, 1984, and was attended by participants from India, Indonesia, Malaysia, Philippines, the Republic of Korea and Sri Lanka. The results of the workshop were very favourably commented on at the Working Group meeting in Kalpakkam and it was recommended that similar workshops should be held in future.

8. Isotope application in hydrology and sedimentology

This project was extended for an additional three years following the request of RCA countries at the 5th RCA Working Group meeting in Dhaka, Bangladesh last year. A limited amount of funds is available from residues of the 1983 Australian contribution and from the Agency's regular budget. The possibility of continuing support "in kind" to this project was announced by Australia at the Kalpakkam meeting.

The project has two main components: a) the establishment of tritium analytical facilities which was completed in Indonesia and the Republic of Korea and is now under way in Malaysia and Thailand, and b) field studies in aquifers now being carried out in Indonesia, Republic of Korea, Malaysia and Thailand.

9. Semi-dwarf mutants for rice improvement

Seven countries (Bangladesh, India, Indonesia, Republic of Korea, Pakistan, Philippines and Thailand) are participating in this project which started in 1982. Work is progressing as planned. During the last two seasons a new semi-dwarf mutant was found after irradiation which is now undergoing evaluation for agrobotanical characters and will be crossed with other semi-dwarf varieties for estimating changes in genetic material. New proposals for research contracts/agreements are expected from Japan and Malaysia.

10. Improvement of cancer therapy

At present six research contractors and three agreement holders are participating in this programme which deals with clinical studies on the combination of conventional radiotherapy with chemical radiomodifiers in the therapy of tumors.

Difficulties in the commercial availability of suitable chemical-radiomodifiers have caused contractors from Sri Lanka and Singapore to delay the start of research activities. A new research protocol was therefore established based on available drugs.

A regional training course for medical technologists in radiotherapy will be held in Tokyo at the end of the year.

The regional workshop on brachytherapy of cancer of the uterus using manual and remote afterloading techniques will be held in Kuala Lumpur, Malaysia in 1985 instead of 1984 as planned. The postponement was necessary to allow sufficient time for installation and commissioning of the Ralstron remote afterloading machine donated by the Government of Japan.

#### 11. Imaging procedures for diagnosis of liver diseases

The preparation of this new coordinated research programme is in progress following a recommendation of the WG meeting in Kalpakkam. Counterparts from thirteen participating countries have been nominated. A planning meeting between the counterparts and the Agency's scientific officer is scheduled in Seoul on 22-24 August 1984. Participants have to review the spectrum and prevalence of liver diseases, the diagnostic strategies and the current status of imaging techniques in their respective countries, and define the work plan for the first phase of the project as developed by the IAEA consultants meeting in March 1984.

#### 12. Nuclear techniques for tropical parasitic diseases

This coordinated research programme started in 1983. Nine research contracts and one research agreement have been awarded so far, involving research institutes in nine RCA Member States.

The work plan for 1984, which involves collection of serum or blood and urine specimens from patients with filariasis or malaria, is proceeding satisfactorily. Anti-filarial monoclonals were supplied to all participants at the end of June of this year by the Pasteur Institute, and additional anti-bancroftian or brugian monoclonals will be supplied in August by the Australian participants. Assays of the specimens are now in course and results will be evaluated in November, and a new work plan for 1985 formulated.

The work plan for malaria has been modified since it was not possible to supply participants with anti-malaria monoclonal antibodies nor with the malaria antigen. Each participant will now attempt to prepare polyclonal antibodies and malaria antigens and use these to assay the malaria specimens using solid phase radioimmunoassay.

A research coordination meeting is planned for 1985.

13. Development of technetium-99m generators using low power research reactors

This new coordinated research programme now includes research institutes in Australia, Indonesia, Malaysia, and Thailand. Arrangements will be made to organize a second workshop on Tc-99m generators at BARC, Trombay, India, following the proposal submitted at the RCA WG meeting in Kalpakkam. This workshop could be funded, in part, by the contribution of the Indian Government.

New Proposals

1. In addition to the extension of ongoing coordinated research projects in -

- use of induced mutation for improvement of grain legume production,
- food irradiation (Phase II), and
- nuclear techniques to improve domestic buffalo production (Phase II),

as discussed under Agenda Item I a), two new proposals were presented at the RCA Working Group meeting in Kalpakkam by India and Bangladesh. The first relates to a three-week Workshop on Reactor Neutron Activation Analysis, to be held at BARC and funded from India's special contribution to RCA on the use of research reactors. The workshop will consist of an orientation course of one week followed by a practical course of two weeks' duration aiming to provide real-time exposure to the technique through eight to ten experiments. The proposal was accepted by RCA representatives.

The second proposal, submitted by Bangladesh, is a research project on the degradation of agroindustrial cellulosic residues through the use of radiation and industrial micro-organisms. Since the degradation products of cellulose can provide fuel the project has great significance for the energy needs of developing countries. In the Agency's view, however, the nuclear component of the programme is too small to justify funding on the basis of a coordinated research programme. It was stated, however, that individual research contracts in this area could be proposed for any specific component of the programme involving major use of radiation techniques.

2. A new regional project to support the radioimmunoassay of thyroid related hormones in RCA countries has been drafted by the Agency and will be discussed at the 7th RCA Working Group meeting.

## UNDP Industrial Project - A Status Report

The UNDP Regional Industrial Applications Project was officially initiated on 1 April 1982 for a period extending through 31 December 1986. The project has now been in an active stage of implementation for more than two years.

For 1984, in addition to \$453 880 being made available to the project by UNDP, Japan has offered a cash contribution of \$261 320 for the sub-projects in NDT, radiation processing, nucleonic control systems in the paper and steel industries, and nuclear instrument maintenance. In addition, the Agency is contributing with \$128 640 from its Regular Programme of Technical Co-operation. The governments of the recipient countries are scheduled to make the equivalent of \$687 644 available to the project "in kind", plus \$147 269 "in kind" is expected from participating industries. Australia has also offered to make \$88 327 available "in kind" for the sub-project on nucleonic control systems in minerals processing. The total resources available to the project in 1984 amount to \$1 767 080.

During 1984, the project phase concerned with the establishment of pilot facilities for demonstration and training purposes, which are key to the technology transfer process, is being concluded. The Regional UNDP (RCA) Industrial Radiation Processing Facility in Jakarta, a pilot plant for radiation vulcanization of natural rubber latex, was commissioned and became operational in November 1983. Another project installation, an electron beam facility for curing the surface coating of wood panels is scheduled to be commissioned and to become operational in September 1984.

With the physical infrastructure in place, the emphasis of project activities has shifted to training. The second training course in rubber vulcanization commenced on 1 April 1984 and will end on 30 September 1984; and the first training course in surface coating is scheduled to take place from 1 October 1984 through 30 March 1985. The first training demonstration course in nucleonic control systems for minerals exploration, mining and processing was completed on 31 March 1984; it was held in Australia and the Philippines with the financial support of the Australian Government. The first training-demonstration course in tracer technology in industry was held in Bombay and Singapore 1 - 30 March 1984. The third training-demonstration course in nucleonic control systems for the paper industry was held in Tokyo and Ban Pong 15 - 30 March 1984.

The following courses are scheduled during the remainder of 1984:

Second training-demonstration course in radiation sterilization of medical products, in Bombay and Seoul, 10 -29 September; training seminar in industrial nucleonic instrument engineering, in Tokyo (date not yet determined); third training course in advanced NDT practice, in Singapore, 1-19 October; and the second training-demonstration course in nucleonic control systems in the steel industry, Bokaro and Tokoyo, 9-23 October.

The first Executive Management Seminar in mineral processing was held in the Philippines, 11-12 June and the second and third Executive Management Seminars for the paper and steel industries are scheduled to be held in Bangkok, 27-28 September and in Bokaro, 5-6 December, respectively.

As another important project activity, detailed market studies were carried out earlier this year. The purpose of these studies was to determine and quantify the potential for technology transfer for each of the industrial branches that are part of this project.

The third meeting of the Senior Board of Advisors (SBA) was held in Kuala Lumpur, 14-16 December 1983, and its fourth meeting in Adelaide, 18-20 June 1984. The mid-term evaluation of the project is now being conducted by the SBA, the Agency and UNDP. The fifth SBA meeting is scheduled to be held in Japan during the third week of December 1984.

At the SBA meeting in Adelaide initial discussions were held with a view to update the project design and to identify fields of activity that could benefit from a project extension beyond 1986. The SBA made a number of recommendations that can be summarized as follows:

- In order to strengthen the network of national focal points and to maintain more direct and sustained contacts with industries that could absorb isotope and radiation technology, a two-pronged approach was suggested for project management. Under such an arrangement, an experienced industrialist would act as a Senior Technical Advisor and a more junior Field Co-ordinator would be in charge of the increasingly numerous field activities.
- Activities so far carried out in the field of tracer technology have shown that the scope of this sub-project may be too broad to lead to product-specific technology transfer. A review was recommended by the SBA with the aim to concentrate on tracer applications for specific regional industries that could benefit from this technology.
- As the regional market for radiation-crosslinked wire and cable appears to be rather limited, the SBA recommended that the corresponding project activity, which so far had been kept in abeyance, should not be activated for the time being.
- Timing and duration of some training activities should be reviewed in the light of experiences gained.

At the fifth SBA meeting in Japan, the Board intends to finalize the mid-term project review. Recommendations for an extension of project activities beyond 1986 will also be discussed at that meeting.

The draft of the NDT certification scheme and training programme was prepared by the NDT Expert Advisory Group and submitted to the 12th RCA Meeting in Vienna on 12 October 1983. The Government's comments were discussed at the Meeting of the NDT Expert Advisory Group in Bangkok, 22-25 May. Many RCA countries are already preparing to harmonize their in-country training with the new NDT certification scheme.

The Technical Co-operation Evaluation Unit has started to conduct an evaluation of RCA training courses. In addition, a desk evaluation review of the paper industry sub-project was submitted to the fourth SBA meeting.